Appendix F.1 Embarrass River Proposed Action Year 1

FLOWS

Case	Year 1				
Flows	Low Flow Conditions (no surface runoff)				Node
n River	flow in river at PM-12	Q_r12_L =	1.19	(cfs)	PM-12
Total flow in Embarrass F	flow in river at PM-13	Q_r13_L =	10.84	(cfs)	PM-13
Tota	flow check	Q_ck_L =	10.84	(cfs)	
	surface water flow into PM-12	Q_s12_L =	0.00	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_L =	0.00	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_L =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_L =	0.26	(cfs)	PM-13
ţa	seepage from Tailings Basin Cells 1E and 2E	Q_fs_L =	3.19	(cfs)	PM-13
v da	hydrometallurgical residue cells liner leakage	Q_rrs_L =	0.00	(cfs)	PM-13
flow data	seepage from cell 2W	Q_s2w_L =	1.99	(cfs)	PM-13
Input	ground water flow into PM-12	Q_g12_L =	0.86	(cfs)	PM-12
du	ground water flow into PM-13	Q_g13_L =	4.21	(cfs)	PM-13

Case	Year 1				
Flow	Average Flow Conditions (mean annual)				_
n River	flow in river at PM-12	Q_r12_M =	13.80	(cfs)	PM-12
Total flow in Embarrass F	flow in river at PM-13	Q_r13_M =	86.71	(cfs)	PM-13
Tota Emb	flow check	Q_ck_M =	86.71	(cfs)	4
	surface water flow into PM-12	Q_s12_M =	12.61	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_M =	61.53	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_M =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_M =	1.99	(cfs)	PM-13
data	seepage from Tailings Basin Cells 1E and 2E	Q_fs_M =	3.19	(cfs)	PM-13
	hydrometallurgical residue cells liner leakage	Q_rrs_M =	0.00	(cfs)	PM-13
nput flow	seepage from cell 2W	Q_s2w_M =	1.99	(cfs)	PM-13
, in	ground water flow into PM-12	Q_g12_M =	0.86	(cfs)	PM-12
dul	ground water flow into PM-13	Q_g13_M =	4.21	(cfs)	PM-13

Case	Year 1				
Flow	High Flow Conditions (avg. annual 1-day max flow)				_
n River	flow in river at PM-12	Q_r12_H =	144.35	(cfs)	PM-12
Total flow in Embarrass Ri	flow in river at PM-13	Q_r13_H =	858.26	(cfs)	PM-13
Total Emba	flow check	Q_ck_H =	858.26	(cfs)	
	surface water flow into PM-12	Q_s12_H =	143.16	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_H =	702.53	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_H =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_H =	1.99	(cfs)	PM-13
ta	seepage from Tailings Basin Cells 1E and 2E	Q_fs_H =	3.19	(cfs)	PM-13
, da	hydrometallurgical residue cells liner leakage	Q_rrs_H =	0.00	(cfs)	PM-13
flow data	seepage from cell 2W	Q_s2w_H =	1.99	(cfs)	PM-13
Input 1	ground water flow into PM-12	Q_g12_H =	0.86	(cfs)	PM-12
aul	ground water flow into PM-13	Q_g13_H =	4.21	(cfs)	PM-13

Case Parameter	Year 1 Silver			
		J		
	concentration of surface water into PM-12	C_s12 =	0.00011	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.00011	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00011	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.00015	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.00096	(mg/L)
ncei	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.000125	(mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	0.000100	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.00008	(mg/L)
dul	concentration of ground water into PM-13	C_g13 =	0.000008	(mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.04	(mg/s)	0	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.19	(mg/s)	2	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.09	(mg/s)	0.09	(mg/s)	0.09	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
Co to	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 = M r13 =		(mg/s) (mg/s)		(mg/s) (mg/s)		(mg/s) (mg/s)
2 0	mass nux in river at PM-13	IVI_113 =	Low Flo		Average		2.74 High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L) (mg/L)	0.000	(mg/L) (mg/L)	0.000	(mg/L) (mg/L)

Case	Year 1			
Parameter	Aluminum			
		-		
	concentration of surface water into PM-12	C_s12 =	0.12	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.12	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.12	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.01325	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.01	(mg/L)
ē	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.18	(mg/L)
cone	concentration in tailings basin cell 2W	C_s2w =	1.5788	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.025	(mg/L)
lnp	concentration of ground water into PM-13	C_g13 =	0.025	(mg/L)

			Low Flo	w	Average	Flow	High Fl	low
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	42.82	(mg/s)	486	(mg/s)
-	mass flux of ground water into PM-12	M_g12 =	0.61	(mg/s)	0.61	(mg/s)	0.61	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	1.12	(mg/s)	1.12	(mg/s)	1.12	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	208.96	(mg/s)	2,386	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	2.98	(mg/s)	2.98	(mg/s)	2.98	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.10	(mg/s)	0.75	(mg/s)	0.75	(mg/s)
	mass flux in seconds from Tailings Desin Calls 1E and 0E	M_fs =	0.90	(mg/s)	0.90	(mg/s)	0.90	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
<u>۽</u> ک	mass flux in seepage from cell 2W	M_s2w =	89.13	(mg/s)	89.13	(mg/s)	89.13	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s) (mg/s)	44.55	(mg/s) (mg/s)	487.90	
			Low Flo	w	Average	Flow	High Fl	low
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L) (mg/L)		(mg/L) (mg/L)		(mg/L) (mg/L)

Case	Year 1		
Parameter	Arsenic		
		-	
	concentration of surface water into PM-12	C_s12 =	0.00075 (mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.00075 (mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00075 (mg/L)
ntration	concentration in Area 5 Pit NW discharge	C_spit =	0.001325 (mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.005946518 (mg/L)
ن	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.004 (mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	0.00291 (mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.00273 (mg/L)
du	concentration of ground water into PM-13	C_g13 =	0.00273 (mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.27	(mg/s)	3	(mg/s)
-	mass flux of ground water into PM-12	M_g12 =	0.07	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1.31	(mg/s)	15	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.33	(mg/s)	0.33	(mg/s)	0.33	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	0.01	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
	mass flux in soonage from Tailings Pasin Colls 1E and 2E	M_fs =	0.54	(mg/s)	0.54	(mg/s)	0.54	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
ې د د	mass flux in seepage from cell 2W	M_s2w =		(mg/s)		(mg/s)		(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s)		(mg/s)		(mg/s)
a ŭ	mass flux in river at PM-13	M_r13 =		(mg/s)		(mg/s)		(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.002	(mg/L)	0.001	(mg/L)	0.001	(mg/L)
co tin Co	concentration in river at PM-13	C_r13 =	0.004	(mg/L)	0.001	(mg/L)	0.001	(mg/L)

Case Parameter	Year 1 Boron			
		4		
	concentration of surface water into PM-12	C_s12 =	0.027	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.027	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.027	(mg/L)
ţi	concentration in Area 5 Pit NW discharge	C_spit =	0.1315	(mg/L)
ntration	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.138981444	(mg/L)
۵ ۵	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.11	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	0.33	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.0212	(mg/L)
dul	concentration of ground water into PM-13	C_g13 =	0.0212	(mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	9.64	(mg/s)	109	(mg/s)
-	mass flux of ground water into PM-12	M_g12 =	0.52	(mg/s)	0.52	(mg/s)	0.52	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	0.25	(mg/s)	0.25	(mg/s)	0.25	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	47.02	(mg/s)	537	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	2.53	(mg/s)	2.53	(mg/s)	2.53	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	0.97	(mg/s)	7.41	(mg/s)	7.41	(mg/s)
	many flux in coopera from Tailings Pasin Colle 1E and 2E	M_fs =	12.53	(mg/s)	12.53	(mg/s)	12.53	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
မိ န	mass flux in seepage from cell 2W	M_s2w =	18.63	(mg/s)	18.63	(mg/s)	18.63	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.77	(mg/s)	10.40	(mg/s)	110.16	(mg/s)
Ma	mass flux in river at PM-13	M_r13 =	35.43	(mg/s)	98.51	(mg/s)	688.06	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to	concentration in river at PM-12	C_r12 =	0.023	(mg/L)	0.027	(mg/L)	0.027	(mg/L)
th Cc	concentration in river at PM-13	C_r13 =	0.115	(mg/L)	0.040	(mg/L)	0.028	(mg/L)

Case	Year 1		
Parameter	Barium		
		1	
	concentration of surface water into PM-12	C_s12 =	0.016 (mg/L)
ata	concentration of surface water into PM-13	C_s13 =	0.016 (mg/L)
pu	concentration in Babbitt WWTP discharge	C_sBab =	0.016 (mg/L)
-	concentration in Area 5 Pit NW discharge	C_spit =	0.0044 (mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	5.29E-02 (mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	5.00E-03 (mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	0.09298 (mg/L)
but	concentration of ground water into PM-12	C_g12 =	0.0681 (mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0681 (mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	5.71	(mg/s)	65	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	1.66	(mg/s)	1.66	(mg/s)	1.66	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.15	(mg/s)	0.15	(mg/s)	0.15	(mg/s)
itrai	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	27.86	(mg/s)	318	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	8.11	(mg/s)	8.11	(mg/s)	8.11	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	0.03	(mg/s)	0.25	(mg/s)	0.25	(mg/s)
	mass flux in seepage from Tailings Pasin Colls 1E and 2E	M_fs =	4.77	(mg/s)	4.77	(mg/s)	4.77	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
<u>ب</u> د	mass flux in seepage from cell 2W	M_s2w =	5.25	(mg/s)	5.25	(mg/s)	5.25	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =	1.81	(mg/s)	7.52	(mg/s)	66.63	(mg/s)
a ŭ	mass flux in river at PM-13	M_r13 =		(mg/s)		(mg/s)	403.11	
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.054	<u>(mg/L)</u>	0.019	(mg/L)	0.016	(mg/L)
S II C	concentration in river at PM-13	C_r13 =	0.065	(mg/L)	0.022	(mg/L)	0.017	(mg/L)

Case Parameter	Year 1 Beryllium			
			-	
	concentration of surface water into PM-12	C_s12 =	0.0001	(mg/L)
ata	concentration of surface water into PM-13	C_s13 =	0.0001	(mg/L)
q	concentration in Babbitt WWTP discharge	C_sBab =	0.0001	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.0001	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000271356	(mg/L)
e	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0	(mg/L)
cone	concentration in tailings basin cell 2W	C_s2w =	0.00075	(mg/L)
out	concentration of ground water into PM-12	C_g12 =	0.000023	(mg/L)
Input	concentration of ground water into PM-13	C_g13 =	0.000023	(mg/L)

			Low Flo	w	Average	Flow	High Fl	low
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.04	(mg/s)	0	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
ıtra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.17	(mg/s)	2	(mg/s)
concentration flux	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.02	(mg/s)	0.02	(mg/s)	0.02	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	-	(mg/s)	-	(mg/s)	-	(mg/s)
Co to	mass flux in seepage from cell 2W	M_s2w =	0.04	(mg/s)	0.04	(mg/s)	0.04	(mg/s)
			Low Flo	w	Average	Flow	High Fl	low
Mass balance at each node	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 =		(mg/s) (mg/s)		(mg/s) (mg/s)		(mg/s) (mg/s)
			Low Flo		Average		High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L) (mg/L)		(mg/L)		(mg/L) (mg/L)

Case Parameter	Year 1 Calcium			
		-		
	concentration of surface water into PM-12	C_s12 =	15	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	15	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	15	(mg/L)
tio	concentration in Area 5 Pit NW discharge	C_spit =	95.35	(mg/L)
ntration	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	45.78662467	(mg/L)
c)	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	416	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	59.78	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	19	(mg/L)
<u> </u>	concentration of ground water into PM-13	C_g13 =	19	(mg/L)

			Low Flo	W	Average	Flow	High Flo	ow
mas	ss flux of surface water into PM-12	M_s12 =	-	(mg/s)	5,352.95	(mg/s)	60,771	(mg/s)
mas	ss flux of ground water into PM-12	M_g12 =	462.42	(mg/s)	462.42	(mg/s)	462.42	(mg/s)
mas mas	ss flux in Babbitt WWTP discharge	M_sBab =	140.09	(mg/s)	140.09	(mg/s)	140.09	(mg/s)
mas mas	ss flux of surface water into PM-13	M_s13 =	-	(mg/s)	26,119.49	(mg/s)	298,224	(mg/s)
b mas	ss flux of ground water into PM-13	M_g13 =	2,263.72	(mg/s)	2,263.72	(mg/s)	2,263.72	(mg/s)
sem concentration sem asem asem asem asem asem asem asem	ss flux of Area 5 Pit NW discharge	M_spit =	701.59	(mg/s)	5,369.83	(mg/s)	5,369.83	(mg/s)
	ss flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	4,128.35	(mg/s)	4,128.35	(mg/s)	4,128.35	(mg/s)
Convert Convert Convert	ss flux in hydrometallurgical residue cells liner leakage	M_rrs =	12.28	(mg/s)		(mg/s)		(mg/s)
ပိ ဍ mas	ss flux in seepage from cell 2W	M_s2w =	3,374.76		3,374.76		1.77	(mg/s)
			Low Flo	W	Average	Flow	High Flo	ow
ass ba each r	ss flux in river at PM-12	M_r12 =	602.51		5,955.45		61,373.93	
	ss flux in river at PM-13	M_r13 =	11,083.21 Low Flo		47,223.88 Average		371,373.85 High Flo	
onvert ux to oncent	centration in river at PM-12	C_r12 =	17.891	(mg/L)	15.249	(mg/l)	15.024	(mg/l)
ບ ≓ ັ con	centration in river at PM-13	C_r13 =	36.122	(mg/L)	19.244	(mg/l)	15.290	(mg/l)

Case Parameter	Year 1 Cadmium			
		1		
	concentration of surface water into PM-12	C_s12 =	0.00008	(mg/L)
ata	concentration of surface water into PM-13	C_s13 =	0.00008	(mg/L)
ip u	concentration in Babbitt WWTP discharge	C_sBab =	0.00008	(mg/L)
ratio	concentration in Area 5 Pit NW discharge	C_spit =	0.0001	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000117453	(mg/L)
-	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0004	(mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	0.000188	(mg/L)
but	concentration of ground water into PM-12	C_g12 =	0.0003	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0003	(mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.03	(mg/s)	0	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itrai	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.14	(mg/s)	2	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.04	(mg/s)	0.04	(mg/s)	0.04	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mana flux in coopera from Tailings Pasin Colle 1E and 2E	M_fs =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
Convert	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
00 Co	2 mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance	mass flux in river at PM-12	M_r12 =	0.01	(mg/s)	0.04	(mg/s)	0.33	(mg/s)
Ma	mass flux in river at PM-13	M_r13 =	0.07	(mg/s)	0.24	(mg/s)	1.99	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Convert mass flux to	concentration in river at PM-12	C_r12 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
ŭ≓ S	concentration in river at PM-13	C_r13 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Case Parameter	Year 1 Chloride		
		-	
	concentration of surface water into PM-12	C_s12 =	6.5 (mg/L)
data	concentration of surface water into PM-13	C_s13 =	6.5 (mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	6.5 (mg/L)
entration	concentration in Area 5 Pit NW discharge	C_spit =	5.95 (mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	1.89E+01 (mg/L)
Cel	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.76E+03 (mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	21.54 (mg/L)
Input	concentration of ground water into PM-12	C_g12 =	1.8 (mg/L)
du	concentration of ground water into PM-13	C_g13 =	1.8 (mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	2,319.61	(mg/s)	26,334	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	43.81	(mg/s)	43.81	(mg/s)	43.81	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	60.70	(mg/s)	60.70	(mg/s)	60.70	(mg/s)
itrai	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	11,318.44	(mg/s)	129,230	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	214.46	(mg/s)	214.46	(mg/s)	214.46	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	43.78	(mg/s)	335.09	(mg/s)	335.09	(mg/s)
	mass flux in soonage from Tailings Pasin Colls 1E and 2E	M_fs =	1,700.65	(mg/s)	1,700.65	(mg/s)	1,700.65	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	51.97	(mg/s)	51.97	(mg/s)	51.97	(mg/s)
<u>ب</u> د	mass flux in seepage from cell 2W	M_s2w =	1,216.00	(mg/s)	1,216.00	(mg/s)	1,216.00	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =	104.51	(mg/s)	2,424.12	(mg/s)	26,438.79	(mg/s)
a ŭ	mass flux in river at PM-13	M_r13 =	3,331.37		17,260.73		159,187.35	
			Low Flor	w	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	3.103	(mg/L)	6.207	(mg/L)	6.472	(mg/L)
e Co	concentration in river at PM-13	C_r13 =	10.858	(mg/L)	7.034	(mg/L)	6.554	(mg/L)

Case	Year 1			
Parameter	Cobalt			
	concentration of surface water into PM-12	C_s12 =	0.0006	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0006	(mg/L)
-	concentration in Babbitt WWTP discharge	C_sBab =	0.0006	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.000555	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.001174401	(mg/L)
۵ ۵	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.005	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	0.001556	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.0011	(mg/L)
du	concentration of ground water into PM-13	C_g13 =	0.0011	(mg/L)

			Low Flo	w	Average	Flow	High F	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.21	(mg/s)	2	(mg/s)
-	mass flux of ground water into PM-12	M_g12 =	0.03	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1.04	(mg/s)	12	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.13	(mg/s)	0.13	(mg/s)	0.13	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.11	(mg/s)	0.11	(mg/s)	0.11	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
ទ ប្	mass flux in seepage from cell 2W	M_s2w =	0.09	(mg/s)	0.09	(mg/s)	0.09	(mg/s)
			Low Flo	w	Average	Flow	High F	ow
Mass balance at each node		M_r12 = M r13 =		(mg/s) (mg/s)		(mg/s)		(mg/s) (mg/s)
			Low Flo		Average		High F	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L) (mg/L)		(mg/L)		(mg/L) (mg/L)

Case Parameter	Year 1 Copper			
		-		
	concentration of surface water into PM-12	C_s12 =	0.0015	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0015	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0015	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.00345	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.005888719	(mg/L)
<u>م</u>	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0015	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	0.004555	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.004	(mg/L)
du	concentration of ground water into PM-13	C_g13 =	0.004	(mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.54	(mg/s)	6	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.10	(mg/s)	0.10	(mg/s)	0.10	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
ıtra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	2.61	(mg/s)	30	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.48	(mg/s)	0.48	(mg/s)	0.48	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.03	(mg/s)	0.19	(mg/s)	0.19	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.53	(mg/s)	0.53	(mg/s)	0.53	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
ធ បំ	mass flux in seepage from cell 2W	M_s2w =	0.26	(mg/s)	0.26	(mg/s)	0.26	(mg/s)
			Low Flor	W	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12	M_r12 =		(mg/s)		(mg/s)		(mg/s)
at at	mass flux in river at PM-13	M_r13 =	1.40 Low Flo	(mg/s)	4.72 Average	(mg/s)	37.47 High Fl	(mg/s)
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.003	(mg/L) (mg/L)	0.002	(mg/L)	0.002	(mg/L) (mg/L)

Case Parameter	Year 1 Fluoride			
	concentration of surface water into PM-12	C_s12 =		(mg/L)
ata	concentration of surface water into PM-13	C_s13 =	0.2	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.2	(mg/L)
ratio	concentration in Area 5 Pit NW discharge	C_spit =	0.125	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	4.57E+00	(mg/L)
-	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	2.85E+00	(mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	1.55	(mg/L)
out	concentration of ground water into PM-12	C_g12 =	0.385	(mg/L)
Ing	concentration of ground water into PM-13	C_g13 =	0.385	(mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	71.37	(mg/s)	810	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	9.37	(mg/s)	9.37	(mg/s)	9.37	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	1.87	(mg/s)	1.87	(mg/s)	1.87	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	348.26	(mg/s)	3,976	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	45.87	(mg/s)	45.87	(mg/s)	45.87	(mg/s)
ert concentration ss flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.92	(mg/s)	7.04	(mg/s)	7.04	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	412.18	(mg/s)	412.18	(mg/s)	412.18	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.08	(mg/s)	0.08	(mg/s)	0.08	(mg/s)
Co to	mass flux in seepage from cell 2W	M_s2w =	87.50	(mg/s)	87.50	(mg/s)	87.50	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 = M r13 =	<u>11.24</u> 557.79	(mg/s)	82.61	(mg/s)	5,350.52	
2 0		IVI_113 =	Low Flo		Average		High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L)		(mg/L)		(mg/L)
O ∓ o	concentration in river at PM-13	C_r13 =	1.818	(mg/L)	0.401	(mg/L)	0.220	(mg/L)

Case	Year 1			
Parameter	Iron			
		-		-
	concentration of surface water into PM-12	C_s12 =	2.9	(mg/L)
ata	concentration of surface water into PM-13	C_s13 =	2.9	(mg/L)
pu	concentration in Babbitt WWTP discharge	C_sBab =	2.9	(mg/L)
ratio	concentration in Area 5 Pit NW discharge	C_spit =	0.037761905	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	4.00E-03	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	4.00E-01	(mg/L)
con	concentration in tailings basin cell 2W	C_s2w =	4.594	(mg/L)
put	concentration of ground water into PM-12	C_g12 =	0.035	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.035	(mg/L)

			Low Flo	W	Average	Flow	High Fl	low
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	1,034.90	(mg/s)	11,749	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.85	(mg/s)	0.85	(mg/s)	0.85	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	27.08	(mg/s)	27.08	(mg/s)	27.08	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	5,049.77	(mg/s)	57,657	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	4.17	(mg/s)	4.17	(mg/s)	4.17	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	0.28	(mg/s)	2.13	(mg/s)	2.13	(mg/s)
	many flux in coopera from Tailings Pasin Colls 1E and 2E	M_fs =	0.36	(mg/s)	0.36	(mg/s)	0.36	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
မိ မိ	mass flux in seepage from cell 2W	M_s2w =	259.35	(mg/s)	259.35	(mg/s)	259.35	(mg/s)
			Low Flo	W	Average	Flow	High Fl	low
Mass balance at each node	mass flux in river at PM-12	M_r12 =	27.93	(mg/s)	1,062.84	(mg/s)	11,777.08	(mg/s)
Ma	mass flux in river at PM-13	M_r13 =	292.10	(mg/s)	6,378.62	(mg/s)	69,699.73	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to	concentration in river at PM-12	C_r12 =	0.829	(mg/L)	2.721	(mg/L)	2.883	(mg/L)
t in C	concentration in river at PM-13	C_r13 =	0.952	(mg/L)	2.599	(mg/L)	2.870	(mg/L)

Case	Year 1			
Parameter	Hardness			
		-		
	concentration of surface water into PM-12	C_s12 =	70	(mg/L)
ata	concentration of surface water into PM-13	C_s13 =	70	(mg/L)
ρι	concentration in Babbitt WWTP discharge	C_sBab =	70	(mg/L)
ratio	concentration in Area 5 Pit NW discharge	C_spit =	942.7142857	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	3.15E+02	(mg/L)
8	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	8.61E+03	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	436.6	(mg/L)
rt	concentration of ground water into PM-12	C_g12 =	87.5	(mg/L)
ıdul	concentration of ground water into PM-13	C_g13 =	87.5	(mg/L)

			Low Flo	w	Average I	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	24,980.41	(mg/s)	283,600	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	2,129.58	(mg/s)	2,129.58	(mg/s)	2,129.58	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	653.73	(mg/s)	653.73	(mg/s)	653.73	(mg/s)
ıtra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	121,890.93	(mg/s)	1,391,712	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	10,425.01	(mg/s)	10,425.01	(mg/s)	10,425.01	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	6,936.49	(mg/s)	53,090.84	(mg/s)	53,090.84	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	28,397.48	(mg/s)	28,397.48	(mg/s)	28,397.48	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	254.25	(mg/s)	254.25	(mg/s)	254.25	(mg/s)
ې د د	mass flux in seepage from cell 2W	M_s2w =	24,647.41	(mg/s)	24,647.41	(mg/s)	24,647.41	(mg/s)
			Low Flo	w	Average I	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 =	2,783.31		27,763.72 266,469.63		286,383.27	
20		IVI_113 =	Low Flo		Average		High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 = C r13 =	82.647 239.367		71.091	(mg/L)	70.104	

Case Parameter	Year 1 Potassium		
	concentration of surface water into PM-12	C s12 =	0.60 (mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.60 (mg/L)
•	concentration in Babbitt WWTP discharge	C_sBab =	0.60 (mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	53.80 (mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	9.15 (mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.80 (mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	7.77 (mg/L)
put	concentration of ground water into PM-12	C_g12 =	1.60 (mg/L)
	concentration of ground water into PM-13	C_g13 =	1.60 (mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	214.12	(mg/s)	2,431	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	38.94	(mg/s)	38.94	(mg/s)	38.94	(mg/s)
tio	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.05	(mg/s)	0.05	(mg/s)	0.05	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1,044.78	(mg/s)	11,929	(mg/s)
concentration flux	mass flux of ground water into PM-13	M_g13 =	190.63	(mg/s)	190.63	(mg/s)	190.63	(mg/s)
conc	mass flux in Babbitt WWTP discharge	M_sBab =	5.60	(mg/s)	5.60	(mg/s)	5.60	(mg/s)
	mana flux of Area E Dit NIM discharge	M_spit =	395.86	(mg/s)	3,029.85	(mg/s)	3,029.85	(mg/s)
Convert to mass	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	825.45	(mg/s)	825.45	(mg/s)	825.45	(mg/s)
e د	mass flux in seepage from cell 2W	M_s2w =	438.64	(mg/s)	438.64	(mg/s)	438.64	
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =	38.99	(mg/s)	253.11	(mg/s)	2,469.85	(mg/s)
Me at	mass flux in river at PM-13	M_r13 =	1,895.18		5,788.07		18,888.99	
			Low Flor	w	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	1.158	(mg/L)	0.648	(mg/L)	0.605	(mg/l)
Col Col Col	concentration in river at PM-13	C_r13 =	6.177	(mg/L)	2.359	(mg/L)	0.778	(mg/l)

Case	Year 1			
Parameter	Magnesium			
		-		
	concentration of surface water into PM-12	C_s12 =	5.90	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	5.90	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	5.90	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	271.00	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	48.72	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	213.00	(mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	69.97	(mg/L)
but	concentration of ground water into PM-12	C_g12 =	10.65	(mg/L)
	concentration of ground water into PM-13	C_g13 =	10.65	(mg/L)

			Low Flo	w	Average	Flow	High F	low
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	2,105.49	(mg/s)	23,903	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	259.20	(mg/s)	259.20	(mg/s)	259.20	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	55.10	(mg/s)	55.10	(mg/s)	55.10	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	10,273.66	(mg/s)	117,301	(mg/s)
concentration flux	mass flux of ground water into PM-13	M_g13 =	1,268.87	(mg/s)	1,268.87	(mg/s)	1,268.87	(mg/s)
conc	mass flux of Area 5 Pit NW discharge	M_spit =	1,994.02	(mg/s)	15,261.91	(mg/s)	15,261.91	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	4,392.66	(mg/s)	4,392.66	(mg/s)	4,392.66	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	6.29	(mg/s)		(mg/s)	6.29	(mg/s)
<u>ء</u> ک	mass flux in seepage from cell 2W	M_s2w =	3,950.02	(mg/s)	3,950.02		3,950.02	(mg/s)
			Low Flo	w	Average	Flow	High F	low
Mass balance at each node	mass flux in river at PM-12	M_r12 =	314.30	(mg/s)	2,419.79	(mg/s)	24,217.73	(mg/s)
Ma at e		M_r13 =	11,926.17	(mg/s)	37,573.21	(mg/s)	166,398.91	(mg/s)
			Low Flo	w	Average	Flow	High F	low
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	9.333	(mg/L)	6.196	(mg/l)	5.928	(mg/l)
c fic	concentration in river at PM-13	C_r13 =	38.870	(mg/L)	15.311	(mg/l)	6.851	(mg/l)

Case Parameter	Year 1 Manganese			
		-		
	concentration of surface water into PM-12	C_s12 =	0.30	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.30	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.30	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.49	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.29	(mg/L)
ncei	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.00	(mg/L)
con	concentration in tailings basin cell 2W	C_s2w =	1.18	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.19	(mg/L)
du l	concentration of ground water into PM-13	C_g13 =	0.19	(mg/L)

			Low Flo	W	Average	Flow	High Fl	low
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	107.06	(mg/s)	1,215	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	4.58	(mg/s)	4.58	(mg/s)	4.58	(mg/s)
concentration flux	mass flux in Babbitt WWTP discharge	M_sBab =	2.80	(mg/s)	2.80	(mg/s)	2.80	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	522.39	(mg/s)	5,964	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	22.40	(mg/s)	22.40	(mg/s)	22.40	(mg/s)
conc	mass flux of Area 5 Pit NW discharge	M_spit =	3.57	(mg/s)	27.31	(mg/s)	27.31	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	26.10	(mg/s)	26.10	(mg/s)	26.10	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		(mg/s)	0.00	(mg/s)
ຊີ ວິ	mass flux in seepage from cell 2W	M_s2w =	66.78	(mg/s)		(mg/s)	66.78	(mg/s)
			Low Flo	w	Average	Flow	High Fl	low
Mass balance at each node	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 = M r13 =	7.38	(mg/s)	114.44		7,329.88	
			Low Flo	w	Average		High Fl	low
Convert mass flux to concentration	concentration in river at PM-12	C_r12 = C_r13 =		(mg/L) (mg/L)	0.293	(mg/l)	0.299	(mg/l)

Case Parameter	Year 1 Sodium			
	concentration of surface water into PM-12	C s12 =	6.00	(mg/L)
lata	concentration of surface water into PM-12	C_s12 = C_s13 =		(mg/L)
-0	concentration in Babbitt WWTP discharge	C_sBab =	6.00	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	119.50	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	66.13	(mg/L)
ncei	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	255.00	(mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	44.31	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	4.90	(mg/L)
lnp	concentration of ground water into PM-13	C_g13 =	4.90	(mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	2,141.18	(mg/s)	24,309	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	119.26	(mg/s)	119.26	(mg/s)	119.26	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	56.03	(mg/s)	56.03	(mg/s)	56.03	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	10,447.79	(mg/s)	119,290	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	583.80	(mg/s)	583.80		583.80	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	879.28	(mg/s)	6,729.88	(mg/s)	6,729.88	(mg/s)
		M_fs =	5,962.27	(mg/s)	5,962.27	(mg/s)	5,962.27	(mg/s)
Convert bo mass	mass flux in hydrometallurgical residue cells liner leakage	M rrs =	7.53	(mg/s)	7.53	(mg/s)	7.53	(mg/s)
ပိန		M_s2w =	2,501.44		2,501.44		2,501.44	
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance	mass flux in river at PM-12	M_r12 =	175.29		2,316.47		24,483.86	
Σā	mass flux in river at PM-13	M_r13 =	10,109.61		28,549.18 Average		159,558.37 High Fl	
Convert mass flux to	concentration in river at PM-12	C_r12 =		(mg/L)		(mg/l)	5.993	
S ≞ S	concentration in river at PM-13	C_r13 =	32.949	(mg/L)	11.634	(mg/l)	6.569	(mg/l)

Case	Year 1			
Parameter	Nickel			
		1		
	concentration of surface water into PM-12	C_s12 =	0.0012	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0012	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0012	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.0052	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.009513833	(mg/L)
0	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.098	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	0.00688	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.007	(mg/L)
dul	concentration of ground water into PM-13	C_g13 =	0.007	(mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.43	(mg/s)	5	(mg/s)
-	mass flux of ground water into PM-12	M_g12 =	0.17	(mg/s)	0.17	(mg/s)	0.17	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	2.09	(mg/s)	24	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.83	(mg/s)	0.83	(mg/s)	0.83	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.04	(mg/s)	0.29	(mg/s)	0.29	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.86	(mg/s)	0.86	(mg/s)	0.86	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
<u>۽</u> ک	mass flux in seepage from cell 2W	M_s2w =	0.39	(mg/s)	0.39	(mg/s)	0.39	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s)		(mg/s)		(mg/s)
at a	mass flux in river at PM-13	M_r13 =		(mg/s)		(mg/s)		(mg/s)
			Low Flo		Average		High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.005	(mg/L)	0.002	(mg/L)	0.001	(mg/L)
Conve flux to concei	concentration in river at PM-13	C_r13 =	0.008	(mg/L)	0.002	(mg/L)	0.001	(mg/L)

Case	Year 1		
Parameter	Lead		
	concentration of surface water into PM-12	C_s12 =	0.00015 (mg/L)
ata	concentration of surface water into PM-13	C_s13 =	0.00015 (mg/L)
р	concentration in Babbitt WWTP discharge	C_sBab =	0.00015 (mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.0003 (mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000585798 (mg/L)
oncei	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0005 (mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	0.0012 (mg/L)
but	concentration of ground water into PM-12	C_g12 =	0.0012 (mg/L)
법	concentration of ground water into PM-13	C_g13 =	0.0012 (mg/L)

			Low Flo	W	Average	Flow	High Fl	low
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.05	(mg/s)	1	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.03	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
tion	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.26	(mg/s)	3	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.14	(mg/s)	0.14	(mg/s)	0.14	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.02	(mg/s)	0.02	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.05	(mg/s)	0.05	(mg/s)	0.05	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =		(mg/s)		(mg/s)	0.00	(mg/s)
ຊ ິວ	mass flux in seepage from cell 2W	M_s2w =	0.07	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
			Low Flo	w	Average	Flow	High Fl	low
Mass balance at each node		M_r12 =		(mg/s) (mg/s)		(mg/s) (mg/s)		(mg/s) (mg/s)
		<u>M_10 -</u>	Low Flo		Average		High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L) (mg/L)		(mg/L) (mg/L)		(mg/L) (mg/L)

Case Parameter	Year 1 Antimony			
	concentration of ourface water into DM 10	0 010	4 005 05	(ma/l)
a	concentration of surface water into PM-12 concentration of surface water into PM-13	C_s12 = C_s13 =	4.00E-05 4.00E-05	
da	concentration in Babbitt WWTP discharge	C_sBab =	4.00E-05	
ation	concentration in Area 5 Pit NW discharge	C_spit =	2.50E-04	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	4.83E-03	(mg/L)
-	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.004	(mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	2.50E-04	(mg/L)
put	concentration of ground water into PM-12	C_g12 =	1.50E-03	(mg/L)
	concentration of ground water into PM-13	C_g13 =	1.50E-03	(mg/L)

			Low Flo	W	Average	Flow	High F	low
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.01	(mg/s)	0	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.04	(mg/s)	0.04	(mg/s)	0.04	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.07	(mg/s)	1	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.18	(mg/s)	0.18	(mg/s)	0.18	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.44	(mg/s)	0.44	(mg/s)	0.44	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
ຊ ິບ	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
			Low Flo	w	Average	Flow	High F	ow
Mass balance at each node		M_r12 =		(mg/s) (mg/s)		(mg/s)		(mg/s) (mg/s)
			Low Flo		Average		High F	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L)		(mg/L)		(mg/L) (mg/L)

Case	Year 1		
Parameter	Selenium		
		-	
	concentration of surface water into PM-12	C_s12 =	0.0003 (mg/L)
ata	concentration of surface water into PM-13	C_s13 =	0.0003 (mg/L)
ρι	concentration in Babbitt WWTP discharge	C_sBab =	0.0003 (mg/L)
ratio	concentration in Area 5 Pit NW discharge	C_spit =	0.0016 (mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000967892 (mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.054 (mg/L)
con	concentration in tailings basin cell 2W	C_s2w =	0.00109 (mg/L)
ort	concentration of ground water into PM-12	C_g12 =	0.00295 (mg/L)
du	concentration of ground water into PM-13	C_g13 =	0.00295 (mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.11	(mg/s)	1	(mg/s)
-	mass flux of ground water into PM-12	M_g12 =	0.07	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.52	(mg/s)	6	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.35	(mg/s)	0.35	(mg/s)	0.35	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.01	(mg/s)	0.09	(mg/s)	0.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.09	(mg/s)	0.09	(mg/s)	0.09	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
<u>۽</u> ک	mass flux in seepage from cell 2W	M_s2w =	0.06	(mg/s)	0.06	(mg/s)	0.06	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s)		(mg/s)		(mg/s)
Ma at	mass flux in river at PM-13	M_r13 =		(mg/s)		(mg/s)		(mg/s)
Convert mass flux to concentration		C_r12 =		(mg/L)	0.000	(mg/L)		(mg/L)
0 ≓ 5	concentration in river at PM-13	C_r13 =	0.002	(mg/L)	0.001	(mg/L)	0.000	(mg/L)

Case	Year 1		
Parameter	Sulfate		
		-	
	concentration of surface water into PM-12	C_s12 =	4.00 (mg/L)
ata	concentration of surface water into PM-13	C_s13 =	4.00 (mg/L)
u da	concentration in Babbitt WWTP discharge	C_sBab =	4.00 (mg/L)
•	concentration in Area 5 Pit NW discharge	C_spit =	1046.27 (mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	142.79 (mg/L)
A	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	7347.00 (mg/L)
con	concentration in tailings basin cell 2W	C_s2w =	152.40 (mg/L)
put	concentration of ground water into PM-12	C_g12 =	8.50 (mg/L)
	concentration of ground water into PM-13	C_g13 =	8.50 (mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	1,427.45	(mg/s)	16,206	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	206.87	(mg/s)	206.87	(mg/s)	206.87	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	37.36	(mg/s)	37.36	(mg/s)	37.36	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	6,965.20	(mg/s)	79,526	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	1,012.72	(mg/s)	1,012.72	(mg/s)	1,012.72	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	7,698.43	(mg/s)	58,922.60	(mg/s)	58,922.60	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	12,874.84	(mg/s)	12,874.84	(mg/s)	12,874.84	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	216.95	(mg/s)	216.95	(mg/s)	216.95	(mg/s)
e ک	mass flux in seepage from cell 2W	M_s2w =	8,603.45	(mg/s)	8,603.45	(mg/s)	8,603.45	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =	244.23	(mg/s)	1,671.68	(mg/s)	16,449.94	(mg/s)
Ma	mass flux in river at PM-13	M_r13 =	30,650.62		90,267.44	(mg/s)	177,606.90	
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	7.252	(mg/L)	4.280	(mg/l)	4.027	(mg/l)
S II S	concentration in river at PM-13	C_r13 =	99.896	(mg/L)	36.785	(mg/l)	7.312	(mg/l)

Case Parameter	Year 1 Thallium			
	concentration of surface water into PM-12	C_s12 =	0.0002	(mg/L)
ata	concentration of surface water into PM-13	C_s13 =	0.0002	(mg/L)
σ	concentration in Babbitt WWTP discharge	C_sBab =	0.0002	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.0006	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.00096816	(mg/L)
8	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0002	(mg/L)
cone	concentration in tailings basin cell 2W	C_s2w =	0.0002	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.000004	(mg/L)
Inp	concentration of ground water into PM-13	C_g13 =	0.000004	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.07	(mg/s)	1	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
concentration	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.35	(mg/s)	4	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
conc	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
		M_fs =	0.09	(mg/s)	0.09	(mg/s)	0.09	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
<u>ء</u> ک		M_s2w =		(mg/s)	0.01	(mg/s)	0.01	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12	M_r12 =		(mg/s)		(mg/s)		(mg/s)
ŭ te	mass flux in river at PM-13	M_r13 =		(mg/s)		(mg/s)		(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
Conve flux to	concentration in river at PM-13	C_r13 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Case Parameter	Year 1 Zinc			
	concentration of surface water into PM-12	C s12 =	0.016	(mg/L)
ata	concentration of surface water into PM-13	C_s13 =		(mg/L)
σ	concentration in Babbitt WWTP discharge	C_sBab =	0.016	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.003	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.009842772	(mg/L)
ICEI	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.01	(mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	0.01435	(mg/L)
ort	concentration of ground water into PM-12	C_g12 =	0.0115	(mg/L)
du du	concentration of ground water into PM-13	C_g13 =	0.0115	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	5.71	(mg/s)	65	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.28	(mg/s)	0.28	(mg/s)	0.28	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.15	(mg/s)	0.15	(mg/s)	0.15	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	27.86	(mg/s)	318	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	1.37	(mg/s)	1.37	(mg/s)	1.37	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.02	(mg/s)	0.17	(mg/s)	0.17	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.89	(mg/s)	0.89	(mg/s)	0.89	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
to Co	mass flux in seepage from cell 2W	M_s2w =		(mg/s)	0.81	(mg/s)		(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 = M r13 =		(mg/s)		(mg/s) (mg/s)	65.25	(mg/s)
20		IVI_I 13 =	Low Flo		Average		High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 = C_r13 =		(mg/L) (mg/L)	0.016	(mg/L) (mg/L)		(mg/L) (mg/L)

Appendix F.2 Embarrass River Proposed Action Year 5

FLOWS

Case	Year 5				
Flows	Low Flow Conditions (no surface runoff)				Node
n River	flow in river at PM-12	Q_r12_L =	1.19	(cfs)	PM-12
Total flow in Embarrass F	flow in river at PM-13	Q_r13_L =	11.77	(cfs)	PM-13
Total Emb ã	flow check	Q_ck_L =	11.77	(cfs)	_
	surface water flow into PM-12	Q_s12_L =	0.00	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_L =	0.00	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_L =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_L =	0.26	(cfs)	PM-13
ta	seepage from Tailings Basin Cells 1E and 2E	Q_fs_L =	4.10	(cfs)	PM-13
flow data	hydrometallurgical residue cells liner leakage	Q_rrs_L =	0.01	(cfs)	PM-13
low	seepage from cell 2W	Q_s2w_L =	1.99	(cfs)	PM-13
Input 1	ground water flow into PM-12	Q_g12_L =	0.86	(cfs)	PM-12
dul	ground water flow into PM-13	Q_g13_L =	4.21	(cfs)	PM-13

Case	Year 5				
Flow	Average Flow Conditions (mean annual)				_
n River	flow in river at PM-12	Q_r12_M =	13.80	(cfs)	PM-12
Total flow in Embarrass R	flow in river at PM-13	Q_r13_M =	87.64	(cfs)	PM-13
Tota Emb	flow check	Q_ck_M =	87.64	(cfs)	
	surface water flow into PM-12	Q_s12_M =	12.61	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_M =	61.53	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_M =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_M =	1.99	(cfs)	PM-13
data	seepage from Tailings Basin Cells 1E and 2E	Q_fs_M =	4.10	(cfs)	PM-13
	hydrometallurgical residue cells liner leakage	Q_rrs_M =	0.01	(cfs)	PM-13
low	seepage from cell 2W	Q_s2w_M =	1.99	(cfs)	PM-13
nput flow	ground water flow into PM-12	Q_g12_M =	0.86	(cfs)	PM-12
dul	ground water flow into PM-13	Q_g13_M =	4.21	(cfs)	PM-13

Case	Year 5			
Flow	High Flow Conditions (avg. annual 1-day max fl			
n River	flow in river at PM-12	Q_r12_H =	144.35 (cfs)	PM-12
flow i rrass	flow in river at PM-13	Q_r13_H =	859.19 (cfs)	PM-13
Total flow in Embarrass R	flow check	Q_ck_H =	859.19 (cfs)	
	surface water flow into PM-12	Q_s12_H =	143.16 (cfs)	PM-12
	surface water flow into PM-13	Q_s13_H =	702.53 (cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_H =	0.33 (cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_H =	1.99 (cfs)	PM-13
ta	seepage from Tailings Basin Cells 1E and 2E	Q_fs_H =	4.10 (cfs)	PM-13
r da	hydrometallurgical residue cells liner leakage	Q_rrs_H =	0.01 (cfs)	PM-13
flow data	seepage from cell 2W	Q_s2w_H =	1.99 (cfs)	PM-13
Input 1	ground water flow into PM-12	Q_g12_H =	0.86 (cfs)	PM-12
aul	ground water flow into PM-13	Q g13 H =	4.21 (cfs)	PM-13

Case Parameter	Year 5 Silver		
		-	
	concentration of surface water into PM-12	C_s12 =	0.00011 (mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.00011 (mg/L)
-	concentration in Babbitt WWTP discharge	C_sBab =	0.00011 (mg/L)
ţi	concentration in Area 5 Pit NW discharge	C_spit =	0.00015 (mg/L)
ntration	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.00090 (mg/L)
۵	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.000125 (mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	0.000100 (mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.000008 (mg/L)
duj	concentration of ground water into PM-13	C_g13 =	0.000008 (mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.04	(mg/s)	0	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.19	(mg/s)	2	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in soonage from Tailings Pasin Colls 1E and 2E	M_fs =	0.10	(mg/s)	0.10	(mg/s)	0.10	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
t S	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =	0.00	(mg/s)	0.04	(mg/s)	0.45	(mg/s)
at M	mass flux in river at PM-13	M_r13 =		(mg/s)		(mg/s)		(mg/s)
		_	Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	<u>(mg/L)</u>	0.000	(mg/L)	0.000	(mg/L)
C C	concentration in river at PM-13	C_r13 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Case	Year 5			
Parameter	Aluminum			
		1		
	concentration of surface water into PM-12	C_s12 =	0.12	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.12	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.12	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.01325	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	9.61E-02	(mg/L)
ē	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.80E-01	(mg/L)
cone	concentration in tailings basin cell 2W	C_s2w =	1.5788	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.025	(mg/L)
lnp	concentration of ground water into PM-13	C_g13 =	0.025	(mg/L)

			Low Flo	W	Average	Flow	High Fl	low
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	42.82	(mg/s)	486	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.61	(mg/s)	0.61	(mg/s)	0.61	(mg/s)
tion	mass flux in Babbitt WWTP discharge	M_sBab =	1.12	(mg/s)	1.12	(mg/s)	1.12	(mg/s)
concentration flux	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	208.96	(mg/s)	2,386	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	2.98	(mg/s)	2.98	(mg/s)	2.98	(mg/s)
conc	mass flux of Area 5 Pit NW discharge	M_spit =	0.10	(mg/s)	0.75	(mg/s)	0.75	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	11.16	(mg/s)	11.16	(mg/s)	11.16	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.08	(mg/s)	0.08	(mg/s)	0.08	(mg/s)
ຊ ິບ	mass flux in seepage from cell 2W	M_s2w =	89.13	(mg/s)	89.13	(mg/s)	89.13	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 = M r13 =	1.73	(mg/s)	44.55	(mg/s)	487.90	
			Low Flo		Average		High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L) (mg/L)		(mg/L)		(mg/L) (mg/L)

Case Parameter	Year 5 Arsenic			
	concentration of surface water into PM-12	C_s12 =	0.00075	(mg/L)
o l	concentration of surface water into PM-13	C_s13 =	0.00075	(mg/L)
pı	concentration in Babbitt WWTP discharge	C_sBab =	0.00075	(mg/L)
ratio	concentration in Area 5 Pit NW discharge	C_spit =	0.001325	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.006775027	(mg/L)
A	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.004	(mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	0.00291	(mg/L)
but	concentration of ground water into PM-12	C_g12 =	0.00273	(mg/L)
lnp	concentration of ground water into PM-13	C_g13 =	0.00273	(mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.27	(mg/s)	3	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.07	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
concentration	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1.31	(mg/s)	15	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.33	(mg/s)	0.33	(mg/s)	0.33	(mg/s)
con	mass flux of Area 5 Pit NW discharge	M_spit =	0.01	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
		M_fs =	0.79	(mg/s)	0.79	(mg/s)	0.79	(mg/s)
Convert	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
ပို	mass flux in seepage from cell 2W	M_s2w =	0.16	(mg/s)	0.16	(mg/s)	0.16	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance	mass flux in river at PM-12	M_r12 =	0.07	(mg/s)	0.34	(mg/s)	3.11	(mg/s)
Ma	mass flux in river at PM-13	M_r13 =	1.36	(mg/s)	3.00	(mg/s)	19.38	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Convert mass flux to	concentration in river at PM-12	C_r12 =	0.002	(mg/L)	0.001	(mg/L)	0.001	(mg/L)
flu flu	concentration in river at PM-13	C_r13 =	0.004	(mg/L)	0.001	(mg/L)	0.001	(mg/L)

Case Parameter	Year 5 Boron			
		-		
	concentration of surface water into PM-12	C_s12 =	0.027 (mg	i/L)
data	concentration of surface water into PM-13	C_s13 =	0.027 (mg	j/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.027 (mg	j/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.1315 (mg	J/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.135355742 (mg	J/L)
0	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.11 (mg	J/L)
conc	concentration in tailings basin cell 2W	C_s2w =	0.33 (mg	J/L)
ort	concentration of ground water into PM-12	C_g12 =	0.0212 (mg	J/L)
ıdul	concentration of ground water into PM-13	C_g13 =	0.0212 (mg	j/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	9.64	(mg/s)	109	(mg/s)
Ę	mass flux of ground water into PM-12	M_g12 =	0.52	(mg/s)	0.52	(mg/s)	0.52	(mg/s)
	mass flux in Babbitt WWTP discharge	M_sBab =	0.25	(mg/s)	0.25	(mg/s)	0.25	(mg/s)
ıtra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	47.02	(mg/s)	537	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	2.53	(mg/s)	2.53	(mg/s)	2.53	(mg/s)
conc	mass flux of Area 5 Pit NW discharge	M_spit =	0.97	(mg/s)	7.41	(mg/s)	7.41	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	15.72	(mg/s)	15.72	(mg/s)	15.72	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.05	(mg/s)	0.05	(mg/s)	0.05	(mg/s)
Co to	mass flux in seepage from cell 2W	M_s2w =	18.63	(mg/s)	18.63	(mg/s)	18.63	(mg/s)
			Low Flor	W	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12	M_r12 =		(mg/s)		(mg/s)	110.16	
ø ≤	mass flux in river at PM-13	M_r13 =	38.65	(mg/s)	101.74 Average		691.28 High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.023	(mg/L) (mg/L)	0.027	(mg/L)	0.027	(mg/L) (mg/L)

Case Parameter	Year 5 Barium		
	concentration of surface water into PM-12	C_s12 =	0.016 (mg/L)
ata	concentration of surface water into PM-13	C_s13 =	0.016 (mg/L)
pr	concentration in Babbitt WWTP discharge	C_sBab =	0.016 (mg/L)
ratio	concentration in Area 5 Pit NW discharge	C_spit =	0.0044 (mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	5.03E-02 (mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	5.00E-03 (mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	0.09298 (mg/L)
but	concentration of ground water into PM-12	C_g12 =	0.0681 (mg/L)
du	concentration of ground water into PM-13	C_g13 =	0.0681 (mg/L)

			Low Flo	W	Average	Flow	High Fl	low
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	5.71	(mg/s)	65	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	1.66	(mg/s)	1.66	(mg/s)	1.66	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.15	(mg/s)	0.15	(mg/s)	0.15	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	27.86	(mg/s)	318	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	8.11	(mg/s)	8.11	(mg/s)	8.11	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	0.03	(mg/s)	0.25	(mg/s)	0.25	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	5.84	(mg/s)	5.84	(mg/s)	5.84	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
Co to	mass flux in seepage from cell 2W	M_s2w =	5.25	(mg/s)	5.25	(mg/s)	5.25	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12	M_r12 =	1.81	(mg/s)	7.52	(mg/s)	66.63	(mg/s)
Ma	mass flux in river at PM-13	M_r13 =		(mg/s)	54.83	(mg/s)	404.19	
			Low Flo	N	Average	Flow	High Fl	low
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.054	(mg/L)	0.019	(mg/L)	0.016	(mg/L)
tlu Co	concentration in river at PM-13	C_r13 =	0.063	(mg/L)	0.022	(mg/L)	0.017	(mg/L)

Case Parameter	Year 5 Beryllium			
		- ·-		
	concentration of surface water into PM-12	C_s12 =	0.0001	(mg/L)
ata	concentration of surface water into PM-13	C_s13 =	0.0001	(mg/L)
i p u	concentration in Babbitt WWTP discharge	C_sBab =	0.0001	(mg/L)
ratio	concentration in Area 5 Pit NW discharge	C_spit =	0.0001	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000454842	(mg/L)
-	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0	(mg/L)
con	concentration in tailings basin cell 2W	C_s2w =	0.00075	(mg/L)
put	concentration of ground water into PM-12	C_g12 =	0.000023	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.000023	(mg/L)

			Low Flo	w	Average	Flow	High Fl	low
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.04	(mg/s)	0	(mg/s)
-	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
Ę	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.17	(mg/s)	2	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
ŭ Xnjj	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.05	(mg/s)	0.05	(mg/s)	0.05	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	-	(mg/s)	-	(mg/s)	-	(mg/s)
ຊ ິວ	mass flux in seepage from cell 2W	M_s2w =	0.04	(mg/s)	0.04	(mg/s)	0.04	(mg/s)
			Low Flo	w	Average	Flow	High Fl	low
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.00	(mg/s)	0.04	(mg/s)	0.41	(mg/s)
Ma at	mass flux in river at PM-13	M_r13 =		(mg/s)		(mg/s)		(mg/s)
			Low Flo	w	Average	Flow	High Fl	low
Convert mass flux to concentration		C_r12 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
S Tu	concentration in river at PM-13	C_r13 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Case Parameter	Year 5 Calcium			
	concentration of surface water into PM-12	C s12 =	15	(mg/L)
ata	concentration of surface water into PM-13	C_s13 =		(mg/L)
р	concentration in Babbitt WWTP discharge	C_sBab =	15	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	95.35	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	55.55427025	(mg/L)
oncer	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	416	(mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	59.78	(mg/L)
but	concentration of ground water into PM-12	C_g12 =	19	(mg/L)
du du	concentration of ground water into PM-13	C_g13 =	19	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	5,352.95	(mg/s)	60,771	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	462.42	(mg/s)	462.42	(mg/s)	462.42	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	140.09	(mg/s)	140.09	(mg/s)	140.09	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	26,119.49	(mg/s)	298,224	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	2,263.72	(mg/s)	2,263.72	(mg/s)	2,263.72	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	701.59	(mg/s)	5,369.83	(mg/s)	5,369.83	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	6,450.21	(mg/s)	6,450.21	(mg/s)	6,450.21	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	176.59	(mg/s)	176.59	(mg/s)	176.59	
ធ បំ	mass flux in seepage from cell 2W	M_s2w =	3,374.76	(mg/s)	3,374.76	(mg/s)	25.38	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 =	602.51		5,955.45		61,373.93	
2 0	mass hux in river at PM-13	IVI_FI3 =	13,569.37 Low Flo		49,710.04 Average		373,883.63 High Fl	
Convert mass flux to concentration		C_r12 =	17.891	(mg/L)	15.249	(mg/l)	15.024	(mg/l)
Case Parameter	Year 5 Cadmium							
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		-	I					
	concentration of surface water into PM-12	C_s12 =	0.00008 (mg/L)					
ata	concentration of surface water into PM-13	C_s13 =	0.00008 (mg/L)					
u di	concentration in Babbitt WWTP discharge	C_sBab =	0.00008 (mg/L)					
ratio	concentration in Area 5 Pit NW discharge	C_spit =	0.0001 (mg/L)					
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000238486 (mg/L)					
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0004 (mg/L)					
cor	concentration in tailings basin cell 2W	C_s2w =	0.000188 (mg/L)					
but	concentration of ground water into PM-12	C_g12 =	0.0003 (mg/L)					
	concentration of ground water into PM-13	C_g13 =	0.0003 (mg/L)					

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.03	(mg/s)	0	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itrai	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.14	(mg/s)	2	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.04	(mg/s)	0.04	(mg/s)	0.04	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	many flux in coopera from Tailings Pasin Colle 1E and 2E	M_fs =	0.03	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
Co to	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.01	(mg/s)	0.04	(mg/s)	0.33	(mg/s)
Ma		M_r13 =	0.08	(mg/s)	0.26	(mg/s)	2.00	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Convert mass flux to	concentration in river at PM-12	C_r12 =	0.000	<u>(mg/L)</u>	0.000	(mg/L)	0.000	(mg/L)
Cc Cc flu	concentration in river at PM-13	C_r13 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Case Parameter	Year 5 Chloride			
		4		
	concentration of surface water into PM-12	C_s12 =	6.5	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	6.5	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	6.5	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	5.95	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	1.07E+01	(mg/L)
0	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.76E+03	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	21.54	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	1.8	(mg/L)
du du	concentration of ground water into PM-13	C_g13 =	1.8	(mg/L)

			Low Flor	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	2,319.61	(mg/s)	26,334	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	43.81	(mg/s)	43.81	(mg/s)	43.81	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	60.70	(mg/s)	60.70	(mg/s)	60.70	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	11,318.44	(mg/s)	129,230	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	214.46	(mg/s)	214.46	(mg/s)	214.46	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	43.78	(mg/s)	335.09	(mg/s)	335.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1,244.90	(mg/s)	1,244.90	(mg/s)	1,244.90	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	747.10	(mg/s)	747.10	(mg/s)	747.10	(mg/s)
န ပိ	mass flux in seepage from cell 2W	M_s2w =	1,216.00	(mg/s)	1,216.00	(mg/s)	1,216.00	(mg/s)
			Low Flor	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =	104.51		2,424.12		26,438.79	
Ma at	mass flux in river at PM-13	M_r13 =	3,570.75		17,500.11		159,426.73	· • /
			Low Flor	w	Average	FIOW	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	3.103	(mg/L)	6.207	(mg/L)	6.472	(mg/L)
Conve flux to concel	concentration in river at PM-13	C r13 =	10.718	(ma/L)	7.056	(mg/L)	6.557	(mg/L)

Case Parameter	Year 5 Cobalt			
		-		
	concentration of surface water into PM-12	C_s12 =	0.0006	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0006	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0006	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.000555	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.00200513	(mg/L)
c)	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.005	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	0.001556	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.0011	(mg/L)
<u> </u>	concentration of ground water into PM-13	C_g13 =	0.0011	(mg/L)

			Low Flo	W	Average Flow		High Flow	
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.21	(mg/s)	2	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.03	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1.04	(mg/s)	12	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.13	(mg/s)	0.13	(mg/s)	0.13	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
		M_fs =	0.23	(mg/s)	0.23	(mg/s)	0.23	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =		(mg/s)		(mg/s)		(mg/s)
မ ပိ	mass flux in seepage from cell 2W	M_s2w =		(mg/s)		(mg/s)	0.09	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 =		(mg/s) (mg/s)		(mg/s)		(mg/s) (mg/s)
			Low Flo	W	Average	Flow	High Fl	low
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.001	(mg/L)	0.001	(mg/L)	0.001	(mg/L)
	concentration in river at PM-13	C r13 =	0.001	(mg/L)	0.001	(mg/L)	0.001	(mg/L)

Case Parameter	Year 5 Copper			
	concentration of surface water into PM-12	C_s12 =	0.0015	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0015	(mg/L)
-	concentration in Babbitt WWTP discharge	C_sBab =	0.0015	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.00345	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.007797191	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0015	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	0.004555	(mg/L)
t	concentration of ground water into PM-12	C_g12 =	0.004	(mg/L)
Input	concentration of ground water into PM-13	C_g13 =	0.004	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.54	(mg/s)	6	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.10	(mg/s)	0.10	(mg/s)	0.10	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	2.61	(mg/s)	30	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.48	(mg/s)	0.48	(mg/s)	0.48	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	0.03	(mg/s)	0.19	(mg/s)	0.19	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.91	(mg/s)	0.91	(mg/s)	0.91	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
۹ د ک	mass flux in seepage from cell 2W	M_s2w =	0.26	(mg/s)	0.26	(mg/s)	0.26	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s)		(mg/s)		(mg/s)
Ma at	mass flux in river at PM-13	M_r13 =		(mg/s)		(mg/s)		(mg/s)
			Low Flo	w	Average	FIOW	High Fl	ow
Convert mass flux to concentration		C_r12 =	0.003	(mg/L)	0.002	(mg/L)	0.002	(mg/L)
Con Con Con	concentration in river at PM-13	C r13 =	0.005	(mg/L)	0.002	(mg/L)	0.002	(mg/L)

Case	Year 5		
Parameter	Fluoride		
		a	4 - 4 - 4 - 4 - 4 - 4 - 4 - 4 - 4 -
	concentration of surface water into PM-12	C_s12 =	0.2 (mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.2 (mg/L)
-	concentration in Babbitt WWTP discharge	C_sBab =	0.2 (mg/L)
ntration	concentration in Area 5 Pit NW discharge	C_spit =	0.125 (mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	2.25E+00 (mg/L)
c)	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	2.85E+00 (mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	1.55 (mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.385 (mg/L)
<u> </u>	concentration of ground water into PM-13	C_g13 =	0.385 (mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	71.37	(mg/s)	810	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	9.37	(mg/s)	9.37	(mg/s)	9.37	(mg/s)
concentration flux	mass flux in Babbitt WWTP discharge	M_sBab =	1.87	(mg/s)	1.87	(mg/s)	1.87	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	348.26	(mg/s)	3,976	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	45.87	(mg/s)	45.87	(mg/s)	45.87	(mg/s)
conc	mass flux of Area 5 Pit NW discharge	M_spit =	0.92	(mg/s)	7.04	(mg/s)	7.04	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	260.89	(mg/s)	260.89	(mg/s)	260.89	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	1.21	(mg/s)	1.21	(mg/s)	1.21	(mg/s)
<u>۽</u> ک	mass flux in seepage from cell 2W	M_s2w =	87.50	(mg/s)	87.50	(mg/s)	87.50	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =	<u>11.24</u> 407.63	(mg/s) (mg/s)	82.61	(mg/s)	5,200.36	
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L) (mg/L)		(mg/L)		(mg/L) (mg/L)

Case	Year 5			
Parameter	Iron			
		-		
	concentration of surface water into PM-12	C_s12 =	2.9	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	2.9	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	2.9	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.037761905	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	5.96E-02	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	4.00E-01	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	4.594	(mg/L)
ont	concentration of ground water into PM-12	C_g12 =	0.035	(mg/L)
Input	concentration of ground water into PM-13	C_g13 =	0.035	(mg/L)

			Low Flow	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	1,034.90	(mg/s)	11,749	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.85	(mg/s)	0.85	(mg/s)	0.85	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	27.08	(mg/s)	27.08	(mg/s)	27.08	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	5,049.77	(mg/s)	57,657	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	4.17	(mg/s)	4.17	(mg/s)	4.17	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.28	(mg/s)	2.13	(mg/s)	2.13	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	6.92	(mg/s)	6.92	(mg/s)	6.92	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.17	(mg/s)	0.17	(mg/s)		(mg/s)
5 S	mass flux in seepage from cell 2W	M_s2w =	259.35		259.35		259.35	1
			Low Flor	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s)	1,062.84		11,777.08	
2 0	mass flux in river at PM-13	M_r13 =	298.82		6,385.34 Average		69,706.44 High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L)		(mg/L)		(mg/L)

Case	Year 5			
Parameter	Hardness			
	concentration of surface water into PM-12	C_s12 =	70	(mg/L)
ata	concentration of surface water into PM-13	C_s13 =	70	(mg/L)
ρι	concentration in Babbitt WWTP discharge	C_sBab =	70	(mg/L)
ratio	concentration in Area 5 Pit NW discharge	C_spit =	942.7142857	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	2.61E+02	(mg/L)
8	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	8.61E+03	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	436.6	(mg/L)
ort	concentration of ground water into PM-12	C_g12 =	87.5	(mg/L)
ıdul	concentration of ground water into PM-13	C_g13 =	87.5	(mg/L)

			Low Flor	w	Average I	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	24,980.41	(mg/s)	283,600	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	2,129.58	(mg/s)	2,129.58	(mg/s)	2,129.58	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	653.73	(mg/s)	653.73	(mg/s)	653.73	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	121,890.93	(mg/s)	1,391,712	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	10,425.01	(mg/s)	10,425.01	(mg/s)	10,425.01	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	6,936.49	(mg/s)	53,090.84	(mg/s)	53,090.84	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	30,336.71	(mg/s)	30,336.71	(mg/s)	30,336.71	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	3,654.83	(mg/s)	3,654.83	(mg/s)	3,654.83	(mg/s)
ទី	mass flux in seepage from cell 2W	M_s2w =	24,647.41	(mg/s)	24,647.41	(mg/s)	24,647.41	(mg/s)
			Low Flor	w	Average I	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12	M_r12 =	2,783.31		27,763.72		286,383.27	
Má at	mass flux in river at PM-13	M_r13 =	78,783.76		271,809.45 Average		1,800,250.00 High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 = C_r13 =	82.647 236.473	(mg/L)	71.091	(mg/L)	70.104	(mg/L)

Case Parameter	Year 5 Potassium		
		•	
	concentration of surface water into PM-12	C_s12 =	0.60 (mg/L)
ata	concentration of surface water into PM-13	C_s13 =	0.60 (mg/L)
p	concentration in Babbitt WWTP discharge	C_sBab =	0.60 (mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	53.80 (mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	7.67 (mg/L)
8	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.80 (mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	7.77 (mg/L)
	concentration of ground water into PM-12	C_g12 =	1.60 (mg/L)
lnp	concentration of ground water into PM-13	C_g13 =	1.60 (mg/L)

			Low Flow	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	214.12	(mg/s)	2,431	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	38.94	(mg/s)	38.94	(mg/s)	38.94	(mg/s)
concentration flux	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.76	(mg/s)	0.76	(mg/s)	0.76	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1,044.78	(mg/s)	11,929	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	190.63	(mg/s)	190.63	(mg/s)	190.63	(mg/s)
conc	mass flux in Babbitt WWTP discharge	M_sBab =	5.60	(mg/s)	5.60	(mg/s)	5.60	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	395.86	(mg/s)	3,029.85	(mg/s)	3,029.85	(mg/s)
Convert to mass	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	890.78	(mg/s)	890.78	(mg/s)	890.78	(mg/s)
Co to	mass flux in seepage from cell 2W	M_s2w =	438.64	(mg/s)	438.64	(mg/s)	438.64	(mg/s)
			Low Flow	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s)	253.82		2,470.56	
a Z	mass flux in river at PM-13	M_r13 =	1,961.22 Low Flor		5,854.11 Average		18,955.03 High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L)		(mg/L)	0.605	

Case Parameter	Year 5 Magnesium			
		a		
	concentration of surface water into PM-12	C_s12 =	5.90	(mg/L)
ata	concentration of surface water into PM-13	C_s13 =	5.90	(mg/L)
pr	concentration in Babbitt WWTP discharge	C_sBab =	5.90	(mg/L)
ratio	concentration in Area 5 Pit NW discharge	C_spit =	271.00	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	29.76	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	213.00	(mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	69.97	(mg/L)
brit	concentration of ground water into PM-12	C_g12 =	10.65	(mg/L)
Ing	concentration of ground water into PM-13	C_g13 =	10.65	(mg/L)

			Low Flor	W	Average	Flow	High Flo	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	2,105.49	(mg/s)	23,903	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	259.20	(mg/s)	259.20	(mg/s)	259.20	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	55.10	(mg/s)	55.10	(mg/s)	55.10	(mg/s)
itrai	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	10,273.66	(mg/s)	117,301	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	1,268.87	(mg/s)	1,268.87	(mg/s)	1,268.87	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	1,994.02	(mg/s)	15,261.91	(mg/s)	15,261.91	(mg/s)
	mana flux in according from Tailings Reain Calls 15 and 25	M_fs =	3,455.69	(mg/s)	3,455.69	(mg/s)	3,455.69	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	90.42	(mg/s)	90.42	(mg/s)	90.42	(mg/s)
မိ မိ	mass flux in seepage from cell 2W	M_s2w =	3,950.02	(mg/s)	3,950.02	(mg/s)	3,950.02	(mg/s)
		_	Low Flor	W	Average	Flow	High Flo	ow
Mass balance at each node	mass flux in river at PM-12	M_r12 =	314.30	(mg/s)	2,419.79	(mg/s)	24,217.73	(mg/s)
Ma		M_r13 =	11,073.32	(mg/s)	36,720.36	(mg/s)	165,546.07	(mg/s)
			Low Flor	W	Average	Flow	High Flo	ow
Convert mass flux to	concentration in river at PM-12	C_r12 =	9.333	(mg/L)	6.196	(mg/l)	5.928	(mg/l)
S i s	concentration in river at PM-13	C_r13 =	33.237	(mg/L)	14.805	(mg/l)	6.808	(mg/l)

Case Parameter	Year 5 Manganese			
	concentration of surface water into PM-12	C_s12 =	0.30	(mg/L)
ata	concentration of surface water into PM-13	C_s13 =	0.30	(mg/L)
q	concentration in Babbitt WWTP discharge	C_sBab =	0.30	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.49	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.31	(mg/L)
<u>a</u>	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.00	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	1.18	(mg/L)
put	concentration of ground water into PM-12	C_g12 =	0.19	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.19	(mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	107.06	(mg/s)	1,215	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	4.58	(mg/s)	4.58	(mg/s)	4.58	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	2.80	(mg/s)	2.80	(mg/s)	2.80	(mg/s)
itrai	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	522.39	(mg/s)	5,964	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	22.40	(mg/s)	22.40	(mg/s)	22.40	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	3.57	(mg/s)	27.31	(mg/s)	27.31	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	36.00	(mg/s)	36.00	(mg/s)	36.00	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M rrs =		(mg/s)		(mg/s)		(mg/s)
۹ ۵	mass flux in seepage from cell 2W	M_s2w =		(mg/s)		(mg/s)		(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12	M_r12 =	7.38	(mg/s)	114.44	(mg/s)	1,222.81	(mg/s)
Me at	mass flux in river at PM-13	M_r13 =	136.13	(mg/s)	789.32	(mg/s)	7,339.78	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.219	(mg/L)	0.293	(mg/l)	0.299	(mg/l)
S 🗄 S	concentration in river at PM-13	C_r13 =	0.409	(mg/L)	0.318	(mg/l)	0.302	(mg/l)

Case Parameter	Year 5 Sodium			
	concentration of surface water into PM-12	C s12 =	6.00	(mg/L)
lata	concentration of surface water into PM-13	C_s13 =		(mg/L)
-0	concentration in Babbitt WWTP discharge	C_sBab =	6.00	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	119.50	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	34.82	(mg/L)
ncei	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	255.00	(mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	44.31	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	4.90	(mg/L)
qul	concentration of ground water into PM-13	C_g13 =	4.90	(mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	2,141.18	(mg/s)	24,309	(mg/s)
-	mass flux of ground water into PM-12	M_g12 =	119.26	(mg/s)	119.26	(mg/s)	119.26	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	56.03	(mg/s)	56.03	(mg/s)	56.03	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	10,447.79	(mg/s)	119,290	
cen	mass flux of ground water into PM-13	M_g13 =	583.80	(mg/s)	583.80	(mg/s)	583.80	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	879.28	(mg/s)	6,729.88	(mg/s)	6,729.88	(mg/s)
	mass flux in second of from Tailings Reain Calls 1F and 0F	M_fs =	4,042.46	(mg/s)	4,042.46	(mg/s)	4,042.46	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	108.24	(mg/s)	108.24	(mg/s)	108.24	(mg/s)
te C	mass flux in seepage from cell 2W	M_s2w =	2,501.44	(mg/s)	2,501.44	(mg/s)	2,501.44	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =	175.29		2,316.47		24,483.86	
at a	mass flux in river at PM-13	M_r13 =	8,290.51		26,730.09		157,739.28	
			Low Flo	w	Average	FIOW	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	5.205	(mg/L)	5.931	(mg/l)	5.993	(mg/l)
Conve flux to concei	concentration in river at PM-13	C_r13 =	24.884	(mg/L)	10.777	(mg/l)	6.487	(mg/l)

Case	Year 5			
Parameter	Nickel			
		-		
	concentration of surface water into PM-12	C_s12 =	0.0012	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0012	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0012	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.0052	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.029814715	(mg/L)
c)	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.098	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	0.00688	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.007	(mg/L)
du	concentration of ground water into PM-13	C_g13 =	0.007	(mg/L)

			Low Flo	W	Average	Flow	High Fl	low
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.43	(mg/s)	5	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.17	(mg/s)	0.17	(mg/s)	0.17	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	2.09	(mg/s)	24	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.83	(mg/s)	0.83	(mg/s)	0.83	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.04	(mg/s)	0.29	(mg/s)	0.29	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	3.46	(mg/s)	3.46	(mg/s)	3.46	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.04	(mg/s)	0.04	(mg/s)	0.04	(mg/s)
۹ د د	mass flux in seepage from cell 2W	M_s2w =	0.39	(mg/s)	0.39	(mg/s)	0.39	(mg/s)
			Low Flo	w	Average	Flow	High Fl	low
Mass balance at each node		M_r12 =		(mg/s)		(mg/s)		(mg/s)
20	mass nux in river at PM-13	M_r13 =	4.95 Low Flo	(mg/s) w	Average	(mg/s) Flow	33.92 High Fl	(mg/s)
Convert mass flux to concentration		C_r12 =		(mg/L) (mg/L)	0.002	(mg/L) (mg/L)	0.001	(mg/L) (mg/L)

Case Parameter	Year 5 Lead		
		J	
	concentration of surface water into PM-12	C_s12 =	0.00015 (mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.00015 (mg/L)
-	concentration in Babbitt WWTP discharge	C_sBab =	0.00015 (mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.0003 (mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000769203 (mg/L)
c)	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0005 (mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	0.0012 (mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.0012 (mg/L)
lnp	concentration of ground water into PM-13	C_g13 =	0.0012 (mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.05	(mg/s)	1	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.03	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itrai	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.26	(mg/s)	3	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.14	(mg/s)	0.14	(mg/s)	0.14	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.02	(mg/s)	0.02	(mg/s)
	mass flux in seepage from Tailings Pasin Colls 1E and 2E	M_fs =	0.09	(mg/s)	0.09	(mg/s)	0.09	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
န် ပိ	mass flux in seepage from cell 2W	M_s2w =	0.07	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.03	(mg/s)	0.08	(mg/s)	0.64	(mg/s)
Ma		M_r13 =	0.33	(mg/s)	0.66	(mg/s)	3.94	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Convert mass flux to	concentration in river at PM-12	C_r12 =	0.001	<u>(mg/L)</u>	0.000	(mg/L)	0.000	(mg/L)
Cc Cc flu	concentration in river at PM-13	C_r13 =	0.001	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Case Parameter	Year 5 Antimony		
		_	
	concentration of surface water into PM-12	C_s12 =	4.00E-05 (mg/L)
data	concentration of surface water into PM-13	C_s13 =	4.00E-05 (mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	4.00E-05 (mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	2.50E-04 (mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	6.47E-03 (mg/L)
CD CD	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.004 (mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	2.50E-04 (mg/L)
Input	concentration of ground water into PM-12	C_g12 =	1.50E-03 (mg/L)
du	concentration of ground water into PM-13	C_g13 =	1.50E-03 (mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.01	(mg/s)	0	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.04	(mg/s)	0.04	(mg/s)	0.04	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.07	(mg/s)	1	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.18	(mg/s)	0.18	(mg/s)	0.18	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in assesses from Tailings Basin Calls 1F and 0F	M_fs =	0.75	(mg/s)	0.75	(mg/s)	0.75	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =		(mg/s)		(mg/s)	0.00	(mg/s)
e S	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s)		(mg/s)		(mg/s)
Ma at	mass flux in river at PM-13	M_r13 =		(mg/s)		(mg/s)		(mg/s)
			Low Flo	w	Average	FIOW	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.001	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
S II S	concentration in river at PM-13	C_r13 =	0.003	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Case Parameter	Year 5 Selenium			
			· · · · · · · · · · · · · · · · · · ·	
	concentration of surface water into PM-12	C_s12 =	0.0003 (mg/L	L)
ata	concentration of surface water into PM-13	C_s13 =	0.0003 (mg/L	L)
ip u	concentration in Babbitt WWTP discharge	C_sBab =	0.0003 (mg/L	L)
ratio	concentration in Area 5 Pit NW discharge	C_spit =	0.0016 (mg/L	L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.001159434 (mg/L	L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.054 (mg/L	L)
con	concentration in tailings basin cell 2W	C_s2w =	0.00109 (mg/L	L)
but	concentration of ground water into PM-12	C_g12 =	0.00295 (mg/L	L)
	concentration of ground water into PM-13	C_g13 =	0.00295 (mg/L	L)

			Low Flow	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.11	(mg/s)	1	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.07	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.52	(mg/s)	6	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.35	(mg/s)	0.35	(mg/s)	0.35	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.01	(mg/s)	0.09	(mg/s)	0.09	(mg/s)
	mass flux in seenage from Tailings Pasin Colls 1E and 2E	M_fs =	0.13	(mg/s)	0.13	(mg/s)	0.13	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.02	(mg/s)	0.02	(mg/s)	0.02	(mg/s)
t C	mass flux in seepage from cell 2W	M_s2w =		(mg/s)		(mg/s)		(mg/s)
			Low Flor	W	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =	0.07	(mg/s)	0.18	(mg/s)	1.29	(mg/s)
Ma at	mass flux in river at PM-13	M_r13 =		(mg/s)		(mg/s)		(mg/s)
			Low Flor	w	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.002	<u>(mg/L)</u>	0.000	(mg/L)	0.000	(mg/L)
tin Co	concentration in river at PM-13	C_r13 =	0.002	(mg/L)	0.001	(mg/L)	0.000	(mg/L)

Case	Year 5		
Parameter	Sulfate		
		-	
	concentration of surface water into PM-12	C_s12 =	4.00 (mg/L)
ata	concentration of surface water into PM-13	C_s13 =	4.00 (mg/L)
u di	concentration in Babbitt WWTP discharge	C_sBab =	4.00 (mg/L)
•	concentration in Area 5 Pit NW discharge	C_spit =	1046.27 (mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	140.42 (mg/L)
a	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	7347.00 (mg/L)
con	concentration in tailings basin cell 2W	C_s2w =	152.40 (mg/L)
but	concentration of ground water into PM-12	C_g12 =	8.50 (mg/L)
	concentration of ground water into PM-13	C_g13 =	8.50 (mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
r	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	1,427.45	(mg/s)	16,206	(mg/s)
_ r	mass flux of ground water into PM-12	M_g12 =	206.87	(mg/s)	206.87	(mg/s)	206.87	(mg/s)
r tio	mass flux in Babbitt WWTP discharge	M_sBab =	37.36	(mg/s)	37.36	(mg/s)	37.36	(mg/s)
r trai	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	6,965.20	(mg/s)	79,526	(mg/s)
r ceu	mass flux of ground water into PM-13	M_g13 =	1,012.72	(mg/s)	1,012.72	(mg/s)	1,012.72	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	7,698.43	(mg/s)	58,922.60	(mg/s)	58,922.60	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	16,304.02	(mg/s)	16,304.02	(mg/s)	16,304.02	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	3,118.71	(mg/s)	3,118.71	(mg/s)	3,118.71	(mg/s)
r Q S	mass flux in seepage from cell 2W	M_s2w =	8,603.45	(mg/s)	8,603.45		8,603.45	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
ass ba each r	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 = M r13 =	244.23		1,671.68		16,449.94	
			Low Flo		Average		High Fl	
onvert ux to oncent	concentration in river at PM-12	C_r12 =		(mg/L)		(mg/l)	4.027	
ŬĘSo	concentration in river at PM-13	C_r13 =	111.002	(mg/L)	38.947	(mg/l)	7.565	(mg/l)

Case Parameter	Year 5 Thallium		
		-	
	concentration of surface water into PM-12	C_s12 =	0.0002 (mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0002 (mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0002 (mg/L)
tio	concentration in Area 5 Pit NW discharge	C_spit =	0.0006 (mg/L)
ntration	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000906999 (mg/L)
CD CD	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0002 (mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	0.0002 (mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.000004 (mg/L)
브	concentration of ground water into PM-13	C_g13 =	0.000004 (mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.07	(mg/s)	1	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
tion	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
Itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.35	(mg/s)	4	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
	many flux in according from Tailings Basin Calls 15 and 25	M_fs =	0.11	(mg/s)	0.11	(mg/s)	0.11	(mg/s)
Convert	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
ပိ မှ	mass flux in seepage from cell 2W	M_s2w =		(mg/s)	0.01	(mg/s)		(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance	mass flux in river at PM-12	M_r12 =	0.00	(mg/s)	0.07	(mg/s)	0.81	(mg/s)
Ma		M_r13 =	0.12	(mg/s)	0.57	(mg/s)	4.94	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to	concentration in river at PM-12	C_r12 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
S = C	concentration in river at PM-13	C_r13 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Case	Year 5			
Parameter	Zinc			
		-		-
	concentration of surface water into PM-12	C_s12 =	0.016	(mg/L)
ata	concentration of surface water into PM-13	C_s13 =	0.016	(mg/L)
pr	concentration in Babbitt WWTP discharge	C_sBab =	0.016	(mg/L)
ratio	concentration in Area 5 Pit NW discharge	C_spit =	0.003	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.017646569	(mg/L)
ICEI	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.01	(mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	0.01435	(mg/L)
ort	concentration of ground water into PM-12	C_g12 =	0.0115	(mg/L)
du	concentration of ground water into PM-13	C_g13 =	0.0115	(mg/L)

			Low Flo	w	Average	Flow	High F	low
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	5.71	(mg/s)	65	(mg/s)
-	mass flux of ground water into PM-12	M_g12 =	0.28	(mg/s)	0.28	(mg/s)	0.28	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.15	(mg/s)	0.15	(mg/s)	0.15	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	27.86	(mg/s)	318	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	1.37	(mg/s)	1.37	(mg/s)	1.37	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.02	(mg/s)	0.17	(mg/s)	0.17	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	2.05	(mg/s)	2.05	(mg/s)	2.05	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =		(mg/s)		(mg/s)	0.00	(mg/s)
<u>۽</u> ک	mass flux in seepage from cell 2W	M_s2w =	0.81	(mg/s)	0.81	(mg/s)	0.81	(mg/s)
			Low Flo	w	Average	Flow	High F	ow
Mass balance at each node		M_r12 =		(mg/s) (mg/s)		(mg/s) (mg/s)	65.25	(mg/s)
20	mass nux in river at FW-13	1113 =	Low Flo		Average		High F	
Convert mass flux to concentration		C_r12 =		(mg/L) (mg/L)	0.016	(mg/L)		(mg/L) (mg/L)

Appendix F.3 Embarrass River Proposed Action Year 8

FLOWS

Case	Year 8				
Flows	Low Flow Conditions (no surface runoff)				Node
n River	flow in river at PM-12	Q_r12_L =	1.19	(cfs)	PM-12
Total flow in Embarrass F	flow in river at PM-13	Q_r13_L =	12.46	(cfs)	PM-13
Tota Emb	flow check	Q_ck_L =	12.46	(cfs)	_
	surface water flow into PM-12	Q_s12_L =	0.00	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_L =	0.00	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_L =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_L =	0.26	(cfs)	PM-13
Ita	seepage from Tailings Basin Cells 1E and 2E	Q_fs_L =	4.79	(cfs)	PM-13
flow data	hydrometallurgical residue cells liner leakage	Q_rrs_L =	0.01	(cfs)	PM-13
low	seepage from cell 2W	Q_s2w_L =	1.99	(cfs)	PM-13
Input 1	ground water flow into PM-12	Q_g12_L =	0.86	(cfs)	PM-12
dul	ground water flow into PM-13	Q_g13_L =	4.21	(cfs)	PM-13

Case	Year 8				
Flow	Average Flow Conditions (mean annual)				
n River	flow in river at PM-12	Q_r12_M =	13.80	(cfs)	PM-12
Total flow in Embarrass R	flow in river at PM-13	Q_r13_M =	88.33	(cfs)	PM-13
Total Emb	flow check	Q_ck_M =	88.33	(cfs)	
	surface water flow into PM-12	Q_s12_M =	12.61	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_M =	61.53	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_M =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_M =	1.99	(cfs)	PM-13
data	seepage from Tailings Basin Cells 1E and 2E	Q_fs_M =	4.79	(cfs)	PM-13
	hydrometallurgical residue cells liner leakage	Q_rrs_M =	0.01	(cfs)	PM-13
low	seepage from cell 2W	Q_s2w_M =	1.99	(cfs)	PM-13
Input flow	ground water flow into PM-12	Q_g12_M =	0.86	(cfs)	PM-12
dul	ground water flow into PM-13	Q_g13_M =	4.21	(cfs)	PM-13

Case	Year 8			
Flow	High Flow Conditions (avg. annual 1-day max 1	low)		٦
n River	flow in river at PM-12	Q_r12_H =	144.35 (cfs)	PM-12
low ii rass	flow in river at PM-13	Q_r13_H =	859.88 (cfs)	PM-13
Total f Embai	flow check	Q_ck_H =	859.88 (cfs)	
	surface water flow into PM-12	Q_s12_H =	143.16 (cfs)	PM-12
	surface water flow into PM-13	Q_s13_H =	702.53 (cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_H =	0.33 (cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_H =	1.99 (cfs)	PM-13
ta	seepage from Tailings Basin Cells 1E and 2E	Q_fs_H =	4.79 (cfs)	PM-13
/ da	hydrometallurgical residue cells liner leakage	Q_rrs_H =	0.01 (cfs)	PM-13
flow data	seepage from cell 2W	Q_s2w_H =	1.99 (cfs)	PM-13
Input 1	ground water flow into PM-12	Q_g12_H =	0.86 (cfs)	PM-12
du	ground water flow into PM-13	Q_g13_H =	4.21 (cfs)	PM-13

Case Parameter	Year 8 Silver		
		-	
	concentration of surface water into PM-12	C_s12 =	0.00011 (mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.00011 (mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00011 (mg/L)
tio	concentration in Area 5 Pit NW discharge	C_spit =	0.00015 (mg/L)
ntration	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.00089 (mg/L)
۵ U	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.000125 (mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	0.000100 (mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.000008 (mg/L)
duj	concentration of ground water into PM-13	C_g13 =	0.000008 (mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.04	(mg/s)	0	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.19	(mg/s)	2	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.12	(mg/s)	0.12	(mg/s)	0.12	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
ຊີ ວິ	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s) (mg/s)		(mg/s)		(mg/s) (mg/s)
		W_110 =	Low Flo		Average		High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L) (mg/L)		(mg/L) (mg/L)		(mg/L) (mg/L)

Case	Year 8			
Parameter	Aluminum			
		1		
	concentration of surface water into PM-12	C_s12 =	0.12	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.12	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.12	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.01325	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	1.01E-01	(mg/L)
ē	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.80E-01	(mg/L)
cone	concentration in tailings basin cell 2W	C_s2w =	1.5788	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.025	(mg/L)
lnp	concentration of ground water into PM-13	C_g13 =	0.025	(mg/L)

			Low Flor	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	42.82	(mg/s)	486	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.61	(mg/s)	0.61	(mg/s)	0.61	(mg/s)
concentration	mass flux in Babbitt WWTP discharge	M_sBab =	1.12	(mg/s)	1.12	(mg/s)	1.12	(mg/s)
itrai	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	208.96	(mg/s)	2,386	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	2.98	(mg/s)	2.98	(mg/s)	2.98	(mg/s)
con	mass flux of Area 5 Pit NW discharge	M_spit =	0.10	(mg/s)	0.75	(mg/s)	0.75	(mg/s)
		M_fs =	13.63	(mg/s)	13.63	(mg/s)	13.63	(mg/s)
Convert	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.06	(mg/s)	0.06	(mg/s)	0.06	(mg/s)
မို ပိ	mass flux in seepage from cell 2W	M_s2w =	89.13	(mg/s)	89.13	(mg/s)	89.13	(mg/s)
		_	Low Flo	W	Average	Flow	High Fl	ow
Mass balance	mass flux in river at PM-12	M_r12 =	1.73	(mg/s)	44.55	(mg/s)	487.90	(mg/s)
Ma	mass flux in river at PM-13	M_r13 =	107.62	(mg/s)	360.05	(mg/s)	2,980.23	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Convert mass flux to	concentration in river at PM-12	C_r12 =	0.051	<u>(mg/L)</u>	0.114	(mg/L)	0.119	(mg/L)
S ≣ S	concentration in river at PM-13	C_r13 =	0.305	(mg/L)	0.144	(mg/L)	0.122	(mg/L)

Case Parameter	Year 8 Arsenic			
	concentration of surface water into PM-12	C_s12 =	0.00075	(mg/L)
ata	concentration of surface water into PM-13	C_s13 =	0.00075	(mg/L)
ρι	concentration in Babbitt WWTP discharge	C_sBab =	0.00075	(mg/L)
ratio	concentration in Area 5 Pit NW discharge	C_spit =	0.001325	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.007035766	(mg/L)
a	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.004	(mg/L)
con	concentration in tailings basin cell 2W	C_s2w =	0.00291	(mg/L)
put	concentration of ground water into PM-12	C_g12 =	0.00273	(mg/L)
Inp	concentration of ground water into PM-13	C_g13 =	0.00273	(mg/L)

			Low Flo	w	Average	Flow	High Fl	low
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.27	(mg/s)	3	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.07	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1.31	(mg/s)	15	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.33	(mg/s)	0.33	(mg/s)	0.33	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.01	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.95	(mg/s)	0.95	(mg/s)	0.95	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
ទ បិ	mass flux in seepage from cell 2W	M_s2w =	0.16	(mg/s)	0.16	(mg/s)	0.16	(mg/s)
			Low Flo	w	Average	Flow	High Fl	low
Mass balance at each node	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 =		(mg/s) (mg/s)		(mg/s) (mg/s)		(mg/s) (mg/s)
< 0		IVI_113 =	Low Flo		Average		High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L) (mg/L)	0.001	(mg/L) (mg/L)		(mg/L) (mg/L)

Case	Year 8			
Parameter	Boron			
		-		
	concentration of surface water into PM-12	C_s12 =	0.027	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.027	(mg/L)
-	concentration in Babbitt WWTP discharge	C_sBab =	0.027	(mg/L)
ţi	concentration in Area 5 Pit NW discharge	C_spit =	0.1315	(mg/L)
ntration	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.140897597	(mg/L)
c)	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.11	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	0.33	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.0212	(mg/L)
duj	concentration of ground water into PM-13	C_g13 =	0.0212	(mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	9.64	(mg/s)	109	(mg/s)
-	mass flux of ground water into PM-12	M_g12 =	0.52	(mg/s)	0.52	(mg/s)	0.52	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.25	(mg/s)	0.25	(mg/s)	0.25	(mg/s)
ıtra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	47.02	(mg/s)	537	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	2.53	(mg/s)	2.53	(mg/s)	2.53	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	0.97	(mg/s)	7.41	(mg/s)	7.41	(mg/s)
	many flux in coopera from Tailings Pasin Collo 1E and 2E	M_fs =	19.10	(mg/s)	19.10	(mg/s)	19.10	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.03	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
မိ မိ	mass flux in seepage from cell 2W	M_s2w =	18.63	(mg/s)	18.63	(mg/s)	18.63	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.77	(mg/s)	10.40	(mg/s)	110.16	(mg/s)
Ma	mass flux in river at PM-13	M_r13 =	42.03	(mg/s)	105.11	(mg/s)	694.66	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to	concentration in river at PM-12	C_r12 =	0.023	(mg/L)	0.027	(mg/L)	0.027	(mg/L)
S all S	concentration in river at PM-13	C_r13 =	0.119	(mg/L)	0.042	(mg/L)	0.029	(mg/L)

Case	Year 8		
Parameter	Barium		
		-	
	concentration of surface water into PM-12	C_s12 =	0.016 (mg/L)
ata	concentration of surface water into PM-13	C_s13 =	0.016 (mg/L)
pu	concentration in Babbitt WWTP discharge	C_sBab =	0.016 (mg/L)
•	concentration in Area 5 Pit NW discharge	C_spit =	0.0044 (mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	5.04E-02 (mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	5.00E-03 (mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	0.09298 (mg/L)
brit	concentration of ground water into PM-12	C_g12 =	0.0681 (mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0681 (mg/L)

			Low Flow	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	5.71	(mg/s)	65	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	1.66	(mg/s)	1.66	(mg/s)	1.66	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.15	(mg/s)	0.15	(mg/s)	0.15	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	27.86	(mg/s)	318	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	8.11	(mg/s)	8.11	(mg/s)	8.11	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	0.03	(mg/s)	0.25	(mg/s)	0.25	(mg/s)
	mass flux in soonage from Tailings Pasin Colls 1E and 2E	M_fs =	6.84	(mg/s)	6.84	(mg/s)	6.84	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
ដ ខ	mass flux in seepage from cell 2W	M_s2w =	5.25	(mg/s)	5.25	(mg/s)	5.25	(mg/s)
			Low Flor	W	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =	1.81	(mg/s)	7.52	(mg/s)	66.63	(mg/s)
a ŭ	mass flux in river at PM-13	M_r13 =		(mg/s)		(mg/s)	405.18	
		-	Low Flor	w	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.054	(mg/L)	0.019	(mg/L)	0.016	(mg/L)
C III C	concentration in river at PM-13	C_r13 =	0.063	(mg/L)	0.022	(mg/L)	0.017	(mg/L)

Case Parameter	Year 8 Beryllium			
		1		
	concentration of surface water into PM-12	C_s12 =	0.0001	(mg/L)
ata	concentration of surface water into PM-13	C_s13 =	0.0001	(mg/L)
ip u	concentration in Babbitt WWTP discharge	C_sBab =	0.0001	(mg/L)
ratio	concentration in Area 5 Pit NW discharge	C_spit =	0.0001	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000543459	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0	(mg/L)
con	concentration in tailings basin cell 2W	C_s2w =	0.00075	(mg/L)
put	concentration of ground water into PM-12	C_g12 =	0.000023	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.000023	(mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.04	(mg/s)	0	(mg/s)
-	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
concentration flux	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.17	(mg/s)	2	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
conc	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in seepage from Tailings Pasin Colls 1E and 2E	M_fs =	0.07	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	-	(mg/s)	-	(mg/s)	-	(mg/s)
t S	mass flux in seepage from cell 2W	M_s2w =	0.04	(mg/s)	0.04	(mg/s)	0.04	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =	0.00	(mg/s)	0.04	(mg/s)	0.41	(mg/s)
Ma At	mass flux in river at PM-13	M_r13 =		(mg/s)		(mg/s)		(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	<u>(mg/L)</u>	0.000	(mg/L)	0.000	(mg/L)
C C	concentration in river at PM-13	C_r13 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Case	Year 8			
Parameter	Calcium			
		1		
	concentration of surface water into PM-12	C_s12 =	15	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	15	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	15	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	95.35	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	72.53696661	(mg/L)
0	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	416	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	59.78	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	19	(mg/L)
dul	concentration of ground water into PM-13	C_g13 =	19	(mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	5,352.95	(mg/s)	60,771	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	462.42	(mg/s)	462.42	(mg/s)	462.42	(mg/s)
tion	mass flux in Babbitt WWTP discharge	M_sBab =	140.09	(mg/s)	140.09	(mg/s)	140.09	(mg/s)
concentration flux	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	26,119.49	(mg/s)	298,224	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	2,263.72	(mg/s)	2,263.72	(mg/s)	2,263.72	(mg/s)
con	mass flux of Area 5 Pit NW discharge	M_spit =	701.59	(mg/s)	5,369.83	(mg/s)	5,369.83	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	9,833.30	(mg/s)	9,833.30	(mg/s)	9,833.30	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	132.27	(mg/s)	132.27	(mg/s)	132.27	(mg/s)
<u>ء</u> ک	mass flux in seepage from cell 2W	M_s2w =	3,374.76		3,374.76		19.01	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 = M r13 =	602.51		5,955.45		61,373.93 377,216.04	
			Low Flo		Average		High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L)	15.249		15.024	
S ≣ S	concentration in river at PM-13	C_r13 =	47.965	(mg/L)	21.223	(mg/l)	15.501	(mg/

Case Parameter	Year 8 Cadmium			
		_		
	concentration of surface water into PM-12	C_s12 =	0.00008	(mg/L)
ata	concentration of surface water into PM-13	C_s13 =	0.00008	(mg/L)
pı	concentration in Babbitt WWTP discharge	C_sBab =	0.00008	(mg/L)
ratio	concentration in Area 5 Pit NW discharge	C_spit =	0.0001	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000383404	(mg/L)
A	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0004	(mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	0.000188	(mg/L)
but	concentration of ground water into PM-12	C_g12 =	0.0003	(mg/L)
lnp	concentration of ground water into PM-13	C_g13 =	0.0003	(mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.03	(mg/s)	0	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itrai	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.14	(mg/s)	2	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.04	(mg/s)	0.04	(mg/s)	0.04	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	man flux in according from Tailings Dasin Calls 15 and 25	M_fs =	0.05	(mg/s)	0.05	(mg/s)	0.05	(mg/s)
Convert	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
ပိ .	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance	mass flux in river at PM-12	M_r12 =	0.01	(mg/s)	0.04	(mg/s)	0.33	(mg/s)
R R		M_r13 =	0.11	(mg/s)	0.28	(mg/s)	2.03	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to	concentration in river at PM-12	C_r12 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
il C	concentration in river at PM-13	C_r13 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Case Parameter	Year 8 Chloride			
		1		
	concentration of surface water into PM-12	C_s12 =	6.5 (1	mg/L)
data	concentration of surface water into PM-13	C_s13 =	6.5 (1	mg/L)
on dá	concentration in Babbitt WWTP discharge	C_sBab =	6.5 (1	mg/L)
ratio	concentration in Area 5 Pit NW discharge	C_spit =	5.95 (1	mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	6.07E+00 (I	mg/L)
concel	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.76E+03 (I	mg/L)
Cor	concentration in tailings basin cell 2W	C_s2w =	21.54 (1	mg/L)
Input	concentration of ground water into PM-12	C_g12 =	1.8 (1	mg/L)
dul	concentration of ground water into PM-13	C_g13 =	1.8 (1	mg/L)

			Low Flor	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	2,319.61	(mg/s)	26,334	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	43.81	(mg/s)	43.81	(mg/s)	43.81	(mg/s)
concentration flux	mass flux in Babbitt WWTP discharge	M_sBab =	60.70	(mg/s)	60.70	(mg/s)	60.70	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	11,318.44	(mg/s)	129,230	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	214.46	(mg/s)	214.46	(mg/s)	214.46	(mg/s)
conc	mass flux of Area 5 Pit NW discharge	M_spit =	43.78	(mg/s)	335.09	(mg/s)	335.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	823.25	(mg/s)	823.25	(mg/s)	823.25	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	559.62	(mg/s)	559.62	(mg/s)	559.62	(mg/s)
<u>و</u> ک	mass flux in seepage from cell 2W	M_s2w =	1,216.00	(mg/s)	1,216.00	(mg/s)	1,216.00	(mg/s)
			Low Flor	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =	104.51		2,424.12		26,438.79	
Ma at	mass flux in river at PM-13	M_r13 =	2,961.63		16,890.98 Average		158,817.61 High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L)		(mg/L)		(mg/L)

Case Parameter	Year 8 Cobalt			
	concentration of surface water into PM-12	C_s12 =	0.0006	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0006	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0006	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.000555	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.002321539	(mg/L)
-	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.005	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	0.001556	(mg/L)
-	concentration of ground water into PM-12	C_g12 =	0.0011	(mg/L)
Input	concentration of ground water into PM-13	C_g13 =	0.0011	(mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.21	(mg/s)	2	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.03	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1.04	(mg/s)	12	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.13	(mg/s)	0.13	(mg/s)	0.13	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
		M_fs =	0.31	(mg/s)	0.31	(mg/s)	0.31	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M rrs =		(mg/s)		(mg/s)		(mg/s)
မိ မိ		M_s2w =		(mg/s)		(mg/s)		(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.03	(mg/s)	0.25	(mg/s)	2.46	(mg/s)
Ma	mass flux in river at PM-13	M_r13 =	0.57	(mg/s)	1.86	(mg/s)	14.96	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to	concentration in river at PM-12	C_r12 =	0.001	(mg/L)	0.001	(mg/L)	0.001	(mg/L)
flu Cc	concentration in river at PM-13	C_r13 =	0.002	(mg/L)	0.001	(mg/L)	0.001	(mg/L)

Case Parameter	Year 8 Copper			
	concentration of surface water into PM-12	C_s12 =	0.0015	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0015	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0015	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.00345	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.00854201	(mg/L)
0	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0015	(mg/L)
cone	concentration in tailings basin cell 2W	C_s2w =	0.004555	(mg/L)
rt	concentration of ground water into PM-12	C_g12 =	0.004	(mg/L)
nduj	concentration of ground water into PM-13	C_g13 =	0.004	(mg/L)

		Low Flor	w	Average	Flow	High Fl	ow
flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.54	(mg/s)	6	(mg/s)
flux of ground water into PM-12	M_g12 =	0.10	(mg/s)	0.10	(mg/s)	0.10	(mg/s)
flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
flux of surface water into PM-13	M_s13 =	-	(mg/s)	2.61	(mg/s)	30	(mg/s)
flux of ground water into PM-13	M_g13 =	0.48	(mg/s)	0.48	(mg/s)	0.48	(mg/s)
flux of Area 5 Pit NW discharge	M_spit =	0.03	(mg/s)	0.19	(mg/s)	0.19	(mg/s)
flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.16	(mg/s)	1.16	(mg/s)	1.16	(mg/s)
flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
flux in seepage from cell 2W	M_s2w =	0.26	(mg/s)	0.26	(mg/s)	0.26	(mg/s)
		Low Flor	w	Average	Flow	High Fl	ow
flux in river at PM-12 flux in river at PM-13	M_r12 =		(mg/s)		(mg/s)		(mg/s)
nux in river at PM-13	IVI_F13 =	Low Flo	(mg/s) w	5.35 Average	(mg/s) Flow	38.10 High Fl	(mg/s) ow
entration in river at PM-12	C_r12 =		(mg/L)		(mg/L)		(mg/L)

Case Parameter	Year 8 Fluoride			
	concentration of surface water into PM-12	C s12 =	0.2	(mg/L)
ata	concentration of surface water into PM-12	C_s12 = C_s13 =		(mg/L)
р	concentration in Babbitt WWTP discharge	C_sBab =	0.2	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.125	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	7.89E-01	(mg/L)
8	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	2.85E+00	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	1.55	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.385	(mg/L)
lnp	concentration of ground water into PM-13	C_g13 =	0.385	(mg/L)

			Low Flor	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	71.37	(mg/s)	810	(mg/s)
-	mass flux of ground water into PM-12	M_g12 =	9.37	(mg/s)	9.37	(mg/s)	9.37	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	1.87	(mg/s)	1.87	(mg/s)	1.87	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	348.26	(mg/s)	3,976	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	45.87	(mg/s)	45.87	(mg/s)	45.87	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.92	(mg/s)	7.04	(mg/s)	7.04	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	106.94	(mg/s)	106.94	(mg/s)	106.94	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.91	(mg/s)	0.91	(mg/s)	0.91	(mg/s)
to_C	mass flux in seepage from cell 2W	M_s2w =		(mg/s)		(mg/s)	87.50	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =	253.37	(mg/s)	82.61	(mg/s)	5,046.10	
		W_110 =	Low Flo		Average		High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L) (mg/L)		(mg/L) (mg/L)		(mg/L) (mg/L)

Case	Year 8		
Parameter	Iron		
		-	
	concentration of surface water into PM-12	C_s12 =	2.9 (mg/L)
ata	concentration of surface water into PM-13	C_s13 =	2.9 (mg/L)
pr	concentration in Babbitt WWTP discharge	C_sBab =	2.9 (mg/L)
ratio	concentration in Area 5 Pit NW discharge	C_spit =	0.037761905 (mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	5.80E-02 (mg/L)
ICE	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	4.00E-01 (mg/L)
con	concentration in tailings basin cell 2W	C_s2w =	4.594 (mg/L)
but	concentration of ground water into PM-12	C_g12 =	0.035 (mg/L)
	concentration of ground water into PM-13	C_g13 =	0.035 (mg/L)

			Low Flor	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	1,034.90	(mg/s)	11,749	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.85	(mg/s)	0.85	(mg/s)	0.85	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	27.08	(mg/s)	27.08	(mg/s)	27.08	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	5,049.77	(mg/s)	57,657	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	4.17	(mg/s)	4.17	(mg/s)	4.17	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.28	(mg/s)	2.13	(mg/s)	2.13	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	7.86	(mg/s)	7.86	(mg/s)	7.86	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.13	(mg/s)	0.13	(mg/s)	0.13	(mg/s)
ទ ប្	mass flux in seepage from cell 2W	M_s2w =	259.35	(mg/s)	259.35	(mg/s)	259.35	(mg/s)
			Low Floy	W	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 = M r13 =	27.93	(mg/s)	1,062.84		69,707.34	
20		IVI_I 13 =	Low Flor		Average		High Fl	· · ·
Convert mass flux to concentration	concentration in river at PM-12	C_r12 = C_r13 =		(mg/L) (mg/L)		(mg/L) (mg/L)		(mg/L) (mg/L)

Case Parameter	Year 8 Hardness			
	concentration of surface water into PM-12	C_s12 =	70	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	70	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	70	(mg/L)
ation	concentration in Area 5 Pit NW discharge	C_spit =	942.7142857	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	2.52E+02	(mg/L)
Icel	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	8.61E+03	(mg/L)
con	concentration in tailings basin cell 2W	C_s2w =	436.6	(mg/L)
ont	concentration of ground water into PM-12	C_g12 =	87.5	(mg/L)
ıdul	concentration of ground water into PM-13	C_g13 =	87.5	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	24,980.41	(mg/s)	283,600	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	2,129.58	(mg/s)	2,129.58	(mg/s)	2,129.58	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	653.73	(mg/s)	653.73	(mg/s)	653.73	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	121,890.93	(mg/s)	1,391,712	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	10,425.01	(mg/s)	10,425.01	(mg/s)	10,425.01	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	6,936.49	(mg/s)	53,090.84	(mg/s)	53,090.84	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	34,228.62	(mg/s)	34,228.62	(mg/s)	34,228.62	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	2,737.70	(mg/s)	2,737.70	(mg/s)	2,737.70	(mg/s)
ទ បិ	mass flux in seepage from cell 2W	M_s2w =	24,647.41	(mg/s)	24,647.41	(mg/s)	24,647.41	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =	2,783.31		27,763.72		286,383.27	
a 2	mass flux in river at PM-13	M_r13 =	81,758.54 Low Flo		274,784.23 Average		1,803,224.78 High Fl	
Convert mass flux to concentration	concentration in river at PM-12 concentration in river at PM-13	C_r12 =	82.647	(mg/L)	71.091	(mg/L)	70.104	(mg/L)

Case Parameter	Year 8 Potassium		
rarameter	rotassium	1	
	concentration of surface water into PM-12	C_s12 =	0.60 (mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.60 (mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.60 (mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	53.80 (mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	6.73 (mg/L)
d)	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.80 (mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	7.77 (mg/L)
nput	concentration of ground water into PM-12	C_g12 =	1.60 (mg/L)
lnp	concentration of ground water into PM-13	C_g13 =	1.60 (mg/L)

			Low Flor	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	214.12	(mg/s)	2,431	(mg/s)
-	mass flux of ground water into PM-12	M_g12 =	38.94	(mg/s)	38.94	(mg/s)	38.94	(mg/s)
concentration flux	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.57	(mg/s)	0.57	(mg/s)	0.57	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1,044.78	(mg/s)	11,929	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	190.63	(mg/s)	190.63	(mg/s)	190.63	(mg/s)
conc flux	mass flux in Babbitt WWTP discharge	M_sBab =	5.60	(mg/s)	5.60	(mg/s)	5.60	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	395.86	(mg/s)	3,029.85	(mg/s)	3,029.85	(mg/s)
Convert to mass	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	912.75	(mg/s)	912.75	(mg/s)	912.75	(mg/s)
န် ပိ	mass flux in seepage from cell 2W	M_s2w =	438.64	(mg/s)	438.64	(mg/s)	438.64	(mg/s)
			Low Flor	W	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 = M_r13 =	39.51		253.63		2,470.37	
			Low Flor	w	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	1.173	(mg/L)	0.649	(mg/L)	0.605	(mg/l) (mg/l)

Case Parameter	Year 8 Magnesium			
	concentration of surface water into PM-12	C_s12 =	5.90	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	5.90	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	5.90	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	271.00	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	17.33	(mg/L)
a	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	213.00	(mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	69.97	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	10.65	(mg/L)
lnp	concentration of ground water into PM-13	C_g13 =	10.65	(mg/L)

			Low Flor	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	2,105.49	(mg/s)	23,903	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	259.20	(mg/s)	259.20	(mg/s)	259.20	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	55.10	(mg/s)	55.10	(mg/s)	55.10	(mg/s)
itrai	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	10,273.66	(mg/s)	117,301	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	1,268.87	(mg/s)	1,268.87	(mg/s)	1,268.87	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	1,994.02	(mg/s)	15,261.91	(mg/s)	15,261.91	(mg/s)
		M_fs =	2,349.41	(mg/s)	2,349.41	(mg/s)	2,349.41	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	67.73	(mg/s)	67.73	(mg/s)	67.73	(mg/s)
<u>۽</u> ک	mass flux in seepage from cell 2W	M_s2w =	3,950.02	(mg/s)	3,950.02	(mg/s)	3,950.02	(mg/s)
		_	Low Flor	W	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12	M_r12 =	314.30	(mg/s)	2,419.79	(mg/s)	24,217.73	(mg/s)
Ma	mass flux in river at PM-13	M_r13 =	9,944.35		35,591.39		164,417.09	
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to	concentration in river at PM-12	C_r12 =	9.333	(mg/L)	6.196	(mg/l)	5.928	(mg/l)
o tin	concentration in river at PM-13	C_r13 =	28.210	(mg/L)	14.239	(mg/l)	6.757	(mg/l)
Case	Year 8							
-----------	-----------------------------------------------------------------	----------	------	--------				
Parameter	Manganese							
		-						
	concentration of surface water into PM-12	C_s12 =	0.30	(mg/L)				
ata	concentration of surface water into PM-13	C_s13 =	0.30	(mg/L)				
q	concentration in Babbitt WWTP discharge	C_sBab =	0.30	(mg/L)				
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.49	(mg/L)				
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.30	(mg/L)				
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.00	(mg/L)				
cor	concentration in tailings basin cell 2W	C_s2w =	1.18	(mg/L)				
put	concentration of ground water into PM-12	C_g12 =	0.19	(mg/L)				
	concentration of ground water into PM-13	C_g13 =	0.19	(mg/L)				

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	107.06	(mg/s)	1,215	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	4.58	(mg/s)	4.58	(mg/s)	4.58	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	2.80	(mg/s)	2.80	(mg/s)	2.80	(mg/s)
ıtra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	522.39	(mg/s)	5,964	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	22.40	(mg/s)	22.40	(mg/s)	22.40	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	3.57	(mg/s)	27.31	(mg/s)	27.31	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	40.29	(mg/s)	40.29	(mg/s)	40.29	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
<u>۽</u> ک	mass flux in seepage from cell 2W	M_s2w =	66.78	(mg/s)	66.78	(mg/s)	66.78	(mg/s)
		_	Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 = M r13 =	7.38	(mg/s) (mg/s)	793.61		1,222.81	
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12 concentration in river at PM-13	C_r12 =		(mg/L) (mg/L)	0.293	(mg/l)	0.299	(mg/l)

Case Parameter	Year 8 Sodium			
	concentration of surface water into PM-12	C s12 =	6.00	(mg/L)
lata	concentration of surface water into PM-13	C_s13 =		(mg/L)
-0	concentration in Babbitt WWTP discharge	C_sBab =	6.00	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	119.50	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	18.93	(mg/L)
ncei	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	255.00	(mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	44.31	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	4.90	(mg/L)
qul	concentration of ground water into PM-13	C_g13 =	4.90	(mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	2,141.18	(mg/s)	24,309	(mg/s)
-	mass flux of ground water into PM-12	M_g12 =	119.26	(mg/s)	119.26	(mg/s)	119.26	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	56.03	(mg/s)	56.03	(mg/s)	56.03	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	10,447.79	(mg/s)	119,290	
cen	mass flux of ground water into PM-13	M_g13 =	583.80	(mg/s)	583.80	(mg/s)	583.80	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	879.28	(mg/s)	6,729.88	(mg/s)	6,729.88	(mg/s)
	mass flux in second of from Tailings Reain Calls 1F and 0F	M_fs =	2,566.23	(mg/s)	2,566.23	(mg/s)	2,566.23	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =		(mg/s)	81.08	(mg/s)	81.08	(mg/s)
te C	mass flux in seepage from cell 2W	M_s2w =	2,501.44	(mg/s)	2,501.44	(mg/s)	2,501.44	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =	175.29	(mg/s)	2,316.47	(mg/s)	24,483.86	(mg/s)
at M	mass flux in river at PM-13	M_r13 =	6,787.12		25,226.70		156,235.89	
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	5.205	(mg/L)	5.931	(mg/l)	5.993	(mg/l)
Col	concentration in river at PM-13	C_r13 =	19.254	(mg/L)	10.092	(mg/l)	6.420	(mg/l)

Case	Year 8			
Parameter	Nickel			
		-		
	concentration of surface water into PM-12	C_s12 =	0.0012	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0012	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0012	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.0052	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.038551821	(mg/L)
c)	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.098	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	0.00688	(mg/L)
out	concentration of ground water into PM-12	C_g12 =	0.007	(mg/L)
Input	concentration of ground water into PM-13	C_g13 =	0.007	(mg/L)

			Low Flo	W	Average	Flow	High Fl	low
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.43	(mg/s)	5	(mg/s)
-	mass flux of ground water into PM-12	M_g12 =	0.17	(mg/s)	0.17	(mg/s)	0.17	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	2.09	(mg/s)	24	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.83	(mg/s)	0.83	(mg/s)	0.83	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.04	(mg/s)	0.29	(mg/s)	0.29	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	5.23	(mg/s)	5.23	(mg/s)	5.23	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =		(mg/s)		(mg/s)	0.03	(mg/s)
<u>۽</u> ک	mass flux in seepage from cell 2W	M_s2w =	0.39	(mg/s)	0.39	(mg/s)	0.39	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s)		(mg/s)		(mg/s)
2 0	mass flux in river at PM-13	M_r13 =	6.70	(mg/s) w	9.47 Average	(mg/s) Flow	35.67 High Fl	(mg/s)
Convert mass flux to concentration		C_r12 =		(mg/L) (mg/L)	0.002	(mg/L)	0.001	(mg/L) (mg/L)

Case	Year 8		
Parameter	Lead		
	1		
	concentration of surface water into PM-12	C_s12 =	0.00015 (mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.00015 (mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00015 (mg/L)
tio	concentration in Area 5 Pit NW discharge	C_spit =	0.0003 (mg/L)
ntration	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.001239552 (mg/L)
۵	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0005 (mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	0.0012 (mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.0012 (mg/L)
넵	concentration of ground water into PM-13	C_g13 =	0.0012 (mg/L)

			Low Flo	w	Average	Flow	High Fl	low
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.05	(mg/s)	1	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.03	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.26	(mg/s)	3	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.14	(mg/s)	0.14	(mg/s)	0.14	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.02	(mg/s)	0.02	(mg/s)
		M_fs =	0.17	(mg/s)	0.17	(mg/s)	0.17	(mg/s)
Convert	mass flux in hydrometallurgical residue cells liner leakage	M rrs =		(mg/s)		(mg/s)		(mg/s)
မိ မိ	mass flux in seepage from cell 2W	M_s2w =		(mg/s)		(mg/s)		(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance	mass flux in river at PM-12	M_r12 =	0.03	(mg/s)	0.08	(mg/s)	0.64	(mg/s)
Ma		M_r13 =	0.41	(mg/s)	0.74	(mg/s)	4.02	(mg/s)
			Low Flo	w	Average	Flow	High Fl	low
Convert mass flux to	concentration in river at PM-12	C_r12 =	0.001	(mg/L)		(mg/L)	0.000	(mg/L)
C ≓ C	concentration in river at PM-13	C_r13 =	0.001	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Case Parameter	Year 8 Antimony			
	encontration of environmentariate DM 40	0 -10	4 005 05	(
a D	concentration of surface water into PM-12	C_s12 =	4.00E-05	· • /
data	concentration of surface water into PM-13	C_s13 =	4.00E-05	· • /
o uo	concentration in Babbitt WWTP discharge	C_sBab =	4.00E-05	
ation	concentration in Area 5 Pit NW discharge	C_spit =	2.50E-04	(mg/L)
ntr	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	8.28E-03	(mg/L)
JCe	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.004	(mg/L)
COL	concentration in tailings basin cell 2W	C_s2w =	2.50E-04	(mg/L)
but	concentration of ground water into PM-12	C_g12 =	1.50E-03	(mg/L)
	concentration of ground water into PM-13	C_g13 =	1.50E-03	(mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.01	(mg/s)	0	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.04	(mg/s)	0.04	(mg/s)	0.04	(mg/s)
tion	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.07	(mg/s)	1	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.18	(mg/s)	0.18	(mg/s)	0.18	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.12	(mg/s)	1.12	(mg/s)	1.12	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =		(mg/s)	0.00	(mg/s)	0.00	(mg/s)
<u>ء</u> ک	mass flux in seepage from cell 2W	M_s2w =		(mg/s)	0.01	(mg/s)	0.01	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s) (mg/s)		(mg/s) (mg/s)		(mg/s) (mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L) (mg/L)		(mg/L) (mg/L)		(mg/L) (mg/L)

Case	Year 8		
Parameter	Selenium	1	
	concentration of surface water into PM-12	C_s12 =	0.0003 (mg/L)
ata	concentration of surface water into PM-13	C_s13 =	0.0003 (mg/L)
üp u	concentration in Babbitt WWTP discharge	C_sBab =	0.0003 (mg/L)
•	concentration in Area 5 Pit NW discharge	C_spit =	0.0016 (mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.001331851 (mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.054 (mg/L)
con	concentration in tailings basin cell 2W	C_s2w =	0.00109 (mg/L)
but	concentration of ground water into PM-12	C_g12 =	0.00295 (mg/L)
	concentration of ground water into PM-13	C_g13 =	0.00295 (mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.11	(mg/s)	1	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.07	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
ıtra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.52	(mg/s)	6	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.35	(mg/s)	0.35	(mg/s)	0.35	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	0.01	(mg/s)	0.09	(mg/s)	0.09	(mg/s)
	mass flux is assessed from Tailings Basis Calls 1F and 0F	M_fs =	0.18	(mg/s)	0.18	(mg/s)	0.18	(mg/s)
Convert	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.02	(mg/s)	0.02	(mg/s)	0.02	(mg/s)
န ပိ	mass flux in seepage from cell 2W	M_s2w =	0.06	(mg/s)	0.06	(mg/s)	0.06	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance		M_r12 =	0.07	(mg/s)	0.18	(mg/s)	1.29	(mg/s)
Š,	mass flux in river at PM-13	M_r13 =		(mg/s)		(mg/s)		(mg/s)
		_	Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to	concentration in river at PM-12	C_r12 =	0.002	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
C C C	concentration in river at PM-13	C_r13 =	0.002	(mg/L)	0.001	(mg/L)	0.000	(mg/L)

Case	Year 8		
Parameter	Sulfate		
		-	
	concentration of surface water into PM-12	C_s12 =	4.00 (mg/L)
data	concentration of surface water into PM-13	C_s13 =	4.00 (mg/L)
-	concentration in Babbitt WWTP discharge	C_sBab =	4.00 (mg/L)
tio	concentration in Area 5 Pit NW discharge	C_spit =	1046.27 (mg/L)
ntration	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	153.28 (mg/L)
ن	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	7347.00 (mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	152.40 (mg/L)
Input	concentration of ground water into PM-12	C_g12 =	8.50 (mg/L)
du	concentration of ground water into PM-13	C_g13 =	8.50 (mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
mas	ss flux of surface water into PM-12	M_s12 =	-	(mg/s)	1,427.45	(mg/s)	16,206	(mg/s)
mas	ss flux of ground water into PM-12	M_g12 =	206.87	(mg/s)	206.87	(mg/s)	206.87	(mg/s)
in mas	ss flux in Babbitt WWTP discharge	M_sBab =	37.36	(mg/s)	37.36	(mg/s)	37.36	(mg/s)
mas mas	ss flux of surface water into PM-13	M_s13 =	-	(mg/s)	6,965.20	(mg/s)	79,526	(mg/s)
u mas	ss flux of ground water into PM-13	M_g13 =	1,012.72	(mg/s)	1,012.72	(mg/s)	1,012.72	(mg/s)
sem concentration sem was mage and as as as as as as as as as as as as as	ss flux of Area 5 Pit NW discharge	M_spit =	7,698.43	(mg/s)	58,922.60	(mg/s)	58,922.60	(mg/s)
	ss flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	20,779.12	(mg/s)	20,779.12	(mg/s)	20,779.12	(mg/s)
Convert Convert Convert Convert	ss flux in hydrometallurgical residue cells liner leakage	M_rrs =	2,336.11	(mg/s)	2,336.11		2,336.11	
S 📮 mas	ss flux in seepage from cell 2W	M_s2w =	8,603.45		8,603.45		8,603.45	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
ass ba each r	ss flux in river at PM-12	M_r12 =	244.23		1,671.68		16,449.94	
		<u></u>	Low Flo		Average		High Fl	
onvert ux to oncent	centration in river at PM-12	C_r12 =		(mg/L)		(mg/l)	4.027	
ບ ≓ ັ con	centration in river at PM-13	C_r13 =	115.384	(mg/L)	40.122	(mg/l)	7.710	(mg/l)

Case Parameter	Year 8 Thallium			
	concentration of surface water into PM-12	C s12 =	0.0002	(mg/L)
ata	concentration of surface water into PM-12	$C_{s12} = C_{s13} =$	0.0002	
n da	concentration in Babbitt WWTP discharge	C_sBab =	0.0002	``
ratio	concentration in Area 5 Pit NW discharge	C_spit =	0.0006	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000934618	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0002	(mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	0.0002	(mg/L)
but	concentration of ground water into PM-12	C_g12 =	0.000004	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.000004	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.07	(mg/s)	1	(mg/s)
-	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
tion	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.35	(mg/s)	4	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
	mass flux in second of from Tailings Reain Calls 1F and 0F	M_fs =	0.13	(mg/s)	0.13	(mg/s)	0.13	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
<u>ب</u> د	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =	0.00	(mg/s)	0.07	(mg/s)	0.81	(mg/s)
at B	mass flux in river at PM-13	M_r13 =		(mg/s)		(mg/s)		(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
o Co tilu	concentration in river at PM-13	C_r13 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Case Parameter	Year 8 Zinc			
		•		
	concentration of surface water into PM-12	C_s12 =	0.016	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.016	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.016	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.003	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.029073121	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.01	(mg/L)
con	concentration in tailings basin cell 2W	C_s2w =	0.01435	(mg/L)
put	concentration of ground water into PM-12	C_g12 =	0.0115	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0115	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	5.71	(mg/s)	65	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.28	(mg/s)	0.28	(mg/s)	0.28	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.15	(mg/s)	0.15	(mg/s)	0.15	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	27.86	(mg/s)	318	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	1.37	(mg/s)	1.37	(mg/s)	1.37	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.02	(mg/s)	0.17	(mg/s)	0.17	(mg/s)
	mana flux in according from Tailings Desig Calls 1E and 0E	M_fs =	3.94	(mg/s)	3.94	(mg/s)	3.94	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
Co to	mass flux in seepage from cell 2W	M_s2w =		(mg/s)	0.81	(mg/s)		(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 = M r13 =		(mg/s) (mg/s)		(mg/s)	65.25	(mg/s)
		<u>-</u>	Low Flo		Average		High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L) (mg/L)		(mg/L)		(mg/L) (mg/L)

Appendix F.4 Embarrass River Proposed Action Year 9

FLOWS

Case	Year 9				
Flows	Low Flow Conditions (no surface runoff)				Node
in : River	flow in river at PM-12	Q_r12_L =	1.19	(cfs)	PM-12
Total flow in Embarrass Ri	flow in river at PM-13	Q_r13_L =	12.93	(cfs)	PM-13
Tota Emb	flow check	Q_ck_L =	12.93	(cfs)	_
	surface water flow into PM-12	Q_s12_L =	0.00	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_L =	0.00	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_L =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_L =	0.26	(cfs)	PM-13
ta	seepage from Tailings Basin Cells 1E and 2E	Q_fs_L =	5.26	(cfs)	PM-13
/ da	hydrometallurgical residue cells liner leakage	Q_rrs_L =	0.01	(cfs)	PM-13
nput flow data	seepage from cell 2W	Q_s2w_L =	1.99	(cfs)	PM-13
out 1	ground water flow into PM-12	Q_g12_L =	0.86	(cfs)	PM-12
dul	ground water flow into PM-13	Q_g13_L =	4.21	(cfs)	PM-13

Case	Year 9				
Flow	Average Flow Conditions (mean annual)				_
n River	flow in river at PM-12	Q_r12_M =	13.80	(cfs)	PM-12
Total flow in Embarrass F	flow in river at PM-13	Q_r13_M =	88.80	(cfs)	PM-13
Total Embi	flow check	Q_ck_M =	88.80	(cfs)	4
	surface water flow into PM-12	Q_s12_M =	12.61	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_M =	61.53	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_M =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_M =	1.99	(cfs)	PM-13
ta	seepage from Tailings Basin Cells 1E and 2E	Q_fs_M =	5.26	(cfs)	PM-13
, da	hydrometallurgical residue cells liner leakage	Q_rrs_M =	0.01	(cfs)	PM-13
lo w	seepage from cell 2W	Q_s2w_M =	1.99	(cfs)	PM-13
nput flow data	ground water flow into PM-12	Q_g12_M =	0.86	(cfs)	PM-12
dul	ground water flow into PM-13	Q_g13_M =	4.21	(cfs)	PM-13

Case	Year 9				
Flow	High Flow Conditions (avg. annual 1-day ma	ax flow)			
n River	flow in river at PM-12	Q_r12_H =	144.35	(cfs)	PM-12
flow iı rrass	flow in river at PM-13	Q_r13_H =	860.35	(cfs)	PM-13
Total 1 Embai	flow check	Q_ck_H =	860.35	(cfs)	
	surface water flow into PM-12	Q_s12_H =	143.16	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_H =	702.53	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_H =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_H =	1.99	(cfs)	PM-13
ta	seepage from Tailings Basin Cells 1E and 2E	Q_fs_H =	5.26	(cfs)	PM-13
/ da	hydrometallurgical residue cells liner leakage	Q_rrs_H =	0.01	(cfs)	PM-1
flow data	seepage from cell 2W	Q_s2w_H =	1.99	(cfs)	PM-1
Ę	ground water flow into PM-12	Q_g12_H =	0.86	(cfs)	PM-12
du	ground water flow into PM-12 ground water flow into PM-13	Q g13 H =	4.21	(cfs)	PM-13

Case	Year 9		
Parameter	Silver		
	concentration of surface water into PM-12	C_s12 =	0.00011 (mg/L)
lata	concentration of surface water into PM-13	C_s13 =	0.00011 (mg/L)
-0	concentration in Babbitt WWTP discharge	C_sBab =	0.00011 (mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.00015 (mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.00090 (mg/L)
ncei	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.000125 (mg/L)
con	concentration in tailings basin cell 2W	C_s2w =	0.000100 (mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.000008 (mg/L)
dul	concentration of ground water into PM-13	C_g13 =	0.000008 (mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0	(mg/s)	0	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0	(mg/s)	2	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	man flux in according from Tailings Basin Calls 15 and 25	M_fs =	0.13	(mg/s)	0.13	(mg/s)	0.13	(mg/s)
Convert	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
ပိ	2 mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 =		(mg/s)		(mg/s)		(mg/s)
2	mass flux in river at PM-13	M_r13 =	0.14 Low Flo	(mg/s)	0.38 Average	(mg/s)	2.78 High Fl	(mg/s)
Convert mass flux to	concentration in river at PM-12	C_r12 =		(mg/L)		(mg/L)		(mg/L)
ŭĘ	concentration in river at PM-13	C_r13 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Case	Year 9			
Parameter	Aluminum			
		-		
	concentration of surface water into PM-12	C_s12 =	0.12	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.12	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.12	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.01325	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	1.07E-01	(mg/L)
ē	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.80E-01	(mg/L)
cone	concentration in tailings basin cell 2W	C_s2w =	1.5788	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.025	(mg/L)
lnp	concentration of ground water into PM-13	C_g13 =	0.025	(mg/L)

			Low Flo	w	Average	Flow	High Fl	low
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	43	(mg/s)	486	(mg/s)
-	mass flux of ground water into PM-12	M_g12 =	0.61	(mg/s)	0.61	(mg/s)	0.61	(mg/s)
concentration flux	mass flux in Babbitt WWTP discharge	M_sBab =	1.12	(mg/s)	1.12	(mg/s)	1.12	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	209	(mg/s)	2,386	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	2.98	(mg/s)	2.98	(mg/s)	2.98	(mg/s)
conc	mass flux of Area 5 Pit NW discharge	M_spit =	0.10	(mg/s)	0.75	(mg/s)	0.75	(mg/s)
	mana flux in anonago from Tailinga Danin Callo 1E and OE	M_fs =	15.88	(mg/s)	15.88	(mg/s)	15.88	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.07	(mg/s)		(mg/s)	0.07	(mg/s)
<u>۽</u> ک	mass flux in seepage from cell 2W	M_s2w =	89.13	(mg/s)	89.13	(mg/s)	89.13	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =	1.73	(mg/s)	44.55	(mg/s)	487.90	
			Low Flo	w	Average	Flow	High Fl	low
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L) (mg/L)		(mg/L) (mg/L)		(mg/L) (mg/L)

Case Parameter	Year 9 Arsenic			
	concentration of surface water into PM-12	C s12 =	0.00075	(mg/L)
ata	concentration of surface water into PM-12	C_s13 =	0.00075	ι υ /
q	concentration in Babbitt WWTP discharge	C_sBab =	0.00075	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.001325	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.007592467	(mg/L)
ICEI	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.004	(mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	0.00291	(mg/L)
put	concentration of ground water into PM-12	C_g12 =	0.00273	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.00273	(mg/L)

			Low Flo	W	Average	Flow	High Fl	low
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0	(mg/s)	3	(mg/s)
-	mass flux of ground water into PM-12	M_g12 =	0.07	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1	(mg/s)	15	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.33	(mg/s)	0.33	(mg/s)	0.33	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.01	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.13	(mg/s)	1.13	(mg/s)	1.13	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		(mg/s)	0.00	(mg/s)
<u>ءَ</u> ک	mass flux in seepage from cell 2W	M_s2w =	0.16	(mg/s)		(mg/s)	0.16	(mg/s)
			Low Flo	w	Average	Flow	High Fl	low
Mass balance at each node	mass flux in river at PM-12	M_r12 =		(mg/s)		(mg/s)		(mg/s)
at ñ	mass flux in river at PM-13	M_r13 =	1.70 Low Flo	(mg/s)	3.34 Average	(mg/s)	19.72 High Fl	(mg/s)
Convert mass flux to concentration	concentration in river at PM-12 concentration in river at PM-13	C_r12 =	0.002	(mg/L) (mg/L)	0.001	(mg/L)	0.001	(mg/L) (mg/L)

Case Parameter	Year 9 Boron		
	concentration of surface water into PM-12	C_s12 =	0.027 (mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.027 (mg/L)
-	concentration in Babbitt WWTP discharge	C_sBab =	0.027 (mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.1315 (mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.145082047 (mg/L)
A	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.11 (mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	0.33 (mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.0212 (mg/L)
법	concentration of ground water into PM-13	C_g13 =	0.0212 (mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	10	(mg/s)	109	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.52	(mg/s)	0.52	(mg/s)	0.52	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.25	(mg/s)	0.25	(mg/s)	0.25	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	47	(mg/s)	537	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	2.53	(mg/s)	2.53	(mg/s)	2.53	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	0.97	(mg/s)	7.41	(mg/s)	7.41	(mg/s)
	mass flux in assesses from Tailings Basin Calls 1E and 0E	M_fs =	21.59	(mg/s)	21.59	(mg/s)	21.59	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.04	(mg/s)	0.04	(mg/s)	0.04	(mg/s)
မိ မိ		M_s2w =		(mg/s)		(mg/s)		(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =	0.77	(mg/s)	10.40	(mg/s)	110.16	(mg/s)
a ŭ	mass flux in river at PM-13	M_r13 =		(mg/s)	107.61		697.15	
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to	concentration in river at PM-12	C_r12 =	0.023	(mg/L)	0.027	(mg/L)	0.027	(mg/L)
co flu:	concentration in river at PM-13	C_r13 =	0.122	(mg/L)	0.043	(mg/L)	0.029	(mg/L)

Case Parameter	Year 9 Barium		
i ulullotoi			
	concentration of surface water into PM-12	C_s12 =	0.016 (mg/L)
ata	concentration of surface water into PM-13	C_s13 =	0.016 (mg/L)
n dâ	concentration in Babbitt WWTP discharge	C_sBab =	0.016 (mg/L)
•	concentration in Area 5 Pit NW discharge	C_spit =	0.0044 (mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	5.05E-02 (mg/L)
<u>.</u>	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	5.00E-03 (mg/L)
con	concentration in tailings basin cell 2W	C_s2w =	0.09298 (mg/L)
put	concentration of ground water into PM-12	C_g12 =	0.0681 (mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0681 (mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	6	(mg/s)	65	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	1.66	(mg/s)	1.66	(mg/s)	1.66	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.15	(mg/s)	0.15	(mg/s)	0.15	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	28	(mg/s)	318	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	8.11	(mg/s)	8.11	(mg/s)	8.11	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	0.03	(mg/s)	0.25	(mg/s)	0.25	(mg/s)
	mass flux in soonage from Tailings Pasin Colls 1E and 2E	M_fs =	7.51	(mg/s)	7.51	(mg/s)	7.51	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
ដ ខ	mass flux in seepage from cell 2W	M_s2w =	5.25	(mg/s)	5.25	(mg/s)	5.25	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =	1.81	(mg/s)	7.52	(mg/s)	66.63	(mg/s)
a ŭ	mass flux in river at PM-13	M_r13 =		(mg/s)		(mg/s)	405.86	
		-	Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.054	(mg/L)	0.019	(mg/L)	0.016	(mg/L)
C C	concentration in river at PM-13	C_r13 =	0.062	(mg/L)	0.022	(mg/L)	0.017	(mg/L)

Case Parameter	Year 9 Beryllium		
		-	
	concentration of surface water into PM-12	C_s12 =	0.0001 (mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0001 (mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0001 (mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.0001 (mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.00056357 (mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0 (mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	0.00075 (mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.000023 (mg/L)
법	concentration of ground water into PM-13	C_g13 =	0.000023 (mg/L)

			Low Flow	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0	(mg/s)	0	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
concentration flux	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0	(mg/s)	2	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
conc	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.08	(mg/s)	0.08	(mg/s)	0.08	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	-	(mg/s)	-	(mg/s)	-	(mg/s)
Co to	mass flux in seepage from cell 2W	M_s2w =	0.04	(mg/s)	0.04	(mg/s)	0.04	(mg/s)
			Low Flor	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s)		(mg/s)		(mg/s)
a 2	mass flux in river at PM-13	M_r13 =	0.13 Low Flor	(mg/s)	Average	(mg/s) Flow	2.53 High Fl	(mg/s)
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L)		(mg/L)		(mg/L)

Case Parameter	Year 9 Calcium			
		-		
	concentration of surface water into PM-12	C_s12 =	15	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	15	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	15	(mg/L)
tio	concentration in Area 5 Pit NW discharge	C_spit =	95.35	(mg/L)
ntration	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	75.53238205	(mg/L)
CD CD	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	416	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	59.78	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	19	(mg/L)
du	concentration of ground water into PM-13	C_g13 =	19	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	5,352.95	(mg/s)	60,771	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	462.42	(mg/s)	462.42	(mg/s)	462.42	(mg/s)
tion	mass flux in Babbitt WWTP discharge	M_sBab =	140.09	(mg/s)	140.09	(mg/s)	140.09	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	26,119.49	(mg/s)	298,224	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	2,263.72	(mg/s)	2,263.72	(mg/s)	2,263.72	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	701.59	(mg/s)	5,369.83	(mg/s)	5,369.83	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	11,239.50	(mg/s)	11,239.50	(mg/s)	11,239.50	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	156.22	(mg/s)	156.22		156.22	(mg/s)
<u>و</u> گ	mass flux in seepage from cell 2W	M_s2w =	3,374.76		3,374.76		22.45	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =	602.51	(mg/s)	5,955.45	(mg/s)	61,373.93	(mg/s)
at M	mass flux in river at PM-13	M_r13 =	18,338.29		54,478.96		378,649.62	
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	17.891	(mg/L)	15.249	(mg/L)	15.024	(mg/l)
	concentration in river at PM-13	C r13 =	50.131	(ma/L)	21.679	(ma/L)	15.552	(ma/l)

Case Parameter	Year 9 Cadmium		
		-	
	concentration of surface water into PM-12	C_s12 =	0.00008 (mg/L)
ata	concentration of surface water into PM-13	C_s13 =	0.00008 (mg/L)
u di	concentration in Babbitt WWTP discharge	C_sBab =	0.00008 (mg/L)
ratio	concentration in Area 5 Pit NW discharge	C_spit =	0.0001 (mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000407879 (mg/L)
-	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0004 (mg/L)
con	concentration in tailings basin cell 2W	C_s2w =	0.000188 (mg/L)
but	concentration of ground water into PM-12	C_g12 =	0.0003 (mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0003 (mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.03	(mg/s)	0	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.14	(mg/s)	2	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.04	(mg/s)	0.04	(mg/s)	0.04	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in seepage from Tailings Pasin Colls 1E and 2E	M_fs =	0.06	(mg/s)	0.06	(mg/s)	0.06	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
ပိ န	mass flux in seepage from cell 2W	M_s2w =		(mg/s)		(mg/s)		(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.01	(mg/s)	0.04	(mg/s)	0.33	(mg/s)
Ma	mass flux in river at PM-13	M_r13 =	0.12	(mg/s)	0.29	(mg/s)	2.04	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to	concentration in river at PM-12	C_r12 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
flu Co	concentration in river at PM-13	C_r13 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Case Parameter	Year 9 Chloride			
		-		
	concentration of surface water into PM-12	C_s12 =	6.5	(mg/L)
ata	concentration of surface water into PM-13	C_s13 =	6.5	(mg/L)
pu	concentration in Babbitt WWTP discharge	C_sBab =	6.5	(mg/L)
ratio	concentration in Area 5 Pit NW discharge	C_spit =	5.95	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	5.89E+00	(mg/L)
-	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.76E+03	(mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	21.54	(mg/L)
out	concentration of ground water into PM-12	C_g12 =	1.8	(mg/L)
dul	concentration of ground water into PM-13	C_g13 =	1.8	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	2,319.61	(mg/s)	26,334	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	43.81	(mg/s)	43.81	(mg/s)	43.81	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	60.70	(mg/s)	60.70	(mg/s)	60.70	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	11,318.44	(mg/s)	129,230	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	214.46	(mg/s)	214.46	(mg/s)	214.46	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	43.78	(mg/s)	335.09	(mg/s)	335.09	(mg/s)
-		M_fs =	876.22	(mg/s)	876.22	(mg/s)	876.22	(mg/s)
Convert	mass flux in seepage from Tailings Basin Cells 1E and 2E mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	660.93	(mg/s)	660.93	(mg/s)	660.93	(mg/s)
ပိ	2 mass flux in seepage from cell 2W	M_s2w =	1,216.00	(mg/s)	1,216.00	(mg/s)	1,216.00	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 =	104.51		2,424.12		26,438.79	
2	mass flux in river at PM-13	M_r13 =	3,115.90		17,045.26 Average		158,971.88 High Fl	
Convert mass flux to	concentration in river at PM-12	C_r12 =	3.103	(mg/L)	6.207	(mg/L)	6.472	(mg/L)
ບ ∉	concentration in river at PM-13	C_r13 =	8.518	(mg/L)	6.783	(mg/L)	6.529	(mg/L)

Case	Year 9			
Parameter	Cobalt			
		-	-	
	concentration of surface water into PM-12	C_s12 =	0.0006	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0006	(mg/L)
•	concentration in Babbitt WWTP discharge	C_sBab =	0.0006	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.000555	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.002481389	(mg/L)
ICEI	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.005	(mg/L)
con	concentration in tailings basin cell 2W	C_s2w =	0.001556	(mg/L)
ort	concentration of ground water into PM-12	C_g12 =	0.0011	(mg/L)
nduj	concentration of ground water into PM-13	C_g13 =	0.0011	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.21	(mg/s)	2	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.03	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
concentration flux	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1.04	(mg/s)	12	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.13	(mg/s)	0.13	(mg/s)	0.13	(mg/s)
con	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.37	(mg/s)	0.37	(mg/s)	0.37	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =		(mg/s)		(mg/s)		(mg/s)
<u>ء</u> ک	mass flux in seepage from cell 2W	M_s2w =	0.09	(mg/s)	0.09	(mg/s)	0.09	(mg/s)
		_	Low Flo	W	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s)		(mg/s)		(mg/s)
2 0	mass flux in river at PM-13	M_r13 =	Low Flo	(mg/s) w	Average	(mg/s) Flow	High Fl	(mg/s)
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L) (mg/L)	0.001	(mg/L) (mg/L)	0.001	(mg/L) (mg/L)

Case Parameter	Year 9 Copper			
	concentration of surface water into PM-12	C_s12 =	0.0015	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0015	(mg/L)
-	concentration in Babbitt WWTP discharge	C_sBab =	0.0015	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.00345	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.008625606	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0015	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	0.004555	(mg/L)
rt	concentration of ground water into PM-12	C_g12 =	0.004	(mg/L)
Input	concentration of ground water into PM-13	C_g13 =	0.004	(mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.54	(mg/s)	6	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.10	(mg/s)	0.10	(mg/s)	0.10	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
concentration flux	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	2.61	(mg/s)	30	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.48	(mg/s)	0.48	(mg/s)	0.48	(mg/s)
conc	mass flux of Area 5 Pit NW discharge	M_spit =	0.03	(mg/s)	0.19	(mg/s)	0.19	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.28	(mg/s)	1.28	(mg/s)	1.28	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
မ ပိ	mass flux in seepage from cell 2W	M_s2w =	0.26	(mg/s)	0.26	(mg/s)	0.26	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s)		(mg/s)		(mg/s)
Ma at	mass flux in river at PM-13	M_r13 =	2.15 Low Flo	(mg/s)	5.47 Average	(mg/s)	38.22 High Fl	(mg/s)
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.003	(mg/L) (mg/L)	0.002	(mg/L)	0.002	(mg/L) (mg/L)

Case Parameter	Year 9 Fluoride			
	concentration of surface water into PM-12	C s12 =	0.2	(mg/L)
ata	concentration of surface water into PM-13	C_s13 =		(mg/L)
р	concentration in Babbitt WWTP discharge	C_sBab =	0.2	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.125	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	6.91E-01	(mg/L)
8	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	2.85E+00	(mg/L)
cone	concentration in tailings basin cell 2W	C_s2w =	1.55	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.385	(mg/L)
lnp	concentration of ground water into PM-13	C_g13 =	0.385	(mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	71.37	(mg/s)	810	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	9.37	(mg/s)	9.37	(mg/s)	9.37	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	1.87	(mg/s)	1.87	(mg/s)	1.87	(mg/s)
concentration flux	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	348.26	(mg/s)	3,976	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	45.87	(mg/s)	45.87	(mg/s)	45.87	(mg/s)
conc	mass flux of Area 5 Pit NW discharge	M_spit =	0.92	(mg/s)	7.04	(mg/s)	7.04	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	102.84	(mg/s)	102.84	(mg/s)	102.84	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	1.07	(mg/s)	1.07	(mg/s)	1.07	(mg/s)
<u>ء</u> ک	mass flux in seepage from cell 2W	M_s2w =		(mg/s)		(mg/s)	87.50	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =	<u>11.24</u> 249.44	(mg/s)	82.61	(mg/s)	<u>821.52</u> 5,042.16	
< 0	mass nux in river at PW-13	IVI_113 =	Low Flo		Average		5,042.16 High Fl	· · ·
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.334	(mg/L) (mg/L)	0.212	(mg/L)	0.201	(mg/L) (mg/L)

Case	Year 9			
Parameter	Iron			
		-		
	concentration of surface water into PM-12	C_s12 =	2.9	(mg/L)
ata	concentration of surface water into PM-13	C_s13 =	2.9	(mg/L)
q	concentration in Babbitt WWTP discharge	C_sBab =	2.9	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.037761905	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	5.91E-02	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	4.00E-01	(mg/L)
con	concentration in tailings basin cell 2W	C_s2w =	4.594	(mg/L)
put	concentration of ground water into PM-12	C_g12 =	0.035	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.035	(mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	1,034.90	(mg/s)	11,749	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.85	(mg/s)	0.85	(mg/s)	0.85	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	27.08	(mg/s)	27.08	(mg/s)	27.08	(mg/s)
ıtra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	5,049.77	(mg/s)	57,657	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	4.17	(mg/s)	4.17	(mg/s)	4.17	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.28	(mg/s)	2.13	(mg/s)	2.13	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	8.80	(mg/s)	8.80	(mg/s)	8.80	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.15	(mg/s)	0.15	(mg/s)	0.15	(mg/s)
ទ បិ	mass flux in seepage from cell 2W	M_s2w =	259.35	(mg/s)	259.35	(mg/s)	259.35	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 = M r13 =	27.93 300.68	(mg/s)	6,387.20		69,708.30	
			Low Flo		Average		High Fl	
Convert mass flux to concentration		C_r12 =		(mg/L)		(mg/L)		(mg/L)
C ≢ S	concentration in river at PM-13	C_r13 =	0.822	(mg/L)	2.542	(mg/L)	2.863	(mg/L)

Case	Year 9			
Parameter	Hardness			
-		-		
	concentration of surface water into PM-12	C_s12 =	70	(mg/L)
ata	concentration of surface water into PM-13	C_s13 =	70	(mg/L)
ρι	concentration in Babbitt WWTP discharge	C_sBab =	70	(mg/L)
ratio	concentration in Area 5 Pit NW discharge	C_spit =	942.7142857	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	2.56E+02	(mg/L)
8	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	8.61E+03	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	436.6	(mg/L)
ort	concentration of ground water into PM-12	C_g12 =	87.5	(mg/L)
ıdul	concentration of ground water into PM-13	C_g13 =	87.5	(mg/L)

			Low Flo	w	Average F	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	24,980.41	(mg/s)	283,600	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	2,129.58	(mg/s)	2,129.58	(mg/s)	2,129.58	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	653.73	(mg/s)	653.73	(mg/s)	653.73	(mg/s)
Itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	121,890.93	(mg/s)	1,391,712	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	10,425.01	(mg/s)	10,425.01	(mg/s)	10,425.01	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	6,936.49	(mg/s)	53,090.84	(mg/s)	53,090.84	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	38,042.63	(mg/s)	38,042.63	(mg/s)	38,042.63	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	3,233.31	(mg/s)	3,233.31	(mg/s)	3,233.31	(mg/s)
<u>ء</u> ک	mass flux in seepage from cell 2W	M_s2w =	24,647.41	(mg/s)	24,647.41		24,647.41	(mg/s)
			Low Flo	w	Average F	Flow	High Fl	ow
Mass balance at each node		M_r12 = M r13 =	2,783.31 86,068.16		27,763.72		286,383.27	
		<u>_</u>	Low Flo		Average F		High Fl	· · ·
Convert mass flux to concentration	concentration in river at PM-12	C_r12 = C_r13 =	82.647		71.091		70.104	

Case Parameter	Year 9 Potassium		
	concentration of surface water into PM-12	C s12 =	0.60 (mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.60 (mg/L)
•	concentration in Babbitt WWTP discharge	C_sBab =	0.60 (mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	53.80 (mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	7.04 (mg/L)
ē	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.80 (mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	7.77 (mg/L)
put	concentration of ground water into PM-12	C_g12 =	1.60 (mg/L)
	concentration of ground water into PM-13	C_g13 =	1.60 (mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	214.12	(mg/s)	2,431	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	38.94	(mg/s)	38.94	(mg/s)	38.94	(mg/s)
tio	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.68	(mg/s)	5.60	(mg/s)	0.68	(mg/s)
concentration flux	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1,044.78	(mg/s)	11,929	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	190.63	(mg/s)	190.63	(mg/s)	190.63	(mg/s)
con	mass flux in Babbitt WWTP discharge	M_sBab =	5.60	(mg/s)	3,029.85	(mg/s)	5.60	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	395.86	(mg/s)	1,048.24	(mg/s)	3,029.85	(mg/s)
Convert to mass	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1,048.24	(mg/s)	0.68	(mg/s)	1,048.24	(mg/s)
ຊີ ວິ	mass flux in seepage from cell 2W	M_s2w =	438.64	(mg/s)	438.64	(mg/s)	438.64	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s)	258.66		2,470.47	
20	mass flux in river at PM-13	M_r13 =	2,118.59		6,011.48 Average		19,112.40 High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L)		(mg/L)		(mg/l)

Case Parameter	Year 9 Magnesium			
		-		
	concentration of surface water into PM-12	C_s12 =	5.90	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	5.90	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	5.90	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	271.00	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	16.28	(mg/L)
a	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	213.00	(mg/L)
con	concentration in tailings basin cell 2W	C_s2w =	69.97	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	10.65	(mg/L)
lnp	concentration of ground water into PM-13	C_g13 =	10.65	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	2,105.49	(mg/s)	23,903	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	259.20	(mg/s)	259.20	(mg/s)	259.20	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	55.10	(mg/s)	55.10	(mg/s)	55.10	(mg/s)
itrai	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	10,273.66	(mg/s)	117,301	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	1,268.87	(mg/s)	1,268.87	(mg/s)	1,268.87	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	1,994.02	(mg/s)	15,261.91	(mg/s)	15,261.91	(mg/s)
	man flux in according from Tailings Dasin Calls 15 and 25	M_fs =	2,422.93	(mg/s)	2,422.93	(mg/s)	2,422.93	(mg/s)
Convert	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	79.99	(mg/s)	79.99	(mg/s)	79.99	(mg/s)
ပိ .	mass flux in seepage from cell 2W	M_s2w =	3,950.02	(mg/s)	3,950.02	(mg/s)	3,950.02	(mg/s)
		_	Low Flo	w	Average	Flow	High Fl	ow
Mass balance	mass flux in river at PM-12	M_r12 =	314.30	(mg/s)	2,419.79	(mg/s)	24,217.73	(mg/s)
Mas		M r13 =	10,030.13	(mg/s)	35,677.17	(mg/s)	164,502.88	(mg/s)
		. –	Low Flo		Average		High Fl	
Convert mass flux to	concentration in river at PM-12	C_r12 =		(mg/L)		(mg/L)	5.928	
ŭ≓ŭ	concentration in river at PM-13	C_r13 =	27.419	(mg/L)	14.197	(mg/L)	6.756	(mg/l)

Case Parameter	Year 9 Manganese			
		1		
	concentration of surface water into PM-12	C_s12 =	0.30	(mg/L)
ata	concentration of surface water into PM-13	C_s13 =	0.30	(mg/L)
р	concentration in Babbitt WWTP discharge	C_sBab =	0.30	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.49	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.29	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.00	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	1.18	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.19	(mg/L)
du	concentration of ground water into PM-13	C_g13 =	0.19	(mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	107.06	(mg/s)	1,215	(mg/s)
-	mass flux of ground water into PM-12	M_g12 =	4.58	(mg/s)	4.58	(mg/s)	4.58	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	2.80	(mg/s)	2.80	(mg/s)	2.80	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	522.39	(mg/s)	5,964	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	22.40	(mg/s)	22.40	(mg/s)	22.40	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	3.57	(mg/s)	27.31	(mg/s)	27.31	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	42.96	(mg/s)	42.96	(mg/s)	42.96	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		(mg/s)	0.00	(mg/s)
<u>ب</u> د	mass flux in seepage from cell 2W	M_s2w =	66.78	(mg/s)		(mg/s)	66.78	(mg/s)
			Low Flor	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 = M_r13 =	7.38	(mg/s)	114.44 796.28		1,222.81	
			Low Flor	w	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 = C_r13 =	0.219	(mg/L)		(mg/L) (mg/L)		(mg/l) (mg/l)

Case Parameter	Year 9 Sodium			
	concentration of surface water into PM-12	C s12 =	6.00	(mg/L)
lata	concentration of surface water into PM-13	C_s13 =		(mg/L)
-0	concentration in Babbitt WWTP discharge	C_sBab =	6.00	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	119.50	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	22.11	(mg/L)
ncei	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	255.00	(mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	44.31	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	4.90	(mg/L)
lnp	concentration of ground water into PM-13	C_g13 =	4.90	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	2,141.18	(mg/s)	24,309	(mg/s)
-	mass flux of ground water into PM-12	M_g12 =	119.26	(mg/s)	119.26	(mg/s)	119.26	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	56.03	(mg/s)	56.03	(mg/s)	56.03	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	10,447.79	(mg/s)	119,290	
cen	mass flux of ground water into PM-13	M_g13 =	583.80	(mg/s)	583.80	(mg/s)	583.80	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	879.28	(mg/s)	6,729.88	(mg/s)	6,729.88	(mg/s)
	mass flux in second of from Tailings Reain Calls 1F and 0F	M_fs =	3,289.71	(mg/s)	3,289.71	(mg/s)	3,289.71	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	95.76	(mg/s)	95.76	(mg/s)	95.76	(mg/s)
te C	mass flux in seepage from cell 2W	M_s2w =	2,501.44	(mg/s)	2,501.44	(mg/s)	2,501.44	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =	175.29	(mg/s)	2,316.47	(mg/s)	24,483.86	(mg/s)
at M	mass flux in river at PM-13	M_r13 =	7,525.28		25,964.85		156,974.04	
		-	Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	5.205	(mg/L)	5.931	(mg/L)	5.993	(mg/l)
Conve flux to concei	concentration in river at PM-13	C_r13 =	20.572	(mg/L)	10.332	(mg/L)	6.447	(mg/l)

Case	Year 9			
Parameter	Nickel			
		-		
	concentration of surface water into PM-12	C_s12 =	0.0012	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0012	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0012	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.0052	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.041162911	(mg/L)
c)	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.098	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	0.00688	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.007	(mg/L)
du	concentration of ground water into PM-13	C_g13 =	0.007	(mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.43	(mg/s)	5	(mg/s)
-	mass flux of ground water into PM-12	M_g12 =	0.17	(mg/s)	0.17	(mg/s)	0.17	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
concentration flux	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	2.09	(mg/s)	24	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.83	(mg/s)	0.83	(mg/s)	0.83	(mg/s)
u o xn	mass flux of Area 5 Pit NW discharge	M_spit =	0.04	(mg/s)	0.29	(mg/s)	0.29	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	6.13	(mg/s)	6.13	(mg/s)	6.13	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =		(mg/s)	0.04	(mg/s)	0.04	(mg/s)
<u>۽</u> ک	mass flux in seepage from cell 2W	M_s2w =	0.39	(mg/s)	0.39	(mg/s)	0.39	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s)		(mg/s)		(mg/s)
20	mass nux in river at PM-13	M_r13 =	7.60 Low Flo	(mg/s) w	Average	(mg/s) Flow	High Fl	(mg/s) ow
Convert mass flux to concentration		C_r12 =		(mg/L) (mg/L)	0.002	(mg/L) (mg/L)		(mg/L) (mg/L)

Case	Year 9		
Parameter	Lead		
	concentration of surface water into PM-12	C_s12 =	0.00015 (mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.00015 (mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00015 (mg/L)
tio	concentration in Area 5 Pit NW discharge	C_spit =	0.0003 (mg/L)
ntration	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.001749429 (mg/L)
۵	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0005 (mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	0.0012 (mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.0012 (mg/L)
luk	concentration of ground water into PM-13	C_g13 =	0.0012 (mg/L)

			Low Flow	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.05	(mg/s)	1	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.03	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itrai	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.26	(mg/s)	3	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.14	(mg/s)	0.14	(mg/s)	0.14	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.02	(mg/s)	0.02	(mg/s)
	mass flux in seepage from Tailings Pasin Colls 1E and 2E	M_fs =	0.26	(mg/s)	0.26	(mg/s)	0.26	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
ပိုင်	mass flux in seepage from cell 2W	M_s2w =		(mg/s)		(mg/s)		(mg/s)
			Low Flor	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =	0.03	(mg/s)	0.08	(mg/s)	0.64	(mg/s)
Ma Af	mass flux in river at PM-13	M_r13 =		(mg/s)		(mg/s)		(mg/s)
		_	Low Flor	w	Average	Flow	High Fl	ow
Convert mass flux to	concentration in river at PM-12	C_r12 =	0.001	<u>(mg/L)</u>	0.000	(mg/L)	0.000	(mg/L)
S E S	concentration in river at PM-13	C_r13 =	0.001	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Case Parameter	Year 9 Antimony		
		0	(
	concentration of surface water into PM-12	C_s12 =	4.00E-05 (mg/L)
data	concentration of surface water into PM-13	C_s13 =	4.00E-05 (mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	4.00E-05 (mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	2.50E-04 (mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	8.83E-03 (mg/L)
0	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.004 (mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	2.50E-04 (mg/L)
Input	concentration of ground water into PM-12	C_g12 =	1.50E-03 (mg/L)
du	concentration of ground water into PM-13	C_g13 =	1.50E-03 (mg/L)

			Low Flo	w	Average	Flow	High Fl	low
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.01	(mg/s)	0	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.04	(mg/s)	0.04	(mg/s)	0.04	(mg/s)
concentration flux	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
tra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.07	(mg/s)	1	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.18	(mg/s)	0.18	(mg/s)	0.18	(mg/s)
conc	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	maga flux in according from Tailings Regin Calls 1F and 0F	M_fs =	1.31	(mg/s)	1.31	(mg/s)	1.31	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M rrs =		(mg/s)		(mg/s)		(mg/s)
۹ ۵		M_s2w =		(mg/s)		(mg/s)		(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s)		(mg/s)		(mg/s) (mg/s)
2.0		<u>IVI_I I 0 =</u>	Low Flo		Average		High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L) (mg/L)	0.000	(mg/L) (mg/L)	0.000	(mg/L) (mg/L)

Case	Year 9			
Parameter	Selenium			
		-		-
	concentration of surface water into PM-12	C_s12 =	0.0003	(mg/L)
ata	concentration of surface water into PM-13	C_s13 =	0.0003	(mg/L)
σ	concentration in Babbitt WWTP discharge	C_sBab =	0.0003	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.0016	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.001403839	(mg/L)
a	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.054	(mg/L)
con	concentration in tailings basin cell 2W	C_s2w =	0.00109	(mg/L)
but	concentration of ground water into PM-12	C_g12 =	0.00295	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.00295	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.11	(mg/s)	1	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.07	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.52	(mg/s)	6	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.35	(mg/s)	0.35	(mg/s)	0.35	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.01	(mg/s)	0.09	(mg/s)	0.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.21	(mg/s)	0.21	(mg/s)	0.21	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.02	(mg/s)	0.02	(mg/s)	0.02	(mg/s)
c to	mass flux in seepage from cell 2W	M_s2w =	0.06	(mg/s)	0.06	(mg/s)	0.06	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 = M r13 =		(mg/s) (mg/s)		(mg/s) (mg/s)		(mg/s) (mg/s)
<u> </u>		IVI_113 =	Low Flo		Average		High F	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L) (mg/L)	0.000	(mg/L) (mg/L)		(mg/L) (mg/L)

Case	Year 9		
Parameter	Sulfate		
		-	
	concentration of surface water into PM-12	C_s12 =	4.00 (mg/L)
data	concentration of surface water into PM-13	C_s13 =	4.00 (mg/L)
-	concentration in Babbitt WWTP discharge	C_sBab =	4.00 (mg/L)
tio	concentration in Area 5 Pit NW discharge	C_spit =	1046.27 (mg/L)
ntration	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	166.62 (mg/L)
۵ ۵	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	7347.00 (mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	152.40 (mg/L)
out	concentration of ground water into PM-12	C_g12 =	8.50 (mg/L)
Input	concentration of ground water into PM-13	C_g13 =	8.50 (mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
m	ass flux of surface water into PM-12	M_s12 =	-	(mg/s)	1,427.45	(mg/s)	16,206	(mg/s)
m	ass flux of ground water into PM-12	M_g12 =	206.87	(mg/s)	206.87	(mg/s)	206.87	(mg/s)
m tio	ass flux in Babbitt WWTP discharge	M_sBab =	37.36	(mg/s)	37.36	(mg/s)	37.36	(mg/s)
m tra	ass flux of surface water into PM-13	M_s13 =	-	(mg/s)	6,965.20	(mg/s)	79,526	(mg/s)
m Cel	ass flux of ground water into PM-13	M_g13 =	1,012.72	(mg/s)	1,012.72	(mg/s)	1,012.72	(mg/s)
concentration flux 3 3 3 3 3	ass flux of Area 5 Pit NW discharge	M_spit =	7,698.43	(mg/s)	58,922.60	(mg/s)	58,922.60	(mg/s)
	ass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	24,792.97	(mg/s)	24,792.97	(mg/s)	24,792.97	(mg/s)
Convert to mass	ass flux in hydrometallurgical residue cells liner leakage	M_rrs =	2,759.02	(mg/s)	2,759.02		2,759.02	
ວິ <u>ຊ</u> ິ m	ass flux in seepage from cell 2W	M_s2w =	8,603.45	(mg/s)	8,603.45	(mg/s)	8,603.45	
			Low Flo	W	Average	Flow	High Fl	ow
ass ba each r	ass flux in river at PM-12	M_r12 = M r13 =	244.23		1,671.68		16,449.94	
		IVI_I I 0 =	Low Flo		Average		High Fl	
onvert ux to oncent	oncentration in river at PM-12	C_r12 =		(mg/L)		(mg/L)	4.027	
o ≓ S co	oncentration in river at PM-13	C_r13 =	123.317	(mg/L)	41.675	(mg/L)	7.888	(mg/l)

Case Parameter	Year 9 Thallium			
	concentration of surface water into PM-12	C_s12 =	0.0002	(mg/L)
ata	concentration of surface water into PM-13	C_s13 =	0.0002	(mg/L)
q	concentration in Babbitt WWTP discharge	C_sBab =	0.0002	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.0006	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000967503	(mg/L)
ICEI	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0002	(mg/L)
con	concentration in tailings basin cell 2W	C_s2w =	0.0002	(mg/L)
put	concentration of ground water into PM-12	C_g12 =	0.000004	(mg/L)
ndul	concentration of ground water into PM-13	C_g13 =	0.000004	(mg/L)

			Low Flow	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.07	(mg/s)	1	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.35	(mg/s)	4	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.14	(mg/s)	0.14	(mg/s)	0.14	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
to_C	mass flux in seepage from cell 2W	M_s2w =		(mg/s)		(mg/s)		(mg/s)
			Low Flow	W	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s)		(mg/s)		(mg/s)
2 0	mass flux in river at PM-13	M_r13 =	0.16 Low Floy	(mg/s)	0.61 Average	(mg/s)	4.98 High Fl	(mg/s)
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L)		(mg/L)		(mg/L)

Case	Year 9		
Parameter	Zinc		
		-	
	concentration of surface water into PM-12	C_s12 =	0.016 (mg/L)
ata	concentration of surface water into PM-13	C_s13 =	0.016 (mg/L)
, p u	concentration in Babbitt WWTP discharge	C_sBab =	0.016 (mg/L)
ratio	concentration in Area 5 Pit NW discharge	C_spit =	0.003 (mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.039738069 (mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.01 (mg/L)
con	concentration in tailings basin cell 2W	C_s2w =	0.01435 (mg/L)
ort	concentration of ground water into PM-12	C_g12 =	0.0115 (mg/L)
du di	concentration of ground water into PM-13	C_g13 =	0.0115 (mg/L)

			Low Flo	w	Average	Flow	High Fl	low
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	5.71	(mg/s)	65	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.28	(mg/s)	0.28	(mg/s)	0.28	(mg/s)
concentration flux	mass flux in Babbitt WWTP discharge	M_sBab =	0.15	(mg/s)	0.15	(mg/s)	0.15	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	27.86	(mg/s)	318	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	1.37	(mg/s)	1.37	(mg/s)	1.37	(mg/s)
conc	mass flux of Area 5 Pit NW discharge	M_spit =	0.02	(mg/s)	0.17	(mg/s)	0.17	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	5.91	(mg/s)	5.91	(mg/s)	5.91	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
မ ပိ	mass flux in seepage from cell 2W	M_s2w =	0.81	(mg/s)	0.81	(mg/s)	0.81	(mg/s)
		_	Low Flo	w	Average	Flow	High Fl	low
Mass balance at each node		M_r12 = M_r13 =		(mg/s) (mg/s)		(mg/s) (mg/s)	65.25	(mg/s) (mg/s)
			Low Flo	w	Average	Flow	High Fl	low
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L) (mg/L)		(mg/L) (mg/L)		(mg/L) (mg/L)
Appendix F.5 Embarrass River Proposed Action Year 15

FLOWS

Case	Year 15				
Flows	Low Flow Conditions (no surface runoff)				Node
n River	flow in river at PM-12	Q_r12_L =	1.19	(cfs)	PM-12
Total flow in Embarrass F	flow in river at PM-13	Q_r13_L =	13.32	(cfs)	PM-13
Tota Emb	flow check	Q_ck_L =	13.32	(cfs)	
	surface water flow into PM-12	Q_s12_L =	0.00	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_L =	0.00	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_L =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_L =	0.26	(cfs)	PM-13
Ita	seepage from Tailings Basin Cells 1E and 2E	Q_fs_L =	5.65	(cfs)	PM-13
flow data	hydrometallurgical residue cells liner leakage	Q_rrs_L =	0.02	(cfs)	PM-13
flov	seepage from cell 2W	Q_s2w_L =	1.99	(cfs)	PM-13
nput	ground water flow into PM-12	Q_g12_L =	0.86	(cfs)	PM-12
qu	ground water flow into PM-13	Q_g13_L =	4.21	(cfs)	PM-13

Case	Year 15				
Flow	Average Flow Conditions (mean annual)				
n River	flow in river at PM-12	Q_r12_M =	13.80	(cfs)	PM-12
Total flow in Embarrass F	flow in river at PM-13	Q_r13_M =	89.19	(cfs)	PM-13
Total Embê	flow check	Q_ck_M =	89.19	(cfs)	
	surface water flow into PM-12	Q_s12_M =	12.61	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_M =	61.53	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_M =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_M =	1.99	(cfs)	PM-13
data	seepage from Tailings Basin Cells 1E and 2E	Q_fs_M =	5.65	(cfs)	PM-13
	hydrometallurgical residue cells liner leakage	Q_rrs_M =	0.02	(cfs)	PM-13
low	seepage from cell 2W	Q_s2w_M =	1.99	(cfs)	PM-13
nput flow	ground water flow into PM-12	Q_g12_M =	0.86	(cfs)	PM-12
dul	ground water flow into PM-13	Q_g13_M =	4.21	(cfs)	PM-13

Case	Year 15				
Flow	High Flow Conditions (avg. annual 1-day max flow)				-
n River	flow in river at PM-12	Q_r12_H =	144.35	(cfs)	PM-12
ⁱ low il rrass	flow in river at PM-13	Q_r13_H =	860.74	(cfs)	PM-13
Total 1 Embaı	flow check	Q_ck_H =	860.74	(cfs)	
	surface water flow into PM-12	Q_s12_H =	143.16	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_H =	702.53	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_H =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_H =	1.99	(cfs)	PM-13
ta	seepage from Tailings Basin Cells 1E and 2E	Q_fs_H =	5.65	(cfs)	PM-13
/ da	hydrometallurgical residue cells liner leakage	Q_rrs_H =	0.02	(cfs)	PM-13
flow data	seepage from cell 2W	Q_s2w_H =	1.99	(cfs)	PM-13
E T	ground water flow into PM-12 ground water flow into PM-13	Q_g12_H =	0.86	(cfs)	PM-12
dul	ground water flow into PM-13	Q_g13_H =	4.21	(cfs)	PM-13

Case Parameter	Year 15 Silver			
	concentration of surface water into PM-12	C_s12 =	0.00011	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.00011	(mg/L)
-	concentration in Babbitt WWTP discharge	C_sBab =	0.00011	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.00015	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.00122	(mg/L)
0	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.000125	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	0.000100	(mg/L)
out	concentration of ground water into PM-12	C_g12 =	0.00008	(mg/L)
Input	concentration of ground water into PM-13	C_g13 =	0.000000	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.04	(mg/s)	0	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itrai	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.19	(mg/s)	2	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	-	(mg/s)	-	(mg/s)	-	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.19	(mg/s)	0.19	(mg/s)	0.19	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		(mg/s)	0.00	(mg/s)
ຊ ບິ	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.00	(mg/s)	0.04	(mg/s)	0.45	(mg/s)
Ma at		M_r13 =	0.20	(mg/s)	0.44	(mg/s)		(mg/s)
		_	Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)	0.000	(mg/L)	0.000	<u>(mg/L)</u>
Con flux con	concentration in river at PM-13	C_r13 =	0.001	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Case Parameter	Year 15 Aluminum			
	concentration of surface water into PM-12	C_s12 =	0.12	(mg/L)
ata	concentration of surface water into PM-13	C_s13 =	0.12	(mg/L)
p	concentration in Babbitt WWTP discharge	C_sBab =	0.12	(mg/L)
ation	concentration in Area 5 Pit NW discharge	C_spit =	0.01325	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	4.43E-01	(mg/L)
Cer	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.80E-01	(mg/L)
con	concentration in tailings basin cell 2W	C_s2w =	1.5788	(mg/L)
but	concentration of ground water into PM-12	C_g12 =	0.025	(mg/L)
du	concentration of ground water into PM-13	C_g13 =	0	(mg/L)

Iss flux of surface water into PM-12 Iss flux of ground water into PM-12 Iss flux in Babbitt WWTP discharge Iss flux of surface water into PM-13 Iss flux of ground water into PM-13 Iss flux of Area 5 Pit NW discharge Iss flux in seepage from Tailings Basin Cells 1E and 2E Iss flux in hydrometallurgical residue cells liner leakage Iss flux in seepage from cell 2W	M_s12 = M_g12 = M_sBab = M_s13 = M_g13 = M_spit = M_fs = M_rrs = M_s2w =	1.12 - 0.10 70.86 0.09 89.13	(mg/s) (mg/s) (mg/s) (mg/s) (mg/s) (mg/s) (mg/s) (mg/s)	0.61 1.12 208.96 - 0.75 70.86 0.09	(mg/s) (mg/s) (mg/s) (mg/s)	0.61 1.12 2,386 - 0.75 70.86 0.09	(mg/s) (mg/s) (mg/s) (mg/s)
Iss flux in Babbitt WWTP discharge Iss flux of surface water into PM-13 Iss flux of ground water into PM-13 Iss flux of Area 5 Pit NW discharge Iss flux in seepage from Tailings Basin Cells 1E and 2E Iss flux in hydrometallurgical residue cells liner leakage	M_sBab = M_s13 = M_g13 = M_spit = M_fs = M_rrs =	1.12 - 0.10 70.86 0.09 89.13	(mg/s) (mg/s) (mg/s) (mg/s) (mg/s) (mg/s)	1.12 208.96 - 0.75 70.86 0.09	(mg/s) (mg/s) (mg/s) (mg/s) (mg/s) (mg/s)	1.12 2,386 0.75 70.86 0.09	(mg/s) (mg/s) (mg/s) (mg/s) (mg/s)
Iss flux of surface water into PM-13 Iss flux of ground water into PM-13 Iss flux of Area 5 Pit NW discharge Iss flux in seepage from Tailings Basin Cells 1E and 2E Iss flux in hydrometallurgical residue cells liner leakage	M_s13 = M_g13 = M_spit = M_fs = M_rrs =	- 0.10 70.86 0.09 89.13	(mg/s) (mg/s) (mg/s) (mg/s) (mg/s)	208.96 - 0.75 70.86 0.09	(mg/s) (mg/s) (mg/s) (mg/s) (mg/s)	2,386 - 0.75 70.86 0.09	(mg/s) (mg/s) (mg/s) (mg/s) (mg/s)
ss flux of ground water into PM-13 ss flux of Area 5 Pit NW discharge ss flux in seepage from Tailings Basin Cells 1E and 2E ss flux in hydrometallurgical residue cells liner leakage	M_g13 = M_spit = M_fs = M_rrs =	70.86 0.09 89.13	(mg/s) (mg/s) (mg/s) (mg/s)	- 0.75 70.86 0.09	(mg/s) (mg/s) (mg/s) (mg/s)	- 0.75 70.86 0.09	(mg/s) (mg/s) (mg/s) (mg/s)
ss flux of Årea 5 Pit NW discharge ss flux in seepage from Tailings Basin Cells 1E and 2E ss flux in hydrometallurgical residue cells liner leakage	M_spit = M_fs = M_rrs =	70.86 0.09 89.13	(mg/s) (mg/s) (mg/s)	0.75 70.86 0.09	(mg/s) (mg/s) (mg/s)	0.75 70.86 0.09	(mg/s) (mg/s) (mg/s)
ss flux in seepage from Tailings Basin Cells 1E and 2E ss flux in hydrometallurgical residue cells liner leakage	M_fs = M_rrs =	70.86 0.09 89.13	(mg/s) (mg/s)	70.86 0.09	(mg/s) (mg/s)	70.86 0.09	(mg/s) (mg/s)
ss flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.09 89.13	(mg/s)	0.09	(mg/s)	0.09	(mg/s)
		0.09 89.13	(mg/s)	0.09	(mg/s)		
ss flux in seepage from cell 2W	M_s2w =		(ma/s)	00.40	(00.42	
			(119/0)	89.13	(mg/s)	89.13	(mg/s)
		Low Flo	w	Average	Flow	High Flo	ow
iss flux in river at PM-12	M_r12 =		(mg/s)		(mg/s)	487.90	
ss flux in river at PM-13	M_r13 =					3,034.51	
ncentration in river at PM-12	C_r12 =					0.119	
			Low Flo	Low Flow	Low Flow Average	Low Flow Average Flow	Low Flow Average Flow High Fl

Case	Year 15			
Parameter	Arsenic			
	concentration of surface water into PM-12	C_s12 =	0.00075	(mg/L)
ata	concentration of surface water into PM-13	C_s13 =	0.00075	(mg/L)
p	concentration in Babbitt WWTP discharge	C_sBab =	0.00075	(mg/L)
ation	concentration in Area 5 Pit NW discharge	C_spit =	0.001325	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.015514819	(mg/L)
ncer	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.004	(mg/L)
co	concentration in tailings basin cell 2W	C_s2w =	0.00291	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.00273	(mg/L)
du	concentration of ground water into PM-13	C_g13 =	0	(mg/L)

			Low Flor	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.27	(mg/s)	3	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.07	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
Itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1.31	(mg/s)	15	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	-	(mg/s)	-	(mg/s)	-	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.01	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	2.48	(mg/s)	2.48	(mg/s)	2.48	(mg/s)
onvert mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
to C	mass flux in seepage from cell 2W	M_s2w =		(mg/s)		(mg/s)	0.16	(mg/s)
			Low Flor	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 =		(mg/s) (mg/s)		(mg/s)		(mg/s) (mg/s)
~ ~ ~		IVI_I I 3 -	Low Flor		Average		High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L) (mg/L)	0.001	(mg/L)		(mg/L) (mg/L)

Case	Year 15			
Parameter	Boron			
		-		
	concentration of surface water into PM-12	C_s12 =	0.027	(mg/L)
ata	concentration of surface water into PM-13	C_s13 =	0.027	(mg/L)
σ	concentration in Babbitt WWTP discharge	C_sBab =	0.027	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.1315	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.173169588	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.11	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	0.33	(mg/L)
et .	concentration of ground water into PM-12	C_g12 =	0.0212	(mg/L)
Input	concentration of ground water into PM-13	C_g13 =	0	(mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	9.64	(mg/s)	109	(mg/s)
-	mass flux of ground water into PM-12	M_g12 =	0.52	(mg/s)	0.52	(mg/s)	0.52	(mg/s)
tion	mass flux in Babbitt WWTP discharge	M_sBab =	0.25	(mg/s)	0.25	(mg/s)	0.25	(mg/s)
tra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	47.02	(mg/s)	537	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	-	(mg/s)	-	(mg/s)	-	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	0.97	(mg/s)	7.41	(mg/s)	7.41	(mg/s)
	mass flux in coopage from Tailings Pasin Colls 1E and 2E	M_fs =	27.67	(mg/s)	27.67	(mg/s)	27.67	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.05	(mg/s)		(mg/s)		(mg/s)
<u>د</u> د	mass flux in seepage from cell 2W	M_s2w =	18.63	(mg/s)		(mg/s)	18.63	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s)		(mg/s)	110.16	
at 6	mass flux in river at PM-13	M_r13 =		(mg/s)	111.18		700.72	
			Low Flo	w	Average	FIOW	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.023	(mg/L)	0.027	(mg/L)	0.027	(mg/L)
Col Col	concentration in river at PM-13	C_r13 =	0.128	(mg/L)	0.044	(mg/L)	0.029	(mg/L)

Case Parameter	Year 15 Barium			
-				
	concentration of surface water into PM-12	C_s12 =	0.016	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.016	(mg/L)
-	concentration in Babbitt WWTP discharge	C_sBab =	0.016	(mg/L)
ation	concentration in Area 5 Pit NW discharge	C_spit =	0.0044	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	6.35E-02	(mg/L)
ncer	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	5.00E-03	(mg/L)
con	concentration in tailings basin cell 2W	C_s2w =	0.09298	(mg/L)
et .	concentration of ground water into PM-12	C_g12 =	0.0681	(mg/L)
Input	concentration of ground water into PM-13	C_g13 =	0	(mg/L)

			Low Flor	W	Average	Flow	High FI	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	5.71	(mg/s)	65	(mg/s)
-	mass flux of ground water into PM-12	M_g12 =	1.66	(mg/s)	1.66	(mg/s)	1.66	(mg/s)
tion	mass flux in Babbitt WWTP discharge	M_sBab =	0.15	(mg/s)	0.15	(mg/s)	0.15	(mg/s)
itrai	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	27.86	(mg/s)	318	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	-	(mg/s)	-	(mg/s)	-	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.03	(mg/s)	0.25	(mg/s)	0.25	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	10.14	(mg/s)	10.14	(mg/s)	10.14	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
to to	mass flux in seepage from cell 2W	M_s2w =	5.25	(mg/s)		(mg/s)	5.25	(mg/s)
			Low Flor	W	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12	M_r12 =		(mg/s)		(mg/s)		(mg/s)
a Z	mass flux in river at PM-13	M_r13 =	17.23 Low Flo	(mg/s)	51.02 Average	(mg/s)	400.37 High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L)		(mg/L)	0.016	

Case Parameter	Year 15 Beryllium			
		-		
	concentration of surface water into PM-12	C_s12 =	0.0001	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0001	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0001	(mg/L)
ation	concentration in Area 5 Pit NW discharge	C_spit =	0.0001	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.001410903	(mg/L)
ncer	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0	(mg/L)
con	concentration in tailings basin cell 2W	C_s2w =	0.00075	(mg/L)
rt .	concentration of ground water into PM-12	C_g12 =	0.000023	(mg/L)
Input	concentration of ground water into PM-13	C_g13 =	0	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.04	(mg/s)	0	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.17	(mg/s)	2	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	-	(mg/s)	-	(mg/s)	-	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in coopage from Tailings Pasin Colls 1E and 2E	M_fs =	0.23	(mg/s)	0.23	(mg/s)	0.23	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	-	(mg/s)	-	(mg/s)	-	(mg/s)
to Co	mass flux in seepage from cell 2W	M_s2w =	0.04	(mg/s)		(mg/s)	0.04	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =	0.00	(mg/s)	0.04	(mg/s)	0.41	(mg/s)
at a	mass flux in river at PM-13	M_r13 =		(mg/s)		(mg/s)		(mg/s)
		-	Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
Col Lin	concentration in river at PM-13	C r13 =	0.001	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Case	Year 15			
Parameter	Calcium			
	concentration of surface water into PM-12	C s12 =	15	(mg/L)
a	concentration of surface water into PM-12	C_\$12 =		(mg/L)
ı data	concentration in Babbitt WWTP discharge	C sBab =		(mg/L)
ntration	concentration in Area 5 Pit NW discharge	_ C_spit =		(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	95.38057957	(mg/L)
ncei	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	416	(mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	59.78	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	19	(mg/L)
i i i i i i i i i i i i i i i i i i i	concentration of ground water into PM-13	C_g13 =	0	(mg/L)

			Low Flo	w	Average	Flow	High Fl	low
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	5,352.95	(mg/s)	60,771	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	462.42	(mg/s)	462.42	(mg/s)	462.42	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	140.09	(mg/s)	140.09	(mg/s)	140.09	(mg/s)
concentration flux	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	26,119.49	(mg/s)	298,224	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	-	(mg/s)	-	(mg/s)	-	(mg/s)
con flux	mass flux of Area 5 Pit NW discharge	M_spit =	701.59	(mg/s)	5,369.83	(mg/s)	5,369.83	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	15,242.69	(mg/s)	15,242.69	(mg/s)	15,242.69	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	205.46	(mg/s)	205.46		205.46	(mg/s)
to_Co	mass flux in seepage from cell 2W	 M_s2w =	3,374.76	(mg/s)	3,374.76		29.52	(mg/s)
			Low Flor	w	Average	Flow	High Fl	low
Mass balance at each node	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 = M_r13 =	602.51		5,955.45		61,373.93	
			Low Flo	w	Average		High Fl	low
Convert mass flux to concentration	concentration in river at PM-12	C_r12 = C_r13 =	<u>17.891</u> 53.397		15.249		15.024	

Case Parameter	Year 15 Cadmium			
		-		
	concentration of surface water into PM-12	C_s12 =	0.00008	(mg/L)
ata	concentration of surface water into PM-13	C_s13 =	0.00008	(mg/L)
p	concentration in Babbitt WWTP discharge	C_sBab =	0.00008	(mg/L)
ation	concentration in Area 5 Pit NW discharge	C_spit =	0.0001	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000705708	(mg/L)
ICel	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0004	(mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	0.000188	(mg/L)
but	concentration of ground water into PM-12	C_g12 =	0.0003	(mg/L)
du d	concentration of ground water into PM-13	C_g13 =	0	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.03	(mg/s)	0	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itrai	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.14	(mg/s)	2	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	-	(mg/s)	-	(mg/s)	-	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in coopage from Tailings Pasin Colls 1E and 2E	M_fs =	0.11	(mg/s)	0.11	(mg/s)	0.11	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
c to	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)		(mg/s)	0.01	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =	0.01	(mg/s)	0.04	(mg/s)	0.33	(mg/s)
A, A	mass flux in river at PM-13	M_r13 =		(mg/s)		(mg/s)		(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
Col Co	concentration in river at PM-13	C_r13 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Case Parameter	Year 15 Chloride			
		-		
	concentration of surface water into PM-12	C_s12 =	6.5	(mg/L)
ata	concentration of surface water into PM-13	C_s13 =	6.5	(mg/L)
p u	concentration in Babbitt WWTP discharge	C_sBab =	6.5	(mg/L)
ratio	concentration in Area 5 Pit NW discharge	C_spit =	5.95	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	7.60E+00	(mg/L)
-	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.76E+03	(mg/L)
con	concentration in tailings basin cell 2W	C_s2w =	21.54	(mg/L)
put	concentration of ground water into PM-12	C_g12 =	1.8	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	2,319.61	(mg/s)	26,334	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	43.81	(mg/s)	43.81	(mg/s)	43.81	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	60.70	(mg/s)	60.70	(mg/s)	60.70	(mg/s)
itrai	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	11,318.44	(mg/s)	129,230	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	-	(mg/s)	-	(mg/s)	-	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	43.78	(mg/s)	335.09	(mg/s)	335.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1,215.25	(mg/s)	1,215.25	(mg/s)	1,215.25	(mg/s)
Convert	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	869.24	(mg/s)	869.24	(mg/s)	869.24	(mg/s)
ပိမ္	mass flux in seepage from cell 2W	M_s2w =	1,216.00	(mg/s)	1,216.00	(mg/s)	1,216.00	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance	mass flux in river at PM-12	M_r12 =	104.51	(mg/s)	2,424.12	(mg/s)	26,438.79	(mg/s)
R M	mass flux in river at PM-13	M_r13 =	3,448.78	(mg/s)	17,378.14	(mg/s)	159,304.77	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to	concentration in river at PM-12	C_r12 =	3.103	(mg/L)	6.207	(mg/L)	6.472	(mg/L)
flu Co	concentration in river at PM-13	C_r13 =	9.150	(mg/L)	6.885	(mg/L)	6.540	(mg/L)

Case Parameter	Year 15 Cobalt			
	concentration of surface water into PM-12	C_s12 =	0.0006	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0006	(mg/L)
-	concentration in Babbitt WWTP discharge	C_sBab =	0.0006	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.000555	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.008661931	(mg/L)
ē	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.005	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	0.001556	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.0011	(mg/L)
du	concentration of ground water into PM-13	C_g13 =	0	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.21	(mg/s)	2	(mg/s)
-	mass flux of ground water into PM-12	M_g12 =	0.03	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1.04	(mg/s)	12	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	-	(mg/s)	-	(mg/s)	-	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.38	(mg/s)	1.38	(mg/s)	1.38	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
ទ ប័	mass flux in seepage from cell 2W	M_s2w =		(mg/s)	0.09	(mg/s)		(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s)		(mg/s)		(mg/s) (mg/s)
		<u> </u>	Low Flo		Average		High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L) (mg/L)	0.001		0.001	(mg/L) (mg/L)

Case	Year 15			
Parameter	Copper			
		1		
	concentration of surface water into PM-12	C_s12 =	0.0015	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0015	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0015	(mg/L)
ation	concentration in Area 5 Pit NW discharge	C_spit =	0.00345	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.020766721	(mg/L)
ICel	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0015	(mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	0.004555	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.004	(mg/L)
du du	concentration of ground water into PM-13	C_g13 =	0	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.54	(mg/s)	6	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.10	(mg/s)	0.10	(mg/s)	0.10	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	2.61	(mg/s)	30	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	-	(mg/s)	-	(mg/s)	-	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	0.03	(mg/s)	0.19	(mg/s)	0.19	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	3.32	(mg/s)	3.32	(mg/s)	3.32	(mg/s)
Convert		M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
မိ နိ	mass flux in seepage from cell 2W	M_s2w =	0.26	(mg/s)	0.26	(mg/s)	0.26	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance		M_r12 =		(mg/s)		(mg/s)		(mg/s)
≥ (mass flux in river at PM-13	M_r13 =	3.71 Low Flo	(mg/s)	7.03 Average	(mg/s)	39.78 High Fl	(mg/s)
Convert mass flux to	concentration in river at PM-12	C_r12 =		(mg/L)	0.0017	(mg/L)	0.002	(mg/L)
	concentration in river at PM-13	C_r13 =	0.010	(mg/L)	0.0028	(mg/L)	0.002	(mg/L)

Case Parameter	Year 15 Fluoride			
	concentration of surface water into PM-12	C s12 =	0.2	(mg/L)
data	concentration of surface water into PM-12	C_s13 =		(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.2	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.125	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	8.26E-01	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	2.85E+00	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	1.55	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.385	(mg/L)
du	concentration of ground water into PM-13	C_g13 =	0	(mg/L)

mass flux of surface water into PM-12 mass flux of ground water into PM-12 mass flux in Babbitt WWTP discharge mass flux of surface water into PM-13 mass flux of ground water into PM-13 mass flux of Area 5 Pit NW discharge	M_s12 = M_g12 = M_sBab = M_s13 = M_g13 = M spit =		(mg/s) (mg/s) (mg/s) (mg/s) (mg/s)	9.37	(mg/s) (mg/s) (mg/s) (mg/s)	9.37	(mg/s) (mg/s) (mg/s)
mass flux in Babbitt WWTP discharge mass flux of surface water into PM-13 mass flux of ground water into PM-13 mass flux of Area 5 Pit NW discharge	M_sBab = M_s13 = M_g13 =		(mg/s) (mg/s)	1.87	(mg/s)	1.87	(mg/s)
mass flux of surface water into PM-13 mass flux of ground water into PM-13 mass flux of Area 5 Pit NW discharge	 M_s13 = M_g13 =	1.87 - -	(mg/s)				
mass flux of ground water into PM-13 mass flux of Area 5 Pit NW discharge	 M_g13 =	-		348.26	(mg/s)	3,976	(ma/s)
nass flux of Area 5 Pit NW discharge		-	(ma/e)				(
	M snit =		(ing/s)	-	(mg/s)	-	(mg/s)
	W_Spit =	0.92	(mg/s)	7.04	(mg/s)	7.04	(mg/s)
mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	132.08	(mg/s)	132.08	(mg/s)	132.08	(mg/s)
mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	1.41	(mg/s)	1.41	(mg/s)	1.41	(mg/s)
mass flux in seepage from cell 2W	M_s2w =	87.50	(mg/s)			87.50	(mg/s)
		Low Flor	W	Average	Flow	High Fl	ow
mass flux in river at PM-12	M_r12 =						
mass flux in river at PM-13	M_r13 =						
concentration in river at PM-12	C_r12 =	0.334	(mg/L)	0.212	(mg/L)	0.201	(mg/L)
	nass flux in hydrometallurgical residue cells liner leakage nass flux in seepage from cell 2W nass flux in river at PM-12 nass flux in river at PM-13	nass flux in hydrometallurgical residue cells liner leakage M_rrs = nass flux in seepage from cell 2W M_s2w = nass flux in river at PM-12 M_r12 = nass flux in river at PM-13 M_r13 = oncentration in river at PM-12 C_r12 =	Mass flux in hydrometallurgical residue cells liner leakage M_rrs = 1.41 hass flux in seepage from cell 2W M_s2w = 87.50 Low Flor Low Flor hass flux in river at PM-12 M_r12 = 11.24 hass flux in river at PM-13 M_r13 = 233.15 C_r12 = 0.334	mass flux in hydrometallurgical residue cells liner leakage M_rrs = 1.41 (mg/s) nass flux in seepage from cell 2W M_s2w = 87.50 (mg/s) Low Flow nass flux in river at PM-12 M_r12 = 11.24 (mg/s) nass flux in river at PM-13 M_r13 = 233.15 (mg/s) Low Flow oncentration in river at PM-12	ass flux in hydrometallurgical residue cells liner leakageM_rrs =1.41 (mg/s)1.41hass flux in seepage from cell 2WM_s2w = 87.50 (mg/s) 87.50 Low FlowAveragehass flux in river at PM-12M_r12 = 11.24 (mg/s) 82.61 hass flux in river at PM-13M_r13 = 233.15 (mg/s) 658.90 Low FlowAverageoncentration in river at PM-12C_r12 = 0.334 (mg/L) 0.212	mass flux in hydrometallurgical residue cells liner leakage M_rrs = 1.41 (mg/s) 1.41 (mg/s) nass flux in seepage from cell 2W M_s2w = 87.50 (mg/s) 87.50 (mg/s) Low Flow Average Flow nass flux in river at PM-12 M_r12 = 11.24 (mg/s) 82.61 (mg/s) nass flux in river at PM-13 M_r13 = 233.15 (mg/s) 658.90 (mg/s) oncentration in river at PM-12 C_r12 = 0.334 (mg/L) 0.212 (mg/L)	mass flux in hydrometallurgical residue cells liner leakageM_rrs =1.41(mg/s)1.41(mg/s)1.41nass flux in seepage from cell 2WM_s2w =87.50(mg/s)87.50(mg/s)87.50Low FlowAverage FlowHigh Flnass flux in river at PM-12M_r12 =11.24(mg/s)82.61(mg/s)821.52nass flux in river at PM-13M_r13 =233.15(mg/s)658.90(mg/s)5,025.87Low FlowAverage FlowHigh Floncentration in river at PM-12C_r12 =0.334(mg/L)0.212(mg/L)0.201

Case	Year 15			
Parameter	Iron			
		-		
	concentration of surface water into PM-12	C_s12 =	2.9	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	2.9	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	2.9	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.037761905	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	9.82E-02	(mg/L)
Ū.	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	4.00E-01	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	4.594	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.035	(mg/L)
lnp	concentration of ground water into PM-13	C_g13 =	0	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	1,034.90	(mg/s)	11,749	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.85	(mg/s)	0.85	(mg/s)	0.85	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	27.08	(mg/s)	27.08	(mg/s)	27.08	(mg/s)
concentration flux	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	5,049.77	(mg/s)	57,657	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	-	(mg/s)	-	(mg/s)	-	(mg/s)
con flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.28	(mg/s)	2.13	(mg/s)	2.13	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	15.69	(mg/s)	15.69	(mg/s)	15.69	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.20	(mg/s)	0.20	(mg/s)	0.20	(mg/s)
ទ ប្	mass flux in seepage from cell 2W	M_s2w =	259.35	(mg/s)	259.35	(mg/s)	259.35	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 =	27.93	(mg/s)	1,062.84		69,711.07	
			Low Flo		Average		High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L) (mg/L)		(mg/L) (mg/L)		(mg/L) (mg/L)

Case Parameter	Year 15 Hardness			
	concentration of surface water into PM-12	C_s12 =	70	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	70	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	70	(mg/L)
tion	concentration in Area 5 Pit NW discharge	C_spit =	942.7142857	(mg/L)
ntratic	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	3.20E+02	(mg/L)
ICE	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	8.61E+03	(mg/L)
co	concentration in tailings basin cell 2W	C_s2w =	436.6	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	87.5	(mg/L)
du	concentration of ground water into PM-13	C_g13 =	0	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	24,980.41	(mg/s)	283,600	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	2,129.58	(mg/s)	2,129.58	(mg/s)	2,129.58	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	653.73	(mg/s)	653.73	(mg/s)	653.73	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	121,890.93	(mg/s)	1,391,712	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	-	(mg/s)	-	(mg/s)	-	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	6,936.49	(mg/s)	53,090.84	(mg/s)	53,090.84	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	51,106.04	(mg/s)	51,106.04	(mg/s)	51,106.04	(mg/s)
onvert mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	4,252.38	(mg/s)	4,252.38	(mg/s)	4,252.38	(mg/s)
မ ပိ	mass flux in seepage from cell 2W	M_s2w =	24,647.41	(mg/s)	24,647.41	(mg/s)	24,647.41	(mg/s)
		-	Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =	2,783.31	(mg/s)	27,763.72	(mg/s)	286,383.27	(mg/s)
Ma at	mass flux in river at PM-13	M_r13 =	89,725.62		282,751.31		1,811,191.86	
		-	Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	82.647	(mg/L)	71.091	(mg/L)	70.104	(mg/L)
cor Co	concentration in river at PM-13	C_r13 =	238.041	(mg/L)	112.023	(mg/L)	74.354	(mg/L)

Case	Year 15			
Parameter	Potassium			
	concentration of surface water into PM-12	C_s12 =	0.60	(mg/L)
ata	concentration of surface water into PM-13	C_s13 =	0.60	(mg/L)
q	concentration in Babbitt WWTP discharge	C_sBab =	0.60	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	53.80	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	14.58	(mg/L)
-	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.80	(mg/L)
con	concentration in tailings basin cell 2W	C_s2w =	7.77	(mg/L)
rt	concentration of ground water into PM-12	C_g12 =	1.60	(mg/L)
Idul	concentration of ground water into PM-13	C_g13 =	0.00	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	214.12	(mg/s)	2,431	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	38.94	(mg/s)	38.94	(mg/s)	38.94	(mg/s)
tion	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.89	(mg/s)	0.89	(mg/s)	0.89	(mg/s)
concentration flux	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1,044.78	(mg/s)	11,929	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	-	(mg/s)	-	(mg/s)	-	(mg/s)
con flux	mass flux in Babbitt WWTP discharge	M_sBab =	5.60	(mg/s)	5.60	(mg/s)	5.60	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	395.86	(mg/s)	3,029.85	(mg/s)	3,029.85	(mg/s)
onvert mass	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	2,330.24	(mg/s)	2,330.24	(mg/s)	2,330.24	(mg/s)
to to	mass flux in seepage from cell 2W	M_s2w =	438.64	(mg/s)	438.64	(mg/s)	438.64	
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 = M_r13 =	<u>39.83</u> 3,210.18	(mg/s)	253.95		2,470.69	
			Low Flo	(e /	Average		High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 = C_r13 =		(mg/L) (mg/L)	0.650	(mg/L)	0.605	(mg/l)

Case Parameter	Year 15 Magnesium			
i arameter	magnesium			
	concentration of surface water into PM-12	C_s12 =	5.90	(mg/L)
ata	concentration of surface water into PM-13	C_s13 =	5.90	(mg/L)
р	concentration in Babbitt WWTP discharge	C_sBab =	5.90	(mg/L)
ation	concentration in Area 5 Pit NW discharge	C_spit =	271.00	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	19.82	(mg/L)
ICEI	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	213.00	(mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	69.97	(mg/L)
put	concentration of ground water into PM-12	C_g12 =	10.65	(mg/L)
du du	concentration of ground water into PM-13	C_g13 =	0.00	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	2,105.49	(mg/s)	23,903	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	259.20	(mg/s)	259.20	(mg/s)	259.20	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	55.10	(mg/s)	55.10	(mg/s)	55.10	(mg/s)
itrai	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	10,273.66	(mg/s)	117,301	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	-	(mg/s)	-	(mg/s)	-	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	1,994.02	(mg/s)	15,261.91	(mg/s)	15,261.91	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	3,167.81	(mg/s)	3,167.81	(mg/s)	3,167.81	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	105.20	(mg/s)	105.20	(mg/s)	105.20	(mg/s)
န် ပိ	mass flux in seepage from cell 2W	M_s2w =	3,950.02	(mg/s)	3,950.02		3,950.02	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =	314.30		2,419.79		24,217.73	
ž	mass flux in river at PM-13	M_r13 =	9,531.35 Low Flo		35,178.39 Average		164,004.09 High Fl	
Convert mass flux to concentration		C_r12 =		(mg/L)		(mg/l)	5.928	
Conve flux to	concentration in river at PM-13	C_r13 =	25.287	(mg/L)	13.937	(mg/l)	6.733	(mg/l)

Case Parameter	Year 15 Manganese			
	concentration of surface water into PM-12	C_s12 =	0.30	(mg/L)
ata	concentration of surface water into PM-13	C_s13 =	0.30	(mg/L)
р	concentration in Babbitt WWTP discharge	C_sBab =	0.30	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.49	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.43	(mg/L)
-	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.00	(mg/L)
L L L L L L L L L L L L L L L L L L L	concentration in tailings basin cell 2W	C_s2w =	1.18	(mg/L)
Et .	concentration of ground water into PM-12	C_g12 =	0.19	(mg/L)
lnp	concentration of ground water into PM-13	C_g13 =	0.00	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	107.06	(mg/s)	1,215	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	4.58	(mg/s)	4.58	(mg/s)	4.58	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	2.80	(mg/s)	2.80	(mg/s)	2.80	(mg/s)
itrai	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	522.39	(mg/s)	5,964	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	-	(mg/s)	-	(mg/s)	-	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	3.57	(mg/s)	27.31	(mg/s)	27.31	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	69.10	(mg/s)	69.10	(mg/s)	69.10	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
t C	mass flux in seepage from cell 2W	M_s2w =	66.78	(mg/s)	66.78	(mg/s)	66.78	(mg/s)
		-	Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =	7.38	(mg/s)	114.44	(mg/s)	1,222.81	(mg/s)
ž	mass flux in river at PM-13	M_r13 =	146.83		800.03		7,350.49	
		_	Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to	concentration in river at PM-12	C_r12 =	0.219	(mg/L)	0.293	(mg/l)	0.299	(mg/l)
Con	concentration in river at PM-13	C_r13 =	0.390	(mg/L)	0.317	(mg/l)	0.302	(mg/l)

Case Parameter	Year 15 Sodium			
	concentration of surface water into PM-12	C_s12 =	6.00	(mg/L)
ata	concentration of surface water into PM-13	C_s13 =	6.00	(mg/L)
с С	concentration in Babbitt WWTP discharge	C_sBab =	6.00	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	119.50	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	22.52	(mg/L)
A	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	255.00	(mg/L)
con	concentration in tailings basin cell 2W	C_s2w =	44.31	(mg/L)
ort	concentration of ground water into PM-12	C_g12 =	4.90	(mg/L)
īduļ	concentration of ground water into PM-13	C_g13 =	0.00	(mg/L)

			Low Flo	w	Average	Flow	High Fl	low
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	2,141.18	(mg/s)	24,309	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	119.26	(mg/s)	119.26	(mg/s)	119.26	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	56.03	(mg/s)	56.03	(mg/s)	56.03	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	10,447.79	(mg/s)	119,290	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	-	(mg/s)	-	(mg/s)	-	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	879.28	(mg/s)	6,729.88	(mg/s)	6,729.88	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	3,599.56	(mg/s)	3,599.56	(mg/s)	3,599.56	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	125.94	(mg/s)	125.94		125.94	(mg/s)
to Co	mass flux in seepage from cell 2W	M_s2w =	2,501.44	(mg/s)	2,501.44	(mg/s)	2,501.44	(mg/s)
			Low Flor	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 = M_r13 =	175.29 7,281.51		2,316.47		24,483.86	
			Low Flor		Average		High Fl	low
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	5.205	(mg/L)	5.931	(mg/l)		(mg/l) (mg/l)

Case Parameter	Year 15 Nickel			
	concentration of surface water into PM-12	C_s12 =	0.0012	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0012	(mg/L)
-	concentration in Babbitt WWTP discharge	C_sBab =	0.0012	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.0052	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.153655831	(mg/L)
ICE	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.098	(mg/L)
co	concentration in tailings basin cell 2W	C_s2w =	0.00688	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.007	(mg/L)
du	concentration of ground water into PM-13	C_g13 =	0	(mg/L)

			Low Flor	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.43	(mg/s)	5	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.17	(mg/s)	0.17	(mg/s)	0.17	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
itrai	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	2.09	(mg/s)	24	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	-	(mg/s)	-	(mg/s)	-	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.04	(mg/s)	0.29	(mg/s)	0.29	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	24.56	(mg/s)	24.56	(mg/s)	24.56	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.05	(mg/s)	0.05	(mg/s)	0.05	(mg/s)
မ ပိ	mass flux in seepage from cell 2W	M_s2w =		(mg/s)		(mg/s)		(mg/s)
			Low Flor	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 =		(mg/s) (mg/s)		(mg/s)		(mg/s) (mg/s)
~ ~ ~		M_113 =	Low Flor		Average		High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.005	(mg/L)	0.002	(mg/L)	0.001	(mg/L) (mg/L)

Case	Year 15			
Parameter	Lead			
		-		
	concentration of surface water into PM-12	C_s12 =	0.00015	(mg/L)
ata	concentration of surface water into PM-13	C_s13 =	0.00015	(mg/L)
p	concentration in Babbitt WWTP discharge	C_sBab =	0.00015	(mg/L)
ation	concentration in Area 5 Pit NW discharge	C_spit =	0.0003	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.002409879	(mg/L)
ncer	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0005	(mg/L)
con	concentration in tailings basin cell 2W	C_s2w =	0.0012	(mg/L)
rt .	concentration of ground water into PM-12	C_g12 =	0.0012	(mg/L)
Input	concentration of ground water into PM-13	C_g13 =	0	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.05	(mg/s)	1	(mg/s)
-	mass flux of ground water into PM-12	M_g12 =	0.03	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.26	(mg/s)	3	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	-	(mg/s)	-	(mg/s)	-	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.02	(mg/s)	0.02	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.39	(mg/s)	0.39	(mg/s)	0.39	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
ဒ္ ပိ	mass flux in seepage from cell 2W	M_s2w =	0.07	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s)		(mg/s)		(mg/s)
Ma at	mass flux in river at PM-13	M_r13 =		(mg/s)		(mg/s)		(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to concentration		C_r12 =	0.001	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
Con flux con	concentration in river at PM-13	C_r13 =	0.001	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Case	Year 15			
Parameter	Antimony			
		-		
	concentration of surface water into PM-12	C_s12 =	4.00E-05	(mg/L)
ata	concentration of surface water into PM-13	C_s13 =	4.00E-05	(mg/L)
p	concentration in Babbitt WWTP discharge	C_sBab =	4.00E-05	(mg/L)
ation	concentration in Area 5 Pit NW discharge	C_spit =	2.50E-04	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	1.13E-02	(mg/L)
ICEI	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.004	(mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	2.50E-04	(mg/L)
brt	concentration of ground water into PM-12	C_g12 =	1.50E-03	(mg/L)
ln p	concentration of ground water into PM-13	C_g13 =	0.00E+00	(mg/L)

			Low Flo	w	Average	Flow	High FI	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.01	(mg/s)	0	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.04	(mg/s)	0.04	(mg/s)	0.04	(mg/s)
tion	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
tra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.07	(mg/s)	1	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	-	(mg/s)	-	(mg/s)	-	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in coopage from Tailings Pasin Colls 1E and 2E	M_fs =	1.81	(mg/s)	1.81	(mg/s)	1.81	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
2 S	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)		(mg/s)	0.01	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s)		(mg/s)		(mg/s)
a ŭ	mass flux in river at PM-13	M_r13 =		(mg/s)		(mg/s)		(mg/s)
			Low Flo		Average	FIUW	High FI	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.001	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
Cor Cor	concentration in river at PM-13	C_r13 =	0.005	(mg/L)	0.001	(mg/L)	0.000	(mg/L)

Case Parameter	Year 15 Selenium			
		-	-	
	concentration of surface water into PM-12	C_s12 =	0.0003	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0003	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0003	(mg/L)
ation	concentration in Area 5 Pit NW discharge	C_spit =	0.0016	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.002521801	(mg/L)
ncei	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.054	(mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	0.00109	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.00295	(mg/L)
u u	concentration of ground water into PM-13	C_g13 =	0	(mg/L)

			Low Flor	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.11	(mg/s)	1	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.07	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
Itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.52	(mg/s)	6	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	-	(mg/s)	-	(mg/s)	-	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	0.01	(mg/s)	0.09	(mg/s)	0.09	(mg/s)
		M_fs =	0.40	(mg/s)	0.40	(mg/s)	0.40	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.03	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
မ ပိ	mass flux in seepage from cell 2W	M_s2w =	0.06	(mg/s)	0.06	(mg/s)	0.06	(mg/s)
		-	Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.07	(mg/s)	0.18	(mg/s)	1.29	(mg/s)
at a		M_r13 =	0.58	(mg/s)	1.29	(mg/s)	7.84	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to	concentration in river at PM-12	C_r12 =	0.002	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
S files	concentration in river at PM-13	C_r13 =	0.002	(mg/L)	0.001	(mg/L)	0.000	(mg/L)

Case	Year 15				
Parameter	Sulfate				
	concentration of surface water into PM-12	C_:	s12 =	4.00	(mg/L)
ata	concentration of surface water into PM-13	C_:	s13 =	4.00	(mg/L)
р	concentration in Babbitt WWTP discharge	C_9	sBab =	4.00	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_9	spit =	1046.27	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_f	fs =	241.92	(mg/L)
Icei	concentration in hydrometallurgical residue cells liner leakage	C_1	rrs =	7347.00	(mg/L)
cor	concentration in tailings basin cell 2W	C_9	s2w =	152.40	(mg/L)
put	concentration of ground water into PM-12	C_9	g12 =	8.50	(mg/L)
	concentration of ground water into PM-13	C_9	g13 =	0.00	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	1,427.45	(mg/s)	16,206	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	206.87	(mg/s)	206.87	(mg/s)	206.87	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	37.36	(mg/s)	37.36	(mg/s)	37.36	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	6,965.20	(mg/s)	79,526	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	-	(mg/s)	-	(mg/s)	-	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	7,698.43	(mg/s)	58,922.60	(mg/s)	58,922.60	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	38,661.16	(mg/s)	38,661.16	(mg/s)	38,661.16	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	3,628.60	(mg/s)	3,628.60	(mg/s)	3,628.60	(mg/s)
to Co	mass flux in seepage from cell 2W	M_s2w =	8,603.45	(mg/s)	8,603.45	(mg/s)	8,603.45	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 = M_r13 =	244.23		1,671.68		16,449.94	
			Low Flo		Average		High Fl	
Convert mass flux to concentration	concentration in river at PM-12 concentration in river at PM-13	C_r12 = C_r13 =	7.252	(mg/L)	4.280		4.027	(mg/l) (mg/l)

Case Parameter	Year 15 Thallium			
		-		
	concentration of surface water into PM-12	C_s12 =	0.0002	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0002	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0002	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.0006	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.001193197	(mg/L)
0	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0002	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	0.0002	(mg/L)
et	concentration of ground water into PM-12	C_g12 =	0.000004	(mg/L)
Inpui	concentration of ground water into PM-13	C_g13 =	0	(mg/L)

mass flux of surface water into PM-12 mass flux of ground water into PM-12	M_s12 =	-	(1
mass flux of ground water into PM-12			(mg/s)	0.07	(mg/s)	1	(mg/s)
	M_g12 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.35	(mg/s)	4	(mg/s)
mass flux of ground water into PM-13	M_g13 =	-	(mg/s)	-	(mg/s)	-	(mg/s)
mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.19	(mg/s)	0.19	(mg/s)	0.19	(mg/s)
mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
		Low Flo	w	Average	Flow	High Fl	ow
mass flux in river at PM-12	M_r12 =						(mg/s)
mass flux in river at PM-13	M_r13 =						
concentration in river at PM-12	C_r12 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
	mass flux of ground water into PM-13 mass flux of Area 5 Pit NW discharge mass flux in seepage from Tailings Basin Cells 1E and 2E mass flux in hydrometallurgical residue cells liner leakage mass flux in seepage from cell 2W mass flux in river at PM-12 mass flux in river at PM-13	mass flux of ground water into PM-13 M_g13 = mass flux of Area 5 Pit NW discharge M_spit = mass flux in seepage from Tailings Basin Cells 1E and 2E M_fs = mass flux in hydrometallurgical residue cells liner leakage M_rrs = mass flux in seepage from cell 2W M_s2w = mass flux in river at PM-12 M_r12 = mass flux in river at PM-13 M_r13 = concentration in river at PM-12 C_r12 =	mass flux of ground water into PM-13 M_g13 = - mass flux of Area 5 Pit NW discharge M_spit = 0.00 mass flux in seepage from Tailings Basin Cells 1E and 2E M_fs = 0.19 mass flux in hydrometallurgical residue cells liner leakage M_rrs = 0.00 mass flux in seepage from cell 2W M_s2w = 0.01 Low Flo mass flux in river at PM-12 M_r12 = 0.00 mass flux in river at PM-13 M_r13 = 0.21 Low Flo concentration in river at PM-12	mass flux of ground water into PM-13M_g13 =.(mg/s)mass flux of Area 5 Pit NW dischargeM_spit =0.00(mg/s)mass flux in seepage from Tailings Basin Cells 1E and 2EM_fs =0.19(mg/s)mass flux in hydrometallurgical residue cells liner leakageM_rrs =0.00(mg/s)mass flux in seepage from cell 2WM_s2w =0.01(mg/s)Low Flowmass flux in river at PM-12M_r12 =0.00(mg/s)Low Flowconcentration in river at PM-12C_r12 =0.000(mg/L)	mass flux of ground water into PM-13M_g13 =-(mg/s)-mass flux of Area 5 Pit NW dischargeM_spit =0.00(mg/s)0.03mass flux in seepage from Tailings Basin Cells 1E and 2EM_fs =0.19(mg/s)0.19mass flux in hydrometallurgical residue cells liner leakageM_rrs =0.00(mg/s)0.00mass flux in seepage from cell 2WM_s2w =0.01(mg/s)0.01Low FlowAveragemass flux in river at PM-12M_r12 =0.00(mg/s)0.07mass flux in river at PM-13M_r13 =0.21(mg/s)0.66Low FlowAverageconcentration in river at PM-12C_r12 =0.000(mg/L)0.000	mass flux of ground water into PM-13 M_g13 = - (mg/s) - (mg/s) mass flux of Area 5 Pit NW discharge M_spit = 0.00 (mg/s) 0.03 (mg/s) mass flux in seepage from Tailings Basin Cells 1E and 2E M_fs = 0.19 (mg/s) 0.19 (mg/s) mass flux in hydrometallurgical residue cells liner leakage M_rrs = 0.00 (mg/s) 0.00 (mg/s) mass flux in seepage from cell 2W M_s2w = 0.01 (mg/s) 0.01 (mg/s) mass flux in river at PM-12 M_r12 = 0.00 (mg/s) 0.07 (mg/s) mass flux in river at PM-13 M_r13 = 0.21 (mg/s) 0.66 (mg/s) mass flux in river at PM-12 C_r12 = 0.000 (mg/L) 0.000 (mg/L)	mass flux of ground water into PM-13 M_g13 = - (mg/s) - (mg/s) - mass flux of Area 5 Pit NW discharge M_spit = 0.00 (mg/s) 0.03 (mg/s) 0.03 mass flux in seepage from Tailings Basin Cells 1E and 2E M_fs = 0.19 (mg/s) 0.19 (mg/s) 0.19 mass flux in hydrometallurgical residue cells liner leakage M_rrs = 0.00 (mg/s) 0.00 (mg/s) 0.00 mass flux in seepage from cell 2W M_s2w = 0.01 (mg/s) 0.01 (mg/s) 0.01 mass flux in river at PM-12 M_r12 = 0.00 (mg/s) 0.07 (mg/s) 0.81 mass flux in river at PM-13 M_r13 = 0.21 (mg/s) 0.66 (mg/s) 5.02 mass flux in river at PM-13 M_r13 = 0.21 (mg/s) 0.66 (mg/s) 5.02 concentration in river at PM-12 C_r12 = 0.000 (mg/L) 0.000 (mg/L) 0.000

Case	Year 15			
Parameter	Zinc			
-		-		
	concentration of surface water into PM-12	C_s12 =	0.016	(mg/L)
ata	concentration of surface water into PM-13	C_s13 =	0.016	(mg/L)
i p u	concentration in Babbitt WWTP discharge	C_sBab =	0.016	(mg/L)
atio	concentration in Area 5 Pit NW discharge	C_spit =	0.003	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.081197396	(mg/L)
ICel	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.01	(mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	0.01435	(mg/L)
put	concentration of ground water into PM-12	C_g12 =	0.0115	(mg/L)
du	concentration of ground water into PM-13	C_g13 =	0	(mg/L)

			Low Flo	w	Average	Flow	High Fl	low
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	5.71	(mg/s)	65	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.28	(mg/s)	0.28	(mg/s)	0.28	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.15	(mg/s)	0.15	(mg/s)	0.15	(mg/s)
concentration flux	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	27.86	(mg/s)	318	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	-	(mg/s)	-	(mg/s)	-	(mg/s)
con flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.02	(mg/s)	0.17	(mg/s)	0.17	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	12.98	(mg/s)	12.98	(mg/s)	12.98	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
<u>ع</u> ک	mass flux in seepage from cell 2W	M_s2w =	0.81	(mg/s)	0.81	(mg/s)	0.81	(mg/s)
			Low Flo	w	Average	Flow	High Fl	low
Mass balance at each node		M_r12 =		(mg/s) (mg/s)		(mg/s)	65.25	(mg/s)
			Low Flo		Average		High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L) (mg/L)		(mg/L)		(mg/L) (mg/L)

Appendix F.6 Embarrass River Proposed Action Year 20

FLOWS

Case	Year 20				
Flows	Low Flow Conditions (no surface runoff)			Node	
in River	flow in river at PM-12	Q_r12_L =	1.19	(cfs)	PM-12
Total flow in Embarrass F	flow in river at PM-13	Q_r13_L =	13.64	(cfs)	PM-13
Total Emb ã	flow check	Q_ck_L =	13.64	(cfs)	4
	surface water flow into PM-12	Q_s12_L =	0.00	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_L =	0.00	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_L =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_L =	0.26	(cfs)	PM-13
ta	seepage from Tailings Basin Cells 1E and 2E	Q_fs_L =	5.97	(cfs)	PM-13
flow data	hydrometallurgical residue cells liner leakage	Q_rrs_L =	0.02	(cfs)	PM-13
low	seepage from cell 2W	Q_s2w_L =	1.99	(cfs)	PM-13
Input 1	ground water flow into PM-12	Q_g12_L =	0.86	(cfs)	PM-12
dul	ground water flow into PM-13	Q_g13_L =	4.21	(cfs)	PM-13

Case	Year 20				
Flow	Average Flow Conditions (mean annual)				
n River	flow in river at PM-12	Q_r12_M =	13.80	(cfs)	PM-12
Total flow in Embarrass R	flow in river at PM-13	Q_r13_M =	89.51	(cfs)	PM-13
Total Embê	flow check	Q_ck_M =	89.51	(cfs)	
	surface water flow into PM-12	Q_s12_M =	12.61	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_M =	61.53	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_M =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_M =	1.99	(cfs)	PM-13
data	seepage from Tailings Basin Cells 1E and 2E	Q_fs_M =	5.97	(cfs)	PM-13
	hydrometallurgical residue cells liner leakage	Q_rrs_M =	0.02	(cfs)	PM-13
low	seepage from cell 2W	Q_s2w_M =	1.99	(cfs)	PM-13
nput flow	ground water flow into PM-12	Q_g12_M =	0.86	(cfs)	PM-12
dul	ground water flow into PM-13	Q_g13_M =	4.21	(cfs)	PM-13

Case Flow	Year 20 High Flow Conditions (avg. annual 1-day max			
liver	flow in river at PM-12	Q_r12_H =	144.35 (cfs)	PM-1
flow iı rrass	flow in river at PM-13	Q_r13_H =	861.06 (cfs)	PM-1
Total 1 Embai	flow check	Q_ck_H =	861.06 (cfs)	
	surface water flow into PM-12	Q_s12_H =	143.16 (cfs)	PM-1
	surface water flow into PM-13	Q_s13_H =	702.53 (cfs)	PM-1
	Babbitt WWTP discharge	Q_sBab_H =	0.33 (cfs)	PM-1
	Area 5 Pit NW discharge	Q_spit_H =	1.99 (cfs)	PM-1
Ita	seepage from Tailings Basin Cells 1E and 2E	Q_fs_H =	5.97 (cfs)	PM-1
/ da	hydrometallurgical residue cells liner leakage	Q_rrs_H =	0.02 (cfs)	PM-1
3	seepage from cell 2W	Q_s2w_H =	1.99 (cfs)	PM-1
Input	ground water flow into PM-12	Q_g12_H =	0.86 (cfs)	PM-1
브	ground water flow into PM-13	Q_g13_H =	4.21 (cfs)	PM-13

Case Parameter	Year 20 Silver		
		_	
	concentration of surface water into PM-12	C_s12 =	0.00011 (mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.00011 (mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00011 (mg/L)
tio	concentration in Area 5 Pit NW discharge	C_spit =	0.00015 (mg/L)
ntration	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.00124 (mg/L)
A	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.000125 (mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	0.000100 (mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.000008 (mg/L)
별	concentration of ground water into PM-13	C_g13 =	0.000008 (mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.04	(mg/s)	0	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.19	(mg/s)	2	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	many flux in according from Tailings Basin Calls 15 and 25	M_fs =	0.21	(mg/s)	0.21	(mg/s)	0.21	(mg/s)
Convert	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
ပိ .	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance	mass flux in river at PM-12	M_r12 =	0.00	(mg/s)	0.04	(mg/s)	0.45	(mg/s)
Ma		M_r13 =	0.22	(mg/s)	0.46	(mg/s)	2.86	(mg/s)
		_	Low Flo	w	Average	Flow	High Fl	
Convert mass flux to	concentration in river at PM-12	C_r12 =		(mg/L)		(mg/L)		(mg/L)
ŬĘ	concentration in river at PM-13	C_r13 =	0.001	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Case	Year 20		
Parameter	Aluminum		
			1
	concentration of surface water into PM-12	C_s12 =	0.12 (mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.12 (mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.12 (mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.01325 (mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	3.74E-01 (mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.80E-01 (mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	1.5788 (mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.025 (mg/L)
넙	concentration of ground water into PM-13	C_g13 =	0.025 (mg/L)

			Low Flo	w	Average	Flow	High Fl	low
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	42.82	(mg/s)	486	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.61	(mg/s)	0.61	(mg/s)	0.61	(mg/s)
concentration flux	mass flux in Babbitt WWTP discharge	M_sBab =	1.12	(mg/s)	1.12	(mg/s)	1.12	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	208.96	(mg/s)	2,386	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	2.98	(mg/s)	2.98	(mg/s)	2.98	(mg/s)
conc	mass flux of Area 5 Pit NW discharge	M_spit =	0.10	(mg/s)	0.75	(mg/s)	0.75	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	63.12	(mg/s)	63.12	(mg/s)	63.12	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.10	(mg/s)	0.10	(mg/s)	0.10	(mg/s)
c to	mass flux in seepage from cell 2W	M_s2w =	89.10	(mg/s)	89.10	(mg/s)	89.10	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s)		(mg/s)	487.90	
oi≤	mass flux in river at PM-13	M_r13 =	157.12 Low Flo		409.55 Average		3,029.73 High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L)	0.114	(mg/L)	0.119	(mg/L) (mg/L)

Case Parameter	Year 20 Arsenic		
		-	Г Г Г
	concentration of surface water into PM-12	C_s12 =	0.00075 (mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.00075 (mg/L)
-	concentration in Babbitt WWTP discharge	C_sBab =	0.00075 (mg/L)
tio	concentration in Area 5 Pit NW discharge	C_spit =	0.001325 (mg/L)
ntration	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.014389887 (mg/L)
CD CD	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.004 (mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	0.00291 (mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.00273 (mg/L)
duj	concentration of ground water into PM-13	C_g13 =	0.00273 (mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.27	(mg/s)	3	(mg/s)
-	mass flux of ground water into PM-12	M_g12 =	0.07	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1.31	(mg/s)	15	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.33	(mg/s)	0.33	(mg/s)	0.33	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	0.01	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
	mass flux in seepage from Tailings Pasin Colls 1E and 2E	M_fs =	2.43	(mg/s)	2.43	(mg/s)	2.43	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
ដ ខ	mass flux in seepage from cell 2W	M_s2w =	0.16	(mg/s)	0.16	(mg/s)	0.16	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =	0.07	(mg/s)	0.34	(mg/s)	3.11	(mg/s)
a ŭ	mass flux in river at PM-13	M_r13 =		(mg/s)		(mg/s)		(mg/s)
		_	Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.002	(mg/L)	0.001	(mg/L)	0.001	(mg/L)
c fin C	concentration in river at PM-13	C_r13 =	0.008	(mg/L)	0.002	(mg/L)	0.001	(mg/L)

Case Parameter	Year 20 Boron			
	concentration of surface water into PM-12	C_s12 =	0.027	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.027	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.027	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.1315	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.174123916	(mg/L)
c)	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.11	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	0.33	(mg/L)
nt	concentration of ground water into PM-12	C_g12 =	0.0212	(mg/L)
Input	concentration of ground water into PM-13	C_g13 =	0.0212	(mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	9.64	(mg/s)	109	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.52	(mg/s)	0.52	(mg/s)	0.52	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	0.25	(mg/s)	0.25	(mg/s)	0.25	(mg/s)
itrai	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	47.02	(mg/s)	537	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	2.53	(mg/s)	2.53	(mg/s)	2.53	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	0.97	(mg/s)	7.41	(mg/s)	7.41	(mg/s)
	many flux in coopera from Tailings Pasin Collo 1E and 2E	M_fs =	29.42	(mg/s)	29.42	(mg/s)	29.42	(mg/s)
Convert	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.06	(mg/s)	0.06	(mg/s)	0.06	(mg/s)
မိ မိ	mass flux in seepage from cell 2W	M_s2w =	18.62	(mg/s)	18.62	(mg/s)	18.62	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance	mass flux in river at PM-12	M_r12 =	0.77	(mg/s)	10.40	(mg/s)	110.16	(mg/s)
Ma	mass flux in river at PM-13	M_r13 =	52.37	(mg/s)	115.46	(mg/s)	705.00	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to	concentration in river at PM-12	C_r12 =	0.023	(mg/L)	0.027	(mg/L)	0.027	(mg/L)
S≞S	concentration in river at PM-13	C_r13 =	0.136	(mg/L)	0.046	(mg/L)	0.029	(mg/L)

Case Parameter	Year 20 Barium		
		-	Г Г Г
	concentration of surface water into PM-12	C_s12 =	0.016 (mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.016 (mg/L)
-	concentration in Babbitt WWTP discharge	C_sBab =	0.016 (mg/L)
tio	concentration in Area 5 Pit NW discharge	C_spit =	0.0044 (mg/L)
ntration	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	6.60E-02 (mg/L)
۵U	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	5.00E-03 (mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	0.09298 (mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.0681 (mg/L)
du	concentration of ground water into PM-13	C_g13 =	0.0681 (mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
1	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	5.71	(mg/s)	65	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	1.66	(mg/s)	1.66	(mg/s)	1.66	(mg/s)
tion	mass flux in Babbitt WWTP discharge	M_sBab =	0.15	(mg/s)	0.15	(mg/s)	0.15	(mg/s)
Itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	27.86	(mg/s)	318	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	8.11	(mg/s)	8.11	(mg/s)	8.11	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.03	(mg/s)	0.25	(mg/s)	0.25	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	11.15	(mg/s)	11.15	(mg/s)	11.15	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
ے گ	mass flux in seepage from cell 2W	M_s2w =	5.25	(mg/s)	5.25	(mg/s)	5.25	(mg/s)
			Low Flo	N	Average	Flow	High Fl	ow
ass ba each r	mass flux in river at PM-12	M_r12 =		(mg/s)		(mg/s)		(mg/s)
2 8 1	mass flux in river at PM-13	M_r13 =	Low Flo	(mg/s)	60.14 Average	(mg/s)	409.50 High Fl	
onvert ux to oncent	concentration in river at PM-12	C_r12 =	0.054	(mg/L)	0.019	(mg/L)	0.016	(mg/L)
O ∓ S	concentration in river at PM-13	C_r13 =	0.068	(mg/L)	0.024	(mg/L)	0.017	(mg/L)

Case Parameter	Year 20 Beryllium			
		-		
	concentration of surface water into PM-12	C_s12 =	0.0001	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0001	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0001	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.0001	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.00131326	(mg/L)
A	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	0.00075	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.000023	(mg/L)
du	concentration of ground water into PM-13	C_g13 =	0.000023	(mg/L)

			Low Flo	w	Average	Flow	High Fl	low
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.04	(mg/s)	0	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
Itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.17	(mg/s)	2	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.22	(mg/s)	0.22	(mg/s)	0.22	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	-	(mg/s)	-	(mg/s)	-	(mg/s)
<u>ءَ</u> ک	mass flux in seepage from cell 2W	M_s2w =	0.04	(mg/s)	0.04	(mg/s)	0.04	(mg/s)
			Low Flo	w	Average	Flow	High Fl	low
Mass balance at each node	mass flux in river at PM-12	M_r12 =		(mg/s)		(mg/s)		(mg/s)
at ũ	mass flux in river at PM-13	M_r13 =	0.27 Low Flo	(mg/s)	0.48 Average	(mg/s)	2.67 High Fl	(mg/s)
Convert mass flux to concentration	concentration in river at PM-12 concentration in river at PM-13	C_r12 =	0.000	(mg/L) (mg/L)	0.000	(mg/L)	0.000	(mg/L) (mg/L)

Case Parameter	Year 20 Calcium			
		-		
	concentration of surface water into PM-12	C_s12 =	15	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	15	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	15	(mg/L)
tio	concentration in Area 5 Pit NW discharge	C_spit =	95.35	(mg/L)
ntration	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	76.37590202	(mg/L)
c)	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	416	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	59.78	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	19	(mg/L)
du du	concentration of ground water into PM-13	C_g13 =	19	(mg/L)

			Low Flo	W	Average	Flow	High Flo	ow
m	ass flux of surface water into PM-12	M_s12 =	-	(mg/s)	5,352.95	(mg/s)	60,771	(mg/s)
_ m	ass flux of ground water into PM-12	M_g12 =	462.42	(mg/s)	462.42	(mg/s)	462.42	(mg/s)
m tio	ass flux in Babbitt WWTP discharge	M_sBab =	140.09	(mg/s)	140.09	(mg/s)	140.09	(mg/s)
m tra	ass flux of surface water into PM-13	M_s13 =	-	(mg/s)	26,119.49	(mg/s)	298,224	(mg/s)
m ceu	ass flux of ground water into PM-13	M_g13 =	2,263.72	(mg/s)	2,263.72	(mg/s)	2,263.72	(mg/s)
concentration flux 3 3 3 3	ass flux of Area 5 Pit NW discharge	M_spit =	701.59	(mg/s)	5,369.83	(mg/s)	5,369.83	(mg/s)
	ass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	12,906.03	(mg/s)	12,906.03	(mg/s)	12,906.03	(mg/s)
Convert to mass	ass flux in hydrometallurgical residue cells liner leakage	M_rrs =	227.25	(mg/s)	227.25		227.25	
ວິ ອີ m	ass flux in seepage from cell 2W	M_s2w =	3,373.51		3,373.51		32.66	(mg/s)
			Low Flo	W	Average	Flow	High Flo	ow
ass ba each r	ass flux in river at PM-12 ass flux in river at PM-13	M_r12 =	602.51		5,955.45		61,373.93	
		IVI_113 =	Low Flo		Average		High Flo	
onvert ux to oncent	oncentration in river at PM-12	C_r12 =	17.891		15.249	(mg/l)	15.024	
ပ≓ဒိα	oncentration in river at PM-13	C_r13 =	51.988	(mg/L)	22.191	(mg/l)	15.610	(mg/l)
Case Parameter	Year 20 Cadmium							
-------------------	-----------------------------------------------------------------	----------	--------------------					
rarameter	Cadmium	1						
	concentration of surface water into PM-12	C_s12 =	0.00008 (mg/L)					
ata	concentration of surface water into PM-13	C_s13 =	0.00008 (mg/L)					
q	concentration in Babbitt WWTP discharge	C_sBab =	0.00008 (mg/L)					
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.0001 (mg/L)					
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000534314 (mg/L)					
8	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0004 (mg/L)					
conc	concentration in tailings basin cell 2W	C_s2w =	0.000188 (mg/L)					
Input	concentration of ground water into PM-12	C_g12 =	0.0003 (mg/L)					
du	concentration of ground water into PM-13	C_g13 =	0.0003 (mg/L)					

			Low Flor	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.03	(mg/s)	0	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.14	(mg/s)	2	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.04	(mg/s)	0.04	(mg/s)	0.04	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.09	(mg/s)	0.09	(mg/s)	0.09	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =		(mg/s)	0.00	(mg/s)	0.00	(mg/s)
<u>ء</u> ک	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
			Low Flor	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 = M r13 =		(mg/s) (mg/s)		(mg/s) (mg/s)		(mg/s) (mg/s)
		<u>.</u>	Low Flor		Average		High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 = C_r13 =		(mg/L) (mg/L)		(mg/L) (mg/L)		(mg/L) (mg/L)

Case Parameter	Year 20 Chloride		
	concentration of surface water into PM-12	C s12 =	6.5 (mg/L)
data	concentration of surface water into PM-12	C_s12 = C_s13 =	6.5 (mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	6.5 (mg/L)
ntration	concentration in Area 5 Pit NW discharge	C_spit =	5.95 (mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	7.66E+00 (mg/L)
CD CD	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.76E+03 (mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	21.54 (mg/L)
Input	concentration of ground water into PM-12	C_g12 =	1.8 (mg/L)
ul n	concentration of ground water into PM-13	C_g13 =	1.8 (mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	2,319.61	(mg/s)	26,334	(mg/s)
-	mass flux of ground water into PM-12	M_g12 =	43.81	(mg/s)	43.81	(mg/s)	43.81	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	60.70	(mg/s)	60.70	(mg/s)	60.70	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	11,318.44	(mg/s)	129,230	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	214.46	(mg/s)	214.46	(mg/s)	214.46	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	43.78	(mg/s)	335.09	(mg/s)	335.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1,293.94	(mg/s)	1,293.94	(mg/s)	1,293.94	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	961.45	(mg/s)	961.45	(mg/s)	961.45	(mg/s)
ຊ ິວ	mass flux in seepage from cell 2W	M_s2w =	1,215.55	(mg/s)	1,215.55	(mg/s)	1,215.55	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =	104.51 3,833.69		2,424.12		26,438.79	
		1	Low Flo		Average		High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L) (mg/L)		(mg/L) (mg/L)		(mg/L) (mg/L)

Case	Year 20			
Parameter	Cobalt			
		-		
	concentration of surface water into PM-12	C_s12 =	0.0006	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0006	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0006	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.000555	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.007940593	(mg/L)
e B	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.005	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	0.001556	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.0011	(mg/L)
dul	concentration of ground water into PM-13	C_g13 =	0.0011	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.21	(mg/s)	2	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.03	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1.04	(mg/s)	12	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.13	(mg/s)	0.13	(mg/s)	0.13	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.34	(mg/s)	1.34	(mg/s)	1.34	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
ទ បំ	mass flux in seepage from cell 2W	M_s2w =	0.09	(mg/s)	0.09	(mg/s)	0.09	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 =		(mg/s) (mg/s)		(mg/s)		(mg/s) (mg/s)
		1.12.13	Low Flo		Average		High Fl	
Convert mass flux to concentration		C_r12 =		(mg/L) (mg/L)		(mg/L) (mg/L)		(mg/L) (mg/L)

Case	Year 20			
Parameter	Copper			
		-		-
	concentration of surface water into PM-12	C_s12 =	0.0015	(mg/L)
ata	concentration of surface water into PM-13	C_s13 =	0.0015	(mg/L)
р	concentration in Babbitt WWTP discharge	C_sBab =	0.0015	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.00345	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.020208301	(mg/L)
8	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0015	(mg/L)
con	concentration in tailings basin cell 2W	C_s2w =	0.004555	(mg/L)
ont	concentration of ground water into PM-12	C_g12 =	0.004	(mg/L)
Input	concentration of ground water into PM-13	C_g13 =	0.004	(mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
mass flux	of surface water into PM-12	M_s12 =	-	(mg/s)	0.54	(mg/s)	6	(mg/s)
mass flux	of ground water into PM-12	M_g12 =	0.10	(mg/s)	0.10	(mg/s)	0.10	(mg/s)
mass flux	in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
mass flux	of surface water into PM-13	M_s13 =	-	(mg/s)	2.61	(mg/s)	30	(mg/s)
mass flux	of ground water into PM-13	M_g13 =	0.48	(mg/s)	0.48	(mg/s)	0.48	(mg/s)
mass flux mass flux mass flux mass flux mass flux	of Area 5 Pit NW discharge	M_spit =	0.03	(mg/s)	0.19	(mg/s)	0.19	(mg/s)
	in seepage from Tailings Basin Cells 1E and 2E	M_fs =	3.41	(mg/s)	3.41	(mg/s)	3.41	(mg/s)
mass flux mass flux mass flux	in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
8 9 mass flux	in seepage from cell 2W	M_s2w =	0.26	(mg/s)	0.26	(mg/s)		(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
ass ba	(in river at PM-12	M_r12 =		(mg/s)		(mg/s)		(mg/s) (mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
onvert ux to oncent	ation in river at PM-12	C_r12 =		(mg/L)		(mg/L)		(mg/L)
🖸 🧮 🕇 concentra	ation in river at PM-13	C_r13 =	0.011	(mg/L)	0.003	(mg/L)	0.002	(mg/L)

Case Parameter	Year 20 Fluoride		
		0	0.0 (
, and the second s	concentration of surface water into PM-12	C_s12 =	0.2 (mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.2 (mg/L)
u	concentration in Babbitt WWTP discharge concentration in Area 5 Pit NW discharge	C_sBab = C_spit =	0.2 (mg/L) 0.125 (mg/L)
tratio		C fs =	7.70E-01 (mg/L)
cent	concentration in hydrometallurgical residue cells liner leakage	C rrs =	2.85E+00 (mg/L)
con	concentration in tailings basin cell 2W	C_s2w =	1.55 (mg/L)
but	concentration of ground water into PM-12	C_g12 =	0.385 (mg/L)
h	concentration of ground water into PM-13	C_g13 =	0.385 (mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	71.37	(mg/s)	810	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	9.37	(mg/s)	9.37	(mg/s)	9.37	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	1.87	(mg/s)	1.87	(mg/s)	1.87	(mg/s)
itrai	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	348.26	(mg/s)	3,976	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	45.87	(mg/s)	45.87	(mg/s)	45.87	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	0.92	(mg/s)	7.04	(mg/s)	7.04	(mg/s)
	mana flux in coopage from Tailings Pasin Colle 1E and 2E	M_fs =	130.19	(mg/s)	130.19	(mg/s)	130.19	(mg/s)
Convert	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	1.56	(mg/s)	1.56	(mg/s)	1.56	(mg/s)
ပိ ပိ	mass flux in seepage from cell 2W	M_s2w =	87.47	(mg/s)	87.47	(mg/s)	87.47	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance	mass flux in river at PM-12	M_r12 =	11.24	(mg/s)	82.61	(mg/s)	821.52	(mg/s)
R a	mass flux in river at PM-13	M_r13 =	277.25	(mg/s)	703.00	(mg/s)	5,069.97	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Convert mass flux to	concentration in river at PM-12	C_r12 =		(mg/L)		(mg/L)		(mg/L)
Ğ≓Ö	concentration in river at PM-13	C_r13 =	0.718	(mg/L)	0.278	(mg/L)	0.208	(mg/L)

Case	Year 20			
Parameter	Iron			
		-		
	concentration of surface water into PM-12	C_s12 =	2.9	(mg/L)
ata	concentration of surface water into PM-13	C_s13 =	2.9	(mg/L)
, p u	concentration in Babbitt WWTP discharge	C_sBab =	2.9	(mg/L)
ratio	concentration in Area 5 Pit NW discharge	C_spit =	0.037761905	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	8.72E-02	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	4.00E-01	(mg/L)
con	concentration in tailings basin cell 2W	C_s2w =	4.594	(mg/L)
put	concentration of ground water into PM-12	C_g12 =	0.035	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.035	(mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	1,034.90	(mg/s)	11,749	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.85	(mg/s)	0.85	(mg/s)	0.85	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	27.08	(mg/s)	27.08	(mg/s)	27.08	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	5,049.77	(mg/s)	57,657	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	4.17	(mg/s)	4.17	(mg/s)	4.17	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.28	(mg/s)	2.13	(mg/s)	2.13	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	14.74	(mg/s)	14.74	(mg/s)	14.74	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.22	(mg/s)		(mg/s)	0.22	(mg/s)
န် ဦ	mass flux in seepage from cell 2W	M_s2w =	259.25	(mg/s)	259.25		259.25	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s)	6,393.11		69,714.22	
< 0	mass nux in river at PM-13	IVI_113 =	Low Flo	306.59 (mg/s)		(ing/s) Flow	High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.829	(mg/L)		(mg/L)	2.883	(mg/L)

Case Parameter	Year 20 Hardness			
	concentration of surface water into PM-12	C s12 =	70	(mg/L)
data	concentration of surface water into PM-13	 C_s13 =		(mg/L)
ep r	concentration in Babbitt WWTP discharge	C_sBab =	70	(mg/L)
atio	concentration in Area 5 Pit NW discharge	C_spit =	942.7142857	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	2.71E+02	(mg/L)
B	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	8.61E+03	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	436.6	(mg/L)
rt	concentration of ground water into PM-12	C_g12 =	87.5	(mg/L)
ıdul	concentration of ground water into PM-13	C_g13 =	87.5	(mg/L)

			Low Flo	w	Average	Flow	High Fl	low
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	24,980.41	(mg/s)	283,600	(mg/s)
-	mass flux of ground water into PM-12	M_g12 =	2,129.58	(mg/s)	2,129.58	(mg/s)	2,129.58	(mg/s)
concentration flux	mass flux in Babbitt WWTP discharge	M_sBab =	653.73	(mg/s)	653.73	(mg/s)	653.73	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	121,890.93	(mg/s)	1,391,712	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	10,425.01	(mg/s)	10,425.01	(mg/s)	10,425.01	(mg/s)
conc	mass flux of Area 5 Pit NW discharge	M_spit =	6,936.49	(mg/s)	53,090.84	(mg/s)	53,090.84	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	45,758.38	(mg/s)	45,758.38	(mg/s)	45,758.38	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	4,703.46	(mg/s)	4,703.46	(mg/s)	4,703.46	(mg/s)
ទ ប្	mass flux in seepage from cell 2W	M_s2w =	24,638.27	(mg/s)	24,638.27	(mg/s)	24,638.27	(mg/s)
		_	Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =	2,783.31 95,244.92		27,763.72		286,383.27	
< 0	mass nux in river at FM-13	IVI_113 =	95,244.92 Low Flo		Average		High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	82.647 246.661		71.091	(mg/L)	70.104	(mg/L)

Case Parameter	Year 20 Potassium			
		a		
	concentration of surface water into PM-12	C_s12 =	0.60	(mg/L)
ata	concentration of surface water into PM-13	C_s13 =	0.60	(mg/L)
pu	concentration in Babbitt WWTP discharge	C_sBab =	0.60	(mg/L)
ratio	concentration in Area 5 Pit NW discharge	C_spit =	53.80	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	13.45	(mg/L)
-	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.80	(mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	7.77	(mg/L)
put	concentration of ground water into PM-12	C_g12 =	1.60	(mg/L)
	concentration of ground water into PM-13	C_g13 =	1.60	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	214.12	(mg/s)	2,431	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	38.94	(mg/s)	38.94	(mg/s)	38.94	(mg/s)
concentration	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.98	(mg/s)	0.98	(mg/s)	0.98	(mg/s)
itrai	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1,044.78	(mg/s)	11,929	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	190.63	(mg/s)	190.63	(mg/s)	190.63	(mg/s)
con	mass flux in Babbitt WWTP discharge	M_sBab =	5.60	(mg/s)	5.60	(mg/s)	5.60	(mg/s)
	mana flux of Area E Dit NIM discharge	M_spit =	395.86	(mg/s)	3,029.85	(mg/s)	3,029.85	(mg/s)
Convert	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	2,272.35	(mg/s)	2,272.35	(mg/s)	2,272.35	(mg/s)
မိ မိ	mass flux in seepage from cell 2W	M_s2w =	438.48	(mg/s)	438.48	(mg/s)	438.48	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance	mass flux in river at PM-12	M_r12 =	39.92	(mg/s)	254.04	(mg/s)	2,470.78	(mg/s)
Ma		M_r13 =	3,342.85	(mg/s)	7,235.74	(mg/s)	20,336.66	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to	concentration in river at PM-12	C_r12 =	1.186	(mg/L)	0.650	(mg/L)	0.605	(mg/l)
S ≣ S	concentration in river at PM-13	C_r13 =	8.657	(mg/L)	2.856	(mg/L)	0.835	(mg/l)

Case Parameter	Year 20 Magnesium		
		-	
	concentration of surface water into PM-12	C_s12 =	5.90 (mg/L)
ata	concentration of surface water into PM-13	C_s13 =	5.90 (mg/L)
pu	concentration in Babbitt WWTP discharge	C_sBab =	5.90 (mg/L)
ratio	concentration in Area 5 Pit NW discharge	C_spit =	271.00 (mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	19.45 (mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	213.00 (mg/L)
con	concentration in tailings basin cell 2W	C_s2w =	69.97 (mg/L)
Input	concentration of ground water into PM-12	C_g12 =	10.65 (mg/L)
du	concentration of ground water into PM-13	C_g13 =	10.65 (mg/L)

l			Low Flo	w	Average	Flow	High Fl	low
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	2,105.49	(mg/s)	23,903	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	259.20	(mg/s)	259.20	(mg/s)	259.20	(mg/s)
concentration flux	mass flux in Babbitt WWTP discharge	M_sBab =	55.10	(mg/s)	55.10	(mg/s)	55.10	(mg/s)
tra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	10,273.66	(mg/s)	117,301	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	1,268.87	(mg/s)	1,268.87	(mg/s)	1,268.87	(mg/s)
inx	mass flux of Area 5 Pit NW discharge	M_spit =	1,994.02	(mg/s)	15,261.91	(mg/s)	15,261.91	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M fs =	3,286.07	(mg/s)	3,286.07	(mg/s)	3,286.07	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M rrs =	116.36		116.36		116.36	
<u>۽</u> گ	mass flux in seepage from cell 2W	M_s2w =	3,948.56		3,948.56		3,948.56	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =	314.30		2,419.79		24,217.73	
<u>a 2</u>	mass flux in river at PM-13	M_r13 =	10,928.17 Low Flo		36,575.21 Average		165,400.92 High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L)		(mg/l)		(mg/l)

Case Parameter	Year 20 Manganese			
	concentration of surface water into PM-12	C s12 =	0.30	(mg/L)
ata	concentration of surface water into PM-13	 C_s13 =	0.30	(mg/L)
q	concentration in Babbitt WWTP discharge	C_sBab =	0.30	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.49	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.45	(mg/L)
oncei	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.00	(mg/L)
con	concentration in tailings basin cell 2W	C_s2w =	1.18	(mg/L)
but	concentration of ground water into PM-12	C_g12 =	0.19	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.19	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	107.06	(mg/s)	1,215	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	4.58	(mg/s)	4.58	(mg/s)	4.58	(mg/s)
concentration	mass flux in Babbitt WWTP discharge	M_sBab =	2.80	(mg/s)	2.80	(mg/s)	2.80	(mg/s)
tra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	522.39	(mg/s)	5,964	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	22.40	(mg/s)	22.40	(mg/s)	22.40	(mg/s)
u os	mass flux of Area 5 Pit NW discharge	M_spit =	3.57	(mg/s)	27.31	(mg/s)	27.31	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M fs =	76.11	(mg/s)		(mg/s)	76.11	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M rrs =		(mg/s)		(mg/s)		(mg/s)
<u>م</u> ک	mass flux in seepage from cell 2W	M_s2w =		(mg/s)		(mg/s)		(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =	7.38	(mg/s)	114.44		1,222.81	
< @	mass nux in river at PM-13	IVI_113 =	Low Flo		Average		High Fl	
Convert mass flux to concentration		C_r12 =		(mg/L) (mg/L)	0.293	(mg/l) (mg/l)	0.299	(mg/l)

Case Parameter	Year 20 Sodium			
	concentration of surface water into PM-12	C s12 =	6.00	(mg/L)
lata	concentration of surface water into PM-13	C_s13 =		(mg/L)
0	concentration in Babbitt WWTP discharge	C_sBab =	6.00	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	119.50	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	19.36	(mg/L)
CD CD	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	255.00	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	44.31	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	4.90	(mg/L)
lnp	concentration of ground water into PM-13	C_g13 =	4.90	(mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	2,141.18	(mg/s)	24,309	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	119.26	(mg/s)	119.26	(mg/s)	119.26	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	56.03	(mg/s)	56.03	(mg/s)	56.03	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	10,447.79	(mg/s)	119,290	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	583.80	(mg/s)	583.80	(mg/s)	583.80	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	879.28	(mg/s)	6,729.88	(mg/s)	6,729.88	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	3,272.20	(mg/s)	3,272.20	(mg/s)	3,272.20	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	139.30	(mg/s)	139.30	(mg/s)	139.30	(mg/s)
မ ပိ	mass flux in seepage from cell 2W	M_s2w =	2,500.51		2,500.51	(mg/s)	2,500.51	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =	175.29		2,316.47		24,483.86	
			Low Flo		Average		High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	5.205	(mg/L)	5.931	(mg/l)	6.443	

Case	Year 20			
Parameter	Nickel			
		-		
	concentration of surface water into PM-12	C_s12 =	0.0012	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0012	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0012	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.0052	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.141786777	(mg/L)
c)	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.098	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	0.00688	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.007	(mg/L)
법	concentration of ground water into PM-13	C_g13 =	0.007	(mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.43	(mg/s)	5	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.17	(mg/s)	0.17	(mg/s)	0.17	(mg/s)
concentration flux	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	2.09	(mg/s)	24	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.83	(mg/s)	0.83	(mg/s)	0.83	(mg/s)
u xnlj	mass flux of Area 5 Pit NW discharge	M_spit =	0.04	(mg/s)	0.29	(mg/s)	0.29	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	23.96	(mg/s)	23.96	(mg/s)	23.96	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.05	(mg/s)	0.05	(mg/s)		(mg/s)
ទ បិ	mass flux in seepage from cell 2W	M_s2w =	0.39	(mg/s)	0.39	(mg/s)	0.39	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 = M r13 =		(mg/s) (mg/s)		(mg/s)		(mg/s) (mg/s)
20		IVI_113 =	Low Flo		Average		High Fl	
Convert mass flux to concentration		C_r12 =		(mg/L) (mg/L)	0.002	(mg/L)	0.001	(mg/L) (mg/L)

Case	Year 20		
Parameter	Lead		
		-	
	concentration of surface water into PM-12	C_s12 =	0.00015 (mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.00015 (mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00015 (mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.0003 (mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.001841737 (mg/L)
0	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0005 (mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	0.0012 (mg/L)
put	concentration of ground water into PM-12	C_g12 =	0.0012 (mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0012 (mg/L)

			Low Flo	w	Average	Flow	High Fl	low
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.05	(mg/s)	1	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.03	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.26	(mg/s)	3	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.14	(mg/s)	0.14	(mg/s)	0.14	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.02	(mg/s)	0.02	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.31	(mg/s)	0.31	(mg/s)	0.31	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
<u>ءَ</u> ک	mass flux in seepage from cell 2W	M_s2w =	0.07	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
			Low Flo	w	Average	Flow	High Fl	low
Mass balance at each node		M_r12 =		(mg/s)		(mg/s)		(mg/s)
2 0	mass flux in river at PM-13	M_r13 =	Low Flo	(mg/s) w	0.88 Average	(mg/s) Flow	4.16 High Fl	(mg/s)
Convert mass flux to concentration		C_r12 =	0.001	(mg/L) (mg/L)	0.000	(mg/L)	0.000	(mg/L) (mg/L)

Case Parameter	Year 20 Antimony			
		0.10		
	concentration of surface water into PM-12	C_s12 =	4.00E-05	(mg/L)
ata	concentration of surface water into PM-13	C_s13 =	4.00E-05	(mg/L)
ρι	concentration in Babbitt WWTP discharge	C_sBab =	4.00E-05	(mg/L)
ratio	concentration in Area 5 Pit NW discharge	C_spit =	2.50E-04	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	1.02E-02	(mg/L)
-	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.004	(mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	2.50E-04	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	1.50E-03	(mg/L)
Inp	concentration of ground water into PM-13	C_g13 =	1.50E-03	(mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.01	(mg/s)	0	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.04	(mg/s)	0.04	(mg/s)	0.04	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itrai	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.07	(mg/s)	1	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.18	(mg/s)	0.18	(mg/s)	0.18	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
		M_fs =	1.73	(mg/s)	1.73	(mg/s)	1.73	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
co to	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.04	<u>(mg/s)</u>	0.05	(mg/s)	0.20	(mg/s)
Ma	mass flux in river at PM-13	M_r13 =		(mg/s)		(mg/s)		(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to	concentration in river at PM-12	C_r12 =	0.001	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
c tin	concentration in river at PM-13	C_r13 =	0.005	(mg/L)	0.001	(mg/L)	0.000	(mg/L)

Case Parameter	Year 20 Selenium			
		-		
	concentration of surface water into PM-12	C_s12 =	0.0003 (mg/	/L)
data	concentration of surface water into PM-13	C_s13 =	0.0003 (mg/	/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0003 (mg/	/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.0016 (mg/	/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.002326015 (mg/	/L)
c)	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.054 (mg/	/L)
conc	concentration in tailings basin cell 2W	C_s2w =	0.00109 (mg/	/L)
Input	concentration of ground water into PM-12	C_g12 =	0.00295 (mg/	/L)
법	concentration of ground water into PM-13	C_g13 =	0.00295 (mg/	/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.11	(mg/s)	1	(mg/s)
-	mass flux of ground water into PM-12	M_g12 =	0.07	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.52	(mg/s)	6	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.35	(mg/s)	0.35	(mg/s)	0.35	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.01	(mg/s)	0.09	(mg/s)	0.09	(mg/s)
	mass flux in soonage from Tailings Pasin Colls 1E and 2E	M_fs =	0.39	(mg/s)	0.39	(mg/s)	0.39	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.03	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
t C	mass flux in seepage from cell 2W	M_s2w =		(mg/s)		(mg/s)		(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =	0.07	(mg/s)	0.18	(mg/s)	1.29	(mg/s)
Ma at	mass flux in river at PM-13	M_r13 =		(mg/s)		(mg/s)		(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.002	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
C III	concentration in river at PM-13	C_r13 =	0.002	(mg/L)	0.001	(mg/L)	0.000	(mg/L)

Case	Year 20		
Parameter	Sulfate		
		-	
	concentration of surface water into PM-12	C_s12 =	4.00 (mg/L)
data	concentration of surface water into PM-13	C_s13 =	4.00 (mg/L)
-	concentration in Babbitt WWTP discharge	C_sBab =	4.00 (mg/L)
tio	concentration in Area 5 Pit NW discharge	C_spit =	1046.27 (mg/L)
ntration	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	211.97 (mg/L)
ن	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	7347.00 (mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	152.40 (mg/L)
nt	concentration of ground water into PM-12	C_g12 =	8.50 (mg/L)
Input	concentration of ground water into PM-13	C_g13 =	8.50 (mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
m	ass flux of surface water into PM-12	M_s12 =	-	(mg/s)	1,427.45	(mg/s)	16,206	(mg/s)
_ m	ass flux of ground water into PM-12	M_g12 =	206.87	(mg/s)	206.87	(mg/s)	206.87	(mg/s)
m tio	ass flux in Babbitt WWTP discharge	M_sBab =	37.36	(mg/s)	37.36	(mg/s)	37.36	(mg/s)
m tra	ass flux of surface water into PM-13	M_s13 =	-	(mg/s)	6,965.20	(mg/s)	79,526	(mg/s)
m ceu	ass flux of ground water into PM-13	M_g13 =	1,012.72	(mg/s)	1,012.72	(mg/s)	1,012.72	(mg/s)
concentration flux 3 3 3 3	ass flux of Area 5 Pit NW discharge	M_spit =	7,698.43	(mg/s)	58,922.60	(mg/s)	58,922.60	(mg/s)
	ass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	35,819.52	(mg/s)	35,819.52	(mg/s)	35,819.52	(mg/s)
Convert to mass	ass flux in hydrometallurgical residue cells liner leakage	M_rrs =	4,013.51	(mg/s)	4,013.51	(mg/s)	4,013.51	
ပိ ဍ m	ass flux in seepage from cell 2W	M_s2w =	8,600.26	(mg/s)	8,600.26	(mg/s)	8,600.26	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
ass ba each r	ass flux in river at PM-12 ass flux in river at PM-13	M_r12 =	244.23		1,671.68		16,449.94	
		<u></u>	Low Flo		Average		High Fl	
onvert ux to oncent	oncentration in river at PM-12	C_r12 =		(mg/L)		(mg/l)	4.027	
o ≓ ŏ co	oncentration in river at PM-13	C_r13 =	148.623	(mg/L)	46.188	(mg/l)	8.386	(mg/l)

Case Parameter	Year 20 Thallium		
	concentration of surface water into PM-12	C s12 =	0.0002 (mg/L)
ata	concentration of surface water into PM-12	$C_{s12} =$ C s13 =	0.0002 (mg/L)
ן da	concentration in Babbitt WWTP discharge	C_sBab =	0.0002 (mg/L)
ratio	concentration in Area 5 Pit NW discharge	C_spit =	0.0006 (mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.001147722 (mg/L)
ICEI	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0002 (mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	0.0002 (mg/L)
rt .	concentration of ground water into PM-12	C_g12 =	0.000004 (mg/L)
i i i i i i i i i i i i i i i i i i i	concentration of ground water into PM-13	C_g13 =	0.000004 (mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.07	(mg/s)	1	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
tion	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itrai	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.35	(mg/s)	4	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
	maga flux in according from Tailings Regin Calls 1E and OE	M_fs =	0.19	(mg/s)	0.19	(mg/s)	0.19	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		(mg/s)	0.00	(mg/s)
ဒု ပိ	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s)		(mg/s)		(mg/s)
Ma at	mass flux in river at PM-13	M_r13 =	0.21 Low Flo	(mg/s)	0.66 Average	(mg/s)	5.03 High Fl	(mg/s)
			LOW FIO	w	Average	FIOW		ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
Conve flux to concel	concentration in river at PM-13	C_r13 =	0.001	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Case Parameter	Year 20 Zinc			
	concentration of surface water into PM-12	C_s12 =	0.016	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.016	(mg/L)
p da	concentration in Babbitt WWTP discharge	C_sBab =	0.016	(mg/L)
atio	concentration in Area 5 Pit NW discharge	C_spit =	0.003	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.061124366	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.01	(mg/L)
cone	concentration in tailings basin cell 2W	C_s2w =	0.01435	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.0115	(mg/L)
du du	concentration of ground water into PM-13	C_g13 =	0.0115	(mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	5.71	(mg/s)	65	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.28	(mg/s)	0.28	(mg/s)	0.28	(mg/s)
concentration flux	mass flux in Babbitt WWTP discharge	M_sBab =	0.15	(mg/s)	0.15	(mg/s)	0.15	(mg/s)
ntra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	27.86	(mg/s)	318	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	1.37	(mg/s)		(mg/s)	1.37	(mg/s)
conc	mass flux of Area 5 Pit NW discharge	M_spit =	0.02	(mg/s)	0.17	(mg/s)	0.17	(mg/s)
		M_fs =	10.33	(mg/s)	10.33	(mg/s)	10.33	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
Co to		M_s2w =	0.81	(mg/s)	0.81	(mg/s)	0.81	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 =		(mg/s) (mg/s)		(mg/s)	65.25	(mg/s) (mg/s)
			Low Flo		Average		High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.013	(mg/L)	0.016	(mg/L)	0.016	(mg/L)
Co Co Co Co	concentration in river at PM-13	C r13 =	0.034	(mg/L)	0.018	(mg/L)	0.016	(mg/L)

Appendix F.7 Embarrass River Proposed Action Closure

FLOWS

Case	Closure				
Flows	Low Flow Conditions (no surface runoff)				Node
in s River	flow in river at PM-12	Q_r12_L =	1.19	(cfs)	PM-12
Total flow in Embarrass F	flow in river at PM-13	Q_r13_L =	9.78	(cfs)	PM-13
Total Emb ê	flow check	Q_ck_L =	9.78	(cfs)	4
	surface water flow into PM-12	Q_s12_L =	0.00	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_L =	0.00	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_L =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_L =	0.26	(cfs)	PM-13
ta	seepage from Tailings Basin Cells 1E and 2E	Q_fs_L =	2.45	(cfs)	PM-13
flow data	hydrometallurgical residue cells liner leakage	Q_rrs_L =	0.00	(cfs)	PM-13
lov	seepage from cell 2W	Q_s2w_L =	1.67	(cfs)	PM-13
Input 1	ground water flow into PM-12	Q_g12_L =	0.86	(cfs)	PM-12
dul	ground water flow into PM-13	Q_g13_L =	4.21	(cfs)	PM-13

Case	Closure				
Flow	Average Flow Conditions (mean annual)				
n River	flow in river at PM-12	Q_r12_M =	13.80	(cfs)	PM-12
Total flow in Embarrass Ri	flow in river at PM-13	Q_r13_M =	85.65	(cfs)	PM-13
Total Emb	flow check	Q_ck_M =	85.65	(cfs)	
	surface water flow into PM-12	Q_s12_M =	12.61	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_M =	61.53	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_M =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_M =	1.99	(cfs)	PM-13
data	seepage from Tailings Basin Cells 1E and 2E	Q_fs_M =	2.45	(cfs)	PM-13
, da	hydrometallurgical residue cells liner leakage	Q_rrs_M =	0.00	(cfs)	PM-13
low	seepage from cell 2W	Q_s2w_M =	1.67	(cfs)	PM-13
nput flow	ground water flow into PM-12	Q_g12_M =	0.86	(cfs)	PM-12
dul	ground water flow into PM-13	Q_g13_M =	4.21	(cfs)	PM-13

Case Flow	Closure High Flow Conditions (avg. annual 1-day max f	low)			-
n River	flow in river at PM-12	Q_r12_H =	144.35	(cfs)	PM-1
flow iı rrass	flow in river at PM-13	Q_r13_H =	857.20	(cfs)	PM-1
Total 1 Embai	flow check	Q_ck_H =	857.20	(cfs)	
	surface water flow into PM-12	Q_s12_H =	143.16	(cfs)	PM-1
	surface water flow into PM-13	Q_s13_H =	702.53	(cfs)	PM-1
	Babbitt WWTP discharge	Q_sBab_H =	0.33	(cfs)	PM-
	Area 5 Pit NW discharge	Q_spit_H =	1.99	(cfs)	PM-
data	seepage from Tailings Basin Cells 1E and 2E	Q_fs_H =	2.45	(cfs)	PM-
/ da	hydrometallurgical residue cells liner leakage	Q_rrs_H =	0.00	(cfs)	PM-
flow	seepage from cell 2W	Q_s2w_H =	1.67	(cfs)	PM-
Input 1	ground water flow into PM-12	Q_g12_H =	0.86	(cfs)	PM-
d L	ground water flow into PM-13	Q g13 H =	4.21	(cfs)	PM-1

Case Parameter	Closure Silver			
		-		
	concentration of surface water into PM-12	C_s12 =	0.00011	(mg/L)
ata	concentration of surface water into PM-13	C_s13 =	0.00011	(mg/L)
q	concentration in Babbitt WWTP discharge	C_sBab =	0.00011	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.00015	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.00097	(mg/L)
-	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.000125	(mg/L)
con	concentration in tailings basin cell 2W	C_s2w =	0.000100	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.00008	(mg/L)
dul	concentration of ground water into PM-13	C_g13 =	0.000008	(mg/L)

			Low Flo	W	Average	Flow	High Fl	low
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.04	(mg/s)	0	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.19	(mg/s)	2	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.07	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
ຊ ິວ	mass flux in seepage from cell 2W	M_s2w =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
			Low Flo	W	Average	Flow	High Fl	low
Mass balance at each node	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 = M r13 =		(mg/s)		(mg/s) (mg/s)		(mg/s) (mg/s)
20		IVI_113 =	Low Flo		Average		High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 = C_r13 =		(mg/L) (mg/L)		(mg/L) (mg/L)		(mg/L) (mg/L)

Case Parameter	Closure Aluminum			
	concentration of surface water into PM-12	C_s12 =	0.12	(mg/L)
ata	concentration of surface water into PM-13	C_s13 =	0.12	(mg/L)
pu	concentration in Babbitt WWTP discharge	C_sBab =	0.12	(mg/L)
ratio	concentration in Area 5 Pit NW discharge	C_spit =	0.01325	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	6.37E-01	(mg/L)
-	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.80E-01	(mg/L)
con	concentration in tailings basin cell 2W	C_s2w =	1.5788	(mg/L)
out	concentration of ground water into PM-12	C_g12 =	0.025	(mg/L)
lu	concentration of ground water into PM-13	C_g13 =	0.025	(mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	42.82	(mg/s)	486	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.61	(mg/s)	0.61	(mg/s)	0.61	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	1.12	(mg/s)	1.12	(mg/s)	1.12	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	208.96	(mg/s)	2,386	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	2.98	(mg/s)	2.98	(mg/s)	2.98	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.10	(mg/s)	0.75	(mg/s)	0.75	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	44.20	(mg/s)	44.20	(mg/s)	44.20	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
<u>ء</u> ک	mass flux in seepage from cell 2W	M_s2w =	74.66	(mg/s)	74.66	(mg/s)	74.66	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 = M r13 =	1.73	(mg/s)	44.55	(mg/s)	487.90	
20		IVI_113 =	Low Flo		Average		High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.051	(mg/L)	0.114	(mg/L)	0.119	(mg/L)

Case Parameter	Closure Arsenic		
	concentration of surface water into PM-12	C_s12 =	0.00075 (mg/L)
ata	concentration of surface water into PM-13	C_s13 =	0.00075 (mg/L)
ip u	concentration in Babbitt WWTP discharge	C_sBab =	0.00075 (mg/L)
ratio	concentration in Area 5 Pit NW discharge	C_spit =	0.001325 (mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.012359831 (mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.004 (mg/L)
con	concentration in tailings basin cell 2W	C_s2w =	0.00291 (mg/L)
but	concentration of ground water into PM-12	C_g12 =	0.00273 (mg/L)
	concentration of ground water into PM-13	C_g13 =	0.00273 (mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.27	(mg/s)	3	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.07	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1.31	(mg/s)	15	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.33	(mg/s)	0.33	(mg/s)	0.33	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	0.01	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
	mass flux in soonage from Tailings Pasin Colls 1E and 2E	M_fs =	0.86	(mg/s)	0.86	(mg/s)	0.86	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
မို ပိ	mass flux in seepage from cell 2W	M_s2w =	0.14	(mg/s)	0.14	(mg/s)	0.14	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.07	<u>(mg/s)</u>	0.34	(mg/s)	3.11	(mg/s)
Ma	mass flux in river at PM-13	M_r13 =	1.40	(mg/s)	3.04	(mg/s)	19.42	(mg/s)
		-	Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to	concentration in river at PM-12	C_r12 =	0.002	<u>(mg/L)</u>	0.001	(mg/L)	0.001	(mg/L)
c fi	concentration in river at PM-13	C_r13 =	0.005	(mg/L)	0.001	(mg/L)	0.001	(mg/L)

Case Parameter	Closure Boron			
	concentration of surface water into PM-12	C_s12 =	0.027	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.027	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.027	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.1315	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.198832748	(mg/L)
c)	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.11	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	0.33	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.0212	(mg/L)
du du	concentration of ground water into PM-13	C_g13 =	0.0212	(mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	9.64	(mg/s)	109	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.52	(mg/s)	0.52	(mg/s)	0.52	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	0.25	(mg/s)	0.25	(mg/s)	0.25	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	47.02	(mg/s)	537	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	2.53	(mg/s)	2.53	(mg/s)	2.53	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	0.97	(mg/s)	7.41	(mg/s)	7.41	(mg/s)
	mass flux in assesses from Tailings Reain Calls 1E and 0E	M_fs =	13.79	(mg/s)	13.79	(mg/s)	13.79	(mg/s)
Convert	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.01	(mg/s)	0.01	(mg/s)		(mg/s)
န် ပိ	mass flux in seepage from cell 2W	M_s2w =	15.61	(mg/s)	15.61	(mg/s)	15.61	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.77	(mg/s)	10.40	(mg/s)	110.16	(mg/s)
A a	mass flux in river at PM-13	M_r13 =	33.66	(mg/s)	96.75	(mg/s)	686.29	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to	concentration in river at PM-12	C_r12 =	0.023	(mg/L)	0.027	(mg/L)	0.027	(mg/L)
S≞S	concentration in river at PM-13	C_r13 =	0.122	(mg/L)	0.040	(mg/L)	0.028	(mg/L)

Case Parameter	Closure Barium		
-		-	
	concentration of surface water into PM-12	C_s12 =	0.016 (mg/L)
ata	concentration of surface water into PM-13	C_s13 =	0.016 (mg/L)
ı p	concentration in Babbitt WWTP discharge	C_sBab =	0.016 (mg/L)
ratio	concentration in Area 5 Pit NW discharge	C_spit =	0.0044 (mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	4.81E-02 (mg/L)
Cer	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	5.00E-03 (mg/L)
cou	concentration in tailings basin cell 2W	C_s2w =	0.09298 (mg/L)
put	concentration of ground water into PM-12	C_g12 =	0.0681 (mg/L)
법	concentration of ground water into PM-13	C_g13 =	0.0681 (mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	5.71	(mg/s)	65	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	1.66	(mg/s)	1.66	(mg/s)	1.66	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.15	(mg/s)	0.15	(mg/s)	0.15	(mg/s)
ıtra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	27.86	(mg/s)	318	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	8.11	(mg/s)	8.11	(mg/s)	8.11	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.03	(mg/s)	0.25	(mg/s)	0.25	(mg/s)
		M_fs =	3.34	(mg/s)	3.34	(mg/s)	3.34	(mg/s)
onvert	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
<u>و</u> گ	mass flux in seepage from cell 2W	M_s2w =	4.40	(mg/s)		(mg/s)	4.40	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12	M_r12 =		(mg/s)		(mg/s)		(mg/s)
Σā	mass flux in river at PM-13	M_r13 =	17.69 Low Flo	(mg/s)		(mg/s)	400.83	
			LOW FIO	w	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.054	(mg/L)	0.019	(mg/L)	0.016	(mg/L)
Conve flux to concei	concentration in river at PM-13	C_r13 =	0.064	(mg/L)	0.021	(mg/L)	0.017	(mg/L)

Case Parameter	Closure Beryllium			
		a	0.000/	<i>, a</i> ,
	concentration of surface water into PM-12	C_s12 =	0.0001	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0001	(mg/L)
-	concentration in Babbitt WWTP discharge	C_sBab =	0.0001	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.0001	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000808254	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	0.00075	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.000023	(mg/L)
<u> </u>	concentration of ground water into PM-13	C_g13 =	0.000023	(mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.04	(mg/s)	0	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
ıtra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.17	(mg/s)	2	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.06	(mg/s)	0.06	(mg/s)	0.06	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	-	(mg/s)	-	(mg/s)	-	(mg/s)
ទ បិ	mass flux in seepage from cell 2W	M_s2w =	0.04	(mg/s)	0.04	(mg/s)	0.04	(mg/s)
	-		Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s)		(mg/s)		(mg/s)
at B	mass flux in river at PM-13	M_r13 =		(mg/s)		(mg/s)		(mg/s)
Convert mass flux to concentration		C_r12 =		(mg/L)		(mg/L)		(mg/L)
0 ∉ 3	concentration in river at PM-13	C_r13 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Case Parameter	Closure Calcium			
Farameter	Calcium			
	concentration of surface water into PM-12	C_s12 =	15	(mg/L)
ata	concentration of surface water into PM-13	C_s13 =	15	(mg/L)
ip u	concentration in Babbitt WWTP discharge	C_sBab =	15	(mg/L)
ratio	concentration in Area 5 Pit NW discharge	C_spit =	95.35	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	59.94387899	(mg/L)
Icel	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	416	(mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	59.78	(mg/L)
but	concentration of ground water into PM-12	C_g12 =	19	(mg/L)
dul	concentration of ground water into PM-13	C_g13 =	19	(mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	5,352.95	(mg/s)	60,771	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	462.42	(mg/s)	462.42	(mg/s)	462.42	(mg/s)
tion	mass flux in Babbitt WWTP discharge	M_sBab =	140.09	(mg/s)	140.09	(mg/s)	140.09	(mg/s)
tra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	26,119.49	(mg/s)	298,224	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	2,263.72	(mg/s)	2,263.72	(mg/s)	2,263.72	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	701.59	(mg/s)	5,369.83	(mg/s)	5,369.83	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	4,157.57	(mg/s)	4,157.57	(mg/s)	4,157.57	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	19.51	(mg/s)	19.51	(mg/s)		(mg/s)
ဒိ ဒိ	mass flux in seepage from cell 2W	M_s2w =	2,826.97	(mg/s)	2,826.97	(mg/s)	2.80	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =	602.51		5,955.45		61,373.93	
2 0	mass flux in river at PM-13	M_r13 =	10,571.86 Low Flo		46,712.53 Average		371,411.34 High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	17.891		15.249		15.024	
S = S	concentration in river at PM-13	C_r13 =	38.183	(mg/L)	19.271	(mg/l)	15.310	(mg/l)

Case Parameter	Closure Cadmium			
		1		
	concentration of surface water into PM-12	C_s12 =	0.00008	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.00008	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00008	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.0001	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000227872	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0004	(mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	0.000188	(mg/L)
but	concentration of ground water into PM-12	C_g12 =	0.0003	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0003	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.03	(mg/s)	0	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itrai	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.14	(mg/s)	2	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.04	(mg/s)	0.04	(mg/s)	0.04	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.02	(mg/s)	0.02	(mg/s)	0.02	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
<u>ء</u> ک	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s)		(mg/s)		(mg/s)
bi≤	mass flux in river at PM-13	M_r13 =	0.07	(mg/s)	0.24 Average	(mg/s)	1.99 High Fl	(mg/s)
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L) (mg/L)	0.000	(mg/L)	0.000	(mg/L) (mg/L)

Case Parameter	Closure Chloride		
	concentration of surface water into PM-12	C s12 =	6.5 (mg/L)
data	concentration of surface water into PM-13	C_s13 =	6.5 (mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	6.5 (mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	5.95 (mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	6.29E+00 (mg/L)
concel	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.76E+03 (mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	21.54 (mg/L)
Input	concentration of ground water into PM-12	C_g12 =	1.8 (mg/L)
lnp	concentration of ground water into PM-13	C_g13 =	1.8 (mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	2,319.61	(mg/s)	26,334	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	43.81	(mg/s)	43.81	(mg/s)	43.81	(mg/s)
concentration	mass flux in Babbitt WWTP discharge	M_sBab =	60.70	(mg/s)	60.70	(mg/s)	60.70	(mg/s)
itrai	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	11,318.44	(mg/s)	129,230	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	214.46	(mg/s)	214.46	(mg/s)	214.46	(mg/s)
conc	mass flux of Area 5 Pit NW discharge	M_spit =	43.78	(mg/s)	335.09	(mg/s)	335.09	(mg/s)
	mass flux in seepage from Tailings Pasin Colls 1E and 2E	M_fs =	436.24	(mg/s)	436.24	(mg/s)	436.24	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	82.56	(mg/s)	82.56	(mg/s)	82.56	(mg/s)
2 S	mass flux in seepage from cell 2W	M_s2w =	1,018.62		1,018.62		1,018.62	
			Low Flor	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =	104.51	(mg/s)	2,424.12	(mg/s)	26,438.79	(mg/s)
a ŭ	mass flux in river at PM-13	M_r13 =	1,900.17		15,829.53		157,756.15	
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	3.103	(mg/L)	6.207	(mg/L)	6.472	(mg/L)
C C C	concentration in river at PM-13	C_r13 =	6.863	(mg/L)	6.530	(mg/L)	6.503	(mg/L)

Case	Closure			
Parameter	Cobalt			
		1	1	
	concentration of surface water into PM-12	C_s12 =	0.0006	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0006	(mg/L)
-	concentration in Babbitt WWTP discharge	C_sBab =	0.0006	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.000555	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.001356866	(mg/L)
0	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.005	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	0.001556	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.0011	(mg/L)
lu	concentration of ground water into PM-13	C_g13 =	0.0011	(mg/L)

			Low Flor	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.21	(mg/s)	2	(mg/s)
-	mass flux of ground water into PM-12	M_g12 =	0.03	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
concentration flux	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
itrai	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1.04	(mg/s)	12	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.13	(mg/s)	0.13	(mg/s)	0.13	(mg/s)
con	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.09	(mg/s)	0.09	(mg/s)	0.09	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
<u>۽</u> ک	mass flux in seepage from cell 2W	M_s2w =	0.07	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
		_	Low Flor	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =	0.03	(mg/s)	0.25	(mg/s)	2.46_	(mg/s)
Ma at	mass flux in river at PM-13	M_r13 =		(mg/s)		(mg/s)		(mg/s)
			Low Flor	w	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.001	(mg/L)	0.001	(mg/L)	0.001	(mg/L)
Con	concentration in river at PM-13	C r13 =	0.001	(mg/L)	0.001	(mg/L)	0.001	(mg/L)

Case	Closure			
Parameter	Copper			
	concentration of surface water into PM-12	C_s12 =	0.0015	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0015	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0015	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.00345	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.018240705	(mg/L)
Cer	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0015	(mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	0.004555	(mg/L)
nput	concentration of ground water into PM-12	C_g12 =	0.004	(mg/L)
법	concentration of ground water into PM-13	C_g13 =	0.004	(mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.54	(mg/s)	6	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.10	(mg/s)	0.10	(mg/s)	0.10	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
itrai	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	2.61	(mg/s)	30	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.48	(mg/s)	0.48	(mg/s)	0.48	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	0.03	(mg/s)	0.19	(mg/s)	0.19	(mg/s)
		M_fs =	1.27	(mg/s)	1.27	(mg/s)	1.27	(mg/s)
Convert	mass flux in hydrometallurgical residue cells liner leakage	M rrs =		(mg/s)		(mg/s)		(mg/s)
မိ မ		M_s2w =		(mg/s)		(mg/s)		(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.11	(mg/s)	0.65	(mg/s)	6.19	(mg/s)
at a	mass flux in river at PM-13	M_r13 =	2.09	(mg/s)	5.41	(mg/s)	38.16	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to	concentration in river at PM-12	C_r12 =	0.003	(mg/L)	0.002	(mg/L)	0.002	(mg/L)
flu Cc	concentration in river at PM-13	C_r13 =	0.008	(mg/L)	0.002	(mg/L)	0.002	(mg/L)

Case Parameter	Closure Fluoride		
		-	
	concentration of surface water into PM-12	C_s12 =	0.2 (mg/L)
ata	concentration of surface water into PM-13	C_s13 =	0.2 (mg/L)
pu	concentration in Babbitt WWTP discharge	C_sBab =	0.2 (mg/L)
ratio	concentration in Area 5 Pit NW discharge	C_spit =	0.125 (mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	1.82E-02 (mg/L)
ICEI	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	2.85E+00 (mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	1.55 (mg/L)
but	concentration of ground water into PM-12	C_g12 =	0.385 (mg/L)
법	concentration of ground water into PM-13	C_g13 =	0.385 (mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	71.37	(mg/s)	810	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	9.37	(mg/s)	9.37	(mg/s)	9.37	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	1.87	(mg/s)	1.87	(mg/s)	1.87	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	348.26	(mg/s)	3,976	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	45.87	(mg/s)	45.87	(mg/s)	45.87	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	0.92	(mg/s)	7.04	(mg/s)	7.04	(mg/s)
	mass flux in second of from Tailings Basin Calls 1E and OE	M_fs =	1.27	(mg/s)	1.27	(mg/s)	1.27	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =		(mg/s)		(mg/s)	0.13	(mg/s)
<u>ې</u> ک		M_s2w =		(mg/s)		(mg/s)		(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s)		(mg/s)	821.52	
Ma at	mass flux in river at PM-13	M_r13 =	132.73		558.48		4,925.45	
			Low Flo		Average		High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.334	(mg/L)	0.212	(mg/L)	0.201	(mg/L)
Col	concentration in river at PM-13	C_r13 =	0.479	(mg/L)	0.230	(mg/L)	0.203	(mg/L)

Case	Closure		
Parameter	Iron		
		-	
	concentration of surface water into PM-12	C_s12 =	2.9 (mg/L)
data	concentration of surface water into PM-13	C_s13 =	2.9 (mg/L)
-	concentration in Babbitt WWTP discharge	C_sBab =	2.9 (mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.037761905 (mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	6.75E-01 (mg/L)
0	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	4.00E-01 (mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	4.594 (mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.035 (mg/L)
브	concentration of ground water into PM-13	C_g13 =	0.035 (mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	1,034.90	(mg/s)	11,749	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.85	(mg/s)	0.85	(mg/s)	0.85	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	27.08	(mg/s)	27.08	(mg/s)	27.08	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	5,049.77	(mg/s)	57,657	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	4.17	(mg/s)	4.17	(mg/s)	4.17	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	0.28	(mg/s)	2.13	(mg/s)	2.13	(mg/s)
	mass flux in second of from Tailings Basin Calls 1E and OE	M_fs =	46.80	(mg/s)	46.80	(mg/s)	46.80	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.02	(mg/s)	0.02	(mg/s)	0.02	(mg/s)
<u>و</u> ک	mass flux in seepage from cell 2W	M_s2w =	217.25	(mg/s)	217.25		217.25	(mg/s)
		_	Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =	27.93	(mg/s)	1,062.84	(mg/s)	11,777.08	(mg/s)
Ma at	mass flux in river at PM-13	M_r13 =	296.45		6,382.97		69,704.07	
		_	Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.829	(mg/L)	2.721	(mg/L)	2.883	(mg/L)
	concentration in river at PM-13	C_r13 =	1.071	(mg/L)	2.633	(mg/L)	2.873	(mg/L)

Case Parameter	Closure Hardness			
	concentration of surface water into PM-12	C s12 =	70	(mg/L)
data	concentration of surface water into PM-12	C_s12 = C_s13 =		(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	70	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	942.7142857	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	227	(mg/L)
concel	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	8610	(mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	436.6	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	87.5	(mg/L)
Inp	concentration of ground water into PM-13	C_g13 =	87.5	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	24,980.41	(mg/s)	283,600	(mg/s)
-	mass flux of ground water into PM-12	M_g12 =	2,129.58	(mg/s)	2,129.58	(mg/s)	2,129.58	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	653.73	(mg/s)	653.73	(mg/s)	653.73	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	121,890.93	(mg/s)	1,391,712	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	10,425.01	(mg/s)	10,425.01	(mg/s)	10,425.01	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	6,936.49	(mg/s)	53,090.84	(mg/s)	53,090.84	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	15,770.06	(mg/s)	15,770.06	(mg/s)	15,770.06	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	403.90	(mg/s)	403.90	(mg/s)	403.90	(mg/s)
ទ ប័	mass flux in seepage from cell 2W	M_s2w =	20,646.59		20,646.59	(mg/s)	20,646.59	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =	2,783.31		27,763.72		286,383.27	
20		IVI_I I 0 =	Low Flo		Average		High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	82.647		71.091		70.104	

Case Parameter	Closure Potassium		
		_	
	concentration of surface water into PM-12	C_s12 =	0.60 (mg/L)
ata	concentration of surface water into PM-13	C_s13 =	0.60 (mg/L)
pr	concentration in Babbitt WWTP discharge	C_sBab =	0.60 (mg/L)
ratio	concentration in Area 5 Pit NW discharge	C_spit =	53.80 (mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	13.37 (mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.80 (mg/L)
	concentration in tailings basin cell 2W	C_s2w =	7.77 (mg/L)
Input	concentration of ground water into PM-12	C_g12 =	1.60 (mg/L)
du	concentration of ground water into PM-13	C_g13 =	1.60 (mg/L)

		Low Flo	w	Average	Flow	High Fl	ow
e water into PM-12	M_s12 =	-	(mg/s)	214.12	(mg/s)	2,431	(mg/s)
water into PM-12	M_g12 =	38.94	(mg/s)	38.94	(mg/s)	38.94	(mg/s)
etallurgical residue cells liner leakage	M_rrs =	0.08	(mg/s)	0.08	(mg/s)	0.08	(mg/s)
water into PM-13	M_s13 =	-	(mg/s)	1,044.78	(mg/s)	11,929	(mg/s)
water into PM-13	M_g13 =	190.63	(mg/s)	190.63	(mg/s)	190.63	(mg/s)
WWTP discharge	M_sBab =	5.60	(mg/s)	5.60	(mg/s)	5.60	(mg/s)
Pit NW discharge	M_spit =	395.86	(mg/s)	3,029.85	(mg/s)	3,029.85	(mg/s)
e from Tailings Basin Cells 1E and 2E	M_fs =	927.38	(mg/s)	927.38	(mg/s)	927.38	(mg/s)
e from cell 2W	M_s2w =	367.44	(mg/s)	367.44	(mg/s)	367.44	(mg/s)
		Low Flor	W	Average	Flow	High Fl	ow
PM-12 PM-13	M_r12 =	39.03	(mg/s)	253.14		2,469.88	
PIM-13	IVI_113 =	Low Flo		Average		High Fl	
er at PM-12	C_r12 =	1.159	(mg/L)		(mg/L)	0.605	
	-	5_12-					

Case Parameter	Closure Magnesium			
		-		
	concentration of surface water into PM-12	C_s12 =	5.90	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	5.90	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	5.90	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	271.00	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	18.87	(mg/L)
0	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	213.00	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	69.97	(mg/L)
but	concentration of ground water into PM-12	C_g12 =	10.65	(mg/L)
비	concentration of ground water into PM-13	C_g13 =	10.65	(mg/L)

			Low Flor	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	2,105.49	(mg/s)	23,903	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	259.20	(mg/s)	259.20	(mg/s)	259.20	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	55.10	(mg/s)	55.10	(mg/s)	55.10	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	10,273.66	(mg/s)	117,301	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	1,268.87	(mg/s)	1,268.87	(mg/s)	1,268.87	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	1,994.02	(mg/s)	15,261.91	(mg/s)	15,261.91	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1,308.55	(mg/s)	1,308.55	(mg/s)	1,308.55	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	9.99	(mg/s)		(mg/s)	9.99	(mg/s)
ទ បំ	mass flux in seepage from cell 2W	M_s2w =	3,308.85	(mg/s)	3,308.85	(mg/s)	3,308.85	(mg/s)
			Low Flor	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 =	314.30 8,204.58		2,419.79		24,217.73	
			Low Flo		Average		High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	9.333 29.633	(mg/L)	6.196			(mg/l) (mg/l)
Case Parameter	Closure Manganese							
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		-						
	concentration of surface water into PM-12	C_s12 =	0.30	(mg/L)				
ata	concentration of surface water into PM-13	C_s13 =	0.30	(mg/L)				
q	concentration in Babbitt WWTP discharge	C_sBab =	0.30	(mg/L)				
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.49	(mg/L)				
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.28	(mg/L)				
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.00	(mg/L)				
con	concentration in tailings basin cell 2W	C_s2w =	1.18	(mg/L)				
put	concentration of ground water into PM-12	C_g12 =	0.19	(mg/L)				
	concentration of ground water into PM-13	C_g13 =	0.19	(mg/L)				

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	107.06	(mg/s)	1,215	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	4.58	(mg/s)	4.58	(mg/s)	4.58	(mg/s)
tion	mass flux in Babbitt WWTP discharge	M_sBab =	2.80	(mg/s)	2.80	(mg/s)	2.80	(mg/s)
tra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	522.39	(mg/s)	5,964	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	22.40	(mg/s)	22.40	(mg/s)	22.40	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	3.57	(mg/s)	27.31	(mg/s)	27.31	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	19.17	(mg/s)	19.17	(mg/s)	19.17	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M rrs =		(mg/s)		(mg/s)		(mg/s)
<u>و</u> گ	mass flux in seepage from cell 2W	M_s2w =		(mg/s)		(mg/s)		(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s)	761.65		1,222.81	
2 @	mass flux in river at PM-13	M_r13 =	108.46		761.65 Average		7,312.11 High Fl	
Convert mass flux to concentration		C_r12 =	0.219	(mg/L) (mg/L)	0.293	(mg/l)		(mg/l)

Case Parameter	Closure Sodium			
	concentration of surface water into PM-12	C_s12 =	6.00	(mg/L)
ata	concentration of surface water into PM-13	C_s13 =	6.00	(mg/L)
pι	concentration in Babbitt WWTP discharge	C_sBab =	6.00	(mg/L)
ratio	concentration in Area 5 Pit NW discharge	C_spit =	119.50	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	12.15	(mg/L)
-	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	255.00	(mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	44.31	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	4.90	(mg/L)
lnp	concentration of ground water into PM-13	C_g13 =	4.90	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	2,141.18	(mg/s)	24,309	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	119.26	(mg/s)	119.26	(mg/s)	119.26	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	56.03	(mg/s)	56.03	(mg/s)	56.03	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	10,447.79	(mg/s)	119,290	
cen	mass flux of ground water into PM-13	M_g13 =	583.80	(mg/s)	583.80	(mg/s)	583.80	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	879.28	(mg/s)	6,729.88	(mg/s)	6,729.88	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	842.70	(mg/s)	842.70	(mg/s)	842.70	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	11.96	(mg/s)	11.96	(mg/s)	11.96	(mg/s)
Co to	mass flux in seepage from cell 2W	M_s2w =	2,095.40	(mg/s)	2,095.40	(mg/s)	2,095.40	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =	175.29	(mg/s)	2,316.47	(mg/s)	24,483.86	(mg/s)
Ma at	mass flux in river at PM-13	M_r13 =	4,588.43		23,028.01		154,037.20	
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	5.205	(mg/L)	5.931	(mg/l)	5.993	(mg/l)
Co Co Co Co	concentration in river at PM-13	C_r13 =	16.572	(mg/L)	9.500	(mg/l)	6.350	(mg/l)

Case	Closure			
Parameter	Nickel			
		-		
	concentration of surface water into PM-12	C_s12 =	0.0012	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0012	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0012	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.0052	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.015125217	(mg/L)
e B	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.098	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	0.00688	(mg/L)
nt	concentration of ground water into PM-12	C_g12 =	0.007	(mg/L)
Input	concentration of ground water into PM-13	C_g13 =	0.007	(mg/L)

			Low Flo	W	Average	Flow	High Fl	low
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.43	(mg/s)	5	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.17	(mg/s)	0.17	(mg/s)	0.17	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	2.09	(mg/s)	24	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.83	(mg/s)	0.83	(mg/s)	0.83	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.04	(mg/s)	0.29	(mg/s)	0.29	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.05	(mg/s)	1.05	(mg/s)	1.05	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
ទ ប្	mass flux in seepage from cell 2W	M_s2w =	0.33	(mg/s)	0.33	(mg/s)	0.33	(mg/s)
		_	Low Flo	w	Average	Flow	High Fl	low
Mass balance at each node		M_r12 =		(mg/s) (mg/s)		(mg/s)		(mg/s) (mg/s)
20	mass nux in river at FW-13	1113 =	Low Flo		Average		High Fl	
Convert mass flux to concentration		C_r12 =		(mg/L) (mg/L)		(mg/L) (mg/L)		(mg/L) (mg/L)

Case	Closure		
Parameter	Lead	l	
	concentration of surface water into PM-12	C_s12 =	0.00015 (mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.00015 (mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00015 (mg/L)
ntration	concentration in Area 5 Pit NW discharge	C_spit =	0.0003 (mg/L)
ıtra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.001097329 (mg/L)
CD CD	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0005 (mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	0.0012 (mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.0012 (mg/L)
qui	concentration of ground water into PM-13	C_g13 =	0.0012 (mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.05	(mg/s)	1	(mg/s)
-	mass flux of ground water into PM-12	M_g12 =	0.03	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.26	(mg/s)	3	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.14	(mg/s)	0.14	(mg/s)	0.14	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.02	(mg/s)	0.02	(mg/s)
	mass flux in assesses from Tailings Reain Calls 1E and 0E	M_fs =	0.08	(mg/s)	0.08	(mg/s)	0.08	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
န် ပိ	mass flux in seepage from cell 2W	M_s2w =	0.06	(mg/s)	0.06	(mg/s)	0.06	(mg/s)
		_	Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =	0.03	(mg/s)	0.08	(mg/s)	0.64	(mg/s)
a a	mass flux in river at PM-13	M_r13 =		(mg/s)		(mg/s)		(mg/s)
		_	Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to	concentration in river at PM-12	C_r12 =	0.001	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
S thursday	concentration in river at PM-13	C_r13 =	0.001	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Case Parameter	Closure Antimony		
	concentration of surface water into PM-12	C_s12 =	4.00E-05 (mg/L)
data	concentration of surface water into PM-13	C_s13 =	4.00E-05 (mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	4.00E-05 (mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	2.50E-04 (mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	5.37E-03 (mg/L)
c)	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.004 (mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	2.50E-04 (mg/L)
Input	concentration of ground water into PM-12	C_g12 =	1.50E-03 (mg/L)
du du	concentration of ground water into PM-13	C_g13 =	1.50E-03 (mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.01	(mg/s)	0	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.04	(mg/s)	0.04	(mg/s)	0.04	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.07	(mg/s)	1	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.18	(mg/s)	0.18	(mg/s)	0.18	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	man flux in an angle from Tailings Rasin Calls 15 and 25	M_fs =	0.37	(mg/s)	0.37	(mg/s)	0.37	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
<u>و</u> گ	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s)		(mg/s)		(mg/s)
Ma	mass flux in river at PM-13	M_r13 =	0.60 Low Flo	(mg/s)		(mg/s)	1.57 High Fl	(mg/s)
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L)	0.000	(mg/L)		(mg/L)
Conve flux to concei	concentration in river at PM-13	C_r13 =	0.002	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Case Parameter	Closure Selenium		
		-	
	concentration of surface water into PM-12	C_s12 =	0.0003 (mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0003 (mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0003 (mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.0016 (mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.001503093 (mg/L)
c)	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.054 (mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	0.00109 (mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.00295 (mg/L)
<u> </u>	concentration of ground water into PM-13	C_g13 =	0.00295 (mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.11	(mg/s)	1	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.07	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itrai	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.52	(mg/s)	6	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.35	(mg/s)	0.35	(mg/s)	0.35	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	0.01	(mg/s)	0.09	(mg/s)	0.09	(mg/s)
	mass flux in seepage from Tailings Pasin Colls 1E and 2E	M_fs =	0.10	(mg/s)	0.10	(mg/s)	0.10	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
ပိုင်	mass flux in seepage from cell 2W	M_s2w =		(mg/s)		(mg/s)	0.05	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.07	(mg/s)	0.18	(mg/s)	1.29	(mg/s)
Ma	mass flux in river at PM-13	M_r13 =	0.60	(mg/s)	1.30	(mg/s)	7.85	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to	concentration in river at PM-12	C_r12 =	0.002	<u>(mg/L)</u>	0.000	(mg/L)	0.000	(mg/L)
Cc Cc flu	concentration in river at PM-13	C_r13 =	0.002	(mg/L)	0.001	(mg/L)	0.000	(mg/L)

Case	Closure		
Parameter	Sulfate		
	concentration of surface water into PM-12	C_s12 =	4.00 (mg/L)
data	concentration of surface water into PM-13	C_s13 =	4.00 (mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	4.00 (mg/L)
tio	concentration in Area 5 Pit NW discharge	C_spit =	1046.27 (mg/L)
ntration	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	110.25 (mg/L)
ن	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	7347.00 (mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	152.40 (mg/L)
Input	concentration of ground water into PM-12	C_g12 =	8.50 (mg/L)
별	concentration of ground water into PM-13	C_g13 =	8.50 (mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	1,427.45	(mg/s)	16,206	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	206.87	(mg/s)	206.87	(mg/s)	206.87	(mg/s)
tion	mass flux in Babbitt WWTP discharge	M_sBab =	37.36	(mg/s)	37.36	(mg/s)	37.36	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	6,965.20	(mg/s)	79,526	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	1,012.72	(mg/s)	1,012.72	(mg/s)	1,012.72	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	7,698.43	(mg/s)	58,922.60	(mg/s)	58,922.60	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	7,646.82	(mg/s)	7,646.82	(mg/s)	7,646.82	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	344.66	(mg/s)	344.66		344.66	
မီ မီ	mass flux in seepage from cell 2W	M_s2w =	7,206.92	(mg/s)	7,206.92	(mg/s)	7,206.92	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 = M_r13 =	244.23 24,153.77		1,671.68		16,449.94	
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	7.252	(mg/L)	4.280	(mg/l)	4.027	(mg/l)
S 🗄 S	concentration in river at PM-13	C_r13 =	87.238	(mg/L)	34.559	(mg/l)	7.054	(mg/l)

Case Parameter	Closure Thallium		
		-	
	concentration of surface water into PM-12	C_s12 =	0.0002 (mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0002 (mg/L)
-	concentration in Babbitt WWTP discharge	C_sBab =	0.0002 (mg/L)
Itio	concentration in Area 5 Pit NW discharge	C_spit =	0.0006 (mg/L)
ntration	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000917488 (mg/L)
C)	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0002 (mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	0.0002 (mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.000004 (mg/L)
<u> </u>	concentration of ground water into PM-13	C_g13 =	0.000004 (mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.07	(mg/s)	1	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
tion	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.35	(mg/s)	4	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
	mana flux in aconogo from Tailinga Basin Calls 1E and 0E	M_fs =	0.06	(mg/s)	0.06	(mg/s)	0.06	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		(mg/s)		(mg/s)
မိ န		M_s2w =	0.01	(mg/s)		(mg/s)		(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s)		(mg/s)		(mg/s)
Ma	mass flux in river at PM-13	M_r13 =	0.08 Low Flo	(mg/s)		(mg/s)	4.90 High Fl	(mg/s)
y c			LOW FIO		Average	FIGW	nigh Fi	
Convert mass flux to	concentration in river at PM-12	C_r12 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
Conve flux to	concentration in river at PM-13	C_r13 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Case	Closure			
Parameter	Zinc			
		-		
	concentration of surface water into PM-12	C_s12 =	0.016	(mg/L)
ata	concentration of surface water into PM-13	C_s13 =	0.016	(mg/L)
ip u	concentration in Babbitt WWTP discharge	C_sBab =	0.016	(mg/L)
ratio	concentration in Area 5 Pit NW discharge	C_spit =	0.003	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.020231354	(mg/L)
ICEI	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.01	(mg/L)
con	concentration in tailings basin cell 2W	C_s2w =	0.01435	(mg/L)
out	concentration of ground water into PM-12	C_g12 =	0.0115	(mg/L)
dul	concentration of ground water into PM-13	C_g13 =	0.0115	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	5.71	(mg/s)	65	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.28	(mg/s)	0.28	(mg/s)	0.28	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	0.15	(mg/s)	0.15	(mg/s)	0.15	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	27.86	(mg/s)	318	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	1.37	(mg/s)	1.37	(mg/s)	1.37	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.02	(mg/s)	0.17	(mg/s)	0.17	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.40	(mg/s)	1.40	(mg/s)	1.40	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
ဒိ ဒိ	mass flux in seepage from cell 2W	M_s2w =	0.68	(mg/s)	0.68	(mg/s)	0.68	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s)		(mg/s)		(mg/s)
2 0	mass flux in river at PM-13	M_r13 =	Low Flo	(mg/s)	Average	(mg/s) Flow	386.98 High Fl	
Convert mass flux to concentration		C_r12 =	0.013	(mg/L) (mg/L)	0.016	(mg/L)	0.016	(mg/L) (mg/L)

Appendix F.8 Embarrass River Proposed Action Post-Closure

FLOWS

Case	Post-Closure				
Flows	Low Flow Conditions (no surface runoff)				Node
in River	flow in river at PM-12	Q_r12_L =	1.19	(cfs)	PM-12
Total flow in Embarrass F	flow in river at PM-13	Q_r13_L =	9.47	(cfs)	PM-13
Tota Emb	flow check	Q_ck_L =	9.47	(cfs)	
	surface water flow into PM-12	Q_s12_L =	0.00	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_L =	0.00	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_L =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_L =	0.26	(cfs)	PM-13
ta	seepage from Tailings Basin Cells 1E and 2E	Q_fs_L =	2.45	(cfs)	PM-13
, da	hydrometallurgical residue cells liner leakage	Q_rrs_L =	0.00	(cfs)	PM-13
Į	seepage from cell 2W	Q_s2w_L =	1.36	(cfs)	PM-13
Input flow data	ground water flow into PM-12	Q_g12_L =	0.86	(cfs)	PM-12
du	ground water flow into PM-13	Q_g13_L =	4.21	(cfs)	PM-13

Case	Post-Closure				
Flow	Average Flow Conditions (mean annual)				_
in River	flow in river at PM-12	Q_r12_M =	13.80	(cfs)	PM-12
Total flow in Embarrass F	flow in river at PM-13	Q_r13_M =	85.34	(cfs)	PM-13
Total Embá	flow check	Q_ck_M =	85.34	(cfs)	4
	surface water flow into PM-12	Q_s12_M =	12.61	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_M =	61.53	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_M =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_M =	1.99	(cfs)	PM-13
ā	seepage from Tailings Basin Cells 1E and 2E	Q_fs_M =	2.45	(cfs)	PM-13
/ data	hydrometallurgical residue cells liner leakage	Q_rrs_M =	0.00	(cfs)	PM-13
lo v	seepage from cell 2W	Q_s2w_M =	1.36	(cfs)	PM-13
nput flow	ground water flow into PM-12	Q_g12_M =	0.86	(cfs)	PM-12
dul	ground water flow into PM-13	Q_g13_M =	4.21	(cfs)	PM-13

Case	Post-Closure				
Flow	High Flow Conditions (avg. annual 1-day ma	ax flow)			_
n River	flow in river at PM-12	Q_r12_H =	144.35	(cfs)	PM-12
flow iı rrass	flow in river at PM-13	Q_r13_H =	856.89	(cfs)	PM-1
Total 1 Embai	flow check	Q_ck_H =	856.89	(cfs)	
	surface water flow into PM-12	Q_s12_H =	143.16	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_H =	702.53	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_H =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_H =	1.99	(cfs)	PM-1
ta	seepage from Tailings Basin Cells 1E and 2E	Q_fs_H =	2.45	(cfs)	PM-1
da	hydrometallurgical residue cells liner leakage	Q rrs H =	0.00	(cfs)	PM-13
flow data	seepage from cell 2W	Q_s2w_H =	1.36	(cfs)	PM-1
Ţ	ground water flow into PM-12	Q_g12_H =	0.86	(cfs)	PM-12
du	ground water flow into PM-12 ground water flow into PM-13	Q g13 H =	4.21	(cfs)	PM-13

Case	Post-Closure		
Parameter	Silver		
		-	
	concentration of surface water into PM-12	C_s12 =	0.00011 (mg/L)
ata	concentration of surface water into PM-13	C_s13 =	0.00011 (mg/L)
p	concentration in Babbitt WWTP discharge	C_sBab =	0.00011 (mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.00015 (mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.00097 (mg/L)
8	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.000125 (mg/L)
con	concentration in tailings basin cell 2W	C_s2w =	0.000100 (mg/L)
ont	concentration of ground water into PM-12	C_g12 =	0.000008 (mg/L)
Input	concentration of ground water into PM-13	C_g13 =	0.000008 (mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.04	(mg/s)	0	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.19	(mg/s)	2	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.07	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
to Co	mass flux in seepage from cell 2W	M_s2w =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s)		(mg/s)		(mg/s)
Ma at	mass flux in river at PM-13	M_r13 =	0.07 Low Flo	(mg/s)	0.31 Average	(mg/s)	2.71 High Fl	(mg/s)
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
c tic	concentration in river at PM-13	C_r13 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(m

Case Parameter	Post-Closure Aluminum			
		-		
	concentration of surface water into PM-12	C_s12 =	0.12 (m	ıg/L)
data	concentration of surface water into PM-13	C_s13 =	0.12 (m	ıg/L)
-	concentration in Babbitt WWTP discharge	C_sBab =	0.12 (m	ıg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.01325 (m	ıg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	6.37E-01 (m	ıg/L)
A	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.80E-01 (m	ıg/L)
	concentration in tailings basin cell 2W	C_s2w =	1.5788 (m	ıg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.025 (m	ıg/L)
dul	concentration of ground water into PM-13	C_g13 =	0.025 (m	ıg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	42.82	(mg/s)	486	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.61	(mg/s)	0.61	(mg/s)	0.61	(mg/s)
concentration flux	mass flux in Babbitt WWTP discharge	M_sBab =	1.12	(mg/s)	1.12	(mg/s)	1.12	(mg/s)
ıtra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	208.96	(mg/s)	2,386	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	2.98	(mg/s)	2.98	(mg/s)	2.98	(mg/s)
conc	mass flux of Area 5 Pit NW discharge	M_spit =	0.10	(mg/s)	0.75	(mg/s)	0.75	(mg/s)
		M_fs =	44.20	(mg/s)	44.20	(mg/s)	44.20	(mg/s)
onvert	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
Co to		M_s2w =	60.72	(mg/s)	60.72	(mg/s)	60.72	(mg/s)
		_	Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 =	1.73	(mg/s)	44.55	(mg/s)	487.90	
2 0		IVI_113 =	Low Flo		Average		L,962.35 High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L) (mg/L)		(mg/L) (mg/L)		(mg/L) (mg/L)

Case Parameter	Post-Closure Arsenic		
		4	
	concentration of surface water into PM-12	C_s12 =	0.00075 (mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.00075 (mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00075 (mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.001325 (mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.012359831 (mg/L)
۵	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.004 (mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	0.00291 (mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.00273 (mg/L)
du du	concentration of ground water into PM-13	C_g13 =	0.00273 (mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.27	(mg/s)	3	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.07	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
concentration flux	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
itrai	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1.31	(mg/s)	15	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.33	(mg/s)	0.33	(mg/s)	0.33	(mg/s)
conc	mass flux of Area 5 Pit NW discharge	M_spit =	0.01	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
		M_fs =	0.86	(mg/s)	0.86	(mg/s)	0.86	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
Co to		M_s2w =	0.11	(mg/s)	0.11	(mg/s)	0.11	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s)		(mg/s)		(mg/s)
Ma at	mass flux in river at PM-13	M_r13 =		(mg/s)		(mg/s)		(mg/s)
			Low Flo	w	Average	FIOW	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.0022	(mg/L)	0.001	(mg/L)	0.001	(mg/L)
Conve flux to conce	concentration in river at PM-13	C_r13 =	0.0051	(mg/L)	0.001	(mg/L)	0.001	(mg/L)

Case Parameter	Post-Closure Boron			
		1		
	concentration of surface water into PM-12	C_s12 =	0.027 (mg	g/L)
ata	concentration of surface water into PM-13	C_s13 =	0.027 (mg	g/L)
ρι	concentration in Babbitt WWTP discharge	C_sBab =	0.027 (mg	g/L)
ratio	concentration in Area 5 Pit NW discharge	C_spit =	0.1315 (mg	g/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.198832748 (mg	g/L)
ICEI	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.11 (mg	g/L)
cor	concentration in tailings basin cell 2W	C_s2w =	0.33 (mg	g/L)
brit	concentration of ground water into PM-12	C_g12 =	0.0212 (mg	g/L)
	concentration of ground water into PM-13	C_g13 =	0.0212 (mg	g/L)

			Low Flor	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	9.64	(mg/s)	109	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.52	(mg/s)	0.52	(mg/s)	0.52	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.25	(mg/s)	0.25	(mg/s)	0.25	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	47.02	(mg/s)	537	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	2.53	(mg/s)	2.53	(mg/s)	2.53	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.97	(mg/s)	7.41	(mg/s)	7.41	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	13.79	(mg/s)	13.79	(mg/s)	13.79	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
Co to	mass flux in seepage from cell 2W	M_s2w =	12.69	(mg/s)	12.69	(mg/s)	12.69	(mg/s)
		_	Low Flor	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s)		(mg/s)	110.16	
Ma at	mass flux in river at PM-13	M_r13 =	30.75	(mg/s)	93.84 Average	(mg/s)	683.38 High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L)		(mg/L)		(mg/L)

Case	Post-Closure			
Parameter	Barium			
	concentration of surface water into PM-12	C_s12 =	0.016 (mg	g/L)
ata	concentration of surface water into PM-13	C_s13 =	0.016 (mg	g/L)
n da	concentration in Babbitt WWTP discharge	C_sBab =	0.016 (mg	g/L)
ratio	concentration in Area 5 Pit NW discharge	C_spit =	0.0044 (mg	g/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	4.81E-02 (mg	g/L)
a	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	5.00E-03 (mg	g/L)
con	concentration in tailings basin cell 2W	C_s2w =	0.09298 (mg	g/L)
Input	concentration of ground water into PM-12	C_g12 =	0.0681 (mg	g/L)
du	concentration of ground water into PM-13	C_g13 =	0.0681 (mg	g/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	5.71	(mg/s)	65	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	1.66	(mg/s)	1.66	(mg/s)	1.66	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	0.15	(mg/s)	0.15	(mg/s)	0.15	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	27.86	(mg/s)	318	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	8.11	(mg/s)		(mg/s)	8.11	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.03	(mg/s)	0.25	(mg/s)	0.25	(mg/s)
		M_fs =	3.34	(mg/s)	3.34	(mg/s)	3.34	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
ဒိ ဒိ		M_s2w =		(mg/s)	3.58	(mg/s)	3.58	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 =		(mg/s)		(mg/s)	66.63	(mg/s)
20		1113 =	Low Flo		Average		High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L) (mg/L)		(mg/L) (mg/L)		(mg/L) (mg/L)

Case Parameter	Post-Closure Beryllium			
		1	1	
	concentration of surface water into PM-12	C_s12 =	0.0001	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0001	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0001	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.0001	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000808254	(mg/L)
-	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	0.00075	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.000023	(mg/L)
법	concentration of ground water into PM-13	C_g13 =	0.000023	(mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.04	(mg/s)	0	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itrai	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.17	(mg/s)	2	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
		M_fs =	0.06	(mg/s)	0.06	(mg/s)	0.06	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	-	(mg/s)	-	(mg/s)		(mg/s)
<u>و</u> گ	mass flux in seepage from cell 2W	M_s2w =	0.03	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.00	(mg/s)	0.04	(mg/s)	0.41	(mg/s)
Ma at	mass flux in river at PM-13	M_r13 =	0.09	(mg/s)	0.30	(mg/s)	2.49	(mg/s)
	1	_	Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
Con	concentration in river at PM-13	C_r13 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Case	Post-Closure			
Parameter	Calcium			
	concentration of surface water into PM-12	C_s12 =	15	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	15	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	15	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	95.35	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	59.94387899	(mg/L)
concel	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	416	(mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	59.78	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	19	(mg/L)
dul	concentration of ground water into PM-13	C_g13 =	19	(mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	5,352.95	(mg/s)	60,771	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	462.42	(mg/s)	462.42	(mg/s)	462.42	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	140.09	(mg/s)	140.09	(mg/s)	140.09	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	26,119.49	(mg/s)	298,224	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	2,263.72	(mg/s)	2,263.72	(mg/s)	2,263.72	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	701.59	(mg/s)	5,369.83	(mg/s)	5,369.83	(mg/s)
		M_fs =	4,157.57	(mg/s)	4,157.57	(mg/s)	4,157.57	(mg/s)
Convert	mass flux in seepage from Tailings Basin Cells 1E and 2E mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	19.51	(mg/s)	19.51	(mg/s)	19.51	(mg/s)
ပိ ့	2 mass flux in seepage from cell 2W	M_s2w =	2,299.27		2,299.27			(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance	mass flux in river at PM-12	M_r12 =	602.51		5,955.45		61,373.93	
2 (mass flux in river at PM-13	M_r13 =	10,044.16 Low Flo		46,184.83 Average		371,411.34 High Fl	
Convert mass flux to	concentration in river at PM-12	C_r12 =	17.891		15.249		15.024	
S≞S	concentration in river at PM-13	C_r13 =	37.472	(mg/L)	19.123	(mg/l)	15.316	(mg/l)

Case Parameter	Post-Closure Cadmium			
Farameter	Cadmium	<u>_</u>		
	concentration of surface water into PM-12	C_s12 =	0.00008	(mg/L)
ata	concentration of surface water into PM-13	C_s13 =	0.00008	(mg/L)
p	concentration in Babbitt WWTP discharge	C_sBab =	0.00008	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.0001	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000227872	(mg/L)
ICE	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0004	(mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	0.000188	(mg/L)
put	concentration of ground water into PM-12	C_g12 =	0.0003	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0003	(mg/L)

			Low Flor	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.03	(mg/s)	0	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itrai	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.14	(mg/s)	2	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.04	(mg/s)	0.04	(mg/s)	0.04	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.02	(mg/s)	0.02	(mg/s)	0.02	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
t S	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
			Low Flor	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s)	0.04	(mg/s)	0.33	(mg/s)
Ma at	mass flux in river at PM-13	M_r13 =		(mg/s)		(mg/s)		(mg/s)
			Low Flor	w	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
Con	concentration in river at PM-13	C r13 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Case	Post-Closure			
Parameter	Chloride	l		
		1		
	concentration of surface water into PM-12	C_s12 =	6.5	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	6.5	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	6.5	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	5.95	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	6.29E+00	(mg/L)
concel	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.76E+03	(mg/L)
Cor	concentration in tailings basin cell 2W	C_s2w =	21.54	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	1.8	(mg/L)
별	concentration of ground water into PM-13	C_g13 =	1.8	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	2,319.61	(mg/s)	26,334	(mg/s)
-	mass flux of ground water into PM-12	M_g12 =	43.81	(mg/s)	43.81	(mg/s)	43.81	(mg/s)
tion	mass flux in Babbitt WWTP discharge	M_sBab =	60.70	(mg/s)	60.70	(mg/s)	60.70	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	11,318.44	(mg/s)	129,230	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	214.46	(mg/s)	214.46	(mg/s)	214.46	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	43.78	(mg/s)	335.09	(mg/s)	335.09	(mg/s)
	mass flux in assesses from Tailings Resin Calls 1E and 0E	M_fs =	436.24	(mg/s)	436.24	(mg/s)	436.24	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	82.56	(mg/s)	82.56	(mg/s)	82.56	(mg/s)
<u>ې</u> ک	mass flux in seepage from cell 2W	M_s2w =	828.47	(mg/s)	828.47	(mg/s)	828.47	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12	M_r12 =	104.51	(mg/s)	2,424.12	(mg/s)	26,438.79	(mg/s)
Ma		M_r13 =	1,710.03	(mg/s)	15,639.39	(mg/s)	157,566.01	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	3.103	(mg/L)	6.207	(mg/L)	6.472	(mg/L)
o Co tilu	concentration in river at PM-13	C_r13 =	6.380	(mg/L)	6.475	(mg/L)	6.498	(mg/L)

Case Parameter	Post-Closure Cobalt			
	concentration of surface water into PM-12	C_s12 =	0.0006	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0006	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0006	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.000555	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.001356866	(mg/L)
Ū Ū	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.005	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	0.001556	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.0011	(mg/L)
du du	concentration of ground water into PM-13	C_g13 =	0.0011	(mg/L)

			Low Flo	w	Average	Flow	High Fl	low
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.21	(mg/s)	2	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.03	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1.04	(mg/s)	12	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.13	(mg/s)		(mg/s)	0.13	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
		M_fs =	0.09	(mg/s)	0.09	(mg/s)	0.09	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
န် ပိ		M_s2w =	0.06	(mg/s)	0.06	(mg/s)	0.06	(mg/s)
			Low Flo	w	Average Flow		High Fl	ow
Mass balance at each node	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 =		(mg/s)		(mg/s)		(mg/s) (mg/s)
			Low Flo		Average		High Fl	
Convert mass flux to	concentration in river at PM-12	C_r12 =	0.001	(mg/L)	0.001	(mg/L)	0.001	(mg/L)
S ≣ S	concentration in river at PM-13	C_r13 =	0.001	(mg/L)	0.001	(mg/L)	0.001	(mg/L)

Case	Post-Closure			
Parameter	Copper			
		-		
	concentration of surface water into PM-12	C_s12 =	0.0015	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0015	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0015	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.00345	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.018240705	(mg/L)
ICE	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0015	(mg/L)
con	concentration in tailings basin cell 2W	C_s2w =	0.004555	(mg/L)
but	concentration of ground water into PM-12	C_g12 =	0.004	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.004	(mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.54	(mg/s)	6	(mg/s)
-	mass flux of ground water into PM-12	M_g12 =	0.10	(mg/s)	0.10	(mg/s)	0.10	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
concentration flux	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	2.61	(mg/s)	30	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.48	(mg/s)	0.48	(mg/s)	0.48	(mg/s)
con	mass flux of Area 5 Pit NW discharge	M_spit =	0.03	(mg/s)	0.19	(mg/s)	0.19	(mg/s)
		M_fs =	1.27	(mg/s)	1.27	(mg/s)	1.27	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
2 S		M_s2w =		(mg/s)		(mg/s)	0.18	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.11	(mg/s)	0.65	(mg/s)	6.19	(mg/s)
Ma		M_r13 =	2.05	(mg/s)	5.37	(mg/s)	38.12	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to	concentration in river at PM-12	C_r12 =		(mg/L)	0.002	(mg/L)	0.002	(mg/L)
3 ≓ 2	concentration in river at PM-13	C_r13 =	0.00766	(mg/L)	0.002	(mg/L)	0.002	(mg/L)

Case	Post-Closure			
Parameter	Fluoride			
		-		
	concentration of surface water into PM-12	C_s12 =	0.2	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.2	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.2	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.125	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	1.82E-02	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	2.85E+00	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	1.55	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.385	(mg/L)
법	concentration of ground water into PM-13	C_g13 =	0.385	(mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	71.37	(mg/s)	810	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	9.37	(mg/s)	9.37	(mg/s)	9.37	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	1.87	(mg/s)	1.87	(mg/s)	1.87	(mg/s)
itrai	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	348.26	(mg/s)	3,976	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	45.87	(mg/s)	45.87	(mg/s)	45.87	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	0.92	(mg/s)	7.04	(mg/s)	7.04	(mg/s)
	mana flux in aconogo from Tailinga Basin Calls 1E and 0E	M_fs =	1.27	(mg/s)	1.27	(mg/s)	1.27	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.13	(mg/s)	0.13	(mg/s)	0.13	(mg/s)
2 S	mass flux in seepage from cell 2W	M_s2w =	59.62	(mg/s)	59.62	(mg/s)	59.62	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =	11.24	(mg/s)	82.61	(mg/s)	821.52	(mg/s)
ž ž	mass flux in river at PM-13	M_r13 =	119.04			(mg/s)	4,911.77	
			Low Flo	W	Average	Flow	High Fl	ow
Convert mass flux to	concentration in river at PM-12	C_r12 =	0.334	(mg/L)	0.212	(mg/L)	0.201	(mg/L)
S the second	concentration in river at PM-13	C_r13 =	0.444	(mg/L)	0.226	(mg/L)	0.203	(mg/L)

Case	Post-Closure			
Parameter	Iron			
		-		
	concentration of surface water into PM-12	C_s12 =	2.9	(mg/L)
ata	concentration of surface water into PM-13	C_s13 =	2.9	(mg/L)
pu	concentration in Babbitt WWTP discharge	C_sBab =	2.9	(mg/L)
ratio	concentration in Area 5 Pit NW discharge	C_spit =	0.037761905	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	6.75E-01	(mg/L)
ICE	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	4.00E-01	(mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	4.594	(mg/L)
ort	concentration of ground water into PM-12	C_g12 =	0.035	(mg/L)
u L	concentration of ground water into PM-13	C_g13 =	0.035	(mg/L)

			Low Flor	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	1,034.90	(mg/s)	11,749	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.85	(mg/s)	0.85	(mg/s)	0.85	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	27.08	(mg/s)	27.08	(mg/s)	27.08	(mg/s)
concentration flux	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	5,049.77	(mg/s)	57,657	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	4.17	(mg/s)	4.17	(mg/s)	4.17	(mg/s)
con	mass flux of Area 5 Pit NW discharge	M_spit =	0.28	(mg/s)	2.13	(mg/s)	2.13	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	46.80	(mg/s)	46.80	(mg/s)	46.80	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.02	(mg/s)	0.02	(mg/s)	0.02	(mg/s)
e S	mass flux in seepage from cell 2W	M_s2w =	176.69	(mg/s)		(mg/s)	176.69	(mg/s)
		_	Low Flor	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s)	1,062.84		11,777.08	
Ma at	mass flux in river at PM-13	M_r13 =	255.89 Low Flor		6,342.41		69,663.52	
			LOW FIO	W	Average	FIOW	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.829	(mg/L)	2.721	(mg/L)	2.883	(mg/L)
Conve flux to concer	concentration in river at PM-13	C_r13 =	0.955	(mg/L)	2.626	(mg/L)	2.873	(mg/L)

Case Parameter	Post-Closure Hardness			
	concentration of surface water into PM-12	C s12 =	70	(mg/L)
data	concentration of surface water into PM-12	C_s12 =		(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	70	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	942.7142857	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	2.27E+02	(mg/L)
<u>a</u>	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	8.61E+03	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	436.6	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	87.5	(mg/L)
lnp	concentration of ground water into PM-13	C_g13 =	87.5	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	24,980.41	(mg/s)	283,600	(mg/s)
-	mass flux of ground water into PM-12	M_g12 =	2,129.58	(mg/s)	2,129.58	(mg/s)	2,129.58	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	653.73	(mg/s)	653.73	(mg/s)	653.73	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	121,890.93	(mg/s)	1,391,712	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	10,425.01	(mg/s)	10,425.01	(mg/s)	10,425.01	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	6,936.49	(mg/s)	53,090.84	(mg/s)	53,090.84	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	15,770.06	(mg/s)	15,770.06	(mg/s)	15,770.06	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	403.90	(mg/s)	403.90	(mg/s)	403.90	(mg/s)
ទ ប័	mass flux in seepage from cell 2W	M_s2w =	16,792.56		16,792.56	(mg/s)	16,792.56	(mg/s)
		-	Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =	2,783.31	(mg/s)	27,763.72	(mg/s)	286,383.27	(mg/s)
at Mi	mass flux in river at PM-13	M_r13 =	53,111.33		246,137.02		1,774,577.57	
			Low Flo	w	Average I	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	82.647	(mg/L)	71.091	(mg/L)	70.104	(mg/L)
in Cc Cc	concentration in river at PM-13	C_r13 =	198.144	(mg/L)	101.913	(mg/L)	73.178	(mg/L)

Case	Post-Closure			
Parameter	Potassium			
		-		
	concentration of surface water into PM-12	C_s12 =	0.60	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.60	(mg/L)
ip u	concentration in Babbitt WWTP discharge	C_sBab =	0.60	(mg/L)
atio	concentration in Area 5 Pit NW discharge	C_spit =	53.80	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	13.37	(mg/L)
ē	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.80	(mg/L)
cone	concentration in tailings basin cell 2W	C_s2w =	7.77	(mg/L)
put	concentration of ground water into PM-12	C_g12 =	1.60	(mg/L)
du	concentration of ground water into PM-13	C_g13 =	1.60	(mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	214.12	(mg/s)	2,431	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	38.94	(mg/s)	38.94	(mg/s)	38.94	(mg/s)
concentration	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.08	(mg/s)	0.08	(mg/s)	0.08	(mg/s) (mg/s) (mg/s) (mg/s) (mg/s) (mg/s) (mg/s) (mg/s) ow (mg/s) ow
ıtra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1,044.78	(mg/s)	11,929	(mg/s)
cer	mass flux of ground water into PM-13	M_g13 =	190.63	(mg/s)	190.63	(mg/s)	190.63	(mg/s)
conc	mass flux in Babbitt WWTP discharge	M_sBab =	5.60	(mg/s)	5.60	(mg/s)	5.60	(mg/s)
	mana flux of Area E Dit NIM discharge	M_spit =	395.86	(mg/s)	3,029.85	(mg/s)	3,029.85	(mg/s)
Convert to mass	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	927.38	(mg/s)	927.38	(mg/s)	927.38	(mg/s)
မ ပိ	mass flux in seepage from cell 2W	M_s2w =	298.85	(mg/s)	298.85	(mg/s)	298.85	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =	39.03	(mg/s)	253.14	(mg/s)	2,469.88	(mg/s)
Me at	mass flux in river at PM-13	M_r13 =	1,857.35		5,750.24		18,851.16	
			Low Flor	w	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	1.159	(mg/L)	0.648	(mg/L)	0.605	(mg/l)
Col Col Cor	concentration in river at PM-13	C_r13 =	6.929	(mg/L)	2.381	(mg/L)	0.777	(mg/l)

Case	Post-Closure			
Parameter	Magnesium			
		-		
	concentration of surface water into PM-12	C_s12 =	5.90	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	5.90	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	5.90	(mg/L)
ation	concentration in Area 5 Pit NW discharge	C_spit =	271.00	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	18.87	(mg/L)
0	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	213.00	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	69.97	(mg/L)
nput	concentration of ground water into PM-12	C_g12 =	10.65	(mg/L)
du	concentration of ground water into PM-13	C_g13 =	10.65	(mg/L)

			Low Flor	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	2,105.49	(mg/s)	23,903	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	259.20	(mg/s)	259.20	(mg/s)	259.20	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	55.10	(mg/s)	55.10	(mg/s)	55.10	(mg/s)
itrai	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	10,273.66	(mg/s)	117,301	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	1,268.87	(mg/s)	1,268.87	(mg/s)	1,268.87	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	1,994.02	(mg/s)	15,261.91	(mg/s)	15,261.91	(mg/s)
		M_fs =	1,308.55	(mg/s)	1,308.55	(mg/s)	1,308.55	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	9.99	(mg/s)	9.99	(mg/s)	9.99	(mg/s)
c to		M_s2w =	2,691.19	(mg/s)	2,691.19	(mg/s)	2,691.19	
			Low Floy	W	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12	M_r12 =	314.30	(mg/s)	2,419.79	(mg/s)	24,217.73	(mg/s)
at S	mass flux in river at PM-13	M_r13 =	7,586.93		33,233.97		162,059.68	· · ·
			Low Flor	w	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	9.333	(mg/L)	6.196	(mg/l)	5.928	(mg/l)
Col	concentration in river at PM-13	C r13 =	28.305	(mg/L)	13.761	(mg/l)	6.683	(mg/l)

Case Parameter	Post-Closure Manganese			
	concentration of surface water into PM-12	C_s12 =	0.30	(mg/L)
ata	concentration of surface water into PM-13	C_s13 =	0.30	(mg/L)
ρι	concentration in Babbitt WWTP discharge	C_sBab =	0.30	(mg/L)
ratio	concentration in Area 5 Pit NW discharge	C_spit =	0.49	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.28	(mg/L)
A	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.00	(mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	1.18	(mg/L)
but	concentration of ground water into PM-12	C_g12 =	0.19	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.19	(mg/L)

			Low Flor	w	Average	Flow	High Fl	ow
n	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	107.06	(mg/s)	1,215	(mg/s)
_ r	mass flux of ground water into PM-12	M_g12 =	4.58	(mg/s)	4.58	(mg/s)	4.58	(mg/s)
r tior	mass flux in Babbitt WWTP discharge	M_sBab =	2.80	(mg/s)	2.80	(mg/s)	2.80	(mg/s) (mg/s) (mg/s) (mg/s) (mg/s) (mg/s) (mg/s) (mg/s) (mg/s) (mg/s) (mg/s)
r trai	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	522.39	(mg/s)	5,964	(mg/s)
r ceu	mass flux of ground water into PM-13	M_g13 =	22.40	(mg/s)	22.40	(mg/s)	22.40	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	3.57	(mg/s)	27.31	(mg/s)	27.31	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	19.17	(mg/s)	19.17	(mg/s)	19.17	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
r e C	mass flux in seepage from cell 2W	M_s2w =	45.50	(mg/s)	45.50	(mg/s)	45.50	(mg/s)
			Low Floy	w	Average	Flow	High Fl	ow
ass ba	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 = M_r13 =		(mg/s) (mg/s)	751.21		7,301.67	
			Low Flor	w	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.219	(mg/L)	0.293	(mg/l)	0.299	(mg/l)
s ≓ s °	concentration in river at PM-13	C_r13 =	0.366	(mg/L)	0.311	(mg/l)	0.301	(mg/l)

Case Parameter	Post-Closure Sodium			
	concentration of surface water into PM-12	C_s12 =	6.00	(mg/L)
ata	concentration of surface water into PM-13	C_s13 =	6.00	(mg/L)
р	concentration in Babbitt WWTP discharge	C_sBab =	6.00	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	119.50	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	12.15	(mg/L)
A	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	255.00	(mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	44.31	(mg/L)
put	concentration of ground water into PM-12	C_g12 =	4.90	(mg/L)
	concentration of ground water into PM-13	C_g13 =	4.90	(mg/L)

			Low Flor	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	2,141.18	(mg/s)	24,309	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	119.26	(mg/s)	119.26	(mg/s)	119.26	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	56.03	(mg/s)	56.03	(mg/s)	56.03	(mg/s)
Itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	10,447.79	(mg/s)	119,290	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	583.80	(mg/s)	583.80	(mg/s)	583.80	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	879.28	(mg/s)	6,729.88	(mg/s)	6,729.88	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	842.70	(mg/s)	842.70	(mg/s)	842.70	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	11.96	(mg/s)	11.96	(mg/s)	11.96	(mg/s)
ຊີ ບິ	mass flux in seepage from cell 2W	M_s2w =	1,704.26	(mg/s)	1,704.26	(mg/s)	1,704.26	(mg/s)
			Low Floy	W	Average	Flow	High Fl	ow
ass ba	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 =	4,197.29		2,316.47		24,483.86	
			Low Flor	w	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	5.205	(mg/L)	5.931	(mg/l)	5.993	(mg/l)
S the C	concentration in river at PM-13	C_r13 =	15.659	(mg/L)	9.373	(mg/l)	6.336	(mg/l)

Case	Post-Closure			
Parameter	Nickel			
	concentration of surface water into PM-12	C_s12 =	0.0012	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0012	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0012	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.0052	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.015125217	(mg/L)
Icel	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.098	(mg/L)
con	concentration in tailings basin cell 2W	C_s2w =	0.00688	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.007	(mg/L)
lnp	concentration of ground water into PM-13	C_g13 =	0.007	(mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.43	(mg/s)	5	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.17	(mg/s)	0.17	(mg/s)	0.17	(mg/s)
tion	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	2.09	(mg/s)	24	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.83	(mg/s)	0.83	(mg/s)	0.83	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	0.04	(mg/s)	0.29	(mg/s)	0.29	(mg/s)
		M_fs =	1.05	(mg/s)	1.05	(mg/s)	1.05	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
မို	mass flux in seepage from cell 2W	M_s2w =	0.26	(mg/s)	0.26	(mg/s)	0.26	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.18	(mg/s)	0.61	(mg/s)	5.04	(mg/s)
Ma	mass flux in river at PM-13	M_r13 =	2.37	(mg/s)	5.14	(mg/s)	31.35	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to	concentration in river at PM-12	C_r12 =	0.005	(mg/L)	0.002	(mg/L)	0.001	(mg/L)
S≞ S	concentration in river at PM-13	C_r13 =	0.009	(mg/L)	0.002	(mg/L)	0.001	(mg/L)

Case	Post-Closure		
Parameter	Lead		
		-	
	concentration of surface water into PM-12	C_s12 =	0.00015 (mg/L)
ata	concentration of surface water into PM-13	C_s13 =	0.00015 (mg/L)
ů p u	concentration in Babbitt WWTP discharge	C_sBab =	0.00015 (mg/L)
ratio	concentration in Area 5 Pit NW discharge	C_spit =	0.0003 (mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.001097329 (mg/L)
ICel	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0005 (mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	0.0012 (mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.0012 (mg/L)
du	concentration of ground water into PM-13	C_g13 =	0.0012 (mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.05	(mg/s)	1	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.03	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.26	(mg/s)	3	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.14	(mg/s)	0.14	(mg/s)	0.14	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.02	(mg/s)	0.02	(mg/s)
		M_fs =	0.08	(mg/s)	0.08	(mg/s)	0.08	(mg/s)
Convert	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
ပိုင်	mass flux in seepage from cell 2W	M_s2w =		(mg/s)		(mg/s)	0.05	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance	mass flux in river at PM-12	M_r12 =	0.03	(mg/s)	0.08	(mg/s)	0.64	(mg/s)
Mas	mass flux in river at PM-13	M r13 =	0.30	(mg/s)	0.63	(mg/s)	3.90	(mg/s)
			Low Flo		Average		High Fl	
Convert mass flux to	concentration in river at PM-12	C_r12 =		(mg/L)		(mg/L)		(mg/L)
ິ ວ ≑ ວ	concentration in river at PM-13	C_r13 =	0.001	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Case Parameter	Post-Closure Antimony		
			I
	concentration of surface water into PM-12	C_s12 =	4.00E-05 (mg/L)
ata	concentration of surface water into PM-13	C_s13 =	4.00E-05 (mg/L)
ip u	concentration in Babbitt WWTP discharge	C_sBab =	4.00E-05 (mg/L)
ratio	concentration in Area 5 Pit NW discharge	C_spit =	2.50E-04 (mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	5.37E-03 (mg/L)
ICEI	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.004 (mg/L)
con	concentration in tailings basin cell 2W	C_s2w =	2.50E-04 (mg/L)
put	concentration of ground water into PM-12	C_g12 =	1.50E-03 (mg/L)
du	concentration of ground water into PM-13	C_g13 =	1.50E-03 (mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.01	(mg/s)	0	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.04	(mg/s)	0.04	(mg/s)	0.04	(mg/s)
tion	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.07	(mg/s)	1	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.18	(mg/s)	0.18	(mg/s)	0.18	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in assesses from Tailings Basin Calls 1F and 0F	M_fs =	0.37	(mg/s)	0.37	(mg/s)	0.37	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
မိ န	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
		_	Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =	0.04	(mg/s)	0.05	(mg/s)	0.20	(mg/s)
Ĕ	mass flux in river at PM-13	M_r13 =		(mg/s)		(mg/s)		(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to	concentration in river at PM-12	C_r12 =	0.001	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
S te C	concentration in river at PM-13	C_r13 =	0.002	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Case	Post-Closure			
Parameter	Selenium			
		-		
	concentration of surface water into PM-12	C_s12 =	0.0003	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0003	(mg/L)
-	concentration in Babbitt WWTP discharge	C_sBab =	0.0003	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.0016	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.001503093	(mg/L)
0	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.054	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	0.00109	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.00295	(mg/L)
du	concentration of ground water into PM-13	C_g13 =	0.00295	(mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.11	(mg/s)	1	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.07	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.52	(mg/s)	6	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.35	(mg/s)		(mg/s)	0.35	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.01	(mg/s)	0.09	(mg/s)	0.09	(mg/s)
		M_fs =	0.10	(mg/s)	0.10	(mg/s)	0.10	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
e S		M_s2w =		(mg/s)		(mg/s)	0.04	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12	M_r12 =		(mg/s)		(mg/s)		(mg/s)
Σē	mass flux in river at PM-13	M_r13 =	0.59 Low Flo	(mg/s)		(mg/s)	7.84 High Fl	(mg/s)
s c				w	Average	FIOW	High Fi	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.002	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
Conve flux to concei	concentration in river at PM-13	C_r13 =	0.002	(mg/L)	0.001	(mg/L)	0.000	(mg/L)

Case	Post-Closure			
Parameter	Sulfate			
		-		
	concentration of surface water into PM-12	C_s12 =	4.00	(mg/L)
ata	concentration of surface water into PM-13	C_s13 =	4.00	(mg/L)
u di	concentration in Babbitt WWTP discharge	C_sBab =	4.00	(mg/L)
atio	concentration in Area 5 Pit NW discharge	C_spit =	1046.27	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	110.25	(mg/L)
Icel	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	7347.00	(mg/L)
con	concentration in tailings basin cell 2W	C_s2w =	152.40	(mg/L)
but	concentration of ground water into PM-12	C_g12 =	8.50	(mg/L)
	concentration of ground water into PM-13	C_g13 =	8.50	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	1,427.45	(mg/s)	16,206	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	206.87	(mg/s)	206.87	(mg/s)	206.87	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	37.36	(mg/s)	37.36	(mg/s)	37.36	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	6,965.20	(mg/s)	79,526	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	1,012.72	(mg/s)	1,012.72	(mg/s)	1,012.72	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	7,698.43	(mg/s)	58,922.60	(mg/s)	58,922.60	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	7,646.82	(mg/s)	7,646.82	(mg/s)	7,646.82	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	344.66	(mg/s)	344.66	(mg/s)	344.66	(mg/s)
မ ပိ		M_s2w =	5,861.63	(mg/s)	5,861.63	(mg/s)	5,861.63	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =	244.23	(mg/s)	1,671.68	(mg/s)	16,449.94	(mg/s)
at a	mass flux in river at PM-13	M_r13 =	22,808.48		82,425.30		169,764.76	
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	7.252	(mg/L)	4.280	(mg/l)	4.027	(mg/l)
Conve flux to concei		C_r13 =	85.092	(mg/L)	34.128	(mg/l)	7.001	(mg/l)

Case	Post-Closure		
Parameter	Thallium		
	concentration of surface water into PM-12	C_s12 =	0.0002 (mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0002 (mg/L)
-	concentration in Babbitt WWTP discharge	C_sBab =	0.0002 (mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.0006 (mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000917488 (mg/L)
0	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0002 (mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	0.0002 (mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.000004 (mg/L)
du	concentration of ground water into PM-13	C_g13 =	0.000004 (mg/L)

			Low Flow	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.07	(mg/s)	1	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.35	(mg/s)	4	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)		(mg/s)	0.00	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
		M_fs =	0.06	(mg/s)	0.06	(mg/s)	0.06	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
ဒိ ဒိ		M_s2w =	0.01	(mg/s)		(mg/s)	0.01	(mg/s)
			Low Flor	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12	M_r12 =		(mg/s)		(mg/s)		(mg/s)
2 0	mass flux in river at PM-13	M_r13 =	0.08 Low Flor	(mg/s)	0.53 Average	(mg/s) Flow	4.89 High Fl	(mg/s)
Convert mass flux to concentration	concentration in river at PM-12	C r12 =		(mg/L)		(mg/L)		(mg/L)

Case	Post-Closure			
Parameter	Zinc			
		-		
	concentration of surface water into PM-12	C_s12 =	0.016 (r	mg/L)
ata	concentration of surface water into PM-13	C_s13 =	0.016 (r	mg/L)
pu	concentration in Babbitt WWTP discharge	C_sBab =	0.016 (r	mg/L)
ratio	concentration in Area 5 Pit NW discharge	C_spit =	0.003 (r	mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.020231354 (r	mg/L)
ICEI	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.01 (r	mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	0.01435 (r	mg/L)
ort	concentration of ground water into PM-12	C_g12 =	0.0115 (r	mg/L)
법	concentration of ground water into PM-13	C_g13 =	0.0115 (r	mg/L)

			Low Flor	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	5.71	(mg/s)	65	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.28	(mg/s)	0.28	(mg/s)	0.28	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.15	(mg/s)	0.15	(mg/s)	0.15	(mg/s)
itrai	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	27.86	(mg/s)	318	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	1.37	(mg/s)	1.37	(mg/s)	1.37	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	0.02	(mg/s)	0.17	(mg/s)	0.17	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.40	(mg/s)	1.40	(mg/s)	1.40	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
Co to	mass flux in seepage from cell 2W	M_s2w =	0.55	(mg/s)	0.55	(mg/s)	0.55	(mg/s)
			Low Flor	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =	0.43	(mg/s)	6.14	(mg/s)	65.25	(mg/s)
A R	mass flux in river at PM-13	M_r13 =		(mg/s)		(mg/s)	386.85	
			Low Flor	w	Average	Flow	High Fl	ow
Convert mass flux to	concentration in river at PM-12	C_r12 =	0.013	(mg/L)	0.016	(mg/L)	0.016	(mg/L)
Con Con	concentration in river at PM-13	C_r13 =	0.014	(mg/L)	0.016	(mg/L)	0.016	(mg/L)
Appendix F.9 Embarrass River Geotechnical Mitigation Year 1

FLOWS

Case	Year 1				
Flows	Low Flow Conditions (no surface runoff)				Node
in River	flow in river at PM-12	Q_r12_L =	1.19	(cfs)	PM-12
Total flow in Embarrass F	flow in river at PM-13	Q_r13_L =	11.22	(cfs)	PM-13
Tota Emb	flow check	Q_ck_L =	11.22	(cfs)	
	surface water flow into PM-12	Q_s12_L =	0.00	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_L =	0.00	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_L =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_L =	0.26	(cfs)	PM-13
ta	seepage from Tailings Basin Cells 1E and 2E	Q_fs_L =	3.56	(cfs)	PM-13
/ da	hydrometallurgical residue cells liner leakage	Q_rrs_L =	0.0010	(cfs)	PM-13
flow data	seepage from cell 2W	Q_s2w_L =	1.99	(cfs)	PM-13
Input 1	ground water flow into PM-12	Q_g12_L =	0.86	(cfs)	PM-12
dul	ground water flow into PM-13	Q_g13_L =	4.21	(cfs)	PM-13

Case	Year 1				
Flow	Average Flow Conditions (mean annual)				_
n River	flow in river at PM-12	Q_r12_M =	13.80	(cfs)	PM-12
Total flow in Embarrass F	flow in river at PM-13	Q_r13_M =	87.09	(cfs)	PM-13
Tota	flow check	Q_ck_M =	87.09	(cfs)	4
	surface water flow into PM-12	Q_s12_M =	12.61	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_M =	61.53	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_M =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_M =	1.99	(cfs)	PM-13
ta	seepage from Tailings Basin Cells 1E and 2E	Q_fs_M =	3.56	(cfs)	PM-13
, da	hydrometallurgical residue cells liner leakage	Q_rrs_M =	0.0010	(cfs)	PM-13
low	seepage from cell 2W	Q_s2w_M =	1.99	(cfs)	PM-13
nput flow data	ground water flow into PM-12	Q_g12_M =	0.86	(cfs)	PM-12
dul	ground water flow into PM-13	Q_g13_M =	4.21	(cfs)	PM-13

Case		Year 1				
Flow		High Flow Conditions (avg. annual 1-day max flo	ow)			
c		flow in river at PM-12	Q_r12_H =	144.35	(cfs)	PM-12
Total flow in	arrass	flow in river at PM-13	Q_r13_H =	858.64	(cfs)	PM-13
Total	Emba	flow check	Q_ck_H =	858.64	(cfs)	
		surface water flow into PM-12	Q_s12_H =	143.16	(cfs)	PM-12
		surface water flow into PM-13	Q_s13_H =	702.53	(cfs)	PM-13
		Babbitt WWTP discharge	Q_sBab_H =	0.33	(cfs)	PM-12
		Area 5 Pit NW discharge	Q_spit_H =	1.99	(cfs)	PM-13
	ta	seepage from Tailings Basin Cells 1E and 2E	Q_fs_H =	3.56	(cfs)	PM-13
	r da	hydrometallurgical residue cells liner leakage	QrrsH=	0.0010	(cfs)	PM-13
	flow data	seepage from cell 2W	Q s2w H =	1.99	(cfs)	PM-13
		ground water flow into PM-12	Q_g12_H =	0.86	(cfs)	PM-12
	lnp	ground water flow into PM-13	Q_g13_H =	4.21	(cfs)	PM-13

Case	Year 1			
Parameter	Silver			
	concentration of surface water into PM-12	C_s12 =	0.00011 (mg/	/L)
data	concentration of surface water into PM-13	C_s13 =	0.00011 (mg/	/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00011 (mg/	/L)
ţi	concentration in Area 5 Pit NW discharge	C_spit =	0.00015 (mg/	/L)
ntration	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.00086 (mg/	/L)
8	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.000125 (mg/	/L)
conc	concentration in tailings basin cell 2W	C_s2w =	0.000100 (mg/	/L)
Input	concentration of ground water into PM-12	C_g12 =	0.000008 (mg/	/L)
브	concentration of ground water into PM-13	C_g13 =	0.000008 (mg/	/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.04	(mg/s)	0	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
ıtra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.19	(mg/s)	2	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.09	(mg/s)	0.09	(mg/s)	0.09	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
۹ ۵	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
		_	Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12	M_r12 =		(mg/s)		(mg/s)		(mg/s)
2 0	mass flux in river at PM-13	M_r13 =	0.10	(mg/s)	Average	(mg/s)	2.74 High Fl	(mg/s)
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.00004	(mg/L)	0.000	(mg/L)	0.000	(mg/L) (mg/L)

Case	Year 1			
Parameter	Aluminum			
		-		
	concentration of surface water into PM-12	C_s12 =	0.12	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.12	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.12	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.01325	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.01	(mg/L)
A 1	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.18	(mg/L)
con	concentration in tailings basin cell 2W	C_s2w =	1.5788	(mg/L)
put	concentration of ground water into PM-12	C_g12 =	0.025	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.025	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	42.82	(mg/s)	486	(mg/s)
	mass flux of ground water into PM-12	M_g12 =	0.61	(mg/s)	0.61	(mg/s)	0.61	(mg/s)
tion	mass flux in Babbitt WWTP discharge	M_sBab =	1.12	(mg/s)	1.12	(mg/s)	1.12	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	208.96	(mg/s)	2,386	(mg/s)
	mass flux of ground water into PM-13	M_g13 =	2.98	(mg/s)	2.98	(mg/s)	2.98	(mg/s)
conc	mass flux of Area 5 Pit NW discharge	M_spit =	0.10	(mg/s)	0.75	(mg/s)	0.75	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.01	(mg/s)	1.01	(mg/s)	1.01	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
ទ ប័	mass flux in seepage from cell 2W	M_s2w =	89.10	(mg/s)	89.10	(mg/s)	89.10	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 = M r13 =		(mg/s) (mg/s)	44.55	(mg/s)	487.90	
		<u>M_10 -</u>	Low Flo		Average		High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L) (mg/L)		(mg/L) (mg/L)		(mg/L) (mg/L)

Case	Year 1			
Parameter	Arsenic			
		-		
	concentration of surface water into PM-12	C_s12 =	0.00075	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.00075	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00075	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.001325	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.006769615	(mg/L)
<u>.</u>	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.004	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	0.00291	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.00273	(mg/L)
브	concentration of ground water into PM-13	C_g13 =	0.00273	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.27	(mg/s)	3	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.07	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
concentration flux	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1.31	(mg/s)	15	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.33	(mg/s)	0.33	(mg/s)	0.33	(mg/s)
con	mass flux of Area 5 Pit NW discharge	M_spit =	0.01	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.68	(mg/s)	0.68	(mg/s)	0.68	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
<u>ء</u> ک	mass flux in seepage from cell 2W	M_s2w =		(mg/s)		(mg/s)	0.16	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 = M r13 =		(mg/s) (mg/s)		(mg/s)		(mg/s) (mg/s)
20		W_113 =	Low Flo		Average		High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 = C_r13 =		(mg/L) (mg/L)		(mg/L)		(mg/L) (mg/L)

Case	Year 1			
Parameter	Boron			
		-		
	concentration of surface water into PM-12	C_s12 =	0.027	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.027	(mg/L)
-	concentration in Babbitt WWTP discharge	C_sBab =	0.027	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.1315	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.137838474	(mg/L)
A 1	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.11	(mg/L)
con	concentration in tailings basin cell 2W	C_s2w =	0.33	(mg/L)
put	concentration of ground water into PM-12	C_g12 =	0.0212	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.0212	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	9.64	(mg/s)	109	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.52	(mg/s)	0.52	(mg/s)	0.52	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.25	(mg/s)	0.25	(mg/s)	0.25	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	47.02	(mg/s)	537	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	2.53	(mg/s)	2.53	(mg/s)	2.53	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.97	(mg/s)	7.41	(mg/s)	7.41	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	13.91	(mg/s)	13.91	(mg/s)	13.91	(mg/s)
onvert mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
<u>ء</u> د	mass flux in seepage from cell 2W	M_s2w =	18.62	(mg/s)		(mg/s)	18.62	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 =		(mg/s) (mg/s)		(mg/s)	689.42	
			Low Flo		Average		High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.023	(mg/L)	0.027	(mg/L)	0.027	(mg/L) (mg/L)

Case	Year 1			
Parameter	Barium			
	concentration of surface water into PM-12	C_s12 =	0.016	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.016	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.016	(mg/L)
ţi	concentration in Area 5 Pit NW discharge	C_spit =	0.0044	(mg/L)
ntration	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	5.05E-02	(mg/L)
8	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	5.00E-03	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	0.09298	(mg/L)
rt	concentration of ground water into PM-12	C_g12 =	0.0681	(mg/L)
Input	concentration of ground water into PM-13	C_g13 =	0.0681	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	5.71	(mg/s)	65	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	1.66	(mg/s)	1.66	(mg/s)	1.66	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.15	(mg/s)	0.15	(mg/s)	0.15	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	27.86	(mg/s)	318	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	8.11	(mg/s)	8.11	(mg/s)	8.11	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.03	(mg/s)	0.25	(mg/s)	0.25	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	5.09	(mg/s)	5.09	(mg/s)	5.09	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
۹ <u>۵</u>	mass flux in seepage from cell 2W	M_s2w =		(mg/s)	5.25	(mg/s)		(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s)		(mg/s) (mg/s)	66.63	(mg/s) (mg/s)
			Low Flo		Average		High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 = C r13 =		(mg/L)		(mg/L) (mg/L)	0.016	(mg/L) (mg/L)

Case	Year 1			
Parameter	Beryllium			
	concentration of surface water into PM-12	C_s12 =	0.0001	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0001	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0001	(mg/L)
ntration	concentration in Area 5 Pit NW discharge	C_spit =	0.0001	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000376001	(mg/L)
8	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	0.00075	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.000023	(mg/L)
브	concentration of ground water into PM-13	C_g13 =	0.000023	(mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.04	(mg/s)	0	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.17	(mg/s)	2	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.04	(mg/s)	0.04	(mg/s)	0.04	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	-	(mg/s)	-	(mg/s)	-	(mg/s)
<u> ۵</u>	mass flux in seepage from cell 2W	M_s2w =	0.04	(mg/s)	0.04	(mg/s)	0.04	(mg/s)
			Low Flo	w	Average	Flow	High Flow	
Mass balance at each node	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 = M r13 =		(mg/s)		(mg/s)		(mg/s) (mg/s)
20		1113 =	Low Flo		0.30 (mg/s) Average Flow		High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 = C_r13 =		(mg/L) (mg/L)		(mg/L) (mg/L)	0.000	(mg/L)

Case	Year 1			
Parameter	Calcium			
	concentration of surface water into PM-12	C_s12 =	15	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	15	(mg/L)
•	concentration in Babbitt WWTP discharge	C_sBab =	15	(mg/L)
tion	concentration in Area 5 Pit NW discharge	C_spit =	95.35	(mg/L)
ntratic	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	77.28097689	(mg/L)
0	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	416	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	59.78	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	19	(mg/L)
법	concentration of ground water into PM-13	C_g13 =	19	(mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	5,352.95	(mg/s)	60,771	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	462.42	(mg/s)	462.42	(mg/s)	462.42	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	140.09	(mg/s)	140.09	(mg/s)	140.09	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	26,119.49	(mg/s)	298,224	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	2,263.72	(mg/s)	2,263.72	(mg/s)	2,263.72	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	701.59	(mg/s)	5,369.83	(mg/s)	5,369.83	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	7,796.40	(mg/s)	7,796.40	(mg/s)	7,796.40	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =		(mg/s)	12.28	(mg/s)	12.28	(mg/s)
ទ បិ	mass flux in seepage from cell 2W	M_s2w =	3,373.51	(mg/s)	3,373.51	(mg/s)	1.77	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 = M r13 =	602.51		5,955.45		61,373.93	
			Low Flo		Average		High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	<u>17.891</u> 46.453		15.249 20.648		15.024	

Case	Year 1			
Parameter	Cadmium			
	concentration of surface water into PM-12	C_s12 =	0.00008	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.00008	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00008	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.0001	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.00032784	(mg/L)
8	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0004	(mg/L)
con	concentration in tailings basin cell 2W	C_s2w =	0.000188	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.0003	(mg/L)
du	concentration of ground water into PM-13	C_g13 =	0.0003	(mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.03	(mg/s)	0	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
ıtra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.14	(mg/s)	2	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.04	(mg/s)	0.04	(mg/s)	0.04	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
		M_fs =	0.03	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
မ ပိ	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)	0.01	(mg/s)		(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12	M_r12 =		(mg/s)		(mg/s)	0.33	(mg/s)
atë	mass flux in river at PM-13	M_r13 =		(mg/s)		(mg/s)		(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
Conve flux to conce	concentration in river at PM-13	C_r13 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Case	Year 1			
Parameter	Chloride			
			n	
	concentration of surface water into PM-12	C_s12 =	6.5	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	6.5	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	6.5	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	5.95	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	1.52E+01	(mg/L)
0	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.76E+03	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	21.54	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	1.8	(mg/L)
브	concentration of ground water into PM-13	C_g13 =	1.8	(mg/L)

			Low Flow	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	2,319.61	(mg/s)	26,334	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	43.81	(mg/s)	43.81	(mg/s)	43.81	(mg/s)
tion	mass flux in Babbitt WWTP discharge	M_sBab =	60.70	(mg/s)	60.70	(mg/s)	60.70	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	11,318.44	(mg/s)	129,230	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	214.46	(mg/s)	214.46	(mg/s)	214.46	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	43.78	(mg/s)	335.09	(mg/s)	335.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1,538.17	(mg/s)	1,538.17	(mg/s)	1,538.17	(mg/s)
onvert mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	51.97	(mg/s)	51.97	(mg/s)	51.97	(mg/s)
<u>ء</u> ک	mass flux in seepage from cell 2W	M_s2w =	1,215.55	(mg/s)	1,215.55		1,215.55	
			Low Flow	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 =	104.51 3,168.44		2,424.12		26,438.79	
		· · <u>_</u> _ · · ·	Low Flow		Average Flow		High Fl	· · · ·
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	3.103	(mg/L)	6.207	(mg/L)	6.472	(mg/L)

Case Parameter	Year 1 Cobalt			
	concentration of surface water into PM-12	C_s12 =	0.0006	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0006	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0006	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.000555	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.001495727	(mg/L)
8	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.005	(mg/L)
cone	concentration in tailings basin cell 2W	C_s2w =	0.001556	(mg/L)
brt	concentration of ground water into PM-12	C_g12 =	0.0011	(mg/L)
dul	concentration of ground water into PM-13	C_g13 =	0.0011	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.21	(mg/s)	2	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.03	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1.04	(mg/s)	12	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.13	(mg/s)	0.13	(mg/s)	0.13	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.15	(mg/s)	0.15	(mg/s)	0.15	(mg/s)
onvert	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
<u>و</u> ک	mass flux in seepage from cell 2W	M_s2w =	0.09	(mg/s)	0.09	(mg/s)	0.09	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s)		(mg/s)		(mg/s)
Ma at	mass flux in river at PM-13	M_r13 =		(mg/s)		(mg/s)		(mg/s)
ω c			Low Flo	w line	Average	FIOW	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.001	(mg/L)	0.001	(mg/L)	0.001	(mg/L)
Con	concentration in river at PM-13	C r13 =	0.001	(ma/L)	0.001	(mg/L)	0.001	(mg/L)

Case	Year 1			
Parameter	Copper			
		-		
	concentration of surface water into PM-12	C_s12 =	0.0015	(mg/L)
ata	concentration of surface water into PM-13	C_s13 =	0.0015	(mg/L)
σ	concentration in Babbitt WWTP discharge	C_sBab =	0.0015	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.00345	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.0068095	(mg/L)
A	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0015	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	0.004555	(mg/L)
-	concentration of ground water into PM-12	C_g12 =	0.004	(mg/L)
Input	concentration of ground water into PM-13	C_g13 =	0.004	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.54	(mg/s)	6	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.10	(mg/s)	0.10	(mg/s)	0.10	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	2.61	(mg/s)	30	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.48	(mg/s)	0.48	(mg/s)	0.48	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.03	(mg/s)	0.19	(mg/s)	0.19	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.69	(mg/s)	0.69	(mg/s)	0.69	(mg/s)
onvert mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
မိ မိ	mass flux in seepage from cell 2W	M_s2w =	0.26	(mg/s)		(mg/s)	0.26	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s)		(mg/s)		(mg/s)
9 S	mass flux in river at PM-13	M_r13 =	Low Flo	(mg/s)	4.87 Average	(mg/s)	37.63 High Fl	(mg/s)
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L)		(mg/L)	0.002	

Case	Year 1			
Parameter	Fluoride			
	concentration of surface water into PM-12	C_s12 =	0.2	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.2	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.2	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.125	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	2.90E+00	(mg/L)
ē	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	2.85E+00	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	1.55	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.385	(mg/L)
법	concentration of ground water into PM-13	C_g13 =	0.385	(mg/L)

			Low Flo	w	Average	FIOW	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	71.37	(mg/s)	810	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	9.37	(mg/s)	9.37	(mg/s)	9.37	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	1.87	(mg/s)	1.87	(mg/s)	1.87	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	348.26	(mg/s)	3,976	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	45.87	(mg/s)	45.87	(mg/s)	45.87	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.92	(mg/s)	7.04	(mg/s)	7.04	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	292.90	(mg/s)	292.90	(mg/s)	292.90	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.08	(mg/s)	0.08	(mg/s)	0.08	(mg/s)
န် ပိ	mass flux in seepage from cell 2W	M_s2w =	87.47	(mg/s)	87.47	(mg/s)	87.47	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12	M_r12 =		(mg/s)		(mg/s)	821.52	
ö≤	mass flux in river at PM-13	M_r13 =	438.48		864.24 Average		5,231.21 High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L)		(mg/L)		(mg/L)

Case	Year 1			
Parameter	Iron			
		-		
	concentration of surface water into PM-12	C_s12 =	2.9	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	2.9	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	2.9	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.037761905	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	4.00E-03	(mg/L)
d)	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	4.00E-01	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	4.594	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.035	(mg/L)
du du	concentration of ground water into PM-13	C_g13 =	0.035	(mg/L)

		Low Flo	w	Average	Flow	High Fl	ow
mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	1,034.90	(mg/s)	11,749	(mg/s)
mass flux of ground water into PM-12	M_g12 =	0.85	(mg/s)	0.85	(mg/s)	0.85	(mg/s)
mass flux in Babbitt WWTP discharge	M_sBab =	27.08	(mg/s)	27.08	(mg/s)	27.08	(mg/s)
mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	5,049.77	(mg/s)	57,657	(mg/s)
mass flux of ground water into PM-13	M_g13 =	4.17	(mg/s)	4.17	(mg/s)	4.17	(mg/s)
mass flux of Area 5 Pit NW discharge	M_spit =	0.28	(mg/s)	2.13	(mg/s)	2.13	(mg/s)
mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.40	(mg/s)	0.40	(mg/s)	0.40	(mg/s)
mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
mass flux in seepage from cell 2W	M_s2w =	259.25	(mg/s)	259.25	(mg/s)	259.25	(mg/s)
		Low Flo	w	Average	Flow	High Fl	ow
mass flux in river at PM-12	M_r12 =					11,777.08	
mass flux in river at PM-13	M_r13 =						· · ·
concentration in river at PM-12	C_r12 =						(mg/L)
	mass flux of ground water into PM-12 mass flux in Babbitt WWTP discharge mass flux of surface water into PM-13 mass flux of ground water into PM-13 mass flux of Area 5 Pit NW discharge mass flux in seepage from Tailings Basin Cells 1E and 2E mass flux in hydrometallurgical residue cells liner leakage mass flux in seepage from cell 2W mass flux in river at PM-12 mass flux in river at PM-13	mass flux of ground water into PM-12 M_g12 = mass flux in Babbitt WWTP discharge M_sBab = mass flux of surface water into PM-13 M_s13 = mass flux of ground water into PM-13 M_g13 = mass flux of Area 5 Pit NW discharge M_spit = mass flux in seepage from Tailings Basin Cells 1E and 2E M_fs = mass flux in seepage from cell 2W M_s2w = mass flux in river at PM-12 M_r12 = mass flux in river at PM-13 M_r13 =	mass flux of surface water into PM-12 $M_s12 =$ mass flux of ground water into PM-12 $M_g12 =$ 0.85mass flux in Babbitt WWTP discharge $M_sBab =$ 27.08mass flux of surface water into PM-13 $M_s13 =$ -mass flux of ground water into PM-13 $M_g13 =$ 4.17mass flux of Area 5 Pit NW discharge $M_spit =$ 0.28mass flux in seepage from Tailings Basin Cells 1E and 2E $M_srs =$ 0.01mass flux in seepage from cell 2W $M_srs =$ Low Flomass flux in river at PM-12M_r12 =27.93mass flux in river at PM-13M_r13 =292.05Low Flo	mass flux of ground water into PM-12 $M_g12 =$ 0.85 (mg/s) mass flux in Babbitt WWTP discharge $M_sBab =$ 27.08 (mg/s) mass flux of surface water into PM-13 $M_s13 =$ - (mg/s) mass flux of ground water into PM-13 $M_g13 =$ 4.17 (mg/s) mass flux of Area 5 Pit NW discharge $M_spit =$ 0.28 (mg/s) mass flux in seepage from Tailings Basin Cells 1E and 2E $M_fs =$ 0.40 (mg/s) mass flux in seepage from cell 2W $M_s2w =$ 259.25 (mg/s) Low Flowmass flux in river at PM-12M_r12 = 27.93 (mg/s)mass flux in river at PM-13M_r13 = 292.05 (mg/s)mass flux in river at PM-13M_r13 = 292.05 (mg/s)	mass flux of surface water into PM-12 M_s12 = - (mg/s) 1,034.90 mass flux of ground water into PM-12 M_g12 = 0.85 (mg/s) 0.85 mass flux in Babbitt WWTP discharge M_sBab = 27.08 (mg/s) 27.08 mass flux of surface water into PM-13 M_s13 = - (mg/s) 5,049.77 mass flux of ground water into PM-13 M_g13 = 4.17 (mg/s) 4.17 mass flux of Area 5 Pit NW discharge M_spit = 0.28 (mg/s) 0.40 mass flux in seepage from Tailings Basin Cells 1E and 2E M_fs = 0.01 (mg/s) 0.01 mass flux in seepage from cell 2W M_s2w = 259.25 (mg/s) 259.25 Low Flow Average mass flux in river at PM-12 M_r12 = 27.93 (mg/s) 1,062.84 mass flux in river at PM-13 M_r13 = 292.05 (mg/s) 6,378.57 Low Flow Average	mass flux of surface water into PM-12 M_s12 = - (mg/s) 1,034.90 (mg/s) mass flux of ground water into PM-12 M_g12 = 0.85 (mg/s) 0.85 (mg/s) mass flux in Babbitt WWTP discharge M_sBab = 27.08 (mg/s) 27.08 (mg/s) mass flux of surface water into PM-13 M_s13 = - (mg/s) 5,049.77 (mg/s) mass flux of ground water into PM-13 M_g13 = 4.17 (mg/s) 4.17 (mg/s) mass flux of Area 5 Pit NW discharge M_spit = 0.28 (mg/s) 2.13 (mg/s) mass flux in seepage from Tailings Basin Cells 1E and 2E M_fs = 0.40 (mg/s) 0.40 (mg/s) mass flux in seepage from cell 2W M_s2w = 259.25 (mg/s) 259.25 (mg/s) mass flux in river at PM-12 M_r12 = 27.93 (mg/s) 1,062.84 (mg/s) mass flux in river at PM-13 M_r13 = 292.05 (mg/s) 6,378.57 (mg/s) mass flux in river at PM-13 M_r13 = 292.05 (mg/s) 6,378.57 (mg/s) mass flux in river at PM-13 <	mass flux of surface water into PM-12 M_s12 = (mg/s) 1,034.90 (mg/s) 11,749 mass flux of ground water into PM-12 M_g12 = 0.85 (mg/s) 0.85 (mg/s) 0.85 mass flux in Babbitt WWTP discharge M_sBab = 27.08 (mg/s) 27.08 (mg/s) 27.08 mass flux of surface water into PM-13 M_s13 = - (mg/s) 5,049.77 (mg/s) 57,657 mass flux of ground water into PM-13 M_g13 = 4.17 (mg/s) 4.17 (mg/s) 2.13 mass flux of Area 5 Pit NW discharge M_spit = 0.28 (mg/s) 0.40 (mg/s) 0.40 mass flux in seepage from Tailings Basin Cells 1E and 2E M_fs = 0.40 (mg/s) 0.01 (mg/s) 0.01 mass flux in hydrometallurgical residue cells liner leakage M_rrs = 0.01 (mg/s) 0.01 (mg/s) 259.25 (mg/s) 259.25 (mg/s) 259.25 (mg/s) 11,777.08 mass flux in river at PM-12 M_r12 = 27.93 (mg/s) 1,062.84

Case	Year 1			
Parameter	Hardness			
	concentration of surface water into PM-12	C_s12 =	70	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	70	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	70	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	942.7142857	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	3.74E+02	(mg/L)
۵ ۵	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	8.61E+03	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	436.6	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	87.5	(mg/L)
<u> </u>	concentration of ground water into PM-13	C_g13 =	87.5	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	24,980.41	(mg/s)	283,600	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	2,129.58	(mg/s)	2,129.58	(mg/s)	2,129.58	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	653.73	(mg/s)	653.73	(mg/s)	653.73	(mg/s)
ıtra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	121,890.93	(mg/s)	1,391,712	(mg/s)
cer	mass flux of ground water into PM-13	M_g13 =	10,425.01	(mg/s)	10,425.01	(mg/s)	10,425.01	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	6,936.49	(mg/s)	53,090.84	(mg/s)	53,090.84	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	37,758.64	(mg/s)	37,758.64	(mg/s)	37,758.64	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	254.25	(mg/s)	254.25	(mg/s)	254.25	(mg/s)
ទ ទ័	mass flux in seepage from cell 2W	M_s2w =	24,638.27		24,638.27	(mg/s)	24,638.27	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12	M_r12 =	2,783.31		27,763.72		286,383.27	
at at	mass flux in river at PM-13	M_r13 =	82,795.96		275,821.65		1,804,262.20	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	82.647 260.755	(mg/L)	Average 71.091 111.911	(mg/L)	70.104	(mg/L)

Case	Year 1			
Parameter	Potassium			
		-		
	concentration of surface water into PM-12	C_s12 =	0.60	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.60	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.60	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	53.80	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	9.31	(mg/L)
0	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.80	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	7.77	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	1.60	(mg/L)
드	concentration of ground water into PM-13	C_g13 =	1.60	(mg/L)

			Low Flo	w	Average	Flow	High Fl	low
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	214.12	(mg/s)	2,431	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	38.94	(mg/s)	38.94	(mg/s)	38.94	(mg/s)
tior	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.05	(mg/s)	0.05	(mg/s)	0.05	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1,044.78	(mg/s)	11,929	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	190.63	(mg/s)	190.63	(mg/s)	190.63	(mg/s)
concentration flux	mass flux in Babbitt WWTP discharge	M_sBab =	5.60	(mg/s)	5.60	(mg/s)	5.60	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	395.86	(mg/s)	3,029.85	(mg/s)	3,029.85	(mg/s)
Convert to mass	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	938.93	(mg/s)	938.93		938.93	(mg/s)
ទ ប្	mass flux in seepage from cell 2W	M_s2w =	438.48	(mg/s)	438.48	(mg/s)	438.48	(mg/s)
		_	Low Flo	w	Average	Flow	High Fl	low
Mass balance at each node		M_r12 = M_r13 =	38.99 2,008.49	(mg/s) (mg/s)	253.11		2,469.85	
			Low Flo	w	Average	Flow	High Fl	low
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L) (mg/L)		(mg/L) (mg/L)		(mg/l) (mg/l)

Case	Year 1			
Parameter	Magnesium			
	concentration of surface water into PM-12	C_s12 =	5.90	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	5.90	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	5.90	(mg/L)
ţi	concentration in Area 5 Pit NW discharge	C_spit =	271.00	(mg/L)
ntration	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	44.03	(mg/L)
c)	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	213.00	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	69.97	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	10.65	(mg/L)
du	concentration of ground water into PM-13	C_g13 =	10.65	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	2,105.49	(mg/s)	23,903	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	259.20	(mg/s)	259.20	(mg/s)	259.20	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	55.10	(mg/s)	55.10	(mg/s)	55.10	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	10,273.66	(mg/s)	117,301	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	1,268.87	(mg/s)	1,268.87	(mg/s)	1,268.87	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	1,994.02	(mg/s)	15,261.91	(mg/s)	15,261.91	(mg/s)
	mass flux in seconds from Tailings Desin Calls 1E and 0E	M_fs =	4,441.73	(mg/s)	4,441.73	(mg/s)	4,441.73	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =		(mg/s)	6.29	(mg/s)	6.29	(mg/s)
e S	mass flux in seepage from cell 2W	M_s2w =	3,948.56	(mg/s)	3,948.56		3,948.56	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =	314.30		2,419.79		24,217.73	
Ma at	mass flux in river at PM-13	M_r13 =	11,973.76		37,620.81		166,446.51 High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L)	6.196	(mg/l)	5.928	
Con flux con	concentration in river at PM-13	C_r13 =	37.710	(mg/L)	15.264	(mg/l)	6.850	(mg/l)

Case	Year 1			
Parameter	Manganese			
		-		
	concentration of surface water into PM-12	C_s12 =	0.30	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.30	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.30	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.49	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.24	(mg/L)
Ð	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.00	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	1.18	(mg/L)
ont	concentration of ground water into PM-12	C_g12 =	0.19	(mg/L)
Input	concentration of ground water into PM-13	C_g13 =	0.19	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	107.06	(mg/s)	1,215	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	4.58	(mg/s)	4.58	(mg/s)	4.58	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	2.80	(mg/s)	2.80	(mg/s)	2.80	(mg/s)
ıtra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	522.39	(mg/s)	5,964	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	22.40	(mg/s)	22.40	(mg/s)	22.40	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	3.57	(mg/s)	27.31	(mg/s)	27.31	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	24.25	(mg/s)	24.25	(mg/s)	24.25	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
to Co	mass flux in seepage from cell 2W	M_s2w =	66.76	(mg/s)	66.76	(mg/s)	66.76	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s)	114.44		1,222.81	
ø ≤	mass flux in river at PM-13	M_r13 =	124.35		777.54 Average		7,328.00 High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.219	(mg/L) (mg/L)	0.293	(mg/l)	0.299	(mg/l)

Case	Year 1			
Parameter	Sodium			
		-		
	concentration of surface water into PM-12	C_s12 =	6.00	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	6.00	(mg/L)
ip u	concentration in Babbitt WWTP discharge	C_sBab =	6.00	(mg/L)
atio	concentration in Area 5 Pit NW discharge	C_spit =	119.50	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	52.95	(mg/L)
<u> </u>	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	255.00	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	44.31	(mg/L)
put	concentration of ground water into PM-12	C_g12 =	4.90	(mg/L)
L L	concentration of ground water into PM-13	C_g13 =	4.90	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	2,141.18	(mg/s)	24,309	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	119.26	(mg/s)	119.26	(mg/s)	119.26	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	56.03	(mg/s)	56.03	(mg/s)	56.03	(mg/s)
itrai	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	10,447.79	(mg/s)	119,290	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	583.80	(mg/s)	583.80	(mg/s)	583.80	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	879.28	(mg/s)	6,729.88	(mg/s)	6,729.88	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	5,341.70	(mg/s)	5,341.70	(mg/s)	5,341.70	(mg/s)
onvert mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	7.53	(mg/s)	7.53	(mg/s)	7.53	(mg/s)
to Co	mass flux in seepage from cell 2W	M_s2w =	2,500.51	(mg/s)	2,500.51		2,500.51	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 = M r13 =	175.29 9,488.11		2,316.47		24,483.86	
20	mass flux in river at PM-13	IVI_13 =	9,488.11 Low Flo		Average		High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	5.205	(mg/L)	5.931	(mg/l)	5.993	

Case	Year 1			
Parameter	Nickel			
	concentration of surface water into PM-12	C_s12 =	0.0012	(mg/L)
ata	concentration of surface water into PM-13	C_s13 =	0.0012	(mg/L)
р	concentration in Babbitt WWTP discharge	C_sBab =	0.0012	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.0052	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.019144051	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.098	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	0.00688	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.007	(mg/L)
법	concentration of ground water into PM-13	C_g13 =	0.007	(mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.43	(mg/s)	5	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.17	(mg/s)	0.17	(mg/s)	0.17	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	2.09	(mg/s)	24	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.83	(mg/s)	0.83	(mg/s)	0.83	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.04	(mg/s)	0.29	(mg/s)	0.29	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.93	(mg/s)	1.93	(mg/s)	1.93	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
ទ ប័	mass flux in seepage from cell 2W	M_s2w =		(mg/s)	0.39	(mg/s)		(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s) (mg/s)		(mg/s)		(mg/s) (mg/s)
< 0	mass nux in river at PM-13	IVI_113 =	Low Flo		Average		J2.35 High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L)	0.002	(mg/L)		(mg/L) (mg/L)

Case	Year 1			
Parameter	Lead			
		-		
	concentration of surface water into PM-12	C_s12 =	0.00015	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.00015	(mg/L)
•	concentration in Babbitt WWTP discharge	C_sBab =	0.00015	(mg/L)
tion	concentration in Area 5 Pit NW discharge	C_spit =	0.0003	(mg/L)
ntratic	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000886329	(mg/L)
ICEI	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0005	(mg/L)
con	concentration in tailings basin cell 2W	C_s2w =	0.0012	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.0012	(mg/L)
du	concentration of ground water into PM-13	C_g13 =	0.0012	(mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.05	(mg/s)	1	(mg/s)
-	mass flux of ground water into PM-12	M_g12 =	0.03	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.26	(mg/s)	3	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.14	(mg/s)	0.14	(mg/s)	0.14	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.02	(mg/s)	0.02	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.09	(mg/s)	0.09	(mg/s)	0.09	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
<u>۽</u> ک	mass flux in seepage from cell 2W	M_s2w =	0.07	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s) (mg/s)		(mg/s)		(mg/s) (mg/s)
			Low Flo		Average		High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L) (mg/L)		(mg/L)		(mg/L) (mg/L)

Case Parameter	Year 1 Antimony			
	concentration of surface water into PM-12	C_s12 =	4.00E-05	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	4.00E-05	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	4.00E-05	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	2.50E-04	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	8.05E-03	(mg/L)
ncei	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.004	(mg/L)
con	concentration in tailings basin cell 2W	C_s2w =	2.50E-04	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	1.50E-03	(mg/L)
u du	concentration of ground water into PM-13	C_g13 =	1.50E-03	(mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.01	(mg/s)	0	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.04	(mg/s)	0.04	(mg/s)	0.04	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.07	(mg/s)	1	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.18	(mg/s)	0.18	(mg/s)	0.18	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
		M_fs =	0.81	(mg/s)	0.81	(mg/s)	0.81	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
e S		M_s2w =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.04	(mg/s)	0.05	(mg/s)	0.20	(mg/s)
Ma	mass flux in river at PM-13	M_r13 =		(mg/s)		(mg/s)		(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.001	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
contraction Co	concentration in river at PM-13	C_r13 =	0.003	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Case	Year 1			
Parameter	Selenium			
		-		
	concentration of surface water into PM-12	C_s12 =	0.0003	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0003	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0003	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.0016	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.001106406	(mg/L)
<u>.</u>	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.054	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	0.00109	(mg/L)
rt	concentration of ground water into PM-12	C_g12 =	0.00295	(mg/L)
Input	concentration of ground water into PM-13	C_g13 =	0.00295	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.11	(mg/s)	1	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.07	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.52	(mg/s)	6	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.35	(mg/s)	0.35	(mg/s)	0.35	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.01	(mg/s)	0.09	(mg/s)	0.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.11	(mg/s)	0.11	(mg/s)	0.11	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
<u>ء</u> ک		M_s2w =		(mg/s)	0.06	(mg/s)	0.06	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 =		(mg/s) (mg/s)		(mg/s)		(mg/s) (mg/s)
			Low Flo		Average		High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.002	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Case Parameter	Year 1 Sulfate			
	concentration of surface water into PM-12	C s12 =	4.00	(mg/L)
data	concentration of surface water into PM-12	C_s12 = C_s13 =		(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	4.00	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	1046.27	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	190.00	(mg/L)
ncei	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	7347.00	(mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	152.40	(mg/L)
t	concentration of ground water into PM-12	C_g12 =	8.50	(mg/L)
nduj	concentration of ground water into PM-13	C_g13 =	8.50	(mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	1,427.45	(mg/s)	16,206	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	206.87	(mg/s)	206.87	(mg/s)	206.87	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	37.36	(mg/s)	37.36	(mg/s)	37.36	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	6,965.20	(mg/s)	79,526	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	1,012.72	(mg/s)	1,012.72	(mg/s)	1,012.72	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	7,698.43	(mg/s)	58,922.60	(mg/s)	58,922.60	(mg/s)
		M_fs =	19,167.71	(mg/s)	19,167.71	(mg/s)	19,167.71	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	216.95	(mg/s)	216.95	(mg/s)	216.95	(mg/s)
<u>و</u> ک	mass flux in seepage from cell 2W	M_s2w =	8,600.26	(mg/s)	8,600.26		8,600.26	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12	M_r12 =	244.23	(mg/s)	1,671.68	(mg/s)	16,449.94	(mg/s)
Ma	mass flux in river at PM-13	M_r13 =	36,940.30		96,557.11		183,896.57	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	7.252	(mg/L)	4.280	(mg/l)	4.027	(mg/l)
c tin C	concentration in river at PM-13	C_r13 =	116.339	(mg/L)	39.177	(mg/l)	7.568	(mg/l)

Case Parameter	Year 1 Thallium			
Farameter	manium	1		
	concentration of surface water into PM-12	C_s12 =	0.0002	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0002	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0002	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.0006	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000907911	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0002	(mg/L)
con	concentration in tailings basin cell 2W	C_s2w =	0.0002	(mg/L)
ort	concentration of ground water into PM-12	C_g12 =	0.000004	(mg/L)
du	concentration of ground water into PM-13	C_g13 =	0.000004	(mg/L)

			Low Flor	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.07	(mg/s)	1	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.35	(mg/s)	4	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.09	(mg/s)	0.09	(mg/s)	0.09	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
۹ ۵	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
			Low Flor	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12	M_r12 =		(mg/s)		(mg/s)		(mg/s)
Ma at	mass flux in river at PM-13	M_r13 =		(mg/s)		(mg/s)		(mg/s)
			Low Flor	w	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
Con Con Con	concentration in river at PM-13	C r13 =	0.000	(mg/l)	0.000	(mg/L)	0.000	(mg/L)

Case Parameter	Year 1 Zinc			
	concentration of surface water into PM-12	C_s12 =	0.016 ((mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.016 ((mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.016 ((mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.003 ((mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.0182086 ((mg/L)
8	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.01 ((mg/L)
cone	concentration in tailings basin cell 2W	C_s2w =	0.01435 ((mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.0115 ((mg/L)
법	concentration of ground water into PM-13	C_g13 =	0.0115 ((mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	5.71	(mg/s)	65	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.28	(mg/s)	0.28	(mg/s)	0.28	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.15	(mg/s)	0.15	(mg/s)	0.15	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	27.86	(mg/s)	318	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	1.37	(mg/s)	1.37	(mg/s)	1.37	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.02	(mg/s)	0.17	(mg/s)	0.17	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.84	(mg/s)	1.84	(mg/s)	1.84	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
<u>ء</u> د	mass flux in seepage from cell 2W	M_s2w =		(mg/s)		(mg/s)	0.81	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s)		(mg/s)		(mg/s)
a Z	mass flux in river at PM-13	M_r13 =	4.47 Low Flo	(mg/s)	38.19 Average	(mg/s)	387.54 High Fl	
Convert mass flux to concentration		C_r12 =	0.013	(mg/L)	0.016	(mg/L)	0.016	(mg/L)
Con flux conc	concentration in river at PM-13	C_r13 =	0.014	(mg/L)	0.015	(mg/L)	(0.016

Appendix F.10 Embarrass River Geotechnical Mitigation Year 5

FLOWS

Case	Year 5				
Flows	Low Flow Conditions (no surface runoff)				Node
in : River	flow in river at PM-12	Q_r12_L =	1.19	(cfs)	PM-12
Total flow in Embarrass F	flow in river at PM-13	Q_r13_L =	12.70	(cfs)	PM-13
Total Emba	flow check	Q_ck_L =	12.70	(cfs)	_
	surface water flow into PM-12	Q_s12_L =	0.00	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_L =	0.00	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_L =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_L =	0.26	(cfs)	PM-13
ta	seepage from Tailings Basin Cells 1E and 2E	Q_fs_L =	5.04	(cfs)	PM-13
flow data	hydrometallurgical residue cells liner leakage	Q_rrs_L =	0.015	(cfs)	PM-13
low	seepage from cell 2W	Q_s2w_L =	1.99	(cfs)	PM-13
	ground water flow into PM-12	Q_g12_L =	0.86	(cfs)	PM-12
du	ground water flow into PM-13	Q_g13_L =	4.21	(cfs)	PM-13

Case	Year 5				
Flow	Average Flow Conditions (mean annual)				
n River	flow in river at PM-12	Q_r12_M =	13.80	(cfs)	PM-12
Total flow in Embarrass F	flow in river at PM-13	Q_r13_M =	88.57	(cfs)	PM-13
Tota Emb	flow check	Q_ck_M =	88.57	(cfs)	
	surface water flow into PM-12	Q_s12_M =	12.61	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_M =	61.53	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_M =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_M =	1.99	(cfs)	PM-13
data	seepage from Tailings Basin Cells 1E and 2E	Q_fs_M =	5.04	(cfs)	PM-13
	hydrometallurgical residue cells liner leakage	Q_rrs_M =	0.015	(cfs)	PM-13
low	seepage from cell 2W	Q_s2w_M =	1.99	(cfs)	PM-13
nput flow	ground water flow into PM-12	Q_g12_M =	0.86	(cfs)	PM-12
dul	ground water flow into PM-13	Q_g13_M =	4.21	(cfs)	PM-13

Case	Year 5				
Flow	High Flow Conditions (avg. annual 1-day max flow)			_	
~	flow in river at PM-12	Q_r12_H =	144.35	(cfs)	PM-12
v i SS	flow in river at PM-13	Q_r13_H =	860.12	(cfs)	PM-1
Total flov Embarra	flow check	Q_ck_H =	860.12	(cfs)	
	surface water flow into PM-12	Q_s12_H =	143.16	(cfs)	PM-1
	surface water flow into PM-13	Q_s13_H =	702.53	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_H =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_H =	1.99	(cfs)	PM-13
ta	seepage from Tailings Basin Cells 1E and 2E	Q_fs_H =	5.04	(cfs)	PM-1
/ da	hydrometallurgical residue cells liner leakage	Q_rrs_H =	0.015	(cfs)	PM-13
flow data	seepage from cell 2W	Q_s2w_H =	1.99	(cfs)	PM-13
	ground water flow into PM-12	Q_g12_H =	0.86	(cfs)	PM-12
립	ground water flow into PM-13	Q g13 H =	4.21	(cfs)	PM-13

Case	Year 5			
Parameter	Silver			
	concentration of surface water into PM-12	C_s12 =	0.00011 (mg/	/L)
data	concentration of surface water into PM-13	C_s13 =	0.00011 (mg/	/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00011 (mg/	/L)
ţi	concentration in Area 5 Pit NW discharge	C_spit =	0.00015 (mg/	/L)
ntration	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.00086 (mg/	/L)
c)	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.000125 (mg/	/L)
conc	concentration in tailings basin cell 2W	C_s2w =	0.000100 (mg/	/L)
Input	concentration of ground water into PM-12	C_g12 =	0.000008 (mg/	/L)
브	concentration of ground water into PM-13	C_g13 =	0.000008 (mg/	/L)

ss flux of surface water into PM-12 ss flux of ground water into PM-12 ss flux in Babbitt WWTP discharge ss flux of surface water into PM-13 ss flux of ground water into PM-13 ss flux of Area 5 Pit NW discharge ss flux in seepage from Tailings Basin Cells 1E and 2E ss flux in hydrometallurgical residue cells liner leakage ss flux in seepage from cell 2W	M_s12 = M_g12 = M_sBab = M_s13 = M_g13 = M_spit = M_fs = M_fs = M_rrs = M_s2w =	0.00 - 0.00 0.00 0.12 0.00	(mg/s) (mg/s)	0.00 0.00 0.19 0.00 0.01 0.12 0.00	(mg/s) (mg/s) (mg/s) (mg/s) (mg/s) (mg/s) (mg/s) (mg/s) (mg/s) (mg/s) (mg/s) (mg/s)	0.00 0.00 2 0.00 0.01 0.12 0.00	(mg/s) (mg/s) (mg/s) (mg/s) (mg/s) (mg/s) (mg/s)
ss flux in Babbitt WWTP discharge ss flux of surface water into PM-13 ss flux of ground water into PM-13 ss flux of Area 5 Pit NW discharge ss flux in seepage from Tailings Basin Cells 1E and 2E ss flux in hydrometallurgical residue cells liner leakage	M_sBab = M_s13 = M_g13 = M_spit = M_fs = M_rrs =	0.00 - 0.00 0.12 0.00 0.01	(mg/s) (mg/s) (mg/s) (mg/s) (mg/s) (mg/s)	0.00 0.19 0.00 0.01 0.12 0.00	(mg/s) (mg/s) (mg/s) (mg/s) (mg/s) (mg/s)	0.00 2 0.00 0.01 0.12 0.00	(mg/s) (mg/s) (mg/s) (mg/s) (mg/s) (mg/s)
ss flux of surface water into PM-13 ss flux of ground water into PM-13 ss flux of Area 5 Pit NW discharge ss flux in seepage from Tailings Basin Cells 1E and 2E ss flux in hydrometallurgical residue cells liner leakage	M_s13 = M_g13 = M_spit = M_fs = M_rrs =	0.00 0.00 0.12 0.00 0.01	(mg/s) (mg/s) (mg/s) (mg/s) (mg/s)	0.19 0.00 0.01 0.12 0.00	(mg/s) (mg/s) (mg/s) (mg/s) (mg/s)	2 0.00 0.01 0.12 0.00	(mg/s) (mg/s) (mg/s) (mg/s) (mg/s)
ss flux of ground water into PM-13 ss flux of Area 5 Pit NW discharge ss flux in seepage from Tailings Basin Cells 1E and 2E ss flux in hydrometallurgical residue cells liner leakage	M_g13 = M_spit = M_fs = M_rrs =	0.00 0.12 0.00 0.01	(mg/s) (mg/s) (mg/s) (mg/s)	0.00 0.01 0.12 0.00	(mg/s) (mg/s) (mg/s) (mg/s)	0.00 0.01 0.12 0.00	(mg/s) (mg/s) (mg/s) (mg/s)
ss flux of Årea 5 Pit NW discharge ss flux in seepage from Tailings Basin Cells 1E and 2E ss flux in hydrometallurgical residue cells liner leakage	M_spit = M_fs = M_rrs =	0.00 0.12 0.00 0.01	(mg/s) (mg/s) (mg/s)	0.01 0.12 0.00	(mg/s) (mg/s) (mg/s)	0.01 0.12 0.00	(mg/s) (mg/s) (mg/s)
ss flux in seepage from Tailings Basin Cells 1E and 2E ss flux in hydrometallurgical residue cells liner leakage	M_fs = M_rrs =	0.12 0.00 0.01	(mg/s) (mg/s)	0.12	(mg/s) (mg/s)	0.12	(mg/s) (mg/s)
ss flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00 0.01	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
· · · · · · · · · · · · · · · · · · ·		0.01					
ss flux in seepage from cell 2W	M_s2w =	0.01				0.01	
					(119/5)	0.01	(mg/s)
		LOW FIU	w	Average	Flow	High Flo	ow
ss flux in river at PM-12	M_r12 =		(mg/s)		(mg/s) (mg/s)		(mg/s) (mg/s)
		Low Flo				High Flo	
contration in river at DM 12	C_r12 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
~~~	ntration in river at PM-12	ntration in river at PM-12 C_r12 =					

Case Parameter	Year 5 Aluminum			
	concentration of surface water into PM-12	C_s12 =	0.12	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.12	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.12	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.01325	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	1.00E-02	(mg/L)
<u>e</u>	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.80E-01	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	1.5788	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.025	(mg/L)
법	concentration of ground water into PM-13	C_g13 =	0.025	(mg/L)

		Low Flo	w	Average	Flow	High Fl	ow
mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	42.82	(mg/s)	486	(mg/s)
mass flux of ground water into PM-12	M_g12 =	0.61	(mg/s)	0.61	(mg/s)	0.61	(mg/s)
mass flux in Babbitt WWTP discharge	M_sBab =	1.12	(mg/s)	1.12	(mg/s)	1.12	(mg/s)
mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	208.96	(mg/s)	2,386	(mg/s)
mass flux of ground water into PM-13	M_g13 =	2.98	(mg/s)	2.98	(mg/s)	2.98	(mg/s)
mass flux of Area 5 Pit NW discharge	M_spit =	0.10	(mg/s)	0.75	(mg/s)	0.75	(mg/s)
mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.42	(mg/s)	1.42	(mg/s)	1.42	(mg/s)
mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.08	(mg/s)	0.08	(mg/s)		(mg/s)
mass flux in seepage from cell 2W	M_s2w =						(mg/s)
-		Low Flo	w	Average	Flow	High Fl	ow
mass flux in river at PM-12	M_r12 =					487.90	
	IVI_113 =						
concentration in river at PM-12	C_r12 =	0.051	(mg/L)				(mg/L)
	mass flux of ground water into PM-12         mass flux in Babbitt WWTP discharge         mass flux of surface water into PM-13         mass flux of ground water into PM-13         mass flux of Area 5 Pit NW discharge         mass flux in seepage from Tailings Basin Cells 1E and 2E         mass flux in hydrometallurgical residue cells liner leakage         mass flux in river at PM-12         mass flux in river at PM-13	mass flux of ground water into PM-12       M_g12 =         mass flux in Babbitt WWTP discharge       M_sBab =         mass flux of surface water into PM-13       M_s13 =         mass flux of ground water into PM-13       M_g13 =         mass flux of Area 5 Pit NW discharge       M_spit =         mass flux in seepage from Tailings Basin Cells 1E and 2E       M_fs =         mass flux in seepage from cell 2W       M_s2w =         mass flux in river at PM-12       M_rr12 =         mass flux in river at PM-13       M_r13 =	mass flux of ground water into PM-12       M_g12 =       0.61         mass flux in Babbitt WWTP discharge       M_sBab =       1.12         mass flux of surface water into PM-13       M_s13 =       -         mass flux of ground water into PM-13       M_g13 =       2.98         mass flux of Area 5 Pit NW discharge       M_spit =       0.10         mass flux in seepage from Tailings Basin Cells 1E and 2E       M_fs =       1.42         mass flux in seepage from Cell 2W       M_sex =       89.10         Low Flo         mass flux in river at PM-12       M_r12 =       1.73         mass flux in river at PM-13       M_r13 =       95.40	mass flux of ground water into PM-12       M_g12 =       0.61 (mg/s)         mass flux in Babbitt WWTP discharge       M_sBab =       1.12 (mg/s)         mass flux of surface water into PM-13       M_s13 =       - (mg/s)         mass flux of ground water into PM-13       M_g13 =       2.98 (mg/s)         mass flux of ground water into PM-13       M_g13 =       2.98 (mg/s)         mass flux of Area 5 Pit NW discharge       M_spit =       0.10 (mg/s)         mass flux in seepage from Tailings Basin Cells 1E and 2E       M_fs =       1.42 (mg/s)         mass flux in seepage from cell 2W       M_s2w =       89.10 (mg/s)         mass flux in river at PM-12       M_r12 =       1.73 (mg/s)         mass flux in river at PM-13       M_r13 =       95.40 (mg/s)	mass flux of ground water into PM-12M_g12 =0.61(mg/s)0.61mass flux in Babbitt WWTP dischargeM_sBab =1.12(mg/s)1.12mass flux of surface water into PM-13M_s13 =-(mg/s)208.96mass flux of ground water into PM-13M_g13 =2.98(mg/s)2.98mass flux of Area 5 Pit NW dischargeM_spit =0.10(mg/s)0.75mass flux in seepage from Tailings Basin Cells 1E and 2EM_fs =1.42(mg/s)1.42mass flux in seepage from cell 2WM_s2w =89.100.0889.10Low FlowAveragemass flux in river at PM-12M_r12 =1.73(mg/s)347.83mass flux in river at PM-13M_r13 =95.40(mg/s)347.83Low FlowAverage	mass flux of ground water into PM-12         M_g12 =         0.61         (mg/s)         0.61         (mg/s)           mass flux in Babbitt WWTP discharge         M_sBab =         1.12         (mg/s)         1.12         (mg/s)           mass flux of surface water into PM-13         M_s13 =         -         (mg/s)         208.96         (mg/s)           mass flux of ground water into PM-13         M_g13 =         2.98         (mg/s)         2.98         (mg/s)           mass flux of Area 5 Pit NW discharge         M_spit =         0.10         (mg/s)         0.75         (mg/s)           mass flux in seepage from Tailings Basin Cells 1E and 2E         M_fs =         1.42         (mg/s)         1.42         (mg/s)           mass flux in seepage from cell 2W         M_szw =         0.08         (mg/s)         0.08         (mg/s)           mass flux in river at PM-12         M_r12 =         1.73         (mg/s)         44.55         (mg/s)           mass flux in river at PM-13         M_r13 =         95.40         (mg/s)         347.83         (mg/s)	mass flux of ground water into PM-12         M_g12 =         0.61         (mg/s)         0.61         (mg/s)         0.61           mass flux in Babbitt WWTP discharge         M_sBab =         1.12         (mg/s)         1.12         (mg/s)         1.12           mass flux of surface water into PM-13         M_s13 =         -         (mg/s)         208.96         (mg/s)         2.386           mass flux of ground water into PM-13         M_g13 =         2.98         (mg/s)         2.98         (mg/s)         2.98           mass flux of Area 5 Pit NW discharge         M_spit =         0.10         (mg/s)         0.75         (mg/s)         0.75           mass flux in seepage from Tailings Basin Cells 1E and 2E         M_fs =         1.42         (mg/s)         1.42         (mg/s)         0.08         (mg/s)         0.08           mass flux in hydrometallurgical residue cells liner leakage         M_rrs =         0.08         (mg/s)         89.10         (mg/s)         89.10         (mg/s)         89.10           mass flux in river at PM-12         M_r12 =         1.73         (mg/s)         347.83         (mg/s)         2.968.01           mass flux in river at PM-13         M_r13 =         95.40         (mg/s)         347.83         (mg/s)         2.968.01 </td

Case	Year 5			
Parameter	Arsenic			
		-		
	concentration of surface water into PM-12	C_s12 =	0.00075	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.00075	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00075	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.001325	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.006769615	(mg/L)
<u>.</u>	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.004	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	0.00291	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.00273	(mg/L)
드	concentration of ground water into PM-13	C_g13 =	0.00273	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.27	(mg/s)	3	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.07	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1.31	(mg/s)	15	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.33	(mg/s)	0.33	(mg/s)	0.33	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.01	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.96	(mg/s)	0.96	(mg/s)	0.96	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
ဒိ ဒိ		M_s2w =		(mg/s)		(mg/s)	0.16	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 =		(mg/s) (mg/s)		(mg/s)		(mg/s) (mg/s)
			Low Flo		Average		High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L) (mg/L)		(mg/L) (mg/L)		(mg/L) (mg/L)

Case Parameter	Year 5 Boron			
	concentration of surface water into PM-12	C_s12 =	0.027	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.027	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.027	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.1315	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.137838474	(mg/L)
concel	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.11	(mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	0.33	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.0212	(mg/L)
qul	concentration of ground water into PM-13	C_g13 =	0.0212	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	9.64	(mg/s)	109	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.52	(mg/s)	0.52	(mg/s)	0.52	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	0.25	(mg/s)	0.25	(mg/s)	0.25	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	47.02	(mg/s)	537	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	2.53	(mg/s)	2.53	(mg/s)	2.53	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	0.97	(mg/s)	7.41	(mg/s)	7.41	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	19.64	(mg/s)	19.64	(mg/s)	19.64	(mg/s)
Convert	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.05	(mg/s)	0.05	(mg/s)	0.05	(mg/s)
မိ မိ	mass flux in seepage from cell 2W	M_s2w =		(mg/s)		(mg/s)	18.62	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance	mass flux in river at PM-12	M_r12 =	0.77	(mg/s)	10.40	(mg/s)	110.16	(mg/s)
Ma	mass flux in river at PM-13	M_r13 =	42.57	(mg/s)	105.66	(mg/s)	695.20	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to		C_r12 =	0.023	(mg/L)	0.027	(mg/L)	0.027	(mg/L)
tlu flu	concentration in river at PM-13	C_r13 =	0.118	(mg/L)	0.042	(mg/L)	0.029	(mg/L)

Case Parameter	Year 5 Barium			
	concentration of surface water into PM-12	C_s12 =	0.016	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.016	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.016	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.0044	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	5.05E-02	(mg/L)
<b>a</b>	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	5.00E-03	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	0.09298	(mg/L)
nt	concentration of ground water into PM-12	C_g12 =	0.0681	(mg/L)
ndul	concentration of ground water into PM-13	C_g13 =	0.0681	(mg/L)

mass flux of surface water into PM-12	M s12 =						
	M_012 =	-	(mg/s)	5.71	(mg/s)	65	(mg/s)
mass flux of ground water into PM-12	M_g12 =	1.66	(mg/s)	1.66	(mg/s)	1.66	(mg/s)
mass flux in Babbitt WWTP discharge	M_sBab =	0.15	(mg/s)	0.15	(mg/s)	0.15	(mg/s)
mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	27.86	(mg/s)	318	(mg/s)
mass flux of ground water into PM-13	M_g13 =	8.11	(mg/s)	8.11	(mg/s)	8.11	(mg/s)
mass flux of Area 5 Pit NW discharge	M_spit =	0.03	(mg/s)	0.25	(mg/s)	0.25	(mg/s)
mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	7.19	(mg/s)	7.19	(mg/s)	7.19	(mg/s)
mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
mass flux in seepage from cell 2W	M_s2w =	5.25	(mg/s)			5.25	(mg/s)
	_	Low Flo	w	Average	Flow	High Fl	ow
mass flux in river at PM-12	M_r12 =						(mg/s)
mass flux in river at PM-13	M_r13 =						
concentration in river at PM-12	C_r12 =	0.054	(mg/L)	0.019	(mg/L)	0.016	(mg/L)
	mass flux of ground water into PM-13 mass flux of Area 5 Pit NW discharge mass flux in seepage from Tailings Basin Cells 1E and 2E mass flux in hydrometallurgical residue cells liner leakage mass flux in seepage from cell 2W mass flux in river at PM-12 mass flux in river at PM-13	mass flux of ground water into PM-13       M_g13 =         mass flux of Area 5 Pit NW discharge       M_spit =         mass flux in seepage from Tailings Basin Cells 1E and 2E       M_fs =         mass flux in hydrometallurgical residue cells liner leakage       M_rrs =         mass flux in seepage from cell 2W       M_s2w =         mass flux in river at PM-12       M_rr12 =         mass flux in river at PM-13       M_r13 =         concentration in river at PM-12       C_r12 =	mass flux of ground water into PM-13 $M_g13 =$ 8.11         mass flux of Area 5 Pit NW discharge       M_spit =       0.03         mass flux in seepage from Tailings Basin Cells 1E and 2E       M_fs =       7.19         mass flux in hydrometallurgical residue cells liner leakage       M_rrs =       0.00         mass flux in seepage from cell 2W       M_s2w =       5.25         Low Flo         mass flux in river at PM-12       M_r12 =       1.81         mass flux in river at PM-13         M_r13 =       22.39         Low Flo         concentration in river at PM-12         C_r12 =       0.054	mass flux of ground water into PM-13 $M_g13 =$ $8.11$ (mg/s)mass flux of Area 5 Pit NW dischargeM_spit = $0.03$ (mg/s)mass flux in seepage from Tailings Basin Cells 1E and 2EM_fs = $7.19$ (mg/s)mass flux in hydrometallurgical residue cells liner leakageM_rrs = $0.00$ (mg/s)mass flux in seepage from cell 2WM_s2w = $5.25$ (mg/s)Low Flowmass flux in river at PM-12M_r12 = $1.81$ (mg/s)concentration in river at PM-12C_r12 = $0.054$ (mg/L)	mass flux of ground water into PM-13       M g13 =       8.11       (mg/s)       8.11         mass flux of Area 5 Pit NW discharge       M_spit =       0.03       (mg/s)       0.25         mass flux in seepage from Tailings Basin Cells 1E and 2E       M_fs =       7.19       (mg/s)       7.19         mass flux in hydrometallurgical residue cells liner leakage       M_rrs =       0.00       (mg/s)       0.00         mass flux in seepage from cell 2W       M_szw =       5.25       (mg/s)       5.25         Low Flow       Average         mass flux in river at PM-12       M_r13 =       22.39       (mg/s)       56.18         Low Flow       Average         concentration in river at PM-12       C_r12 =       0.054       (mg/L)       0.019	mass flux of ground water into PM-13M_g13 =8.11 (mg/s)8.11 (mg/s)mass flux of Area 5 Pit NW dischargeM_spit =0.03 (mg/s)0.25 (mg/s)mass flux in seepage from Tailings Basin Cells 1E and 2EM_fs =7.19 (mg/s)7.19 (mg/s)mass flux in hydrometallurgical residue cells liner leakageM_rrs =0.00 (mg/s)0.00 (mg/s)mass flux in seepage from cell 2WM_s2w =5.25 (mg/s)5.25 (mg/s)Low FlowAverage Flowmass flux in river at PM-12M_r12 =1.81 (mg/s)7.52 (mg/s)Low FlowAverage Flowconcentration in river at PM-12M_r13 =22.39 (mg/s)56.18 (mg/s)C_r12 =0.054 (mg/L)0.019 (mg/L)	mass flux of ground water into PM-13       M g13 =       8.11       (mg/s)       8.11       (mg/s)       8.11         mass flux of Area 5 Pit NW discharge       M_spit =       0.03       (mg/s)       0.25       (mg/s)       0.25         mass flux in seepage from Tailings Basin Cells 1E and 2E       M_fs =       7.19       (mg/s)       7.19       (mg/s)       7.19         mass flux in hydrometallurgical residue cells liner leakage       M_rrs =       0.00       (mg/s)       0.00       (mg/s)       0.00         mass flux in seepage from cell 2W       M_s2w =       5.25       (mg/s)       5.25       (mg/s)       5.25         mass flux in river at PM-12       M_r12 =       1.81       (mg/s)       7.52       (mg/s)       66.63         mass flux in river at PM-13       M_r13 =       22.39       (mg/s)       56.18       (mg/s)       405.54         concentration in river at PM-12       C_r12 =       0.054       (mg/L)       0.019       (mg/L)       0.016

Case	Year 5			
Parameter	Beryllium			
	concentration of surface water into PM-12	C_s12 =	0.0001	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0001	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0001	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.0001	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000376001	(mg/L)
0	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	0.00075	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.000023	(mg/L)
<u>u</u>	concentration of ground water into PM-13	C_g13 =	0.000023	(mg/L)

			Low Flor	w	Average	Flow	High Fl	ow
m	nass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.04	(mg/s)	0	(mg/s)
m	nass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
m tio	nass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
m tra	nass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.17	(mg/s)	2	(mg/s)
m ceu	nass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
concentration flux  ㅋ  ㅋ  ㅋ	nass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	nass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.05	(mg/s)	0.05	(mg/s)	0.05	(mg/s)
Convert to mass	nass flux in hydrometallurgical residue cells liner leakage	M_rrs =	-	(mg/s)	-	(mg/s)	-	(mg/s)
m 🛱 Ç	nass flux in seepage from cell 2W	M_s2w =		(mg/s)		(mg/s)	0.04	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
ass ba each r	nass flux in river at PM-12	M_r12 =		(mg/s)		(mg/s)		(mg/s) (mg/s)
			Low Flor	w	Average	Flow	High Fl	ow
onvert ux to oncent	oncentration in river at PM-12	C_r12 =		(mg/L)		(mg/L)		(mg/L)
O ∉ 5 c	oncentration in river at PM-13	C_r13 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Case Parameter	Year 5 Calcium			
	concentration of surface water into PM-12	C_s12 =	15	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	15	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	15	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	95.35	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	77.28097689	(mg/L)
ncer	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	416	(mg/L)
COL	concentration in tailings basin cell 2W	C_s2w =	59.78	(mg/L)
but	concentration of ground water into PM-12	C_g12 =	19	(mg/L)
dul	concentration of ground water into PM-13	C_g13 =	19	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	5,352.95	(mg/s)	60,771	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	462.42	(mg/s)	462.42	(mg/s)	462.42	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	140.09	(mg/s)	140.09	(mg/s)	140.09	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	26,119.49	(mg/s)	298,224	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	2,263.72	(mg/s)	2,263.72	(mg/s)	2,263.72	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	701.59	(mg/s)	5,369.83	(mg/s)	5,369.83	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	11,012.42	(mg/s)	11,012.42	(mg/s)	11,012.42	(mg/s)
onvert mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	176.59	(mg/s)	176.59	(mg/s)	176.59	(mg/s)
<u>ء</u> ک	mass flux in seepage from cell 2W	M_s2w =	3,373.51	(mg/s)	3,373.51	(mg/s)	25.38	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12	M_r12 =	602.51		5,955.45		61,373.93	
2 0	mass flux in river at PM-13	M_r13 =	18,130.33		54,271.00 Average		378,445.83 High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	17.891	(mg/L)	15.249		15.024	
Case	Year 5							
-----------	-----------------------------------------------------------------	----------	------------	--------				
Parameter	Cadmium							
		1						
	concentration of surface water into PM-12	C_s12 =	0.00008	(mg/L)				
data	concentration of surface water into PM-13	C_s13 =	0.00008	(mg/L)				
	concentration in Babbitt WWTP discharge	C_sBab =	0.00008	(mg/L)				
ation	concentration in Area 5 Pit NW discharge	C_spit =	0.0001	(mg/L)				
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.00032784	(mg/L)				
0	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0004	(mg/L)				
conc	concentration in tailings basin cell 2W	C_s2w =	0.000188	(mg/L)				
Input	concentration of ground water into PM-12	C_g12 =	0.0003	(mg/L)				
빌	concentration of ground water into PM-13	C_g13 =	0.0003	(mg/L)				

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.03	(mg/s)	0	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itrai	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.14	(mg/s)	2	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.04	(mg/s)	0.04	(mg/s)	0.04	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
		M_fs =	0.05	(mg/s)	0.05	(mg/s)	0.05	(mg/s)
onvert	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
ຊ ບິ	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 =		(mg/s) (mg/s)		(mg/s)		(mg/s) (mg/s)
			Low Flo		Average		High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
Con flux	concentration in river at PM-13	C_r13 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Case Parameter	Year 5 Chloride			
	concentration of surface water into PM-12	C_s12 =	6.5	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	6.5	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	6.5	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	5.95	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	1.52E+01	(mg/L)
<b>A</b>	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.76E+03	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	21.54	(mg/L)
ort	concentration of ground water into PM-12	C_g12 =	1.8	(mg/L)
nduj	concentration of ground water into PM-13	C_g13 =	1.8	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	2,319.61	(mg/s)	26,334	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	43.81	(mg/s)	43.81	(mg/s)	43.81	(mg/s)
tion	mass flux in Babbitt WWTP discharge	M_sBab =	60.70	(mg/s)	60.70	(mg/s)	60.70	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	11,318.44	(mg/s)	129,230	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	214.46	(mg/s)	214.46	(mg/s)	214.46	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	43.78	(mg/s)	335.09	(mg/s)	335.09	
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M fs =	2,172.67	(mg/s)	2,172.67	(mg/s)	2,172.67	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M rrs =	747.10	(mg/s)	747.10	(mg/s)	747.10	
<u>ء</u> دُ		 M_s2w =	1,215.55		1,215.55		1,215.55	
			Low Flo	W	Average	Flow	High Fl	
Mass balance at each node	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 =	104.51		2,424.12		26,438.79	
		IVI_I I 0 =	Low Flo		Average		High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	3.103	(mg/L)	6.207	(mg/L)	6.472	(mg/L)

Case Parameter	Year 5 Cobalt			
	concentration of surface water into PM-12	C_s12 =	0.0006	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0006	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0006	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.000555	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.001495727	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.005	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	0.001556	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.0011	(mg/L)
dul	concentration of ground water into PM-13	C_g13 =	0.0011	(mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.21	(mg/s)	2	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.03	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
concentration flux	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1.04	(mg/s)	12	(mg/s)
cer	mass flux of ground water into PM-13	M_g13 =	0.13	(mg/s)	0.13	(mg/s)	0.13	(mg/s)
conc	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
		M_fs =	0.21	(mg/s)	0.21	(mg/s)	0.21	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
ဒ ပိ	mass flux in seepage from cell 2W	M_s2w =	0.09	(mg/s)	0.09	(mg/s)	0.09	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 = M r13 =		(mg/s) (mg/s)		(mg/s)		(mg/s) (mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.001	(mg/L)	0.001	(mg/L)	0.001	(mg/L)
0 G 6	concentration in river at PM-13	C r13 =		(mg/L)		(mg/L)		(mg/L)

Case	Year 5			
Parameter	Copper			
		-		
	concentration of surface water into PM-12	C_s12 =	0.0015	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0015	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0015	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.00345	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.0068095	(mg/L)
<b>A</b>	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0015	(mg/L)
con	concentration in tailings basin cell 2W	C_s2w =	0.004555	(mg/L)
ont	concentration of ground water into PM-12	C_g12 =	0.004	(mg/L)
lnp	concentration of ground water into PM-13	C_g13 =	0.004	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.54	(mg/s)	6	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.10	(mg/s)	0.10	(mg/s)	0.10	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	2.61	(mg/s)	30	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.48	(mg/s)	0.48	(mg/s)	0.48	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.03	(mg/s)	0.19	(mg/s)	0.19	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.97	(mg/s)	0.97	(mg/s)	0.97	(mg/s)
onvert mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
<u>ء</u> ک	mass flux in seepage from cell 2W	M_s2w =	0.26	(mg/s)		(mg/s)	0.26	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 = M_r13 =		(mg/s)		(mg/s)		(mg/s) (mg/s)
20		IVI_113 =	Low Flo		Average		High Fl	· · · /
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.003	(mg/L)	0.002	(mg/L)	0.002	(mg/L) (mg/L)

Case Parameter	Year 5 Fluoride			
	concentration of surface water into PM-12	C_s12 =	0.2	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.2	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.2	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.125	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	2.90E+00	(mg/L)
0	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	2.85E+00	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	1.55	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.385	(mg/L)
dul	concentration of ground water into PM-13	C_g13 =	0.385	(mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	71.37	(mg/s)	810	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	9.37	(mg/s)	9.37	(mg/s)	9.37	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	1.87	(mg/s)	1.87	(mg/s)	1.87	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	348.26	(mg/s)	3,976	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	45.87	(mg/s)	45.87	(mg/s)	45.87	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.92	(mg/s)	7.04	(mg/s)	7.04	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	413.72	(mg/s)	413.72	(mg/s)	413.72	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	1.21	(mg/s)	1.21	(mg/s)	1.21	(mg/s)
မ ပိ	mass flux in seepage from cell 2W	M_s2w =	87.47	(mg/s)	87.47	(mg/s)	87.47	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12	M_r12 =	11.24	(mg/s)	82.61	(mg/s)	821.52	(mg/s)
Ma		M_r13 =	560.43	(mg/s)	986.18	(mg/s)	5,353.16	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.334	(mg/L)	0.212	(mg/L)	0.201	(mg/L)
S II C	concentration in river at PM-13	C_r13 =	1.559	(mg/L)	0.393	(mg/L)	0.220	(mg/L)

Case	Year 5			
Parameter	Iron			
	concentration of surface water into PM-12	C_s12 =	2.9	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	2.9	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	2.9	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.037761905	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	4.00E-03	(mg/L)
<u>.</u>	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	4.00E-01	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	4.594	(mg/L)
rt	concentration of ground water into PM-12	C_g12 =	0.035	(mg/L)
Input	concentration of ground water into PM-13	C_g13 =	0.035	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	1,034.90	(mg/s)	11,749	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.85	(mg/s)	0.85	(mg/s)	0.85	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	27.08	(mg/s)	27.08	(mg/s)	27.08	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	5,049.77	(mg/s)	57,657	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	4.17	(mg/s)	4.17	(mg/s)	4.17	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.28	(mg/s)	2.13	(mg/s)	2.13	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.57	(mg/s)	0.57	(mg/s)	0.57	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.17	(mg/s)	0.17	(mg/s)	0.17	(mg/s)
မီ ပိ	mass flux in seepage from cell 2W	M_s2w =	259.25		259.25		259.25	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s)	1,062.84		11,777.08	
Ma at	mass flux in river at PM-13	M_r13 =	292.37		6,378.89		69,700.00	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L)	2.721	(mg/L)	2.883	(mg/L)
Conve flux to concer	concentration in river at PM-13	C_r13 =	0.813	(mg/L)	2.545	(mg/L)	2.863	(mg/L)

Case	Year 5	1		
Parameter	Hardness			
		-	1	1
	concentration of surface water into PM-12	C_s12 =	70	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	70	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	70	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	942.7142857	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	3.74E+02	(mg/L)
concel	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	8.61E+03	(mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	436.6	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	87.5	(mg/L)
<u>Ľ</u>	concentration of ground water into PM-13	C_g13 =	87.5	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	24,980.41	(mg/s)	283,600	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	2,129.58	(mg/s)	2,129.58	(mg/s)	2,129.58	(mg/s)
tion	mass flux in Babbitt WWTP discharge	M_sBab =	653.73	(mg/s)	653.73	(mg/s)	653.73	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	121,890.93	(mg/s)	1,391,712	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	10,425.01	(mg/s)	10,425.01	(mg/s)	10,425.01	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	6,936.49	(mg/s)	53,090.84	(mg/s)	53,090.84	(mg/s)
		M_fs =	53,334.08	(mg/s)	53,334.08	(mg/s)	53,334.08	(mg/s)
Convert	mass flux in seepage from Tailings Basin Cells 1E and 2E mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	3,654.83	(mg/s)	3,654.83	(mg/s)	3,654.83	(mg/s)
ပိ .	2 mass flux in seepage from cell 2W	M_s2w =	24,638.27	(mg/s)	24,638.27	(mg/s)	24,638.27	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance	mass flux in river at PM-12	M_r12 =	2,783.31	(mg/s)	27,763.72	(mg/s)	286,383.27	(mg/s)
Ma	mass flux in river at PM-13	M_r13 =	101,771.99	(mg/s)	294,797.68	(mg/s)	1,823,238.23	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to	concentration in river at PM-12	C_r12 =		(mg/L)	71.091		70.104	
ΩĘ	concentration in river at PM-13	C_r13 =	283.067	(mg/L)	117.606	(mg/L)	74.902	(mg/L)

Case	Year 5			
Parameter	Potassium			
	concentration of surface water into PM-12	C_s12 =	0.60	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.60	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.60	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	53.80	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	9.31	(mg/L)
<b>a</b>	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.80	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	7.77	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	1.60	(mg/L)
별	concentration of ground water into PM-13	C_g13 =	1.60	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	214.12	(mg/s)	2,431	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	38.94	(mg/s)	38.94	(mg/s)	38.94	(mg/s)
tio	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.76	(mg/s)	0.76	(mg/s)	0.76	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1,044.78	(mg/s)	11,929	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	190.63	(mg/s)	190.63	(mg/s)	190.63	(mg/s)
concentration flux	mass flux in Babbitt WWTP discharge	M_sBab =	5.60	(mg/s)	5.60	(mg/s)	5.60	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	395.86	(mg/s)	3,029.85	(mg/s)	3,029.85	(mg/s)
onvert mass	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1,326.24	(mg/s)	1,326.24	(mg/s)	1,326.24	(mg/s)
<u>ء</u> ک	mass flux in seepage from cell 2W	M_s2w =	438.48	(mg/s)	438.48		438.48	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s)	253.82		2,470.56	
2 0	mass flux in river at PM-13	M_r13 =	2,396.51		6,289.41 Average		19,390.33 High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L)	0.650	(mg/L) (mg/L)	0.605	

Case	Year 5			
Parameter	Magnesium			
		-		
	concentration of surface water into PM-12	C_s12 =	5.90	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	5.90	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	5.90	(mg/L)
tio	concentration in Area 5 Pit NW discharge	C_spit =	271.00	(mg/L)
ntration	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	44.03	(mg/L)
8	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	213.00	(mg/L)
cone	concentration in tailings basin cell 2W	C_s2w =	69.97	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	10.65	(mg/L)
du	concentration of ground water into PM-13	C_g13 =	10.65	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	2,105.49	(mg/s)	23,903	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	259.20	(mg/s)	259.20	(mg/s)	259.20	(mg/s)
concentration	mass flux in Babbitt WWTP discharge	M_sBab =	55.10	(mg/s)	55.10	(mg/s)	55.10	(mg/s)
tra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	10,273.66	(mg/s)	117,301	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	1,268.87	(mg/s)	1,268.87	(mg/s)	1,268.87	(mg/s)
con	mass flux of Area 5 Pit NW discharge	M_spit =	1,994.02	(mg/s)	15,261.91	(mg/s)	15,261.91	(mg/s)
		M_fs =	6,273.94	(mg/s)	6,273.94	(mg/s)	6,273.94	(mg/s)
Convert	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	90.42	(mg/s)	90.42	(mg/s)	90.42	(mg/s)
န ပိ		M_s2w =	3,948.56	(mg/s)	3,948.56		3,948.56	
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance		M_r12 =	314.30		2,419.79		24,217.73	
Ma Ma	mass flux in river at PM-13	M_r13 =	13,890.10 Low Flo		39,537.14		168,362.85	
Convert mass flux to	concentration in river at PM-12	C_r12 =	9.333	(mg/L)		(mg/l)	5.928	(mg/l)
ŭ≓ S	concentration in river at PM-13	C_r13 =	38.634	(mg/L)	15.773	(mg/l)	6.917	(mg/l)

Case Parameter	Year 5 Manganese			
		-		
	concentration of surface water into PM-12	C_s12 =	0.30	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.30	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.30	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.49	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.24	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.00	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	1.18	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.19	(mg/L)
브	concentration of ground water into PM-13	C_g13 =	0.19	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	107.06	(mg/s)	1,215	(mg/s)
-	mass flux of ground water into PM-12	M_g12 =	4.58	(mg/s)	4.58	(mg/s)	4.58	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	2.80	(mg/s)	2.80	(mg/s)	2.80	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	522.39	(mg/s)	5,964	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	22.40	(mg/s)	22.40	(mg/s)	22.40	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	3.57	(mg/s)	27.31	(mg/s)	27.31	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	34.25	(mg/s)	34.25	(mg/s)	34.25	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
<u>و</u> د	mass flux in seepage from cell 2W	M_s2w =		(mg/s)		(mg/s)	66.76	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12	M_r12 =	7.38	(mg/s)	114.44		1,222.81	(mg/s)
Ma at	mass flux in river at PM-13	M_r13 =	134.35		787.55		7,338.01	
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.219	(mg/L)	0.293	(mg/l)	0.299	(mg/l)
Conve flux to concel	concentration in river at PM-13	C_r13 =	0.374	(mg/L)	0.314	(mg/l)	0.301	(mg/l)

Case	Year 5			
Parameter	Sodium			
		-		
	concentration of surface water into PM-12	C_s12 =	6.00	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	6.00	(mg/L)
ip u	concentration in Babbitt WWTP discharge	C_sBab =	6.00	(mg/L)
atio	concentration in Area 5 Pit NW discharge	C_spit =	119.50	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	52.95	(mg/L)
<u> </u>	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	255.00	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	44.31	(mg/L)
put	concentration of ground water into PM-12	C_g12 =	4.90	(mg/L)
dul	concentration of ground water into PM-13	C_g13 =	4.90	(mg/L)

nass flux of surface water into PM-12 nass flux of ground water into PM-12 nass flux in Babbitt WWTP discharge nass flux of surface water into PM-13 nass flux of ground water into PM-13	M_s12 = M_g12 = M_sBab = M_s13 =	119.26 56.03	(mg/s) (mg/s) (mg/s) (mg/s)		(mg/s) (mg/s)	24,309 119.26 56.03	(mg/s)
nass flux in Babbitt WWTP discharge nass flux of surface water into PM-13	M_sBab = M_s13 =	56.03	(mg/s)	56.03	(mg/s)		
nass flux of surface water into PM-13	 M_s13 =					56.03	(ma/a)
		-	(ma/s)				(mg/s)
nass flux of ground water into PM-13			(1119/3)	10,447.79	(mg/s)	119,290	(mg/s)
	M_g13 =	583.80	(mg/s)	583.80	(mg/s)	583.80	(mg/s)
nass flux of Area 5 Pit NW discharge	M_spit =	879.28	(mg/s)	6,729.88	(mg/s)	6,729.88	(mg/s)
nass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	7,545.15	(mg/s)	7,545.15	(mg/s)	7,545.15	(mg/s)
nass flux in hydrometallurgical residue cells liner leakage	M_rrs =	108.24	(mg/s)	108.24	(mg/s)	108.24	(mg/s)
nass flux in seepage from cell 2W	M_s2w =	2,500.51	(mg/s)	2,500.51	(mg/s)	2,500.51	(mg/s)
		Low Floy	w	Average	Flow	High Fl	ow
nass flux in river at PM-12	M_r12 =	175.29		2,316.47		24,483.86	
nass flux in river at PM-13	M_r13 =	11,792.27 Low Flor		30,231.84 Average		161,241.03 High Fl	
							-

Case Parameter	Year 5 Nickel			
	concentration of surface water into PM-12	C_s12 =	0.0012	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0012	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0012	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.0052	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.019144051	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.098	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	0.00688	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.007	(mg/L)
du	concentration of ground water into PM-13	C_g13 =	0.007	(mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.43	(mg/s)	5	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.17	(mg/s)	0.17	(mg/s)	0.17	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	2.09	(mg/s)	24	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.83	(mg/s)	0.83	(mg/s)	0.83	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.04	(mg/s)	0.29	(mg/s)	0.29	(mg/s)
		M_fs =	2.73	(mg/s)	2.73	(mg/s)	2.73	(mg/s)
onvert mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.04	(mg/s)	0.04	(mg/s)	0.04	(mg/s)
န် ပိ	mass flux in seepage from cell 2W	M_s2w =	0.39	(mg/s)	0.39	(mg/s)	0.39	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 = M r13 =		(mg/s) (mg/s)		(mg/s) (mg/s)		(mg/s) (mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.005	(mg/L)	0.002	(mg/L)	0.001	(mg/L)
Con	concentration in river at PM-13	C r13 =	0.012	(mg/L)	0.003	(mg/L)	0.001	(mg/L)

Case	Year 5			
Parameter	Lead			
		-		
	concentration of surface water into PM-12	C_s12 =	0.00015	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.00015	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00015	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.0003	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000886329	(mg/L)
8	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0005	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	0.0012	(mg/L)
t	concentration of ground water into PM-12	C_g12 =	0.0012	(mg/L)
ndul	concentration of ground water into PM-13	C_g13 =	0.0012	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.05	(mg/s)	1	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.03	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
concentration flux	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.26	(mg/s)	3	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.14	(mg/s)	0.14	(mg/s)	0.14	(mg/s)
conc	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.02	(mg/s)	0.02	(mg/s)
		M_fs =	0.13	(mg/s)	0.13	(mg/s)	0.13	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
۹ ۵	mass flux in seepage from cell 2W	M_s2w =	0.07	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 = M_r13 =		(mg/s) (mg/s)		(mg/s)		(mg/s) (mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.001	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
5 G G	concentration in river at PM-13	C r13 =		(mg/L)		(mg/L)		(mg/L)

Case	Year 5			
Parameter	Antimony			
	concentration of surface water into PM-12	C_s12 =	4.00E-05	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	4.00E-05	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	4.00E-05	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	2.50E-04	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	8.05E-03	(mg/L)
8	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.004	(mg/L)
con	concentration in tailings basin cell 2W	C_s2w =	2.50E-04	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	1.50E-03	(mg/L)
duj	concentration of ground water into PM-13	C_g13 =	1.50E-03	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.01	(mg/s)	0	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.04	(mg/s)	0.04	(mg/s)	0.04	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.07	(mg/s)	1	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.18	(mg/s)	0.18	(mg/s)	0.18	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
		M_fs =	1.15	(mg/s)	1.15	(mg/s)	1.15	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
ဒ္ ပိ		M_s2w =		(mg/s)		(mg/s)	0.01	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12	M_r12 =		(mg/s)		(mg/s)		(mg/s)
Mat	mass flux in river at PM-13	M_r13 =		(mg/s)		(mg/s)		(mg/s)
<i>" с</i>			Low Flo	w	Average	FIOW	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.001	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
Conve flux to conce	concentration in river at PM-13	C_r13 =	0.004	(mg/L)	0.001	(mg/L)	0.000	(mg/L)

Case Parameter	Year 5 Selenium			
	concentration of surface water into PM-12	C_s12 =	0.0003	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0003	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0003	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.0016	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.001106406	(mg/L)
8	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.054	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	0.00109	(mg/L)
brit	concentration of ground water into PM-12	C_g12 =	0.00295	(mg/L)
	concentration of ground water into PM-13	C_g13 =	0.00295	(mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.11	(mg/s)	1	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.07	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
ıtra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.52	(mg/s)	6	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.35	(mg/s)	0.35	(mg/s)	0.35	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.01	(mg/s)	0.09	(mg/s)	0.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.16	(mg/s)	0.16	(mg/s)	0.16	(mg/s)
onvert mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.02	(mg/s)	0.02	(mg/s)	0.02	(mg/s)
<u>ء</u> ک	mass flux in seepage from cell 2W	M_s2w =	0.06	(mg/s)		(mg/s)		(mg/s)
		_	Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 =		(mg/s) (mg/s)		(mg/s)		(mg/s) (mg/s)
20	mass nux in river at FIN-13	IVI_113 =	Low Flo		Average		High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.002	(mg/L)	0.000	(mg/L) (mg/L)		(mg/L) (mg/L)

Case Parameter	Year 5 Sulfate			
		-		
	concentration of surface water into PM-12	C_s12 =	4.00	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	4.00	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	4.00	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	1046.27	(mg/L)
ntre	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	190.00	(mg/L)
G	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	7347.00	(mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	152.40	(mg/L)
ort	concentration of ground water into PM-12	C_g12 =	8.50	(mg/L)
ndu	concentration of ground water into PM-13	C_g13 =	8.50	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	1,427.45	(mg/s)	16,206	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	206.87	(mg/s)	206.87	(mg/s)	206.87	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	37.36	(mg/s)	37.36	(mg/s)	37.36	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	6,965.20	(mg/s)	79,526	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	1,012.72	(mg/s)	1,012.72	(mg/s)	1,012.72	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	7,698.43	(mg/s)	58,922.60	(mg/s)	58,922.60	(mg/s)
	many flux in according from Tailings Basis Calls 15 and 25	M_fs =	27,074.39	(mg/s)	27,074.39	(mg/s)	27,074.39	(mg/s)
Convert	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	3,118.71	(mg/s)	3,118.71	(mg/s)	3,118.71	(mg/s)
န ပိ	mass flux in seepage from cell 2W	M_s2w =	8,600.26	(mg/s)	8,600.26	(mg/s)	8,600.26	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance		M_r12 =	244.23		1,671.68		16,449.94	
Ĕ	mass flux in river at PM-13	M_r13 =	47,748.73		107,365.55 Average		194,705.01 High Fl	
Convert mass flux to	concentration in river at PM-12	C_r12 =	7.252	(mg/L)	4.280	(mg/l)	4.027	(mg/l)
0 ∉ 8	concentration in river at PM-13	C_r13 =	132.808	(mg/L)	42.832	(mg/l)	7.999	(mg/l)

Case Parameter	Year 5 Thallium			
	concentration of surface water into PM-12	C_s12 =	0.0002	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0002	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0002	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.0006	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000907911	(mg/L)
<u>.</u>	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0002	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	0.0002	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.000004	(mg/L)
du	concentration of ground water into PM-13	C_g13 =	0.000004	(mg/L)

			Low Flow	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.07	(mg/s)	1	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.35	(mg/s)	4	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.13	(mg/s)	0.13	(mg/s)	0.13	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
<u>ء</u> ک		M_s2w =	0.01	(mg/s)		(mg/s)	0.01	(mg/s)
		_	Low Flor	W	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 =		(mg/s) (mg/s)		(mg/s)		(mg/s) (mg/s)
			Low Flor		Average		High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Case Parameter	Year 5 Zinc			
	concentration of surface water into PM-12	C_s12 =	0.016	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.016	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.016	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.003	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.0182086	(mg/L)
Icel	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.01	(mg/L)
con	concentration in tailings basin cell 2W	C_s2w =	0.01435	(mg/L)
put	concentration of ground water into PM-12	C_g12 =	0.0115	(mg/L)
nduj	concentration of ground water into PM-13	C_g13 =	0.0115	(mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	5.71	(mg/s)	65	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.28	(mg/s)	0.28	(mg/s)	0.28	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	0.15	(mg/s)	0.15	(mg/s)	0.15	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	27.86	(mg/s)	318	(mg/s)
cer	mass flux of ground water into PM-13	M_g13 =	1.37	(mg/s)	1.37	(mg/s)	1.37	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.02	(mg/s)	0.17	(mg/s)	0.17	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	2.59	(mg/s)	2.59	(mg/s)	2.59	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
<u>۽</u> ک	mass flux in seepage from cell 2W	M_s2w =	0.81	(mg/s)	0.81	(mg/s)	0.81	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12	M_r12 =		(mg/s)		(mg/s)		(mg/s)
Ma at	mass flux in river at PM-13	M_r13 =	5.23 Low Flo	(mg/s)		(mg/s)	388.31 High Fl	
s c					Average			0w
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.013	(mg/L)	0.016	(mg/L)	0.016	(mg/L)
Conve flux to concei	concentration in river at PM-13	C r13 =	0.015	(mg/L)	0.016	(mg/L)	0.016	(mg/L)

Appendix F.11 Embarrass River Geotechnical Mitigation Year 10

### FLOWS

Case	Year 10			
Flows	Low Flow Conditions (no surface runoff)			Node
in River	flow in river at PM-12	Q_r12_L =	1.19 (cfs)	PM-12
Total flow in Embarrass F	flow in river at PM-13	Q_r13_L =	13.22 (cfs)	PM-13
Total Emba	flow check	Q_ck_L =	13.22 (cfs)	_
	surface water flow into PM-12	Q_s12_L =	0.00 (cfs)	PM-12
	surface water flow into PM-13	Q_s13_L =	0.00 (cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_L =	0.33 (cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_L =	0.26 (cfs)	PM-13
ta	seepage from Tailings Basin Cells 1E and 2E	Q_fs_L =	5.55 (cfs)	PM-13
flow data	hydrometallurgical residue cells liner leakage	Q_rrs_L =	0.017 (cfs)	PM-13
lo v	seepage from cell 2W	Q_s2w_L =	1.99 (cfs)	PM-13
Input 1	ground water flow into PM-12	Q_g12_L =	0.86 (cfs)	PM-12
dul	ground water flow into PM-13	Q_g13_L =	4.21 (cfs)	PM-13

Case	Year 10				
Flow	Average Flow Conditions (mean annual)				
n River	flow in river at PM-12	Q_r12_M =	13.80	(cfs)	PM-12
Total flow in Embarrass F	flow in river at PM-13	Q_r13_M =	89.09	(cfs)	PM-13
Tota Emb	flow check	Q_ck_M =	89.09	(cfs)	
	surface water flow into PM-12	Q_s12_M =	12.61	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_M =	61.53	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_M =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_M =	1.99	(cfs)	PM-13
data	seepage from Tailings Basin Cells 1E and 2E	Q_fs_M =	5.55	(cfs)	PM-13
v da	hydrometallurgical residue cells liner leakage	Q_rrs_M =	0.017	(cfs)	PM-13
input flow	seepage from cell 2W	Q_s2w_M =	1.99	(cfs)	PM-13
E .	ground water flow into PM-12	Q_g12_M =	0.86	(cfs)	PM-12
dul	ground water flow into PM-13	Q_g13_M =	4.21	(cfs)	PM-13

Case	Year 10				
Flow	High Flow Conditions (avg. annual 1-day max flow)				_
n River	flow in river at PM-12	Q_r12_H =	144.35	(cfs)	PM-12
Total flow in Embarrass F	flow in river at PM-13	Q_r13_H =	860.64	(cfs)	PM-1
Total flow Embarras	flow check	Q_ck_H =	860.64	(cfs)	
	surface water flow into PM-12	Q_s12_H =	143.16	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_H =	702.53	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_H =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_H =	1.99	(cfs)	PM-1
ta	seepage from Tailings Basin Cells 1E and 2E	Q_fs_H =	5.55	(cfs)	PM-1
/ da	hydrometallurgical residue cells liner leakage	Q_rrs_H =	0.017	(cfs)	PM-1
flow data	seepage from cell 2W	Q_s2w_H =	1.99	(cfs)	PM-13
	ground water flow into PM-12	Q_g12_H =	0.86	(cfs)	PM-12
넵	ground water flow into PM-13	Q g13 H =	4.21	(cfs)	PM-13

Case Parameter	Year 10 Silver			
	concentration of surface water into PM-12	C_s12 =	0.00011 (mg	g/L)
data	concentration of surface water into PM-13	C_s13 =	0.00011 (mg	g/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00011 (mg	g/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.00015 (mg	g/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.00084 (mg	g/L)
ncer	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.000125 (mg	g/L)
cor	concentration in tailings basin cell 2W	C_s2w =	0.000100 (mg	g/L)
Input	concentration of ground water into PM-12	C_g12 =	0.000008 (mg	g/L)
법	concentration of ground water into PM-13	C_g13 =	0.000008 (mg	g/L)

			Low Flor	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.04	(mg/s)	0	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.19	(mg/s)	2	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.13	(mg/s)	0.13	(mg/s)	0.13	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
ဒိ ဒိ		M_s2w =		(mg/s)		(mg/s)	0.01	(mg/s)
			Low Flor	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 =		(mg/s) (mg/s)		(mg/s)		(mg/s) (mg/s)
20		1113 =	Low Flo		Average		High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Case	Year 10			
Parameter	Aluminum			
		-		
	concentration of surface water into PM-12	C_s12 =	0.12	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.12	(mg/L)
-	concentration in Babbitt WWTP discharge	C_sBab =	0.12	(mg/L)
ntration	concentration in Area 5 Pit NW discharge	C_spit =	0.01325	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	1.25E-01	(mg/L)
CD CD	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.80E-01	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	1.5788	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.025	(mg/L)
duj	concentration of ground water into PM-13	C_g13 =	0.025	(mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	42.82	(mg/s)	486	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.61	(mg/s)	0.61	(mg/s)	0.61	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	1.12	(mg/s)	1.12	(mg/s)	1.12	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	208.96	(mg/s)	2,386	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	2.98	(mg/s)		(mg/s)	2.98	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.10	(mg/s)	0.75	(mg/s)	0.75	(mg/s)
		M_fs =	19.65	(mg/s)	19.65	(mg/s)	19.65	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.09	(mg/s)	0.09	(mg/s)	0.09	(mg/s)
ဒိ ဒိ		M_s2w =		(mg/s)		(mg/s)	89.10	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s)		(mg/s)	487.90	
at at	mass flux in river at PM-13	M_r13 =	113.63		366.06		2,986.25	
			Low Flo	W	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.051	(mg/L)	0.114	(mg/L)	0.119	(mg/L)
Conve flux to conce	concentration in river at PM-13	C_r13 =	0.304	(mg/L)	0.145	(mg/L)	0.123	(mg/L)

Case	Year 10			
Parameter	Arsenic			
		-		
	concentration of surface water into PM-12	C_s12 =	0.00075	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.00075	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00075	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.001325	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.009432521	(mg/L)
ICE	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.004	(mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	0.00291	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.00273	(mg/L)
Input	concentration of ground water into PM-13	C_g13 =	0.00273	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.27	(mg/s)	3	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.07	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1.31	(mg/s)	15	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.33	(mg/s)	0.33	(mg/s)	0.33	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.01	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.48	(mg/s)	1.48	(mg/s)	1.48	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
<u>ءَ</u> ک	mass flux in seepage from cell 2W	M_s2w =		(mg/s)		(mg/s)	0.16	(mg/s)
		_	Low Flo	W	Average	Flow	High Fl	ow
ass ba each r	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 =		(mg/s)		(mg/s)		(mg/s) (mg/s)
		1	Low Flo		Average		High Fl	( <b>e</b> /
onvert ux to oncent	concentration in river at PM-12	C_r12 =		(mg/L)		(mg/L)		(mg/L)
CĘδ	concentration in river at PM-13	C_r13 =	0.005	(mg/L)	0.001	(mg/L)	0.001	(mg/L)

Case	Year 10			
Parameter	Boron			
		-		
	concentration of surface water into PM-12	C_s12 =	0.027	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.027	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.027	(mg/L)
tio	concentration in Area 5 Pit NW discharge	C_spit =	0.1315	(mg/L)
ntration	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.149974322	(mg/L)
ICEI	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.11	(mg/L)
con	concentration in tailings basin cell 2W	C_s2w =	0.33	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.0212	(mg/L)
du	concentration of ground water into PM-13	C_g13 =	0.0212	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	9.64	(mg/s)	109	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.52	(mg/s)	0.52	(mg/s)	0.52	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	0.25	(mg/s)	0.25	(mg/s)	0.25	(mg/s)
itrai	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	47.02	(mg/s)	537	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	2.53	(mg/s)	2.53	(mg/s)	2.53	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.97	(mg/s)	7.41	(mg/s)	7.41	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	23.55	(mg/s)	23.55	(mg/s)	23.55	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.05	(mg/s)	0.05	(mg/s)	0.05	(mg/s)
မ ပိ	mass flux in seepage from cell 2W	M_s2w =		(mg/s)		(mg/s)	18.62	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s)		(mg/s)	110.16	
at a	mass flux in river at PM-13	M_r13 =		(mg/s)	109.57		699.11	
			Low Flo	w	Average	FIOW	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.023	(mg/L)	0.027	(mg/L)	0.027	(mg/L)
Conve flux to concei	concentration in river at PM-13	C_r13 =	0.124	(mg/L)	0.043	(mg/L)	0.029	(mg/L)

Case	Year 10			
Parameter	Barium			
		r		
	concentration of surface water into PM-12	C_s12 =	0.016	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.016	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.016	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.0044	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	4.92E-02	(mg/L)
0	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	5.00E-03	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	0.09298	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.0681	(mg/L)
별	concentration of ground water into PM-13	C_g13 =	0.0681	(mg/L)

			Low Flor	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	5.71	(mg/s)	65	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	1.66	(mg/s)	1.66	(mg/s)	1.66	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	0.15	(mg/s)	0.15	(mg/s)	0.15	(mg/s)
ıtra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	27.86	(mg/s)	318	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	8.11	(mg/s)		(mg/s)	8.11	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.03	(mg/s)	0.25	(mg/s)	0.25	(mg/s)
	mass flux in seenage from Tailings Pasin Calls 1E and 2E	M_fs =	7.73	(mg/s)	7.73	(mg/s)	7.73	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
<u>ء</u> ک		M_s2w =	5.25	(mg/s)		(mg/s)	5.25	(mg/s)
			Low Flor	W	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s)		(mg/s)	66.63	(mg/s)
<b>_</b> 0		W_110 =	Low Flor		Average		High Fl	( ¢ )
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.054	(mg/L)	0.019	(mg/L)		(mg/L) (mg/L)

Case Parameter	Year 10 Beryllium			
rarameter	Derymum			
	concentration of surface water into PM-12	C_s12 =	0.0001	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0001	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0001	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.0001	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000587308	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	0.00075	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.000023	(mg/L)
법	concentration of ground water into PM-13	C_g13 =	0.000023	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.04	(mg/s)	0	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itrai	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.17	(mg/s)	2	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.09	(mg/s)	0.09	(mg/s)	0.09	(mg/s)
Convert	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	-	(mg/s)	-	(mg/s)	-	(mg/s)
c C	mass flux in seepage from cell 2W	M_s2w =	0.04	(mg/s)	0.04	(mg/s)	0.04	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance	mass flux in river at PM-12	M_r12 =	0.00	(mg/s)	0.04	(mg/s)	0.41	(mg/s)
Ma		M_r13 =	0.14	(mg/s)	0.35	(mg/s)	2.54	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to	concentration in river at PM-12	C_r12 =		(mg/L)		(mg/L)		(mg/L)
S≓S	concentration in river at PM-13	C_r13 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Case	Year 10			
Parameter	Calcium			
		1		
	concentration of surface water into PM-12	C_s12 =	15	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	15	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	15	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	95.35	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	107.272439	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	416	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	59.78	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	19	(mg/L)
별	concentration of ground water into PM-13	C_g13 =	19	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	5,352.95	(mg/s)	60,771	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	462.42	(mg/s)	462.42	(mg/s)	462.42	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	140.09	(mg/s)	140.09	(mg/s)	140.09	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	26,119.49	(mg/s)	298,224	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	2,263.72	(mg/s)	2,263.72		2,263.72	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	701.59	(mg/s)	5,369.83	(mg/s)	5,369.83	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	16,841.82	(mg/s)	16,841.82	(mg/s)	16,841.82	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	202.28	(mg/s)	202.28	(mg/s)	202.28	(mg/s)
နို မိ	mass flux in seepage from cell 2W	M_s2w =	3,373.51		3,373.51			(mg/s)
			Low Flo	w	Average	Flow	High Flo	ow
Mass balance at each node		M_r12 = M r13 =	602.51		5,955.45		61,373.93 384,304.62	
		M_110 =	Low Flo		Average		High Fl	<b>v</b> ,
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	17.891	(mg/L)	15.249	(mg/l)	15.024	(mg/l)

Case Parameter	Year 10 Cadmium			
	concentration of surface water into PM-12	C_s12 =	0.00008	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.00008	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00008	(mg/L)
ţi	concentration in Area 5 Pit NW discharge	C_spit =	0.0001	(mg/L)
ntration	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000645923	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0004	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	0.000188	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.0003	(mg/L)
du	concentration of ground water into PM-13	C_g13 =	0.0003	(mg/L)

			Low Flor	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.03	(mg/s)	0	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.14	(mg/s)	2	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.04	(mg/s)	0.04	(mg/s)	0.04	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.10	(mg/s)	0.10	(mg/s)	0.10	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
<u>ء</u> د	mass flux in seepage from cell 2W	M_s2w =		(mg/s)		(mg/s)	0.01	(mg/s)
			Low Flor	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s)		(mg/s)		(mg/s)
2 0	mass flux in river at PM-13	M_r13 =	0.16 Low Flor	(mg/s)	Average	(mg/s)	2.08 High Fl	(mg/s)
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L)		(mg/L)	0.000	

Case	Year 10			
Parameter	Chloride			
	concentration of surface water into PM-12	C_s12 =	6.5	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	6.5	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	6.5	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	5.95	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	5.09E+00	(mg/L)
concel	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.76E+03	(mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	21.54	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	1.8	(mg/L)
별	concentration of ground water into PM-13	C_g13 =	1.8	(mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	2,319.61	(mg/s)	26,334	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	43.81	(mg/s)	43.81	(mg/s)	43.81	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	60.70	(mg/s)	60.70	(mg/s)	60.70	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	11,318.44	(mg/s)	129,230	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	214.46	(mg/s)	214.46		214.46	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	43.78	(mg/s)	335.09	(mg/s)	335.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	799.23	(mg/s)	799.23	(mg/s)	799.23	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M rrs =	855.78		855.78	(mg/s)	855.78	(mg/s)
<u>ء</u> ک	mass flux in seepage from cell 2W	M_s2w =	1,215.55	(mg/s)	1,215.55		1,215.55	
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =	104.51 3,233.31		2,424.12		26,438.79	
		IVI_I 13 =	Low Flo		Average		High Flo	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	3.103	(mg/L)	6.207	(mg/L)	6.472	(mg/L)

Case	Year 10			
Parameter	Cobalt			
		-		
	concentration of surface water into PM-12	C_s12 =	0.0006	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0006	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0006	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.000555	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.001629161	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.005	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	0.001556	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.0011	(mg/L)
별	concentration of ground water into PM-13	C_g13 =	0.0011	(mg/L)

			Low Flo	w	Average	Flow	High Fl	low
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.21	(mg/s)	2	(mg/s)
-	mass flux of ground water into PM-12	M_g12 =	0.03	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1.04	(mg/s)	12	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.13	(mg/s)	0.13	(mg/s)	0.13	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.26	(mg/s)	0.26	(mg/s)	0.26	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
<u>ء</u> ک	mass flux in seepage from cell 2W	M_s2w =	0.09	(mg/s)	0.09	(mg/s)	0.09	(mg/s)
			Low Flo	w	Average	Flow	High Fl	low
Mass balance at each node		M_r12 =		(mg/s) (mg/s)		(mg/s) (mg/s)		(mg/s) (mg/s)
			Low Flo	w	Average		High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L) (mg/L)		(mg/L) (mg/L)		(mg/L) (mg/L)

Case	Year 10			
Parameter	Copper			
		-		
	concentration of surface water into PM-12	C_s12 =	0.0015	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0015	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0015	(mg/L)
tio	concentration in Area 5 Pit NW discharge	C_spit =	0.00345	(mg/L)
ntration	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.006983188	(mg/L)
e	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0015	(mg/L)
cone	concentration in tailings basin cell 2W	C_s2w =	0.004555	(mg/L)
out	concentration of ground water into PM-12	C_g12 =	0.004	(mg/L)
Input	concentration of ground water into PM-13	C_g13 =	0.004	(mg/L)

			Low Flow	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.54	(mg/s)	6	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.10	(mg/s)	0.10	(mg/s)	0.10	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	2.61	(mg/s)	30	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.48	(mg/s)	0.48	(mg/s)	0.48	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.03	(mg/s)	0.19	(mg/s)	0.19	(mg/s)
		M_fs =	1.10	(mg/s)	1.10	(mg/s)	1.10	(mg/s)
onvert mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
<u>ء</u> ک	mass flux in seepage from cell 2W	M_s2w =		(mg/s)	0.26	(mg/s)	0.26	(mg/s)
		_	Low Flow	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 =		(mg/s) (mg/s)		(mg/s)		(mg/s) (mg/s)
20	mass flux in river at PM-13	IVI_F13 =	Low Flo		5.28 Average		38.04 High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.003	(mg/L)		(mg/L)		(mg/L)

Case Parameter	Year 10 Fluoride			
	concentration of surface water into PM-12	C_s12 =	0.2	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.2	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.2	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.125	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	5.07E-01	(mg/L)
ncei	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	2.85E+00	(mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	1.55	(mg/L)
out	concentration of ground water into PM-12	C_g12 =	0.385	(mg/L)
nduj	concentration of ground water into PM-13	C_g13 =	0.385	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	71.37	(mg/s)	810	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	9.37	(mg/s)	9.37	(mg/s)	9.37	(mg/s)
ţi	mass flux in Babbitt WWTP discharge	M_sBab =	1.87	(mg/s)	1.87	(mg/s)	1.87	(mg/s)
concentration flux	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	348.26	(mg/s)	3,976	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	45.87	(mg/s)	45.87	(mg/s)	45.87	(mg/s)
con	mass flux of Area 5 Pit NW discharge	M_spit =	0.92	(mg/s)	7.04	(mg/s)		(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	79.61	(mg/s)	79.61	(mg/s)	79.61	(mg/s)
onvert mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	1.39	(mg/s)	1.39	(mg/s)		(mg/s)
ຊີ ວິ	mass flux in seepage from cell 2W	M_s2w =		(mg/s)		(mg/s)	87.47	(mg/s)
	-		Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 =	226.49	(mg/s)	82.61	(mg/s)	<u>821.52</u> 5,019.21	
		1	Low Flo		Average		High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.334	(mg/L)	0.212	(mg/L)	0.201	(mg/L)

Case	Year 10			
Parameter	Iron			
		-		
	concentration of surface water into PM-12	C_s12 =	2.9	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	2.9	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	2.9	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.037761905	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	3.97E-02	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	4.00E-01	(mg/L)
con	concentration in tailings basin cell 2W	C_s2w =	4.594	(mg/L)
ort	concentration of ground water into PM-12	C_g12 =	0.035	(mg/L)
Idu	concentration of ground water into PM-13	C_g13 =	0.035	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	1,034.90	(mg/s)	11,749	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.85	(mg/s)	0.85	(mg/s)	0.85	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	27.08	(mg/s)	27.08	(mg/s)	27.08	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	5,049.77	(mg/s)	57,657	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	4.17	(mg/s)	4.17	(mg/s)	4.17	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.28	(mg/s)	2.13	(mg/s)	2.13	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M fs =	6.24	(mg/s)	6.24	(mg/s)	6.24	(mg/s)
Convert to mass		M_rrs =		(mg/s)		(mg/s)		(mg/s)
<u>ء</u> دُ	mass flux in seepage from cell 2W	 M_s2w =	259.25		259.25		259.25	
			Low Flo		Average		High Fl	ow
Mass balance at each node		M_r12 =	27.93 298.06	(mg/s)	1,062.84		69,705.69	
		IM_113 =	Low Flo		Average		High Fl	· · · /
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.829	(mg/L)	2.721	(mg/L)	2.883	(mg/L)

Case Parameter	Year 10 Hardness			
	concentration of surface water into PM-12	C_s12 =	70	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	70	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	70	(mg/L)
ation	concentration in Area 5 Pit NW discharge	C_spit =	942.7142857	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	3.11E+02	(mg/L)
0	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	8.61E+03	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	436.6	(mg/L)
nput	concentration of ground water into PM-12	C_g12 =	87.5	(mg/L)
lnp	concentration of ground water into PM-13	C_g13 =	87.5	(mg/L)

			Low Flo	w	Average I	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	24,980.41	(mg/s)	283,600	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	2,129.58	(mg/s)	2,129.58	(mg/s)	2,129.58	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	653.73	(mg/s)	653.73	(mg/s)	653.73	(mg/s)
concentration flux	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	121,890.93	(mg/s)	1,391,712	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	10,425.01	(mg/s)	10,425.01	(mg/s)	10,425.01	(mg/s)
conc	mass flux of Area 5 Pit NW discharge	M_spit =	6,936.49	(mg/s)	53,090.84	(mg/s)	53,090.84	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	48,800.08	(mg/s)	48,800.08	(mg/s)	48,800.08	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	4,186.52	(mg/s)	4,186.52	(mg/s)	4,186.52	(mg/s)
ទ ប័	mass flux in seepage from cell 2W	M_s2w =	24,638.27	(mg/s)	24,638.27	(mg/s)	24,638.27	(mg/s)
			Low Flo	w	Average I	Flow	High Fl	ow
Mass balance at each node		M_r12 =	2,783.31 97,769.68		27,763.72 290,795.36		286,383.27	
< 0		IVI_113 =	57,769.68		Average		High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	82.647		71.091	(mg/L)	70.104	(mg/L)

Case	Year 10			
Parameter	Potassium			
		-		
	concentration of surface water into PM-12	C_s12 =	0.60	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.60	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.60	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	53.80	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	7.98	(mg/L)
<b>a</b>	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.80	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	7.77	(mg/L)
nt	concentration of ground water into PM-12	C_g12 =	1.60	(mg/L)
Input	concentration of ground water into PM-13	C_g13 =	1.60	(mg/L)

			Low Flo	w	Average	Flow	High Fl	low
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	214.12	(mg/s)	2,431	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	38.94	(mg/s)	38.94	(mg/s)	38.94	(mg/s)
concentration flux	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.88	(mg/s)	0.88	(mg/s)	0.88	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1,044.78	(mg/s)	11,929	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	190.63	(mg/s)	190.63	(mg/s)	190.63	(mg/s)
conc	mass flux in Babbitt WWTP discharge	M_sBab =	5.60	(mg/s)	5.60	(mg/s)	5.60	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	395.86	(mg/s)	3,029.85	(mg/s)	3,029.85	(mg/s)
Convert to mass	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1,252.62	(mg/s)	1,252.62	(mg/s)	1,252.62	(mg/s)
<u> ۵</u>	mass flux in seepage from cell 2W	M_s2w =	438.48	(mg/s)	438.48	(mg/s)	438.48	(mg/s)
			Low Flo	w	Average	Flow	High Fl	low
Mass balance at each node	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 =	39.82	(mg/s)	6,215.90		2,470.67	
		W_110 =	Low Flo		Average		High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	6.210	(mg/L)		(mg/L) (mg/L)		(mg/l) (mg/l)

Case Parameter	Year 10 Magnesium			
	concentration of surface water into PM-12	C_s12 =	5.90	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	5.90	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	5.90	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	271.00	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	10.43	(mg/L)
0	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	213.00	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	69.97	(mg/L)
put	concentration of ground water into PM-12	C_g12 =	10.65	(mg/L)
	concentration of ground water into PM-13	C_g13 =	10.65	(mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	2,105.49	(mg/s)	23,903	(mg/s)
-	mass flux of ground water into PM-12	M_g12 =	259.20	(mg/s)	259.20	(mg/s)	259.20	(mg/s)
concentration	mass flux in Babbitt WWTP discharge	M_sBab =	55.10	(mg/s)	55.10	(mg/s)	55.10	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	10,273.66	(mg/s)	117,301	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	1,268.87	(mg/s)	1,268.87	(mg/s)	1,268.87	(mg/s)
conc	mass flux of Area 5 Pit NW discharge	M_spit =	1,994.02	(mg/s)	15,261.91	(mg/s)	15,261.91	(mg/s)
		M_fs =	1,638.19	(mg/s)	1,638.19	(mg/s)	1,638.19	(mg/s)
onvert	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	103.57	(mg/s)	103.57	(mg/s)	103.57	(mg/s)
e S		M_s2w =	3,948.56		3,948.56	(mg/s)	3,948.56	
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =	314.30		2,419.79		24,217.73	
at Ma	mass flux in river at PM-13	M_r13 =	9,267.50		34,914.55		163,740.25	
			Low Flo	W	Average	Flow	High Fl	ow
Convert mass flux to	concentration in river at PM-12	C_r12 =	9.333	(mg/L)	6.196	(mg/l)	5.928	(mg/l)
Conve flux to	concentration in river at PM-13	C_r13 =	24.773	(mg/L)	13.848	(mg/l)	6.723	(mg/l)
Case	Year 10							
-----------	-----------------------------------------------------------------	----------	------	--------				
Parameter	Manganese							
	concentration of surface water into PM-12	C_s12 =	0.30	(mg/L)				
data	concentration of surface water into PM-13	C_s13 =	0.30	(mg/L)				
	concentration in Babbitt WWTP discharge	C_sBab =	0.30	(mg/L)				
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.49	(mg/L)				
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.16	(mg/L)				
۵	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.00	(mg/L)				
conc	concentration in tailings basin cell 2W	C_s2w =	1.18	(mg/L)				
ort	concentration of ground water into PM-12	C_g12 =	0.19	(mg/L)				
Input	concentration of ground water into PM-13	C_g13 =	0.19	(mg/L)				

			Low Flor	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	107.06	(mg/s)	1,215	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	4.58	(mg/s)	4.58	(mg/s)	4.58	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	2.80	(mg/s)	2.80	(mg/s)	2.80	(mg/s)
itrai	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	522.39	(mg/s)	5,964	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	22.40	(mg/s)	22.40	(mg/s)	22.40	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	3.57	(mg/s)	27.31	(mg/s)	27.31	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	24.88	(mg/s)	24.88	(mg/s)	24.88	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
ဒ္ ပိ		M_s2w =		(mg/s)		(mg/s)		(mg/s)
			Low Flor	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =	7.38	(mg/s)	114.44	(mg/s)	1,222.81	(mg/s)
Ma at	mass flux in river at PM-13	M_r13 =	124.99		778.18		7,328.64	
			Low Flor	w	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.219	(mg/L)	0.293	(mg/l)	0.299	(mg/l)
Con	concentration in river at PM-13	C_r13 =	0.334	(mg/L)	0.309	(mg/l)	0.301	(mg/l)

Case Parameter	Year 10 Sodium			
	concentration of surface water into PM-12	C_s12 =	6.00	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	6.00	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	6.00	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	119.50	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	31.37	(mg/L)
ncei	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	255.00	(mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	44.31	(mg/L)
ort	concentration of ground water into PM-12	C_g12 =	4.90	(mg/L)
nduj	concentration of ground water into PM-13	C_g13 =	4.90	(mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	2,141.18	(mg/s)	24,309	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	119.26	(mg/s)	119.26	(mg/s)	119.26	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	56.03	(mg/s)	56.03	(mg/s)	56.03	(mg/s)
ıtra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	10,447.79	(mg/s)	119,290	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	583.80	(mg/s)	583.80	(mg/s)	583.80	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	879.28	(mg/s)	6,729.88	(mg/s)	6,729.88	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	4,924.53	(mg/s)	4,924.53	(mg/s)	4,924.53	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	123.99	(mg/s)	123.99	(mg/s)	123.99	(mg/s)
ဒု ပိ	mass flux in seepage from cell 2W	M_s2w =	2,500.51		2,500.51		2,500.51	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12	M_r12 =	175.29		2,316.47		24,483.86	(mg/s)
Ma at	mass flux in river at PM-13	M_r13 =	9,187.40		27,626.97		158,636.16	
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	5.205	(mg/L)	5.931	(mg/l)	5.993	(mg/l)
Conve flux to concei	concentration in river at PM-13	C_r13 =	24.559	(mg/L)	10.958	(mg/l)	6.513	(mg/l)

Case Parameter	Year 10 Nickel		
	concentration of surface water into PM-12	C_s12 =	0.0012 (mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0012 (mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0012 (mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.0052 (mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.024818317 (mg/L)
concel	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.098 (mg/L)
Cor Cor	concentration in tailings basin cell 2W	C_s2w =	0.00688 (mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.007 (mg/L)
L L	concentration of ground water into PM-13	C_g13 =	0.007 (mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.43	(mg/s)	5	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.17	(mg/s)	0.17	(mg/s)	0.17	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	2.09	(mg/s)	24	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.83	(mg/s)	0.83	(mg/s)	0.83	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.04	(mg/s)	0.29	(mg/s)	0.29	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	3.90	(mg/s)	3.90	(mg/s)	3.90	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =		(mg/s)	0.05	(mg/s)		(mg/s)
မ ပိ	mass flux in seepage from cell 2W	M_s2w =	0.39	(mg/s)	0.39	(mg/s)	0.39	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 =		(mg/s)		(mg/s)		(mg/s) (mg/s)
			Low Flo		Average		High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.005	(mg/L)	0.002	(mg/L)	0.001	(mg/L)
S II o	concentration in river at PM-13	C r13 =	0.014	(mg/L)	0.003	(mg/L)	0.001	(mg/L)

Case Parameter	Year 10 Lead			
		1		
	concentration of surface water into PM-12	C_s12 =	0.00015	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.00015	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00015	(mg/L)
ation	concentration in Area 5 Pit NW discharge	C_spit =	0.0003	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.002998768	(mg/L)
<u> </u>	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0005	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	0.0012	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.0012	(mg/L)
lub	concentration of ground water into PM-13	C_g13 =	0.0012	(mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.05	(mg/s)	1	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.03	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.26	(mg/s)	3	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.14	(mg/s)	0.14	(mg/s)	0.14	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.02	(mg/s)	0.02	(mg/s)
		M_fs =	0.47	(mg/s)	0.47	(mg/s)	0.47	(mg/s)
onvert mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
န် ပိ	mass flux in seepage from cell 2W	M_s2w =	0.07	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 = M r13 =		(mg/s) (mg/s)		(mg/s)		(mg/s) (mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.001	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
Con	concentration in river at PM-13	C r13 =	0.002	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Case	Year 10			
Parameter	Antimony			
		-		
	concentration of surface water into PM-12	C_s12 =	4.00E-05	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	4.00E-05	(mg/L)
n di	concentration in Babbitt WWTP discharge	C_sBab =	4.00E-05	(mg/L)
atio	concentration in Area 5 Pit NW discharge	C_spit =	2.50E-04	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	1.17E-02	(mg/L)
<u>.</u>	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.004	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	2.50E-04	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	1.50E-03	(mg/L)
duj	concentration of ground water into PM-13	C_g13 =	1.50E-03	(mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.01	(mg/s)	0	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.04	(mg/s)	0.04	(mg/s)	0.04	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.07	(mg/s)	1	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.18	(mg/s)	0.18	(mg/s)	0.18	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.84	(mg/s)	1.84	(mg/s)	1.84	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
<u>۽</u> ک	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.04	(mg/s)	0.05	(mg/s)	0.20	(mg/s)
at a	mass flux in river at PM-13	M_r13 =		(mg/s)		(mg/s)		(mg/s)
		-	Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.001	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
Conve flux to concei	concentration in river at PM-13	C r13 =	0.006	(mg/L)	0.001	(mg/L)	0.000	(mg/L)

Case Parameter	Year 10 Selenium			
	concentration of surface water into PM-12	C_s12 =	0.0003	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0003	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0003	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.0016	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.00156894	(mg/L)
<b>A</b>	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.054	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	0.00109	(mg/L)
ort	concentration of ground water into PM-12	C_g12 =	0.00295	(mg/L)
ndul	concentration of ground water into PM-13	C_g13 =	0.00295	(mg/L)

s flux of surface water into PM-12 s flux of ground water into PM-12 s flux of ground water into PM-12 s flux of surface water into PM-13 s flux of ground water into PM-13 s flux of Area 5 Pit NW discharge s flux in seepage from Tailings Basin Cells 1E and 2E s flux in hydrometallurgical residue cells liner leakage s flux in seepage from cell 2W	M_s12 =   M_g12 =   M_sBab =   M_s13 =   M_g13 =   M_spit =   M_fs =   M_rrs =   M_s2w =	0.00 - 0.35 0.01 0.25 0.03 0.06	(mg/s) (mg/s) (mg/s)	0.07 0.00 0.52 0.35 0.09 0.25 0.03	(mg/s) (mg/s)   (mg/s) (mg/s)   (mg/s) (mg/s)   (mg/s) (mg/s)   (mg/s) (mg/s)	0.07 0.00 6 0.35 0.09	(mg/s) (mg/s) (mg/s) (mg/s) (mg/s) (mg/s) (mg/s)
s flux in Babbitt WWTP discharge s flux of surface water into PM-13 s flux of ground water into PM-13 s flux of Area 5 Pit NW discharge s flux in seepage from Tailings Basin Cells 1E and 2E s flux in hydrometallurgical residue cells liner leakage	M_sBab = M_s13 = M_g13 = M_spit = M_fs = M_rrs =	0.00 - 0.35 0.01 0.25 0.03 0.06	(mg/s) (mg/s) (mg/s) (mg/s) (mg/s) (mg/s)	0.00 0.52 0.35 0.09 0.25 0.03	(mg/s) (mg/s) (mg/s) (mg/s) (mg/s)	0.00 6 0.35 0.09 0.25	(mg/s) (mg/s) (mg/s) (mg/s) (mg/s)
s flux of surface water into PM-13 s flux of ground water into PM-13 s flux of Area 5 Pit NW discharge s flux in seepage from Tailings Basin Cells 1E and 2E s flux in hydrometallurgical residue cells liner leakage	M_s13 = M_g13 = M_spit = M_fs = M_rrs =	- 0.35 0.01 0.25 0.03 0.06	(mg/s) (mg/s) (mg/s) (mg/s) (mg/s)	0.52 0.35 0.09 0.25 0.03	(mg/s) (mg/s) (mg/s) (mg/s)	6 0.35 0.09 0.25	(mg/s) (mg/s) (mg/s) (mg/s)
s flux of ground water into PM-13 s flux of Area 5 Pit NW discharge s flux in seepage from Tailings Basin Cells 1E and 2E s flux in hydrometallurgical residue cells liner leakage	M_g13 = M_spit = M_fs = M_rrs =	0.01 0.25 0.03 0.06	(mg/s) (mg/s) (mg/s) (mg/s)	0.35 0.09 0.25 0.03	(mg/s) (mg/s) (mg/s)	0.35 0.09 0.25	(mg/s) (mg/s) (mg/s)
s flux of Area 5 Pit NW discharge s flux in seepage from Tailings Basin Cells 1E and 2E s flux in hydrometallurgical residue cells liner leakage	M_spit = M_fs = M_rrs =	0.01 0.25 0.03 0.06	(mg/s) (mg/s) (mg/s)	0.09 0.25 0.03	(mg/s) (mg/s)	0.09	(mg/s) (mg/s)
s flux in seepage from Tailings Basin Cells 1E and 2E s flux in hydrometallurgical residue cells liner leakage	M_fs = M_rrs =	0.25 0.03 0.06	(mg/s) (mg/s)	0.25	(mg/s)	0.25	(mg/s)
s flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.03 0.06	(mg/s)	0.03			
		0.03 0.06	(mg/s)		(mg/s)	0.03	(ma/s)
	M_s2w =	0.06					
			(119/5)	0.06	(mg/s)	0.06	(mg/s)
		Low Flo	w	Average	Flow	High Flo	ow
s flux in river at PM-12 s flux in river at PM-13	M_r12 =		(mg/s) (mg/s)		(mg/s) (mg/s)		(mg/s) (mg/s)
		Low Flo		Average		High Flo	
	C_r12 =	0.002	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
	ntration in river at PM-12	ntration in river at PM-12 C_r12 =	ntration in river at PM-12 $C_r12 = 0.002$	ntration in river at PM-12 C_r12 = 0.002 (mg/L)	ntration in river at PM-12 C_r12 = 0.002 (mg/L) 0.000	ntration in river at PM-12 C_r12 = 0.002 (mg/L) 0.000 (mg/L)	ntration in river at PM-12 C_r12 = 0.002 (mg/L) 0.000 (mg/L) 0.000

Case	Year 10			
Parameter	Sulfate			
		r		
	concentration of surface water into PM-12	C_s12 =	4.00	(mg/L)
ata	concentration of surface water into PM-13	C_s13 =	4.00	(mg/L)
σ	concentration in Babbitt WWTP discharge	C_sBab =	4.00	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	1046.27	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	223.12	(mg/L)
<b>A</b>	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	7347.00	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	152.40	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	8.50	(mg/L)
브	concentration of ground water into PM-13	C_g13 =	8.50	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	1,427.45	(mg/s)	16,206	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	206.87	(mg/s)	206.87	(mg/s)	206.87	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	37.36	(mg/s)	37.36	(mg/s)	37.36	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	6,965.20	(mg/s)	79,526	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	1,012.72	(mg/s)	1,012.72	(mg/s)	1,012.72	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	7,698.43	(mg/s)	58,922.60	(mg/s)	58,922.60	(mg/s)
		M_fs =	35,029.37	(mg/s)	35,029.37	(mg/s)	35,029.37	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	3,572.40	(mg/s)	3,572.40	(mg/s)	3,572.40	(mg/s)
ဒု ပိ	mass flux in seepage from cell 2W	M_s2w =	8,600.26	(mg/s)	8,600.26	(mg/s)	8,600.26	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12	M_r12 =	244.23		1,671.68		16,449.94	
at	mass flux in river at PM-13	M_r13 =	56,157.40		115,774.21		203,113.67	
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	7.252	(mg/L)	4.280	(mg/l)	4.027	(mg/l)
Col Col	concentration in river at PM-13	C_r13 =	150.115	(mg/L)	45.920	(mg/l)	8.339	(mg/l)

Case	Year 10 Thallium			
Parameter	Thailium	1		
	concentration of surface water into PM-12	C_s12 =	0.0002	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0002	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0002	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.0006	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.001032064	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0002	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	0.0002	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.000004	(mg/L)
dul	concentration of ground water into PM-13	C_g13 =	0.000004	(mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.07	(mg/s)	1	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.35	(mg/s)	4	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.16	(mg/s)	0.16	(mg/s)	0.16	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
۹ ۵	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
tss balance each node	mass flux in river at PM-12	M_r12 =	0.00	(mg/s)	0.07	(mg/s)	0.81	(mg/s)
Mass at eac	mass flux in river at PM-13	M_r13 =		(mg/s)		(mg/s)		(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
Conve flux to concei	concentration in river at PM-13	C r13 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Case Parameter	Year 10 Zinc			
	concentration of surface water into PM-12	C_s12 =	0.016	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.016	(mg/L)
i č	concentration in Babbitt WWTP discharge	C_sBab =	0.016	(mg/L)
atio	concentration in Area 5 Pit NW discharge	C_spit =	0.003	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.063569909	(mg/L)
ē	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.01	(mg/L)
cone	concentration in tailings basin cell 2W	C_s2w =	0.01435	(mg/L)
ort	concentration of ground water into PM-12	C_g12 =	0.0115	(mg/L)
법	concentration of ground water into PM-13	C_g13 =	0.0115	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	5.71	(mg/s)	65	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.28	(mg/s)	0.28	(mg/s)	0.28	(mg/s)
tion	mass flux in Babbitt WWTP discharge	M_sBab =	0.15	(mg/s)	0.15	(mg/s)	0.15	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	27.86	(mg/s)	318	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	1.37	(mg/s)	1.37	(mg/s)	1.37	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.02	(mg/s)	0.17	(mg/s)	0.17	(mg/s)
	mana flux in aconage from Tailings Reain Calls 1E and 2E	M_fs =	9.98	(mg/s)	9.98	(mg/s)	9.98	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
မ ပိ	mass flux in seepage from cell 2W	M_s2w =	0.81	(mg/s)		(mg/s)	0.81	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s)		(mg/s)		(mg/s)
Ma at	mass flux in river at PM-13	M_r13 =		(mg/s)		(mg/s)	395.69	
			Low Flo	w in the second	Average		High Fl	0w
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.013	(mg/L)	0.016	(mg/L)	0.016	(mg/L)
Conve flux to conce	concentration in river at PM-13	C r13 =	0.034	(mg/L)	0.018	(mg/L)	0.016	(mg/L)

Appendix F.12 Embarrass River Geotechnical Mitigation Year 15

FLOWS

Case	Year 15				
Flows	Low Flow Conditions (no surface runoff)				Node
n River	flow in river at PM-12	Q_r12_L =	1.19	(cfs)	PM-12
Total flow in Embarrass F	flow in river at PM-13	Q_r13_L =	13.69	(cfs)	PM-13
Tota Emb	flow check	Q_ck_L =	13.69	(cfs)	
	surface water flow into PM-12	Q_s12_L =	0.00	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_L =	0.00	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_L =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_L =	0.26	(cfs)	PM-13
Ita	seepage from Tailings Basin Cells 1E and 2E	Q_fs_L =	6.02	(cfs)	PM-13
v da	hydrometallurgical residue cells liner leakage	Q_rrs_L =	0.02	(cfs)	PM-13
flow data	seepage from cell 2W	Q_s2w_L =	1.99	(cfs)	PM-13
	ground water flow into PM-12	Q_g12_L =	0.86	(cfs)	PM-12
dul	ground water flow into PM-13	Q_g13_L =	4.21	(cfs)	PM-13

Case	Year 15				
Flow	Average Flow Conditions (mean annual)				_
in River	flow in river at PM-12	Q_r12_M =	13.80	(cfs)	PM-12
Total flow in Embarrass Ri	flow in river at PM-13	Q_r13_M =	89.56	(cfs)	PM-13
Tota Emb	flow check	Q_ck_M =	89.56	(cfs)	4
	surface water flow into PM-12	Q_s12_M =	12.61	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_M =	61.53	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_M =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_M =	1.99	(cfs)	PM-13
data	seepage from Tailings Basin Cells 1E and 2E	Q_fs_M =	6.02	(cfs)	PM-13
, da	hydrometallurgical residue cells liner leakage	Q_rrs_M =	0.02	(cfs)	PM-13
flow	seepage from cell 2W	Q_s2w_M =	1.99	(cfs)	PM-13
Input 1	ground water flow into PM-12	Q_g12_M =	0.86	(cfs)	PM-12
du	ground water flow into PM-13	Q_g13_M =	4.21	(cfs)	PM-13

Case	Year 15				
Flow	High Flow Conditions (avg. annual 1-day max	flow)			_
n River	flow in river at PM-12	Q_r12_H =	144.35	(cfs)	PM-12
Total flow in Embarrass F	flow in river at PM-13	Q_r13_H =	861.11	(cfs)	PM-13
Total Embi	flow check	Q_ck_H =	861.11	(cfs)	_
	surface water flow into PM-12	Q_s12_H =	143.16	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_H =	702.53	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_H =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_H =	1.99	(cfs)	PM-13
ta	seepage from Tailings Basin Cells 1E and 2E	Q_fs_H =	6.02	(cfs)	PM-13
flow data	hydrometallurgical residue cells liner leakage	Q_rrs_H =	0.02	(cfs)	PM-13
No.	seepage from cell 2W	Q_s2w_H =	1.99	(cfs)	PM-13
Input 1	ground water flow into PM-12	Q_g12_H =	0.86	(cfs)	PM-12
au	ground water flow into PM-13	Q_g13_H =	4.21	(cfs)	PM-13

81.53

Case Parameter	Year 15 Silver			
		- 		
	concentration of surface water into PM-12	C_s12 =	0.00011	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.00011	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00011	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.00015	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.00089	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.000125	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	0.000100	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.00008	(mg/L)
브	concentration of ground water into PM-13	C_g13 =	0.00008	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.04	(mg/s)	0	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
concentration flux	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.19	(mg/s)	2	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
conc	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
		M_fs =	0.15	(mg/s)	0.15	(mg/s)	0.15	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
e S	mass flux in seepage from cell 2W	M_s2w =		(mg/s)	0.01	(mg/s)	0.01	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 = M r13 =		(mg/s) (mg/s)		(mg/s)		(mg/s) (mg/s)
2 0		IM_113 =	Low Flo		Average		High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L) (mg/L)	0.000	(mg/L) (mg/L)	0.000	

Case Parameter	Year 15 Aluminum			
	concentration of surface water into PM-12	C_s12 =	0.12	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.12	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.12	(mg/L)
tio	concentration in Area 5 Pit NW discharge	C_spit =	0.01325	(mg/L)
ntration	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	8.74E-02	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.80E-01	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	1.5788	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.025	(mg/L)
lnp	concentration of ground water into PM-13	C_g13 =	0.025	(mg/L)

			Low Flo	w	Average	Flow	High Flo	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	42.82	(mg/s)	486	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.61	(mg/s)	0.61	(mg/s)	0.61	(mg/s)
tion	mass flux in Babbitt WWTP discharge	M_sBab =	1.12	(mg/s)	1.12	(mg/s)	1.12	(mg/s)
Itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	208.96	(mg/s)	2,386	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	2.98	(mg/s)	2.98	(mg/s)	2.98	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.10	(mg/s)	0.75	(mg/s)	0.75	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	14.87	(mg/s)	14.87	(mg/s)	14.87	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.09	(mg/s)	0.09	(mg/s)	0.09	(mg/s)
<u>ءَ</u> ک	mass flux in seepage from cell 2W	M_s2w =	89.10	(mg/s)		(mg/s)	89.10	(mg/s)
			Low Flo	W	Average	Flow	High Flo	ow
Mass balance at each node		M_r12 =		(mg/s)		(mg/s)	487.90	
a S	mass flux in river at PM-13	M_r13 =	108.86		361.29 Average		2,981.47 High Flo	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L)		(mg/L)		(mg/L)

Case	Year 15			
Parameter	Arsenic			
	concentration of surface water into PM-12	C_s12 =	0.00075	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.00075	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00075	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.001325	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.007825647	(mg/L)
ICE	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.004	(mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	0.00291	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.00273	(mg/L)
별	concentration of ground water into PM-13	C_g13 =	0.00273	(mg/L)

			Low Flor	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.27	(mg/s)	3	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.07	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
concentration flux	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1.31	(mg/s)	15	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.33	(mg/s)	0.33	(mg/s)	0.33	(mg/s)
con	mass flux of Area 5 Pit NW discharge	M_spit =	0.01	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.33	(mg/s)	1.33	(mg/s)	1.33	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		(mg/s)	0.00	(mg/s)
<u>ء</u> ک		M_s2w =		(mg/s)		(mg/s)	0.16	(mg/s)
			Low Flor	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 =		(mg/s) (mg/s)		(mg/s) (mg/s)		(mg/s) (mg/s)
			Low Flor		Average		High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.002	(mg/L)	0.001	(mg/L)	0.001	(mg/L)

Case	Year 15			
Parameter	Boron			
		-		
	concentration of surface water into PM-12	C_s12 =	0.027	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.027	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.027	(mg/L)
ntration	concentration in Area 5 Pit NW discharge	C_spit =	0.1315	(mg/L)
ıtra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.153530941	(mg/L)
ICEI	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.11	(mg/L)
cou	concentration in tailings basin cell 2W	C_s2w =	0.33	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.0212	(mg/L)
d L	concentration of ground water into PM-13	C_g13 =	0.0212	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	9.64	(mg/s)	109	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.52	(mg/s)	0.52	(mg/s)	0.52	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.25	(mg/s)	0.25	(mg/s)	0.25	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	47.02	(mg/s)	537	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	2.53	(mg/s)	2.53	(mg/s)	2.53	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.97	(mg/s)	7.41	(mg/s)	7.41	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	26.14	(mg/s)	26.14	(mg/s)	26.14	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.05	(mg/s)	0.05	(mg/s)	0.05	(mg/s)
ទ បិ	mass flux in seepage from cell 2W	M_s2w =	18.62	(mg/s)	18.62	(mg/s)	18.62	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s)		(mg/s)	110.16	
a ≤	mass flux in river at PM-13	M_r13 =	49.08	(mg/s) w	112.16 Average		701.71 High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.023	(mg/L) (mg/L)	0.027	(mg/L)	0.027	(mg/L) (mg/L)

Case	Year 15			
Parameter	Barium			
		-		
	concentration of surface water into PM-12	C_s12 =	0.016	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.016	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.016	(mg/L)
ţi	concentration in Area 5 Pit NW discharge	C_spit =	0.0044	(mg/L)
ntration	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	5.00E-02	(mg/L)
۵	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	5.00E-03	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	0.09298	(mg/L)
ont	concentration of ground water into PM-12	C_g12 =	0.0681	(mg/L)
Input	concentration of ground water into PM-13	C_g13 =	0.0681	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	5.71	(mg/s)	65	(mg/s)
-	mass flux of ground water into PM-12	M_g12 =	1.66	(mg/s)	1.66	(mg/s)	1.66	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.15	(mg/s)	0.15	(mg/s)	0.15	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	27.86	(mg/s)	318	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	8.11	(mg/s)	8.11	(mg/s)	8.11	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.03	(mg/s)	0.25	(mg/s)	0.25	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	8.50	(mg/s)	8.50	(mg/s)	8.50	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
ទ ប្	mass flux in seepage from cell 2W	M_s2w =	5.25	(mg/s)	5.25	(mg/s)	5.25	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s)		(mg/s)		(mg/s)
at 8	mass flux in river at PM-13	M_r13 =	23.71	(mg/s)		(mg/s)	406.85 High Fl	
					Average			0
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.054	(mg/L)	0.019	(mg/L)	0.016	(mg/L)
Con Con con	concentration in river at PM-13	C_r13 =	0.061	(mg/L)	0.023	(mg/L)	0.017	(mg/L)

Case Parameter	Year 15 Beryllium			
		-		
	concentration of surface water into PM-12	C_s12 =	0.0001	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0001	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0001	(mg/L)
tio	concentration in Area 5 Pit NW discharge	C_spit =	0.0001	(mg/L)
ntration	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000487063	(mg/L)
concel	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0	(mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	0.00075	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.000023	(mg/L)
법	concentration of ground water into PM-13	C_g13 =	0.000023	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.04	(mg/s)	0	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.17	(mg/s)	2	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.08	(mg/s)	0.08	(mg/s)	0.08	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	-	(mg/s)	-	(mg/s)	-	(mg/s)
۹ ۵	mass flux in seepage from cell 2W	M_s2w =		(mg/s)	0.04	(mg/s)		(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =	0.00	(mg/s)		(mg/s)		(mg/s)
at B	mass flux in river at PM-13	M_r13 =		(mg/s)		(mg/s)		(mg/s)
			Low Flo	w	Average	FIOW	High Fl	ow
Convert mass flux to concentration		C_r12 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
Con Con con	concentration in river at PM-13	C_r13 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Case	Year 15			
Parameter	Calcium			
	concentration of surface water into PM-12	C_s12 =	15	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	15	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	15	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	95.35	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	81.6110992	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	416	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	59.78	(mg/L)
t	concentration of ground water into PM-12	C_g12 =	19	(mg/L)
Input	concentration of ground water into PM-13	C_g13 =	19	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	5,352.95	(mg/s)	60,771	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	462.42	(mg/s)	462.42	(mg/s)	462.42	(mg/s)
tion	mass flux in Babbitt WWTP discharge	M_sBab =	140.09	(mg/s)	140.09	(mg/s)	140.09	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	26,119.49	(mg/s)	298,224	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	2,263.72	(mg/s)	2,263.72	(mg/s)	2,263.72	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	701.59	(mg/s)	5,369.83	(mg/s)	5,369.83	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	13,893.59	(mg/s)	13,893.59	(mg/s)	13,893.59	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	205.46	(mg/s)	205.46		205.46	(mg/s)
မိ မိ	mass flux in seepage from cell 2W	M_s2w =	3,373.51	(mg/s)	3,373.51			(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =	602.51		5,955.45		61,373.93	
		1.12.13	Low Flo		Average		High Fl	( <b>e</b> /
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	17.891		15.249		15.024	
ວ≓ວ	concentration in river at PM-13	C_r13 =	54.319	(mg/L)	22.561	(mg/L)	15.649	(mg/l)

Case	Year 15			
Parameter	Cadmium			
	concentration of surface water into PM-12	C_s12 =	0.00008	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.00008	(mg/L)
-	concentration in Babbitt WWTP discharge	C_sBab =	0.00008	(mg/L)
tio	concentration in Area 5 Pit NW discharge	C_spit =	0.0001	(mg/L)
ntration	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000567381	(mg/L)
d)	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0004	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	0.000188	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.0003	(mg/L)
법	concentration of ground water into PM-13	C_g13 =	0.0003	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.03	(mg/s)	0	(mg/s)
-	mass flux of ground water into PM-12	M_g12 =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.14	(mg/s)	2	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.04	(mg/s)	0.04	(mg/s)	0.04	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.10	(mg/s)	0.10	(mg/s)	0.10	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
ទ ប្	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =	0.01	(mg/s)	0.04	(mg/s)	0.33	(mg/s)
at a	mass flux in river at PM-13	M_r13 =		(mg/s)		(mg/s)		(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
Con Con con	concentration in river at PM-13	C_r13 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Case	Year 15			
Parameter	Chloride			
	concentration of surface water into PM-12	C s12 =	65	(mg/L)
data	concentration of surface water into PM-13	C s13 =		(mg/L)
	concentration in Babbitt WWTP discharge	 C_sBab =		(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	5.95	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	5.66E+00	(mg/L)
concel	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.76E+03	(mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	21.54	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	1.8	(mg/L)
du	concentration of ground water into PM-13	C_g13 =	1.8	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	2,319.61	(mg/s)	26,334	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	43.81	(mg/s)	43.81	(mg/s)	43.81	(mg/s)
concentration flux	mass flux in Babbitt WWTP discharge	M_sBab =	60.70	(mg/s)	60.70	(mg/s)	60.70	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	11,318.44	(mg/s)	129,230	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	214.46	(mg/s)	214.46	(mg/s)	214.46	(mg/s)
u xn	mass flux of Area 5 Pit NW discharge	M_spit =	43.78	(mg/s)	335.09	(mg/s)	335.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	963.96	(mg/s)	963.96	(mg/s)	963.96	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M rrs =	869.24	(mg/s)	869.24		869.24	(mg/s)
<u>ء</u> ک		M_s2w =	1,215.55		1,215.55		1,215.55	
			Low Flo	w	Average	Flow	High Flo	ow
Mass balance at each node		M_r12 =	104.51 3,411.50		2,424.12		26,438.79	
20	mass nux in river at PM-13	IVI_F13 =	3,411.50		Average		159,267.48 High Flo	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	3.103	(mg/L)		(mg/L)	6.472	

Case	Year 15			
Parameter	Cobalt			
		-		
	concentration of surface water into PM-12	C_s12 =	0.0006	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0006	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0006	(mg/L)
ntration	concentration in Area 5 Pit NW discharge	C_spit =	0.000555	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.001926627	(mg/L)
۵	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.005	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	0.001556	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.0011	(mg/L)
du	concentration of ground water into PM-13	C_g13 =	0.0011	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.21	(mg/s)	2	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.03	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
tion	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1.04	(mg/s)	12	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.13	(mg/s)	0.13	(mg/s)	0.13	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.33	(mg/s)	0.33	(mg/s)	0.33	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
ទ បំ	mass flux in seepage from cell 2W	M_s2w =		(mg/s)	0.09	(mg/s)		(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s)		(mg/s)		(mg/s) (mg/s)
20		IVI_I 13 =	Low Flo		Average		High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L) (mg/L)		(mg/L) (mg/L)	0.001	(mg/L)

Case	Year 15			
Parameter	Copper			
		-		
	concentration of surface water into PM-12	C_s12 =	0.0015	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0015	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0015	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.00345	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.009053616	(mg/L)
<b>a</b>	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0015	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	0.004555	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.004	(mg/L)
브	concentration of ground water into PM-13	C_g13 =	0.004	(mg/L)

			Low Flor	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.54	(mg/s)	6	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.10	(mg/s)	0.10	(mg/s)	0.10	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	2.61	(mg/s)	30	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.48	(mg/s)	0.48	(mg/s)	0.48	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.03	(mg/s)	0.19	(mg/s)	0.19	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.54	(mg/s)	1.54	(mg/s)	1.54	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
<u>۽</u> ک	mass flux in seepage from cell 2W	M_s2w =	0.26	(mg/s)	0.26	(mg/s)		(mg/s)
			Low Flor	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 = M_r13 =		(mg/s) (mg/s)		(mg/s) (mg/s)		(mg/s) (mg/s)
			Low Flor	w	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 = C_r13 =	0.003	(mg/L)	0.002	(mg/L)	0.002	(mg/L)

Case	Year 15			
Parameter	Fluoride			
		-		
	concentration of surface water into PM-12	C_s12 =	0.2	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.2	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.2	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.125	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	5.63E-01	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	2.85E+00	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	1.55	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.385	(mg/L)
브	concentration of ground water into PM-13	C_g13 =	0.385	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	71.37	(mg/s)	810	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	9.37	(mg/s)	9.37	(mg/s)	9.37	(mg/s)
concentration flux	mass flux in Babbitt WWTP discharge	M_sBab =	1.87	(mg/s)	1.87	(mg/s)	1.87	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	348.26	(mg/s)	3,976	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	45.87	(mg/s)	45.87	(mg/s)	45.87	(mg/s)
uo xnli	mass flux of Area 5 Pit NW discharge	M_spit =	0.92	(mg/s)	7.04	(mg/s)	7.04	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	95.87	(mg/s)	95.87	(mg/s)	95.87	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	1.41	(mg/s)	1.41	(mg/s)	1.41	(mg/s)
ទ បិ	mass flux in seepage from cell 2W	M_s2w =	87.47	(mg/s)	87.47	(mg/s)	87.47	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =	11.24	(mg/s)	82.61	(mg/s)	<u>821.52</u> 5,035.50	
		1.12.13	Low Flo		Average		High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L) (mg/L)		(mg/L) (mg/L)	0.201	(mg/L)

Case	Year 15			
Parameter	Iron			
		-		
	concentration of surface water into PM-12	C_s12 =	2.9	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	2.9	(mg/L)
_	concentration in Babbitt WWTP discharge	C_sBab =	2.9	(mg/L)
ntration	concentration in Area 5 Pit NW discharge	C_spit =	0.037761905	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	3.86E-02	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	4.00E-01	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	4.594	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.035	(mg/L)
르	concentration of ground water into PM-13	C_g13 =	0.035	(mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	1,034.90	(mg/s)	11,749	(mg/s)
-	mass flux of ground water into PM-12	M_g12 =	0.85	(mg/s)	0.85	(mg/s)	0.85	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	27.08	(mg/s)	27.08	(mg/s)	27.08	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	5,049.77	(mg/s)	57,657	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	4.17	(mg/s)	4.17	(mg/s)	4.17	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	0.28	(mg/s)	2.13	(mg/s)	2.13	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	6.57	(mg/s)	6.57	(mg/s)	6.57	(mg/s)
Convert	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.20	(mg/s)	0.20	(mg/s)	0.20	(mg/s)
ပိ ပိ	mass flux in seepage from cell 2W	M_s2w =	259.25	(mg/s)	259.25	(mg/s)	259.25	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance		M_r12 =		(mg/s)	1,062.84		11,777.08	
Ĕ	mass flux in river at PM-13	M_r13 =	298.40		6,384.92 Average		69,706.03 High Fl	
Convert mass flux to		C_r12 =	0.829	(mg/L)	2.721	(mg/L)	2.883	(mg/L)
o ≑ c	concentration in river at PM-13	C_r13 =	0.770	(mg/L)	2.519	(mg/L)	2.860	(mg/L)

Case Parameter	Year 15 Hardness			
	concentration of surface water into PM-12	C_s12 =	70	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	70	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	70	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	942.7142857	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	2.55E+02	(mg/L)
Cet	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	8.61E+03	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	436.6	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	87.5	(mg/L)
법	concentration of ground water into PM-13	C_g13 =	87.5	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	24,980.41	(mg/s)	283,600	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	2,129.58	(mg/s)	2,129.58	(mg/s)	2,129.58	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	653.73	(mg/s)	653.73	(mg/s)	653.73	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	121,890.93	(mg/s)	1,391,712	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	10,425.01	(mg/s)	10,425.01	(mg/s)	10,425.01	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	6,936.49	(mg/s)	53,090.84	(mg/s)	53,090.84	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	43,358.02	(mg/s)	43,358.02	(mg/s)	43,358.02	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	4,252.38	(mg/s)	4,252.38	(mg/s)	4,252.38	(mg/s)
<u>۽</u> ک	mass flux in seepage from cell 2W	M_s2w =	24,638.27	(mg/s)	24,638.27		24,638.27	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =	2,783.31 92,393.48		27,763.72 285,419.17		286,383.27	
			Low Flo		Average		High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	82.647		71.091		70.104	

Case	Year 15			
Parameter	Potassium			
		-		
	concentration of surface water into PM-12	C_s12 =	0.60	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.60	(mg/L)
-	concentration in Babbitt WWTP discharge	C_sBab =	0.60	(mg/L)
tio	concentration in Area 5 Pit NW discharge	C_spit =	53.80	(mg/L)
ntration	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	6.68	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.80	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	7.77	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	1.60	(mg/L)
du	concentration of ground water into PM-13	C_g13 =	1.60	(mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
m	ass flux of surface water into PM-12	M_s12 =	-	(mg/s)	214.12	(mg/s)	2,431	(mg/s)
_ m	ass flux of ground water into PM-12	M_g12 =	38.94	(mg/s)	38.94	(mg/s)	38.94	(mg/s)
concentration flux 3 3 3 3 3	ass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.89	(mg/s)	5.60	(mg/s)	0.89	(mg/s)
m Itra	ass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1,044.78	(mg/s)	11,929	(mg/s)
m ce	ass flux of ground water into PM-13	M_g13 =	190.63	(mg/s)	190.63	(mg/s)	190.63	(mg/s)
m tinx	ass flux in Babbitt WWTP discharge	M_sBab =	5.60	(mg/s)	3,029.85	(mg/s)	5.60	(mg/s)
	ass flux of Area 5 Pit NW discharge	M_spit =	395.86	(mg/s)	1,137.30	(mg/s)	3,029.85	(mg/s)
Convert to mass	ass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1,137.30			(mg/s)	1,137.30	(mg/s)
ວິ ໑ m	ass flux in seepage from cell 2W	M_s2w =	438.48	(mg/s)	438.48		438.48	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
ass ba each r	ass flux in river at PM-12	M_r12 = M r13 =	39.83	(mg/s)	258.66		2,470.69	
			Low Flo		Average		High Fl	( <b>e</b> /
onvert ux to oncent	oncentration in river at PM-12	C_r12 =		(mg/L)		(mg/L)		(mg/l)
ŭ ≓ ŭ co	oncentration in river at PM-13	C_r13 =	5.700	(mg/L)	2.407	(mg/L)	0.788	(mg/l)

Case Parameter	Year 15 Magnesium			
	encodential of environmentariate DM 10	0 -10	F 00	(
ta	concentration of surface water into PM-12 concentration of surface water into PM-13	C_s12 = C_s13 =		(mg/L) (mg/L)
n data	concentration in Babbitt WWTP discharge	C_sBab =		(mg/L)
ntration	concentration in Area 5 Pit NW discharge	C_spit =	271.00	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	12.36	(mg/L)
concel	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	213.00	(mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	69.97	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	10.65	(mg/L)
Ing	concentration of ground water into PM-13	C_g13 =	10.65	(mg/L)

			Low Flo	w	Average	Flow	High Flo	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	2,105.49	(mg/s)	23,903	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	259.20	(mg/s)	259.20	(mg/s)	259.20	(mg/s)
tion	mass flux in Babbitt WWTP discharge	M_sBab =	55.10	(mg/s)	55.10	(mg/s)	55.10	(mg/s)
itrai	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	10,273.66	(mg/s)	117,301	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	1,268.87	(mg/s)	1,268.87	(mg/s)	1,268.87	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	1,994.02	(mg/s)	15,261.91	(mg/s)	15,261.91	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	2,104.35	(mg/s)	2,104.35	(mg/s)	2,104.35	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	105.20	(mg/s)	105.20	(mg/s)	105.20	(mg/s)
e S		M_s2w =	3,948.56		3,948.56	(mg/s)	3,948.56	
			Low Flo	w	Average	Flow	High Flo	ow
Mass balance at each node		M_r12 =	314.30		2,419.79		24,217.73	
Ma at	mass flux in river at PM-13	M_r13 =	9,735.30		35,382.34		164,208.04	
			LOW FIO		Average		High Fl	0
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	9.333	(mg/L)	6.196	(mg/L)	5.928	(mg/l)
Conve flux to concel	concentration in river at PM-13	C_r13 =	25.133	(mg/L)	13.960	(mg/L)	6.738	(mg/l)

Case Parameter	Year 15 Manganese			
		-		
	concentration of surface water into PM-12	C_s12 =	0.30	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.30	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.30	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.49	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.19	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.00	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	1.18	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.19	(mg/L)
브	concentration of ground water into PM-13	C_g13 =	0.19	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	107.06	(mg/s)	1,215	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	4.58	(mg/s)	4.58	(mg/s)	4.58	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	2.80	(mg/s)	2.80	(mg/s)	2.80	(mg/s)
itrai	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	522.39	(mg/s)	5,964	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	22.40	(mg/s)	22.40	(mg/s)	22.40	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	3.57	(mg/s)	27.31	(mg/s)	27.31	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	33.00	(mg/s)	33.00	(mg/s)	33.00	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =		(mg/s)		(mg/s)	0.00	(mg/s)
<u>ء</u> ک	mass flux in seepage from cell 2W	M_s2w =	66.76	(mg/s)		(mg/s)	66.76	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s)	114.44		1,222.81	
Ma at	mass flux in river at PM-13	M_r13 =	133.10 Low Flo		786.29 Average		7,336.75 High Fl	
ς L			LOW FIO	w	Average	FIOW		ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.219	(mg/L)	0.293	(mg/L)	0.299	(mg/l)
Conve flux to conce	concentration in river at PM-13	C_r13 =	0.344	(mg/L)	0.310	(mg/L)	0.301	(mg/l)

Case Parameter	Year 15 Sodium			
i urumotor	Couldin			
	concentration of surface water into PM-12	C_s12 =	6.00	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	6.00	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	6.00	(mg/L)
ţi	concentration in Area 5 Pit NW discharge	C_spit =	119.50	(mg/L)
ntration	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	26.02	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	255.00	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	44.31	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	4.90	(mg/L)
dul	concentration of ground water into PM-13	C_g13 =	4.90	(mg/L)

			Low Flo	w	Average	Flow	High Flo	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	2,141.18	(mg/s)	24,309	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	119.26	(mg/s)	119.26	(mg/s)	119.26	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	56.03	(mg/s)	56.03	(mg/s)	56.03	(mg/s)
ıtra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	10,447.79	(mg/s)	119,290	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	583.80	(mg/s)	583.80		583.80	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	879.28	(mg/s)	6,729.88	(mg/s)	6,729.88	(mg/s)
		M_fs =	4,430.53	(mg/s)	4,430.53	(mg/s)	4,430.53	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	125.94	(mg/s)	125.94	(mg/s)	125.94	(mg/s)
ဒု ပိ		M_s2w =	2,500.51		2,500.51	(mg/s)	2,500.51	
			Low Flo	W	Average	Flow	High Fle	ow
Mass balance at each node		M_r12 =	175.29		2,316.47		24,483.86	
Ma at	mass flux in river at PM-13	M_r13 =	8,695.35		27,134.93		158,144.12	
			Low Flo	w	Average	FIOW	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	5.205	(mg/L)	5.931	(mg/L)	5.993	(mg/l)
Conve flux to concei	concentration in river at PM-13	C_r13 =	22.449	(mg/L)	10.706	(mg/L)	6.489	(mg/l)

Case	Year 15			
Parameter	Nickel			
		-		
	concentration of surface water into PM-12	C_s12 =	0.0012	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0012	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0012	(mg/L)
tio	concentration in Area 5 Pit NW discharge	C_spit =	0.0052	(mg/L)
ntration	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.022174447	(mg/L)
<b>A</b>	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.098	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.00688	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.007	(mg/L)
브	concentration of ground water into PM-13	C_g13 =	0.007	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.43	(mg/s)	5	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.17	(mg/s)	0.17	(mg/s)	0.17	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	2.09	(mg/s)	24	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.83	(mg/s)	0.83	(mg/s)	0.83	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.04	(mg/s)	0.29	(mg/s)	0.29	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	3.78	(mg/s)	3.78	(mg/s)	3.78	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.05	(mg/s)	0.05	(mg/s)	0.05	(mg/s)
Co to	mass flux in seepage from cell 2W	M_s2w =	0.39	(mg/s)	0.39	(mg/s)	0.39	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s)		(mg/s)		(mg/s)
20	mass flux in river at PM-13	M_r13 =	5.27	(mg/s)	Average	(mg/s) Flow	34.24 High Fl	(mg/s)
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L)	0.002	(mg/L)	0.001	(mg/L) (mg/L)

Case	Year 15		
Parameter	Lead		
		-	
	concentration of surface water into PM-12	C_s12 =	0.00015 (mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.00015 (mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00015 (mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.0003 (mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.002700416 (mg/L)
c)	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0005 (mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	0.0012 (mg/L)
nt	concentration of ground water into PM-12	C_g12 =	0.0012 (mg/L)
Input	concentration of ground water into PM-13	C_g13 =	0.0012 (mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.05	(mg/s)	1	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.03	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
ıtra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.26	(mg/s)	3	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.14	(mg/s)	0.14	(mg/s)	0.14	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.02	(mg/s)	0.02	(mg/s)
		M_fs =	0.46	(mg/s)	0.46	(mg/s)	0.46	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
Co to		M_s2w =	0.07	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 = M r13 =		(mg/s) (mg/s)		(mg/s) (mg/s)		(mg/s) (mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.001	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
c tro	concentration in river at PM-13	C r13 =	0.002	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Case	Year 15			
Parameter	Antimony			
		-		
	concentration of surface water into PM-12	C_s12 =	4.00E-05	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	4.00E-05	(mg/L)
i p u	concentration in Babbitt WWTP discharge	C_sBab =	4.00E-05	(mg/L)
atio	concentration in Area 5 Pit NW discharge	C_spit =	2.50E-04	(mg/L)
	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	9.29E-03	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.004	(mg/L)
con	concentration in tailings basin cell 2W	C_s2w =	2.50E-04	(mg/L)
put	concentration of ground water into PM-12	C_g12 =	1.50E-03	(mg/L)
법	concentration of ground water into PM-13	C_g13 =	1.50E-03	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.01	(mg/s)	0	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.04	(mg/s)	0.04	(mg/s)	0.04	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.07	(mg/s)	1	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.18	(mg/s)	0.18	(mg/s)	0.18	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mana flux in according from Tailings Reain Calls 1E and 2E	M_fs =	1.58	(mg/s)	1.58	(mg/s)	1.58	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
မ ပိ	mass flux in seepage from cell 2W	M_s2w =		(mg/s)		(mg/s)	0.01	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s)		(mg/s)		(mg/s)
a S	mass flux in river at PM-13	M_r13 =		(mg/s)		(mg/s)		(mg/s)
<i>(</i> ) <i>(</i> )			Low Flo		Average	FIOW	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.001	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
Conve flux to conce	concentration in river at PM-13	C_r13 =	0.005	(mg/L)	0.001	(mg/L)	0.000	(mg/L)

Case Parameter	Year 15 Selenium			
	concentration of surface water into PM-12	C_s12 =	0.0003	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0003	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0003	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.0016	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.001534421	(mg/L)
0	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.054	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	0.00109	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.00295	(mg/L)
dul	concentration of ground water into PM-13	C_g13 =	0.00295	(mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.11	(mg/s)	1	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.07	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
concentration flux	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.52	(mg/s)	6	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.35	(mg/s)	0.35	(mg/s)	0.35	(mg/s)
con	mass flux of Area 5 Pit NW discharge	M_spit =	0.01	(mg/s)	0.09	(mg/s)	0.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.26	(mg/s)	0.26	(mg/s)	0.26	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.03	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
ဒိ ဒိ	mass flux in seepage from cell 2W	M_s2w =	0.06	(mg/s)	0.06	(mg/s)	0.06	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 =		(mg/s)		(mg/s)		(mg/s)
< 0	mass nux in river at PM-13	IVI_113 =	Low Flo		Average	(mg/s) Flow	High Fl	(mg/s) ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.002	(mg/L)	0.000	(mg/L) (mg/L)		(mg/L) (mg/L)

Case Parameter	Year 15 Sulfate			
	concentration of surface water into PM-12	C_s12 =	4.00	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	4.00	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	4.00	(mg/L)
ation	concentration in Area 5 Pit NW discharge	C_spit =	1046.27	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	183.93	(mg/L)
0	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	7347.00	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	152.40	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	8.50	(mg/L)
dul	concentration of ground water into PM-13	C_g13 =	8.50	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	1,427.45	(mg/s)	16,206	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	206.87	(mg/s)	206.87	(mg/s)	206.87	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	37.36	(mg/s)	37.36	(mg/s)	37.36	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	6,965.20	(mg/s)	79,526	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	1,012.72	(mg/s)	1,012.72	(mg/s)	1,012.72	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	7,698.43	(mg/s)	58,922.60	(mg/s)	58,922.60	(mg/s)
		M_fs =	31,312.16	(mg/s)	31,312.16	(mg/s)	31,312.16	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	3,628.60	(mg/s)	3,628.60	(mg/s)	3,628.60	(mg/s)
မီ နိ		M_s2w =	8,600.26		8,600.26		8,600.26	
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12 mass flux in river at PM-13	<u>M_r12 =</u> M_r13 =	244.23		1,671.68		16,449.94	
			Low Flo	W	Average	Flow	High Fl	ow
Convert mass flux to	concentration in river at PM-12	C_r12 =	7.252	(mg/L)		(mg/L)	4.027	(mg/l)
ŭ ≓ S	concentration in river at PM-13	C_r13 =	135.529	(mg/L)	44.235	(mg/L)	8.185	(mg/l)

Case Parameter	Year 15 Thallium			
	concentration of surface water into PM-12	C_s12 =	0.0002	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0002	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0002	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.0006	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.001032291	(mg/L)
<u>.</u>	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0002	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	0.0002	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.000004	(mg/L)
qul	concentration of ground water into PM-13	C_g13 =	0.000004	(mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.07	(mg/s)	1	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
concentration flux	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.35	(mg/s)	4	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
conc	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.18	(mg/s)	0.18	(mg/s)	0.18	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
ဒိ ဒိ	mass flux in seepage from cell 2W	M_s2w =		(mg/s)		(mg/s)	0.01	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 = M r13 =		(mg/s) (mg/s)		(mg/s) (mg/s)		(mg/s) (mg/s)
		W_113 =	Low Flo		Average		High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 = C r13 =		(mg/L) (mg/L)		(mg/L) (mg/L)		(mg/L) (mg/L)

Case Parameter	Year 15 Zinc			
	concentration of surface water into PM-12	C_s12 =	0.016	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.016	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.016	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.003	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.066565637	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.01	(mg/L)
cone	concentration in tailings basin cell 2W	C_s2w =	0.01435	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.0115	(mg/L)
법	concentration of ground water into PM-13	C_g13 =	0.0115	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	5.71	(mg/s)	65	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.28	(mg/s)	0.28	(mg/s)	0.28	(mg/s)
tion	mass flux in Babbitt WWTP discharge	M_sBab =	0.15	(mg/s)	0.15	(mg/s)	0.15	(mg/s)
tra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	27.86	(mg/s)	318	(mg/s)
concentration flux	mass flux of ground water into PM-13	M_g13 =	1.37	(mg/s)	1.37	(mg/s)	1.37	(mg/s)
con	mass flux of Area 5 Pit NW discharge	M_spit =	0.02	(mg/s)	0.17	(mg/s)	0.17	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	11.33	(mg/s)	11.33	(mg/s)	11.33	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		(mg/s)	0.00	(mg/s)
ຊິ ບິ		M_s2w =		(mg/s)		(mg/s)		(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 =		(mg/s) (mg/s)		(mg/s) (mg/s)	65.25	(mg/s)
		<u>M_10 -</u>	Low Flo		Average		High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.013	(mg/L)		(mg/L) (mg/L)		(mg/L) (mg/L)
Appendix F.13 Embarrass River Geotechnical Mitigation Year 20

#### FLOWS

Case	Year 20				
Flows	Low Flow Conditions (no surface runoff)				Node
in River	flow in river at PM-12	Q_r12_L =	1.19	(cfs)	PM-12
Total flow in Embarrass F	flow in river at PM-13	Q_r13_L =	14.13	(cfs)	PM-13
Tota Emb	flow check	Q_ck_L =	14.13	(cfs)	_
	surface water flow into PM-12	Q_s12_L =	0.00	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_L =	0.00	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_L =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_L =	0.26	(cfs)	PM-13
ta	seepage from Tailings Basin Cells 1E and 2E	Q_fs_L =	6.46	(cfs)	PM-13
v da	hydrometallurgical residue cells liner leakage	Q_rrs_L =	0.0193	(cfs)	PM-13
flow data	seepage from cell 2W	Q_s2w_L =	1.99	(cfs)	PM-13
Input 1	ground water flow into PM-12	Q_g12_L =	0.86	(cfs)	PM-12
du du	ground water flow into PM-13	Q_g13_L =	4.21	(cfs)	PM-13

Case	Year 20				
Flow	Average Flow Conditions (mean annual)				_
n River	flow in river at PM-12	Q_r12_M =	13.80	(cfs)	PM-12
Total flow in Embarrass F	flow in river at PM-13	Q_r13_M =	90.00	(cfs)	PM-13
Tota	flow check	Q_ck_M =	90.00	(cfs)	
	surface water flow into PM-12	Q_s12_M =	12.61	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_M =	61.53	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_M =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_M =	1.99	(cfs)	PM-13
ta	seepage from Tailings Basin Cells 1E and 2E	Q_fs_M =	6.46	(cfs)	PM-13
, da	hydrometallurgical residue cells liner leakage	Q_rrs_M =	0.0193	(cfs)	PM-13
lo v	seepage from cell 2W	Q_s2w_M =	1.99	(cfs)	PM-13
nput flow data	ground water flow into PM-12	Q_g12_M =	0.86	(cfs)	PM-12
du	ground water flow into PM-13	Q_g13_M =	4.21	(cfs)	PM-13

Case	Year 20				
Flow	High Flow Conditions (avg. annual 1-day ma	ax flow)			_
с .	flow in river at PM-12	Q_r12_H =	144.35	(cfs)	PM-12
Total flow in	flow in river at PM-13	Q_r13_H =	861.55	(cfs)	PM-13
Total	flow check	Q_ck_H =	861.55	(cfs)	
	surface water flow into PM-12	Q_s12_H =	143.16	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_H =	702.53	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_H =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_H =	1.99	(cfs)	PM-13
4	seepage from Tailings Basin Cells 1E and 2E	Q_fs_H =	6.46	(cfs)	PM-13
1010	hydrometallurgical residue cells liner leakage	QrrsH=	0.0193	(cfs)	PM-13
10.01	seepage from cell 2W	Q s2w H =	1.99	(cfs)	PM-13
1	ground water flow into PM-12	Q_g12_H =	0.86	(cfs)	PM-12
1	ground water flow into PM-12 ground water flow into PM-13	Q g13 H =	4.21	(cfs)	PM-13

Case Parameter	Year 20 Silver			
			· · · · · ·	
	concentration of surface water into PM-12	C_s12 =	0.00011	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.00011	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00011	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.00015	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.00095	(mg/L)
ncei	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.000125	(mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	0.000100	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.00008	(mg/L)
법	concentration of ground water into PM-13	C_g13 =	0.00008	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.04	(mg/s)	0	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.19	(mg/s)	2	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.17	(mg/s)	0.17	(mg/s)	0.17	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
<u>ء</u> ک		M_s2w =		(mg/s)		(mg/s)	0.01	(mg/s)
		_	Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 =		(mg/s) (mg/s)		(mg/s)		(mg/s) (mg/s)
		<u>M_10 -</u>	Low Flo		Average		High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Case Parameter	Year 20 Aluminum			
	concentration of surface water into PM-12	C_s12 =	0.12	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.12	(mg/L)
-	concentration in Babbitt WWTP discharge	C_sBab =	0.12	(mg/L)
ţi	concentration in Area 5 Pit NW discharge	C_spit =	0.01325	(mg/L)
ntration	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	6.88E-02	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.80E-01	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	1.5788	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.025	(mg/L)
dul	concentration of ground water into PM-13	C_g13 =	0.025	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	42.82	(mg/s)	486	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.61	(mg/s)	0.61	(mg/s)	0.61	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	1.12	(mg/s)	1.12	(mg/s)	1.12	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	208.96	(mg/s)	2,386	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	2.98	(mg/s)		(mg/s)	2.98	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.10	(mg/s)	0.75	(mg/s)	0.75	(mg/s)
		M_fs =	12.58	(mg/s)	12.58	(mg/s)	12.58	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.10	(mg/s)	0.10	(mg/s)	0.10	(mg/s)
ဒူ ပိ		M_s2w =	89.10	(mg/s)		(mg/s)	89.10	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12	M_r12 =	1.73	(mg/s)	44.55	(mg/s)	487.90	(mg/s)
at a	mass flux in river at PM-13	M_r13 =	106.58	(mg/s)	359.01	(mg/s)	2,979.19	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.051	(mg/L)	0.114	(mg/L)	0.119	(mg/L)
<u>s a s</u>	concentration in river at PM-13	C r13 =	0 266	(mg/L)	0 141	(mg/L)	0 122	(mg/L)

Case	Year 20			
Parameter	Arsenic			
		-		
	concentration of surface water into PM-12	C_s12 =	0.00075	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.00075	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00075	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.001325	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.007453418	(mg/L)
ICE	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.004	(mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	0.00291	(mg/L)
	concentration of ground water into PM-12	C_g12 =	0.00273	(mg/L)
Input	concentration of ground water into PM-13	C_g13 =	0.00273	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.27	(mg/s)	3	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.07	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
concentration	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1.31	(mg/s)	15	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.33	(mg/s)	0.33	(mg/s)	0.33	(mg/s)
con	mass flux of Area 5 Pit NW discharge	M_spit =	0.01	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
		M_fs =	1.36	(mg/s)	1.36	(mg/s)	1.36	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
2 S		M_s2w =		(mg/s)		(mg/s)	0.16	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 =		(mg/s) (mg/s)		(mg/s)		(mg/s) (mg/s)
			Low Flo		Average		High Fl	
Convert mass flux to	concentration in river at PM-12	C_r12 =		(mg/L)		(mg/L)		(mg/L)
0 ∉ 5	concentration in river at PM-13	C_r13 =	0.005	(mg/L)	0.001	(mg/L)	0.001	(mg/L)

Case	Year 20			
Parameter	Boron			
		-		
	concentration of surface water into PM-12	C_s12 =	0.027	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.027	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.027	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.1315	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.158659552	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.11	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	0.33	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.0212	(mg/L)
르	concentration of ground water into PM-13	C_g13 =	0.0212	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	9.64	(mg/s)	109	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.52	(mg/s)	0.52	(mg/s)	0.52	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	0.25	(mg/s)	0.25	(mg/s)	0.25	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	47.02	(mg/s)	537	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	2.53	(mg/s)	2.53	(mg/s)	2.53	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.97	(mg/s)	7.41	(mg/s)	7.41	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	29.01	(mg/s)	29.01	(mg/s)	29.01	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.06	(mg/s)	0.06	(mg/s)	0.06	(mg/s)
မိ မိ	mass flux in seepage from cell 2W	M_s2w =		(mg/s)		(mg/s)	18.62	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s)		(mg/s)	110.16	
a Z	mass flux in river at PM-13	M_r13 =	51.96 Low Flo	(mg/s)	115.04 Average		704.59 High Fl	( ¢ )
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L)		(mg/L)	0.027	

Case	Year 20			
Parameter	Barium			
	concentration of surface water into PM-12	C_s12 =	0.016	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.016	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.016	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.0044	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	5.40E-02	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	5.00E-03	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	0.09298	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.0681	(mg/L)
브	concentration of ground water into PM-13	C_g13 =	0.0681	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	5.71	(mg/s)	65	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	1.66	(mg/s)	1.66	(mg/s)	1.66	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	0.15	(mg/s)	0.15	(mg/s)	0.15	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	27.86	(mg/s)	318	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	8.11	(mg/s)	8.11	(mg/s)	8.11	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.03	(mg/s)	0.25	(mg/s)	0.25	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	9.87	(mg/s)	9.87	(mg/s)	9.87	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
<u>ء</u> ک	mass flux in seepage from cell 2W	M_s2w =	5.25	(mg/s)	5.25	(mg/s)	5.25	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s)		(mg/s)	66.63	(mg/s) (mg/s)
			Low Flo	w	Average		High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L) (mg/L)		(mg/L)		(mg/L) (mg/L)

Case Parameter	Year 20 Beryllium			
		-		
	concentration of surface water into PM-12	C_s12 =	0.0001	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0001	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0001	(mg/L)
tio	concentration in Area 5 Pit NW discharge	C_spit =	0.0001	(mg/L)
ntration	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000472927	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	0.00075	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.000023	(mg/L)
법	concentration of ground water into PM-13	C_g13 =	0.000023	(mg/L)

			Low Flo	w	Average	Flow	High Fl	low
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.04	(mg/s)	0	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.17	(mg/s)	2	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.09	(mg/s)	0.09	(mg/s)	0.09	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	-	(mg/s)	-	(mg/s)	-	(mg/s)
မ ပိ	mass flux in seepage from cell 2W	M_s2w =	0.04	(mg/s)	0.04	(mg/s)	0.04	(mg/s)
			Low Flo	w	Average	Flow	High Fl	low
Mass balance at each node		M_r12 =		(mg/s)		(mg/s)		(mg/s)
<u>a ≥ a</u>	mass flux in river at PM-13	M_r13 =	0.13	(mg/s)	0.35 Average	(mg/s) Flow	2.53 High Fl	(mg/s)
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L) (mg/L)

Case	Year 20			
Parameter	Calcium			
	concentration of surface water into PM-12	C_s12 =	15	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	15	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	15	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	95.35	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	65.23766506	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	416	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	59.78	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	19	(mg/L)
법	concentration of ground water into PM-13	C_g13 =	19	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	5,352.95	(mg/s)	60,771	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	462.42	(mg/s)	462.42	(mg/s)	462.42	(mg/s)
tion	mass flux in Babbitt WWTP discharge	M_sBab =	140.09	(mg/s)	140.09	(mg/s)	140.09	(mg/s)
tra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	26,119.49	(mg/s)	298,224	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	2,263.72	(mg/s)	2,263.72	(mg/s)	2,263.72	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	701.59	(mg/s)	5,369.83	(mg/s)	5,369.83	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	11,928.83	(mg/s)	11,928.83	(mg/s)	11,928.83	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	227.25	(mg/s)	227.25		227.25	(mg/s)
<u>ب</u> د	mass flux in seepage from cell 2W	M_s2w =	3,373.51		3,373.51			(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 = M r13 =	602.51		5,955.45		61,373.93 379,420.20	
			Low Flo		Average		High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	17.891		15.249		15.024	
0 ∉ 8	concentration in river at PM-13	C_r13 =	47.743	(mg/L)	21.686	(mg/l)	15.561	(mg/l)

Case Parameter	Year 20 Cadmium			
		-		
	concentration of surface water into PM-12	C_s12 =	0.00008	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.00008	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00008	(mg/L)
tio	concentration in Area 5 Pit NW discharge	C_spit =	0.0001	(mg/L)
ntration	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000503271	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0004	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	0.000188	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.0003	(mg/L)
법	concentration of ground water into PM-13	C_g13 =	0.0003	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.03	(mg/s)	0	(mg/s)
-	mass flux of ground water into PM-12	M_g12 =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.14	(mg/s)	2	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.04	(mg/s)	0.04	(mg/s)	0.04	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.09	(mg/s)	0.09	(mg/s)	0.09	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
ទ ប្	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s)	0.04	(mg/s)		(mg/s)
at 8	mass flux in river at PM-13	M_r13 =		(mg/s)		(mg/s)		(mg/s)
			Low Flo	w	Average	FIOW	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
Con Con con	concentration in river at PM-13	C_r13 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Case	Year 20 Oblasida			
Parameter	Chloride	l		
	concentration of surface water into PM-12	C_s12 =	6.5	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	6.5	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	6.5	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	5.95	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	5.85E+00	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.76E+03	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	21.54	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	1.8	(mg/L)
du	concentration of ground water into PM-13	C_g13 =	1.8	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	2,319.61	(mg/s)	26,334	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	43.81	(mg/s)	43.81	(mg/s)	43.81	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	60.70	(mg/s)	60.70	(mg/s)	60.70	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	11,318.44	(mg/s)	129,230	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	214.46	(mg/s)	214.46		214.46	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	43.78	(mg/s)	335.09	(mg/s)	335.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1,070.58	(mg/s)	1,070.58	(mg/s)	1,070.58	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	961.45	(mg/s)	961.45	(mg/s)	961.45	(mg/s)
ຊີ ບິ	mass flux in seepage from cell 2W	M_s2w =	1,215.55	(mg/s)	1,215.55		1,215.55	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =	104.51 3,610.33		2,424.12		26,438.79	
		W_110 =	Low Flo		Average		High Flo	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	3.103	(mg/L)	6.207	(mg/L)	6.472	(mg/L)

Case	Year 20			
Parameter	Cobalt			
	concentration of surface water into PM-12	C_s12 =	0.0006	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0006	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0006	(mg/L)
tio	concentration in Area 5 Pit NW discharge	C_spit =	0.000555	(mg/L)
ntration	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.00218589	(mg/L)
¢	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.005	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	0.001556	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.0011	(mg/L)
d L	concentration of ground water into PM-13	C_g13 =	0.0011	(mg/L)

					Average		High Fl	011
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.21	(mg/s)	2	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.03	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
concentration flux	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1.04	(mg/s)	12	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.13	(mg/s)	0.13	(mg/s)	0.13	(mg/s)
con	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.40	(mg/s)	0.40	(mg/s)	0.40	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)		(mg/s)	0.00	(mg/s)
ဒိ ဒိ	mass flux in seepage from cell 2W	M_s2w =	0.09	(mg/s)	0.09	(mg/s)	0.09	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s) (mg/s)		(mg/s) (mg/s)		(mg/s) (mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L) (mg/L)		(mg/L) (mg/L)		(mg/L) (mg/L)

Case	Year 20			
Parameter	Copper			
		-		
	concentration of surface water into PM-12	C_s12 =	0.0015	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0015	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0015	(mg/L)
ntration	concentration in Area 5 Pit NW discharge	C_spit =	0.00345	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.011428793	(mg/L)
ICEI	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0015	(mg/L)
con	concentration in tailings basin cell 2W	C_s2w =	0.004555	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.004	(mg/L)
법	concentration of ground water into PM-13	C_g13 =	0.004	(mg/L)

			Low Flor	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.54	(mg/s)	6	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.10	(mg/s)	0.10	(mg/s)	0.10	(mg/s)
tion	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	2.61	(mg/s)	30	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.48	(mg/s)	0.48	(mg/s)	0.48	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.03	(mg/s)	0.19	(mg/s)	0.19	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	2.09	(mg/s)	2.09	(mg/s)	2.09	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
<u>ء</u> ک		M_s2w =	0.26	(mg/s)		(mg/s)	0.26	(mg/s)
			Low Flor	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 =		(mg/s) (mg/s)		(mg/s)		(mg/s) (mg/s)
20		113 =	Low Flor		Average		High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.003	(mg/L)	0.002	(mg/L)	0.002	(mg/L)

Case	Year 20			
Parameter	Fluoride			
	concentration of surface water into PM-12	C_s12 =	0.2	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.2	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.2	(mg/L)
tio	concentration in Area 5 Pit NW discharge	C_spit =	0.125	(mg/L)
ntration	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	5.99E-01	(mg/L)
ICE	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	2.85E+00	(mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	1.55	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.385	(mg/L)
li	concentration of ground water into PM-13	C_g13 =	0.385	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	71.37	(mg/s)	810	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	9.37	(mg/s)	9.37	(mg/s)	9.37	(mg/s)
concentration flux	mass flux in Babbitt WWTP discharge	M_sBab =	1.87	(mg/s)	1.87	(mg/s)	1.87	(mg/s)
ıtra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	348.26	(mg/s)	3,976	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	45.87	(mg/s)	45.87	(mg/s)	45.87	(mg/s)
uo xnjj	mass flux of Area 5 Pit NW discharge	M_spit =	0.92	(mg/s)	7.04	(mg/s)	7.04	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	109.60	(mg/s)	109.60	(mg/s)	109.60	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	1.56	(mg/s)	1.56	(mg/s)	1.56	(mg/s)
to Co	mass flux in seepage from cell 2W	M_s2w =	87.47	(mg/s)	87.47	(mg/s)	87.47	(mg/s)
		_	Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =	256.65	(mg/s)	82.61	(mg/s)	<u>821.52</u> 5,049.38	
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to concentration		C_r12 =		(mg/L) (mg/L)		(mg/L)		(mg/L) (mg/L)

Case	Year 20			
Parameter	Iron			
		-		
	concentration of surface water into PM-12	C_s12 =	2.9	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	2.9	(mg/L)
_	concentration in Babbitt WWTP discharge	C_sBab =	2.9	(mg/L)
ntration	concentration in Area 5 Pit NW discharge	C_spit =	0.037761905	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	2.17E-02	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	4.00E-01	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	4.594	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.035	(mg/L)
du	concentration of ground water into PM-13	C_g13 =	0.035	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	1,034.90	(mg/s)	11,749	(mg/s)
-	mass flux of ground water into PM-12	M_g12 =	0.85	(mg/s)	0.85	(mg/s)	0.85	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	27.08	(mg/s)	27.08	(mg/s)	27.08	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	5,049.77	(mg/s)	57,657	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	4.17	(mg/s)	4.17	(mg/s)	4.17	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.28	(mg/s)	2.13	(mg/s)	2.13	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	3.97	(mg/s)	3.97	(mg/s)	3.97	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.22	(mg/s)	0.22	(mg/s)	0.22	(mg/s)
co to	mass flux in seepage from cell 2W	M_s2w =	259.25	(mg/s)	259.25	(mg/s)	259.25	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =	27.93	(mg/s)	1,062.84	(mg/s)	11,777.08	(mg/s)
Ma at	mass flux in river at PM-13	M_r13 =	295.82		6,382.34		69,703.45	( <b>e</b> /
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.829	(mg/L)	2.721	(mg/L)	2.883	(mg/L)
Con flux	concentration in river at PM-13	C r13 =	0.740	(mg/L)	2.506	(mg/L)	2.859	(mg/L)

Case Parameter	Year 20 Hardness			
	concentration of surface water into PM-12	C_s12 =	70	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	70	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	70	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	942.7142857	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	2.18E+02	(mg/L)
concel	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	8.61E+03	(mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	436.6	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	87.5	(mg/L)
<u> </u>	concentration of ground water into PM-13	C_g13 =	87.5	(mg/L)

			Low Flo	w	Average	Flow	High Flo	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	24,980.41	(mg/s)	283,600	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	2,129.58	(mg/s)	2,129.58	(mg/s)	2,129.58	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	653.73	(mg/s)	653.73	(mg/s)	653.73	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	121,890.93	(mg/s)	1,391,712	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	10,425.01	(mg/s)	10,425.01	(mg/s)	10,425.01	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	6,936.49	(mg/s)	53,090.84	(mg/s)	53,090.84	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	39,904.86	(mg/s)	39,904.86	(mg/s)	39,904.86	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	4,703.46	(mg/s)	4,703.46		4,703.46	(mg/s)
<u>۽</u> ک	mass flux in seepage from cell 2W	M_s2w =	24,638.27	(mg/s)	24,638.27	(mg/s)	24,638.27	(mg/s)
			Low Flo	w	Average	Flow	High Fle	ow
Mass balance at each node		M_r12 = M r13 =	2,783.31 89,391.40		27,763.72		286,383.27	
			Low Flo		Average		High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	82.647		71.091		70.104	

Case	Year 20			
Parameter	Potassium			
	concentration of surface water into PM-12	C_s12 =	0.60	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.60	(mg/L)
-	concentration in Babbitt WWTP discharge	C_sBab =	0.60	(mg/L)
ntration	concentration in Area 5 Pit NW discharge	C_spit =	53.80	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	6.23	(mg/L)
(D)	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.80	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	7.77	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	1.60	(mg/L)
별	concentration of ground water into PM-13	C_g13 =	1.60	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	214.12	(mg/s)	2,431	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	38.94	(mg/s)	38.94	(mg/s)	38.94	(mg/s)
concentration flux	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.98	(mg/s)	0.98	(mg/s)	0.98	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1,044.78	(mg/s)	11,929	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	190.63	(mg/s)	190.63	(mg/s)	190.63	(mg/s)
conc	mass flux in Babbitt WWTP discharge	M_sBab =	5.60	(mg/s)	5.60	(mg/s)	5.60	(mg/s)
	mana flux of Area E Dit NIM disabarga	M_spit =	395.86	(mg/s)	3,029.85	(mg/s)	3,029.85	(mg/s)
Convert to mass	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1,138.87	(mg/s)	1,138.87	(mg/s)	1,138.87	(mg/s)
e S	mass flux in seepage from cell 2W	M_s2w =	438.48	(mg/s)	438.48	(mg/s)	438.48	(mg/s)
		_	Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12	M_r12 =	39.92	(mg/s)	254.04	(mg/s)	2,470.78	(mg/s)
Ma	mass flux in river at PM-13	M_r13 =	2,209.36	(mg/s)	6,102.25	(mg/s)	19,203.17	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	1.186	(mg/L)	0.650	(mg/L)	0.605	(mg/l)
con Co	concentration in river at PM-13	C_r13 =	5.523	(mg/L)	2.396	(mg/L)	0.788	(mg/l)

Case Parameter	Year 20 Magnesium			
		0	5.00	(
	concentration of surface water into PM-12	C_s12 =		(mg/L)
data	concentration of surface water into PM-13	C_s13 =		(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	5.90	(mg/L)
atic	concentration in Area 5 Pit NW discharge	C_spit =	271.00	(mg/L)
ntration	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	13.44	(mg/L)
conce	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	213.00	(mg/L)
CO CO	concentration in tailings basin cell 2W	C_s2w =	69.97	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	10.65	(mg/L)
Ľ	concentration of ground water into PM-13	C_g13 =	10.65	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow	
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	2,105.49	(mg/s)	23,903	(mg/s)	
_	mass flux of ground water into PM-12	M_g12 =	259.20	(mg/s)	259.20	(mg/s)	259.20	(mg/s)	
tior	mass flux in Babbitt WWTP discharge	M_sBab =	55.10	(mg/s)	55.10	(mg/s)	55.10	(mg/s)	
itrai	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	10,273.66	(mg/s)	117,301	(mg/s)	
cen	mass flux of ground water into PM-13	M_g13 =	1,268.87	(mg/s)	1,268.87	(mg/s)	1,268.87	(mg/s)	
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	1,994.02	(mg/s)	15,261.91	(mg/s)	15,261.91	(mg/s)	
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	2,457.15	(mg/s)	2,457.15	(mg/s)	2,457.15	(mg/s)	
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	116.36	(mg/s)	116.36	(mg/s)	116.36	(mg/s)	
မီ ပိ		M_s2w =	3,948.56		3,948.56		3,948.56		
			Low Flo	w	Average	Flow	High Flow		
Mass balance at each node		M_r12 =	314.30		2,419.79		24,217.73		
Ma at	mass flux in river at PM-13	M_r13 =	10,099.26 Low Flo		35,746.30 Average		164,572.01 High Fl		
ISS			LOW FIO		Average				
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	9.333	(mg/L)	6.196	(mg/l)	5.928	(mg/l)	
Conve flux to concei	concentration in river at PM-13	C_r13 =	25.248	(mg/L)	14.034	(mg/l)	6.750	(mg/l)	

Case Parameter	Year 20 Manganese			
	concentration of surface water into PM-12	C s12 =	0.30	(mg/L)
data	concentration of surface water into PM-13	C_s13 =		(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.30	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.49	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.23	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.00	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	1.18	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.19	(mg/L)
법	concentration of ground water into PM-13	C_g13 =	0.19	(mg/L)

			Low Flo	W	Average	Flow	High Flo	ow
r	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	107.06	(mg/s)	1,215	(mg/s)
_ r	mass flux of ground water into PM-12	M_g12 =	4.58	(mg/s)	4.58	(mg/s)	4.58	(mg/s)
r tio	mass flux in Babbitt WWTP discharge	M_sBab =	2.80	(mg/s)	2.80	(mg/s)	2.80	(mg/s)
r trai	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	522.39	(mg/s)	5,964	(mg/s)
r ceu	mass flux of ground water into PM-13	M_g13 =	22.40	(mg/s)	22.40	(mg/s)	22.40	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	3.57	(mg/s)	27.31	(mg/s)	27.31	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M fs =	42.20	(mg/s)	42.20	(mg/s)	42.20	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =		(mg/s)		(mg/s)		(mg/s)
r e Ĉ	mass flux in seepage from cell 2W	 M_s2w =		(mg/s)		(mg/s)		(mg/s)
			Low Flo	w	Average	Flow	High Flo	ow
ass ba each r	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 = M r13 =	7.38	(mg/s)	114.44		1,222.81	
			Low Flo	w	Average	Flow	High Fl	ow
onvert ux to oncent	concentration in river at PM-12	C_r12 =		(mg/L)		(mg/l)	0.299	
ŭ ≓ ŭ	concentration in river at PM-13	C_r13 =	0.356	(mg/L)	0.312	(mg/l)	0.301	(mg/l)

Case Parameter	Year 20 Sodium			
	concentration of surface water into PM-12	C_s12 =	6.00	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	6.00	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	6.00	(mg/L)
ţi	concentration in Area 5 Pit NW discharge	C_spit =	119.50	(mg/L)
ntration	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	22.22	(mg/L)
concel	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	255.00	(mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	44.31	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	4.90	(mg/L)
duj	concentration of ground water into PM-13	C_g13 =	4.90	(mg/L)

			Low Flo	w	Average	Flow	High Flo	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	2,141.18	(mg/s)	24,309	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	119.26	(mg/s)	119.26	(mg/s)	119.26	(mg/s)
concentration	mass flux in Babbitt WWTP discharge	M_sBab =	56.03	(mg/s)	56.03	(mg/s)	56.03	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	10,447.79	(mg/s)	119,290	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	583.80	(mg/s)	583.80		583.80	(mg/s)
u o	mass flux of Area 5 Pit NW discharge	M_spit =	879.28	(mg/s)	6,729.88	(mg/s)	6,729.88	(mg/s)
		M_fs =	4,062.28	(mg/s)	4,062.28	(mg/s)	4,062.28	(mg/s)
Convert	mass flux in seepage from Tailings Basin Cells 1E and 2E mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	139.30	(mg/s)	139.30	(mg/s)	139.30	(mg/s)
ပိ	2 mass flux in seepage from cell 2W	M_s2w =	2,500.51		2,500.51		2,500.51	
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance	mass flux in river at PM-12	M_r12 =	175.29		2,316.47		24,483.86	
Σ	mass flux in river at PM-13	M_r13 =	8,340.46		26,780.03 Average		157,789.22 High Flo	
Convert mass flux to	concentration in river at PM-12	C_r12 =	5.205	(mg/L)	5.931	(mg/l)	5.993	(mg/l)
ŬĘ	concentration in river at PM-13	C_r13 =	20.851	(mg/L)	10.514	(mg/l)	6.472	(mg/l)

Case	Year 20			
Parameter	Nickel			
		-		
	concentration of surface water into PM-12	C_s12 =	0.0012	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0012	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0012	(mg/L)
ntration	concentration in Area 5 Pit NW discharge	C_spit =	0.0052	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.023571036	(mg/L)
<b>A</b>	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.098	(mg/L)
	concentration in tailings basin cell 2W	C_s2w =	0.00688	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.007	(mg/L)
브	concentration of ground water into PM-13	C_g13 =	0.007	(mg/L)

Iss flux of surface water into PM-12 Iss flux of ground water into PM-12 Iss flux in Babbitt WWTP discharge Iss flux of surface water into PM-13 Iss flux of ground water into PM-13 Iss flux of Area 5 Pit NW discharge Iss flux in seepage from Tailings Basin Cells 1E and 2E Iss flux in hydrometallurgical residue cells liner leakage Iss flux in seepage from cell 2W	M_s12 = M_g12 = M_sBab = M_s13 = M_g13 = M_spit = M_fs = M_fs = M_rrs = M_s2w =	0.01 - 0.83 0.04 4.31 0.05	(mg/s)   (mg/s)	0.17 0.01 2.09 0.83 0.29 4.31 0.05	(mg/s)   (mg/s)	0.17 0.01 24 0.83 0.29 4.31 0.05	(mg/s) (mg/s) (mg/s) (mg/s) (mg/s) (mg/s) (mg/s)
Iss flux in Babbitt WWTP discharge Iss flux of surface water into PM-13 Iss flux of ground water into PM-13 Iss flux of Area 5 Pit NW discharge Iss flux in seepage from Tailings Basin Cells 1E and 2E Iss flux in hydrometallurgical residue cells liner leakage	M_sBab = M_s13 = M_g13 = M_spit = M_fs = M_rrs =	0.01 - 0.83 0.04 4.31 0.05 0.39	(mg/s) (mg/s) (mg/s) (mg/s) (mg/s) (mg/s)	0.01 2.09 0.83 0.29 4.31 0.05	(mg/s) (mg/s) (mg/s) (mg/s) (mg/s) (mg/s)	0.01 24 0.83 0.29 4.31 0.05	(mg/s) (mg/s) (mg/s) (mg/s) (mg/s)
ass flux of surface water into PM-13 lss flux of ground water into PM-13 lss flux of Area 5 Pit NW discharge lss flux in seepage from Tailings Basin Cells 1E and 2E lss flux in hydrometallurgical residue cells liner leakage	M_s13 = M_g13 = M_spit = M_fs = M_rrs =	0.83 0.04 4.31 0.05 0.39	(mg/s) (mg/s) (mg/s) (mg/s) (mg/s)	2.09 0.83 0.29 4.31 0.05	(mg/s) (mg/s) (mg/s) (mg/s) (mg/s)	24 0.83 0.29 4.31 0.05	(mg/s) (mg/s) (mg/s) (mg/s) (mg/s)
ass flux of ground water into PM-13 ass flux of Area 5 Pit NW discharge ass flux in seepage from Tailings Basin Cells 1E and 2E ass flux in hydrometallurgical residue cells liner leakage	M_g13 = M_spit = M_fs = M_rrs =	0.04 4.31 0.05 0.39	(mg/s) (mg/s) (mg/s) (mg/s)	0.83 0.29 4.31 0.05	(mg/s) (mg/s) (mg/s) (mg/s)	0.83 0.29 4.31 0.05	(mg/s) (mg/s) (mg/s) (mg/s)
uss flux of Årea 5 Pit NW discharge uss flux in seepage from Tailings Basin Cells 1E and 2E uss flux in hydrometallurgical residue cells liner leakage	M_spit = M_fs = M_rrs =	0.04 4.31 0.05 0.39	(mg/s) (mg/s) (mg/s)	0.29 4.31 0.05	(mg/s) (mg/s) (mg/s)	0.29 4.31 0.05	(mg/s) (mg/s) (mg/s)
uss flux in seepage from Tailings Basin Cells 1E and 2E uss flux in hydrometallurgical residue cells liner leakage	M_fs = M_rrs =	4.31 0.05 0.39	(mg/s) (mg/s)	4.31 0.05	(mg/s) (mg/s)	4.31 0.05	(mg/s) (mg/s)
ss flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.05 0.39	(mg/s)	0.05	(mg/s)	0.05	(mg/s)
		0.39					
iss flux in seepage from cell 2W	M_s2w =		(mg/s)	0.39	(mg/s)	0.39	(
		Low Flo					(mg/s)
			w	Average	Flow	High Fl	wo
iss flux in river at PM-12	M_r12 =		(mg/s) (mg/s)		(mg/s) (mg/s)		(mg/s) (mg/s)
		Low Flo	w	Average	Flow	High Fl	ow
ncentration in river at PM-12	C_r12 =	0.005	(mg/L)	0.002		0.001	
			Low Flo	Low Flow	Low Flow Average   centration in river at PM-12 C_r12 = 0.005 (mg/L) 0.002	Low Flow Average Flow	Low Flow Average Flow High Flo

Case	Year 20			
Parameter	Lead			
		-		
	concentration of surface water into PM-12	C_s12 =	0.00015 (	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.00015 (	(mg/L)
_	concentration in Babbitt WWTP discharge	C_sBab =	0.00015 (	(mg/L)
tio	concentration in Area 5 Pit NW discharge	C_spit =	0.0003 (	(mg/L)
ntration	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.002295615 (	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0005 (	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	0.0012 (	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.0012 (	(mg/L)
du	concentration of ground water into PM-13	C_g13 =	0.0012 (	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.05	(mg/s)	1	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.03	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itrai	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.26	(mg/s)	3	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.14	(mg/s)	0.14	(mg/s)	0.14	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.02	(mg/s)	0.02	(mg/s)
	many flux in according from Tailings Desig Calls 15 and 05	M_fs =	0.42	(mg/s)	0.42	(mg/s)	0.42	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
မိ န	mass flux in seepage from cell 2W	M_s2w =	0.07	(mg/s)		(mg/s)	0.07	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =	0.03	(mg/s)	0.08	(mg/s)	0.64	(mg/s)
Ĕ	mass flux in river at PM-13	M_r13 =		(mg/s)		(mg/s)		(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to	concentration in river at PM-12	C_r12 =	0.001	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
S fi C	concentration in river at PM-13	C_r13 =	0.002	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Case Parameter	Year 20 Antimony			
		-	_	
	concentration of surface water into PM-12	C_s12 =	4.00E-05	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	4.00E-05	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	4.00E-05	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	2.50E-04	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	8.78E-03	(mg/L)
concei	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.004	(mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	2.50E-04	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	1.50E-03	(mg/L)
du du	concentration of ground water into PM-13	C_g13 =	1.50E-03	(mg/L)

			Low Flor	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.01	(mg/s)	0	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.04	(mg/s)	0.04	(mg/s)	0.04	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.07	(mg/s)	1	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.18	(mg/s)	0.18	(mg/s)	0.18	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.61	(mg/s)	1.61	(mg/s)	1.61	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
ទ បិ	mass flux in seepage from cell 2W	M_s2w =		(mg/s)		(mg/s)	0.01	(mg/s)
			Low Flor	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 =		(mg/s)		(mg/s)		(mg/s) (mg/s)
20		IVI_113 =	Low Flo		Average		High Fl	<b>U</b>
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.001	(mg/L)		(mg/L)	0.000	(mg/L)

Case Parameter	Year 20 Selenium			
T urumotor	Colonian			
	concentration of surface water into PM-12	C_s12 =	0.0003	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0003	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0003	(mg/L)
tio	concentration in Area 5 Pit NW discharge	C_spit =	0.0016	(mg/L)
ntration	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.001434159	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.054	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	0.00109	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.00295	(mg/L)
du du	concentration of ground water into PM-13	C_g13 =	0.00295	(mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
m	nass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.11	(mg/s)	1	(mg/s)
	nass flux of ground water into PM-12	M_g12 =	0.07	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
n tio	nass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
u trai	nass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.52	(mg/s)	6	(mg/s)
r ceu	nass flux of ground water into PM-13	M_g13 =	0.35	(mg/s)	0.35	(mg/s)	0.35	(mg/s)
concentration flux la la la la	nass flux of Area 5 Pit NW discharge	M_spit =	0.01	(mg/s)	0.09	(mg/s)	0.09	(mg/s)
	nass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.26	(mg/s)	0.26	(mg/s)	0.26	(mg/s)
Convert to mass	nass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.03	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
n e S	nass flux in seepage from cell 2W	M_s2w =		(mg/s)		(mg/s)		(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
ass ba each r	nass flux in river at PM-12	M_r12 =		(mg/s)		(mg/s)		(mg/s)
n <b>o S</b>	nass flux in river at PM-13	M_r13 =	0.79 Low Flo	(mg/s)	1.50 Average	(mg/s)	8.05 High Fl	(mg/s)
onvert ux to oncent	oncentration in river at PM-12	C_r12 =	0.002	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
OĘŏc	oncentration in river at PM-13	C_r13 =	0.002	(mg/L)	0.001	(mg/L)	0.000	(mg/L)

Case	Year 20			
Parameter	Sulfate			
	concentration of surface water into PM-12	C s12 =	4.00	(mg/L)
data	concentration of surface water into PM-13	C s13 =		(mg/L)
n da	concentration in Babbitt WWTP discharge	C_sBab =	4.00	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	1046.27	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	163.33	(mg/L)
۵ ۵	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	7347.00	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	152.40	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	8.50	(mg/L)
<u>Ľ</u>	concentration of ground water into PM-13	C_g13 =	8.50	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	1,427.45	(mg/s)	16,206	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	206.87	(mg/s)	206.87	(mg/s)	206.87	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	37.36	(mg/s)	37.36	(mg/s)	37.36	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	6,965.20	(mg/s)	79,526	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	1,012.72	(mg/s)	1,012.72	(mg/s)	1,012.72	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	7,698.43	(mg/s)	58,922.60	(mg/s)	58,922.60	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	29,864.60	(mg/s)	29,864.60	(mg/s)	29,864.60	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	4,013.51	(mg/s)	4,013.51	(mg/s)	4,013.51	(mg/s)
to Co	mass flux in seepage from cell 2W	M_s2w =	8,600.26	(mg/s)	8,600.26	(mg/s)	8,600.26	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12	M_r12 =	244.23	(mg/s)	1,671.68	(mg/s)	16,449.94	(mg/s)
Ma at	mass flux in river at PM-13	M_r13 =	51,433.74		111,050.56		198,390.02	
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	7.252	(mg/L)	4.280	(mg/l)	4.027	(mg/l)
Conve flux to concei	concentration in river at PM-13	C_r13 =	128.582	(mg/L)	43.598	(mg/l)	8.137	(mg/l)

Case Parameter	Year 20 Thallium			
	encontration of conference water into DM 40	0 -10	0.0000	(
data	concentration of surface water into PM-12 concentration of surface water into PM-13	C_s12 = C_s13 =	0.0002	
	concentration in Babbitt WWTP discharge	C_sBab =	0.0002	
ntration	concentration in Area 5 Pit NW discharge	C_spit =	0.0006	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.001001115	(mg/L)
۵U	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0002	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	0.0002	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.000004	(mg/L)
dul	concentration of ground water into PM-13	C_g13 =	0.000004	(mg/L)

			Low Flo	w	Average	Flow	High Fl	low
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.07	(mg/s)	1	(mg/s)
-	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
tion	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.35	(mg/s)	4	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.18	(mg/s)	0.18	(mg/s)	0.18	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
ຊີ ວິ	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
			Low Flo	w	Average	Flow	High Fl	low
Mass balance at each node		M_r12 = M r13 =		(mg/s) (mg/s)		(mg/s) (mg/s)		(mg/s) (mg/s)
< 0	mass nux in river at FM-13	IVI_113 =	Low Flo		Average		5.02 High Fl	
Convert mass flux to concentration		C_r12 =		(mg/L) (mg/L)	0.000	(mg/L) (mg/L)		(mg/L) (mg/L)

Case	Year 20			
Parameter	Zinc			
		-		
	concentration of surface water into PM-12	C_s12 =	0.016	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.016	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.016	(mg/L)
ţi	concentration in Area 5 Pit NW discharge	C_spit =	0.003	(mg/L)
ntration	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.058688337	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.01	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	0.01435	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.0115	(mg/L)
법	concentration of ground water into PM-13	C_g13 =	0.0115	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	5.71	(mg/s)	65	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.28	(mg/s)	0.28	(mg/s)	0.28	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	0.15	(mg/s)	0.15	(mg/s)	0.15	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	27.86	(mg/s)	318	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	1.37	(mg/s)	1.37	(mg/s)	1.37	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	0.02	(mg/s)	0.17	(mg/s)	0.17	(mg/s)
	many flux in according from Tailings Desig Calls 15 and 25	M_fs =	10.73	(mg/s)	10.73	(mg/s)	10.73	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
မိ မိ	mass flux in seepage from cell 2W	M_s2w =	0.81	(mg/s)		(mg/s)	0.81	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =	0.43	(mg/s)	6.14	(mg/s)	65.25	(mg/s)
Ĕ	mass flux in river at PM-13	M_r13 =		(mg/s)		(mg/s)	396.44	
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to	concentration in river at PM-12	C_r12 =	0.013	(mg/L)	0.016	(mg/L)	0.016	(mg/L)
S fi C	concentration in river at PM-13	C_r13 =	0.033	(mg/L)	0.018	(mg/L)	0.016	(mg/L)

Appendix F.14 Embarrass River Geotechnical Mitigation Closure

#### FLOWS

Case	Closure				
Flows	Low Flow Conditions (no surface runoff)				Node
in s River	flow in river at PM-12	Q_r12_L =	1.19	(cfs)	PM-12
low 'ras	flow in river at PM-13	Q_r13_L =	9.06	(cfs)	PM-13
Total flow in Embarrass F	flow check	Q_ck_L =	9.06	(cfs)	_
	surface water flow into PM-12	Q_s12_L =	0.00	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_L =	0.00	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_L =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_L =	0.26	(cfs)	PM-13
ata	seepage from Tailings Basin Cells 1E and 2E	Q_fs_L =	1.73	(cfs)	PM-13
flow data	hydrometallurgical residue cells liner leakage	Q_rrs_L =	0.0017	(cfs)	PM-13
flov	seepage from cell 2W	Q_s2w_L =	1.67	(cfs)	PM-13
Input 1	ground water flow into PM-12	Q_g12_L =	0.86	(cfs)	PM-12
L L	ground water flow into PM-13	Q_g13_L =	4.21	(cfs)	PM-13

Case	Closure				
Flow	Average Flow Conditions (mean annual)				_
n River	flow in river at PM-12	Q_r12_M =	13.80	(cfs)	PM-12
Total flow in Embarrass F	flow in river at PM-13	Q_r13_M =	84.93	(cfs)	PM-13
Tota	flow check	Q_ck_M =	84.93	(cfs)	
	surface water flow into PM-12	Q_s12_M =	12.61	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_M =	61.53	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_M =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_M =	1.99	(cfs)	PM-13
ta	seepage from Tailings Basin Cells 1E and 2E	Q_fs_M =	1.73	(cfs)	PM-13
/ da	hydrometallurgical residue cells liner leakage	Q_rrs_M =	0.0017	(cfs)	PM-13
low	seepage from cell 2W	Q_s2w_M =	1.67	(cfs)	PM-13
nput flow data	ground water flow into PM-12	Q_g12_M =	0.86	(cfs)	PM-12
du	ground water flow into PM-13	Q_g13_M =	4.21	(cfs)	PM-13

Case	Closure				
Flow	High Flow Conditions (avg. annual 1-day ma	ax flow)			
n Diver		Q_r12_H =	144.35	(cfs)	PM-12
Total flow in	flow in river at PM-13	Q_r13_H =	856.48	(cfs)	PM-13
Total 1 Emba	flow check	Q_ck_H =	856.48	(cfs)	
	surface water flow into PM-12	Q_s12_H =	143.16	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_H =	702.53	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_H =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_H =	1.99	(cfs)	PM-13
\$	seepage from Tailings Basin Cells 1E and 2E	Q_fs_H =	1.73	(cfs)	PM-13
ctoto otto	hydrometallurgical residue cells liner leakage	Q rrs H =	0.00	(cfs)	PM-13
flow	seepage from cell 2W	Q s2w H =	1.67	(cfs)	PM-13
1	ground water flow into PM-12	Q_g12_H =	0.86	(cfs)	PM-12
2	ground water flow into PM-12 ground water flow into PM-13	Q_g13_H =	4.21	(cfs)	PM-13

Case Parameter	Closure Silver			
		-		
	concentration of surface water into PM-12	C_s12 =	0.00011	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.00011	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00011	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.00015	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.00124	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.000125	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	0.000100	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.00008	(mg/L)
브	concentration of ground water into PM-13	C_g13 =	0.00008	(mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.04	(mg/s)	0	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.19	(mg/s)	2	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.06	(mg/s)	0.06	(mg/s)	0.06	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
<u>ء</u> د	mass flux in seepage from cell 2W	M_s2w =	0.00	(mg/s)		(mg/s)	0.00	(mg/s)
		_	Low Flo	W	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 =		(mg/s) (mg/s)		(mg/s) (mg/s)		(mg/s) (mg/s)
20		IVI_I I 3 =	Low Flo		Average		High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Case Parameter	Closure Aluminum			
	concentration of surface water into PM-12	C_s12 =	0.12	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.12	(mg/L)
-	concentration in Babbitt WWTP discharge	C_sBab =	0.12	(mg/L)
tio	concentration in Area 5 Pit NW discharge	C_spit =	0.01325	(mg/L)
ntration	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	6.15E-01	(mg/L)
CD CD	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.80E-01	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	1.5788	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.025	(mg/L)
lnp	concentration of ground water into PM-13	C_g13 =	0.025	(mg/L)

ss flux of surface water into PM-12 ss flux of ground water into PM-12 ss flux in Babbitt WWTP discharge ss flux of surface water into PM-13 ss flux of ground water into PM-13 ss flux of Area 5 Pit NW discharge ss flux in seepage from Tailings Basin Cells 1E and 2E ss flux in hydrometallurgical residue cells liner leakage ss flux in seepage from cell 2W	M_s12 = M_g12 = M_sBab = M_s13 = M_g13 = M_spit = M_fs = M_fs = M_rrs = M_s2w =	1.12 - 2.98 0.10 30.13 0.01	(mg/s)   (mg/s)	0.61 1.12 208.96 2.98 0.75 30.13 0.01	(mg/s) (mg/s)   (mg/s) (mg/s)   (mg/s) (mg/s)   (mg/s) (mg/s)   (mg/s) (mg/s)   (mg/s) (mg/s)	0.61 1.12 2,386 2.98 0.75 30.13 0.01	(mg/s) (mg/s)
ss flux in Babbitt WWTP discharge ss flux of surface water into PM-13 ss flux of ground water into PM-13 ss flux of Area 5 Pit NW discharge ss flux in seepage from Tailings Basin Cells 1E and 2E ss flux in hydrometallurgical residue cells liner leakage	M_sBab = M_s13 = M_g13 = M_spit = M_fs = M_rrs =	1.12 - 2.98 0.10 30.13 0.01 74.66	(mg/s) (mg/s) (mg/s) (mg/s) (mg/s) (mg/s)	1.12 208.96 2.98 0.75 30.13 0.01	(mg/s) (mg/s) (mg/s) (mg/s) (mg/s) (mg/s)	1.12 2,386 2.98 0.75 30.13 0.01	(mg/s) (mg/s) (mg/s) (mg/s) (mg/s)
ss flux of surface water into PM-13 ss flux of ground water into PM-13 ss flux of Area 5 Pit NW discharge ss flux in seepage from Tailings Basin Cells 1E and 2E ss flux in hydrometallurgical residue cells liner leakage	M_s13 = M_g13 = M_spit = M_fs = M_rrs =	2.98 0.10 30.13 0.01 74.66	(mg/s) (mg/s) (mg/s) (mg/s) (mg/s)	208.96 2.98 0.75 30.13 0.01	(mg/s) (mg/s) (mg/s) (mg/s) (mg/s)	2,386 2.98 0.75 30.13 0.01	(mg/s) (mg/s) (mg/s) (mg/s)
ss flux of ground water into PM-13 ss flux of Area 5 Pit NW discharge ss flux in seepage from Tailings Basin Cells 1E and 2E ss flux in hydrometallurgical residue cells liner leakage	M_g13 = M_spit = M_fs = M_rrs =	0.10 30.13 0.01 74.66	(mg/s) (mg/s) (mg/s) (mg/s)	2.98 0.75 30.13 0.01	(mg/s) (mg/s) (mg/s) (mg/s)	2.98 0.75 30.13 0.01	(mg/s) (mg/s) (mg/s)
ss flux of Årea 5 Pit NW discharge ss flux in seepage from Tailings Basin Cells 1E and 2E ss flux in hydrometallurgical residue cells liner leakage	M_spit = M_fs = M_rrs =	0.10 30.13 0.01 74.66	(mg/s) (mg/s) (mg/s)	2.98 0.75 30.13 0.01	(mg/s) (mg/s) (mg/s) (mg/s)	0.75 30.13 0.01	(mg/s) (mg/s)
ss flux in seepage from Tailings Basin Cells 1E and 2E ss flux in hydrometallurgical residue cells liner leakage	M_fs = M_rrs =	30.13 0.01 74.66	(mg/s) (mg/s)	30.13 0.01	(mg/s) (mg/s)	30.13 0.01	(mg/s)
ss flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.01 74.66	(mg/s)	0.01	(mg/s)	0.01	
ss flux in hydrometallurgical residue cells liner leakage	_	74.66					(mg/s)
ss flux in seepage from cell 2W	M_s2w =	74.66				74.00	
				1 1100	(····g/0/	74.66	(mg/s)
		LOWIN	w	Average	Flow	High Flo	wc
ss flux in river at PM-12	M_r12 =		(mg/s)		(mg/s)	487.90	
ss flux in river at PM-13	M_r13 =	109.60		362.03 Average		2,982.21 High Flo	
	C_r12 =					0.119	
	ntration in river at PM-12	ntration in river at PM-12 C_r12 =	ntration in river at PM-12 $C_r r 12 = 0.051$	ntration in river at PM-12 C_r12 = 0.051 (mg/L)	ntration in river at PM-12 C_r12 = 0.051 (mg/L) 0.114	ntration in river at PM-12 C_r12 = 0.051 (mg/L) 0.114 (mg/L)	ntration in river at PM-12 C_r12 = 0.051 (mg/L) 0.114 (mg/L) 0.119

Case Parameter	Closure Arsenic			
	concentration of surface water into PM-12	C_s12 =	0.00075	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.00075	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00075	(mg/L)
ţi	concentration in Area 5 Pit NW discharge	C_spit =	0.001325	(mg/L)
ntration	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.027915158	(mg/L)
concel	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.004	(mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	0.00291	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.00273	(mg/L)
dul	concentration of ground water into PM-13	C_g13 =	0.00273	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.27	(mg/s)	3	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.07	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
concentration flux	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1.31	(mg/s)	15	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.33	(mg/s)	0.33	(mg/s)	0.33	(mg/s)
con	mass flux of Area 5 Pit NW discharge	M_spit =	0.01	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.37	(mg/s)	1.37	(mg/s)	1.37	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =		(mg/s)		(mg/s)	0.00	(mg/s)
to Co	mass flux in seepage from cell 2W	M_s2w =	0.14	(mg/s)	0.14	(mg/s)	0.14	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s)		(mg/s)		(mg/s)
20	mass flux in river at PM-13	M_r13 =	Low Flo	(mg/s) w	3.55 Average	(mg/s) Flow	High Fl	(mg/s) ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L) (mg/L)	0.001	(mg/L)	0.001	(mg/L) (mg/L)

Case	Closure			
Parameter	Boron			
		-		
	concentration of surface water into PM-12	C_s12 =	0.027	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.027	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.027	(mg/L)
ntration	concentration in Area 5 Pit NW discharge	C_spit =	0.1315	(mg/L)
ıtra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.150573845	(mg/L)
ICE	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.11	(mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	0.33	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.0212	(mg/L)
브	concentration of ground water into PM-13	C_g13 =	0.0212	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	9.64	(mg/s)	109	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.52	(mg/s)	0.52	(mg/s)	0.52	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.25	(mg/s)	0.25	(mg/s)	0.25	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	47.02	(mg/s)	537	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	2.53	(mg/s)	2.53	(mg/s)	2.53	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.97	(mg/s)	7.41	(mg/s)	7.41	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	7.38	(mg/s)	7.38	(mg/s)	7.38	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
ទ បំ	mass flux in seepage from cell 2W	M_s2w =	15.61	(mg/s)	15.61	(mg/s)	15.61	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s)		(mg/s)	110.16	
a ≤	mass flux in river at PM-13	M_r13 =	27.25	(mg/s) w	90.34 Average	(mg/s) Flow	679.88 High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.023	(mg/L)	0.027	(mg/L)	0.027	(mg/L) (mg/L)

Case	Closure			
Parameter	Barium			
	concentration of surface water into PM-12	C_s12 =	0.016	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.016	(mg/L)
-	concentration in Babbitt WWTP discharge	C_sBab =	0.016	(mg/L)
ntration	concentration in Area 5 Pit NW discharge	C_spit =	0.0044	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	1.95E-02	(mg/L)
۵ ۵	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	5.00E-03	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	0.09298	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.0681	(mg/L)
법	concentration of ground water into PM-13	C_g13 =	0.0681	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	5.71	(mg/s)	65	(mg/s)
-	mass flux of ground water into PM-12	M_g12 =	1.66	(mg/s)	1.66	(mg/s)	1.66	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.15	(mg/s)	0.15	(mg/s)	0.15	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	27.86	(mg/s)	318	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	8.11	(mg/s)	8.11	(mg/s)	8.11	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.03	(mg/s)	0.25	(mg/s)	0.25	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.95	(mg/s)	0.95	(mg/s)	0.95	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =		(mg/s)		(mg/s)	0.00	(mg/s)
<u>ء</u> ک	mass flux in seepage from cell 2W	M_s2w =		(mg/s)		(mg/s)	4.40	(mg/s)
		_	Low Flo	W	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s) (mg/s)		(mg/s)	66.63	(mg/s)
20		WI_113 =	Low Flo		Average		High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L) (mg/L)		(mg/L) (mg/L)		(mg/L) (mg/L)

Case	Closure			
Parameter	Beryllium			
		a (a		( (1))
_	concentration of surface water into PM-12	C_s12 =	0.0001	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0001	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0001	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.0001	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.001323498	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	0.00075	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.000023	(mg/L)
du du	concentration of ground water into PM-13	C_g13 =	0.000023	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.04	(mg/s)	0	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.17	(mg/s)	2	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.06	(mg/s)	0.06	(mg/s)	0.06	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	-	(mg/s)	-	(mg/s)	-	(mg/s)
e C	mass flux in seepage from cell 2W	M_s2w =	0.04	(mg/s)	0.04	(mg/s)	0.04	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.00	(mg/s)	0.04	(mg/s)	0.41	(mg/s)
Ma		M_r13 =	0.11	(mg/s)	0.32	(mg/s)	2.50	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to	concentration in river at PM-12	C_r12 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
Con flux	concentration in river at PM-13	C_r13 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Case Parameter	Closure Calcium			
	concentration of surface water into PM-12	C_s12 =	15	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	15	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	15	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	95.35	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	68.73996034	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	416	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	59.78	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	19	(mg/L)
법	concentration of ground water into PM-13	C_g13 =	19	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	5,352.95	(mg/s)	60,771	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	462.42	(mg/s)	462.42	(mg/s)	462.42	(mg/s)
tion	mass flux in Babbitt WWTP discharge	M_sBab =	140.09	(mg/s)	140.09	(mg/s)	140.09	(mg/s)
tra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	26,119.49	(mg/s)	298,224	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	2,263.72	(mg/s)	2,263.72	(mg/s)	2,263.72	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	701.59	(mg/s)	5,369.83	(mg/s)	5,369.83	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	3,367.90	(mg/s)	3,367.90	(mg/s)	3,367.90	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	19.51	(mg/s)		(mg/s)		(mg/s)
မီ မီ	mass flux in seepage from cell 2W	M_s2w =	2,826.97		2,826.97			(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =	602.51 9,782.19		5,955.45		61,373.93	
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to	concentration in river at PM-12	C_r12 =	17.891	(mg/L)	15.249	(mg/l)	15.024	(mg/l)
Con	concentration in river at PM-13	C_r13 =	38.136	(mg/L)	19.106	(mg/l)	15.291	(mg/l)
Case Parameter	Closure Cadmium							
-------------------	-----------------------------------------------------------------	----------	-------------	--------				
	concentration of surface water into PM-12	C_s12 =	0.00008	(mg/L)				
data	concentration of surface water into PM-13	C_s13 =	0.00008	(mg/L)				
	concentration in Babbitt WWTP discharge	C_sBab =	0.00008	(mg/L)				
ntration	concentration in Area 5 Pit NW discharge	C_spit =	0.0001	(mg/L)				
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.001182282	(mg/L)				
۵ ۵	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0004	(mg/L)				
conc	concentration in tailings basin cell 2W	C_s2w =	0.000188	(mg/L)				
Input	concentration of ground water into PM-12	C_g12 =	0.0003	(mg/L)				
lnp	concentration of ground water into PM-13	C_g13 =	0.0003	(mg/L)				

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.03	(mg/s)	0	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.14	(mg/s)	2	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.04	(mg/s)	0.04	(mg/s)	0.04	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.06	(mg/s)	0.06	(mg/s)	0.06	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
ទ បំ	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s)		(mg/s)		(mg/s)
at ñ	mass flux in river at PM-13	M_r13 =	0.11 Low Flo	(mg/s)	0.28 Average	(mg/s)	2.03 High Fl	(mg/s)
<u>م</u> ح			LOW FIO	~	Average		nigii ri	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
Con flux con	concentration in river at PM-13	C_r13 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Case Parameter	Closure Chloride			
	concentration of surface water into PM-12	C s12 =	6.5	(mg/L)
data	concentration of surface water into PM-13	C_s13 =		(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	6.5	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	5.95	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	3.97E+00	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.76E+03	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	21.54	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	1.8	(mg/L)
duj	concentration of ground water into PM-13	C_g13 =	1.8	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	2,319.61	(mg/s)	26,334	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	43.81	(mg/s)	43.81	(mg/s)	43.81	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	60.70	(mg/s)	60.70	(mg/s)	60.70	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	11,318.44	(mg/s)	129,230	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	214.46	(mg/s)	214.46	(mg/s)	214.46	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	43.78	(mg/s)	335.09	(mg/s)	335.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	194.68	(mg/s)	194.68	(mg/s)	194.68	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M rrs =	82.56	(mg/s)	82.56	(mg/s)	82.56	(mg/s)
<u>ء</u> ک		M_s2w =	1,018.62		1,018.62		1,018.62	
			Low Flo	w	Average	Flow	High Flo	ow
Mass balance at each node		M_r12 =	104.51		2,424.12		26,438.79	
20	mass flux in river at PM-13	M_r13 =	1,658.61		15,587.96 Average		157,514.59 High Flo	( <b>e</b> /
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	3.103	(mg/L)	6.207	(mg/L) (mg/L)	6.472	

Case	Closure			
Parameter	Cobalt			
		1		
	concentration of surface water into PM-12	C_s12 =	0.0006	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0006	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0006	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.000555	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.002707554	(mg/L)
ncei	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.005	(mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	0.001556	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.0011	(mg/L)
du	concentration of ground water into PM-13	C_g13 =	0.0011	(mg/L)

mass flux of surface water into PM-12 mass flux of ground water into PM-12 mass flux in Babbitt WWTP discharge	M_s12 = M_g12 = M_sBab =	- 0.03	(mg/s)	0.21	(mg/s)	2	(mg/s)
mass flux in Babbitt WWTP discharge		0.03	(ma/a)				
*	M sBab =		(mg/s)	0.03	(mg/s)	0.03	(mg/s)
and the state that the DM 40		0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1.04	(mg/s)	12	(mg/s)
mass flux of ground water into PM-13	M_g13 =	0.13	(mg/s)	0.13	(mg/s)	0.13	(mg/s)
mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.13	(mg/s)	0.13	(mg/s)	0.13	(mg/s)
mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
mass flux in seepage from cell 2W	M_s2w =			0.07	(mg/s)		(mg/s)
		Low Flo	w	Average	Flow	High Fl	ow
mass flux in river at PM-12 mass flux in river at PM-13	M_r12 = M_r13 =						(mg/s) (mg/s)
		Low Flo	w	Average	Flow	High Fl	ow
concentration in river at PM-12	C_r12 =						(mg/L)
	mass flux of Area 5 Pit NW discharge mass flux in seepage from Tailings Basin Cells 1E and 2E mass flux in hydrometallurgical residue cells liner leakage mass flux in seepage from cell 2W mass flux in river at PM-12 mass flux in river at PM-13	mass flux of Area 5 Pit NW discharge M_spit =   mass flux in seepage from Tailings Basin Cells 1E and 2E M_fs =   mass flux in hydrometallurgical residue cells liner leakage M_rrs =   mass flux in seepage from cell 2W M_s2w =   mass flux in river at PM-12 M_r12 =   mass flux in river at PM-13 M_r13 =   concentration in river at PM-12 C_r12 =	mass flux of Area 5 Pit NW discharge M_spit = 0.00   mass flux in seepage from Tailings Basin Cells 1E and 2E M_fs = 0.13   mass flux in hydrometallurgical residue cells liner leakage M_rrs = 0.00   mass flux in seepage from cell 2W M_s2w = 0.07   Low Flo   mass flux in river at PM-12 M_r12 = 0.03   mass flux in river at PM-13 M_r13 = 0.37   Low Flo   concentration in river at PM-12	mass flux of Area 5 Pit NW dischargeM_spit =0.00 (mg/s)mass flux in seepage from Tailings Basin Cells 1E and 2EM_fs =0.13 (mg/s)mass flux in hydrometallurgical residue cells liner leakageM_rrs =0.00 (mg/s)mass flux in seepage from cell 2WM_s2w =0.07 (mg/s)Low Flowmass flux in river at PM-12M_r12 =0.03 (mg/s)Low Flowconcentration in river at PM-12C_r12 =0.001 (mg/L)	mass flux of Area 5 Pit NW dischargeM_spit =0.00(mg/s)0.03mass flux in seepage from Tailings Basin Cells 1E and 2EM_fs =0.13(mg/s)0.13mass flux in hydrometallurgical residue cells liner leakageM_rrs =0.00(mg/s)0.00mass flux in seepage from cell 2WM_s2w =0.07(mg/s)0.07Low FlowAveragemass flux in river at PM-12M_r12 =0.03(mg/s)0.25mass flux in river at PM-13M_r13 =0.37(mg/s)1.66Low FlowAverageconcentration in river at PM-120.001(mg/L)0.001	mass flux of Area 5 Pit NW dischargeM_spit =0.00(mg/s)0.03(mg/s)mass flux in seepage from Tailings Basin Cells 1E and 2EM_fs =0.13(mg/s)0.13(mg/s)mass flux in hydrometallurgical residue cells liner leakageM_rrs =0.00(mg/s)0.00(mg/s)mass flux in seepage from cell 2WM_s2w =0.07(mg/s)0.07(mg/s)Low FlowAverage Flowmass flux in river at PM-12M_r12 =0.03(mg/s)0.25(mg/s)mass flux in river at PM-13M_r13 =0.37(mg/s)1.66(mg/s)Low FlowAverage FlowC_r12 =0.001(mg/L)OutputC_r12 =0.001(mg/L)OutputC_r12 =0.001(mg/L)Output	mass flux of Area 5 Pit NW discharge M_spit = 0.00 (mg/s) 0.03 (mg/s) 0.03   mass flux in seepage from Tailings Basin Cells 1E and 2E M_fs = 0.13 (mg/s) 0.13 (mg/s) 0.13   mass flux in hydrometallurgical residue cells liner leakage M_rrs = 0.00 (mg/s) 0.00 (mg/s) 0.00   mass flux in seepage from cell 2W M_s2w = 0.07 (mg/s) 0.07 (mg/s) 0.07   mass flux in seepage from cell 2W M_s2w = 0.07 (mg/s) 0.07 (mg/s) 0.07   mass flux in river at PM-12 M_r12 = 0.03 (mg/s) 0.25 (mg/s) 2.46   mass flux in river at PM-13 M_r13 = 0.37 (mg/s) 1.66 (mg/s) 14.76   Low Flow Average Flow High Fl   concentration in river at PM-12 0.001 (mg/L) 0.001 0.001

Case	Closure			
Parameter	Copper			
		-		
	concentration of surface water into PM-12	C_s12 =	0.0015	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0015	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0015	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.00345	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.014116893	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0015	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	0.004555	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.004	(mg/L)
duj	concentration of ground water into PM-13	C_g13 =	0.004	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.54	(mg/s)	6	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.10	(mg/s)	0.10	(mg/s)	0.10	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	2.61	(mg/s)	30	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.48	(mg/s)	0.48	(mg/s)	0.48	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	0.03	(mg/s)	0.19	(mg/s)	0.19	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.69	(mg/s)	0.69	(mg/s)	0.69	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
c to	mass flux in seepage from cell 2W	M_s2w =	0.22	(mg/s)	0.22	(mg/s)	0.22	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12	M_r12 =	0.11	(mg/s)	0.65	(mg/s)	6.19	(mg/s)
Ma		M_r13 =	1.52	(mg/s)	4.84	(mg/s)	37.59	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.003	(mg/L)	0.002	(mg/L)	0.002	(mg/L)
Con flux	concentration in river at PM-13	C_r13 =	0.006	(mg/L)	0.002	(mg/L)	0.002	(mg/L)

Case	Closure			
Parameter	Fluoride			
	concentration of surface water into PM-12	C_s12 =	0.2	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.2	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.2	(mg/L)
ntration	concentration in Area 5 Pit NW discharge	C_spit =	0.125	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	1.14E+00	(mg/L)
ICEI	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	2.85E+00	(mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	1.55	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.385	(mg/L)
브	concentration of ground water into PM-13	C_g13 =	0.385	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	71.37	(mg/s)	810	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	9.37	(mg/s)	9.37	(mg/s)	9.37	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	1.87	(mg/s)	1.87	(mg/s)	1.87	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	348.26	(mg/s)	3,976	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	45.87	(mg/s)	45.87	(mg/s)	45.87	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.92	(mg/s)	7.04	(mg/s)	7.04	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	55.70	(mg/s)	55.70	(mg/s)	55.70	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.13	(mg/s)	0.13	(mg/s)		(mg/s)
ទ បិ	mass flux in seepage from cell 2W	M_s2w =	73.30	(mg/s)	73.30	(mg/s)	73.30	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =	11.24	(mg/s)	82.61	(mg/s)	<u>821.52</u> 4,979.89	
20		IVI_I I 0 =	Low Flo		Average		High Fl	
Convert mass flux to concentration		C_r12 =		(mg/L) (mg/L)		(mg/L)	0.201	(mg/L)

Case	Closure			
Parameter	Iron			
		-		
	concentration of surface water into PM-12	C_s12 =	2.9	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	2.9	(mg/L)
_	concentration in Babbitt WWTP discharge	C_sBab =	2.9	(mg/L)
ntration	concentration in Area 5 Pit NW discharge	C_spit =	0.037761905	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	9.94E-02	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	4.00E-01	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	4.594	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.035	(mg/L)
별	concentration of ground water into PM-13	C_g13 =	0.035	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	1,034.90	(mg/s)	11,749	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.85	(mg/s)	0.85	(mg/s)	0.85	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	27.08	(mg/s)	27.08	(mg/s)	27.08	(mg/s)
itrai	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	5,049.77	(mg/s)	57,657	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	4.17	(mg/s)	4.17	(mg/s)	4.17	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.28	(mg/s)	2.13	(mg/s)	2.13	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	4.87	(mg/s)	4.87	(mg/s)	4.87	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.02	(mg/s)	0.02	(mg/s)	0.02	(mg/s)
e S	mass flux in seepage from cell 2W	M_s2w =	217.25	(mg/s)	217.25	(mg/s)	217.25	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s)	1,062.84		11,777.08	
Ma at	mass flux in river at PM-13	M_r13 =	254.52		6,341.04		69,662.15	
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.829	(mg/L)	2.721	(mg/L)	2.883	(mg/L)
Cor Co	concentration in river at PM-13	C_r13 =	0.992	(mg/L)	2.638	(mg/L)	2.874	(mg/L)

Case Parameter	Closure Hardness			
	concentration of surface water into PM-12	C s12 =	70	(mg/L)
data	concentration of surface water into PM-13	 C_s13 =		(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	70	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	942.7142857	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	402	(mg/L)
concel	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	8610	(mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	436.6	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	87.5	(mg/L)
L L	concentration of ground water into PM-13	C_g13 =	87.5	(mg/L)

			Low Flo	W	Average	Flow	High F	low
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	24,980.41	(mg/s)	283,600	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	2,129.58	(mg/s)	2,129.58	(mg/s)	2,129.58	(mg/s)
tion	mass flux in Babbitt WWTP discharge	M_sBab =	653.73	(mg/s)	653.73	(mg/s)	653.73	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	121,890.93	(mg/s)	1,391,712	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	10,425.01	(mg/s)	10,425.01	(mg/s)	10,425.01	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	6,936.49	(mg/s)	53,090.84	(mg/s)	53,090.84	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	19,699.16	(mg/s)	19,699.16	(mg/s)	19,699.16	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	403.90	(mg/s)	403.90	(mg/s)	403.90	(mg/s)
<u>ء</u> ک	mass flux in seepage from cell 2W	M_s2w =	20,646.59	(mg/s)	20,646.59	(mg/s)	20,646.59	(mg/s)
			Low Flo	w	Average	Flow	High F	low
Mass balance at each node		M_r12 =	2,783.31		27,763.72		286,383.27	
			Low Flo		Average		High F	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	82.647		71.091		70.104	

Case	Closure			
Parameter	Potassium			
		-		
	concentration of surface water into PM-12	C_s12 =	0.60	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.60	(mg/L)
-	concentration in Babbitt WWTP discharge	C_sBab =	0.60	(mg/L)
ntration	concentration in Area 5 Pit NW discharge	C_spit =	53.80	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	21.31	(mg/L)
d)	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.80	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	7.77	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	1.60	(mg/L)
브	concentration of ground water into PM-13	C_g13 =	1.60	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	214.12	(mg/s)	2,431	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	38.94	(mg/s)	38.94	(mg/s)	38.94	(mg/s)
concentration flux	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.08	(mg/s)	0.08	(mg/s)	0.08	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1,044.78	(mg/s)	11,929	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	190.63	(mg/s)	190.63	(mg/s)	190.63	(mg/s)
uo xnjj	mass flux in Babbitt WWTP discharge	M_sBab =	5.60	(mg/s)	5.60	(mg/s)	5.60	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	395.86	(mg/s)	3,029.85	(mg/s)	3,029.85	(mg/s)
Convert to mass	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1,043.93	(mg/s)	1,043.93		1,043.93	(mg/s)
ទ បិ	mass flux in seepage from cell 2W	M_s2w =	367.44	(mg/s)	367.44	(mg/s)	367.44	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 = M r13 =	39.03	(mg/s) (mg/s)	253.14		2,469.88	
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to concentration		C_r12 =	1.159	(mg/L)		(mg/L) (mg/L)	0.605	(mg/l) (mg/l)

Case Parameter	Closure Magnesium			
		-		
	concentration of surface water into PM-12	C_s12 =	5.90	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	5.90	(mg/L)
-	concentration in Babbitt WWTP discharge	C_sBab =	5.90	(mg/L)
tio	concentration in Area 5 Pit NW discharge	C_spit =	271.00	(mg/L)
ntration	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	55.96	(mg/L)
concel	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	213.00	(mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	69.97	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	10.65	(mg/L)
du	concentration of ground water into PM-13	C_g13 =	10.65	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	2,105.49	(mg/s)	23,903	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	259.20	(mg/s)	259.20	(mg/s)	259.20	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	55.10	(mg/s)	55.10	(mg/s)	55.10	(mg/s)
itrai	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	10,273.66	(mg/s)	117,301	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	1,268.87	(mg/s)	1,268.87	(mg/s)	1,268.87	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	1,994.02	(mg/s)	15,261.91	(mg/s)	15,261.91	(mg/s)
-	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	2,741.51	(mg/s)	2,741.51	(mg/s)	2,741.51	(mg/s)
Convert	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	9.99	(mg/s)	9.99	(mg/s)	9.99	(mg/s)
ວິ.	2 mass flux in seepage from cell 2W	M_s2w =	3,308.85	(mg/s)	3,308.85		3,308.85	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance	mass flux in river at PM-12	M_r12 =	314.30	(mg/s)	2,419.79	(mg/s)	24,217.73	(mg/s)
Ma:	mass flux in river at PM-13	M r13 =	9,637.53	(mg/s)	35,284.58	(mg/s)	164,110.28	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to	concentration in river at PM-12	C_r12 =	9.333	(mg/L)		(mg/l)	5.928	
fit C	concentration in river at PM-13	C_r13 =	37.572	(mg/L)	14.680	(mg/l)	6.771	(mg/l)

Case Parameter	Closure Manganese			
		_		
	concentration of surface water into PM-12	C_s12 =	0.30	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.30	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.30	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.49	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.14	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.00	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	1.18	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.19	(mg/L)
브	concentration of ground water into PM-13	C_g13 =	0.19	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	107.06	(mg/s)	1,215	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	4.58	(mg/s)	4.58	(mg/s)	4.58	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	2.80	(mg/s)	2.80	(mg/s)	2.80	(mg/s)
ıtra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	522.39	(mg/s)	5,964	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	22.40	(mg/s)	22.40	(mg/s)	22.40	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	3.57	(mg/s)	27.31	(mg/s)	27.31	(mg/s)
		M_fs =	7.03	(mg/s)	7.03	(mg/s)	7.03	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
ដ ប័	mass flux in seepage from cell 2W	M_s2w =	55.94	(mg/s)	55.94	(mg/s)	55.94	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s)	114.44		1,222.81	
at B	mass flux in river at PM-13	M_r13 =	96.32 Low Flo	(mg/s)	749.51 Average		7,299.97 High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L)		(mg/l)	0.299	
C Hu:	concentration in river at PM-13	C_r13 =	0.376	(mg/L)	0.312	(mg/l)	0.301	(mg/l)

Case Parameter	Closure Sodium			
	concentration of surface water into PM-12	C_s12 =	6.00	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	6.00	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	6.00	(mg/L)
tio	concentration in Area 5 Pit NW discharge	C_spit =	119.50	(mg/L)
ntration	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	26.63	(mg/L)
۵	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	255.00	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	44.31	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	4.90	(mg/L)
dul	concentration of ground water into PM-13	C_g13 =	4.90	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	2,141.18	(mg/s)	24,309	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	119.26	(mg/s)	119.26	(mg/s)	119.26	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	56.03	(mg/s)	56.03	(mg/s)	56.03	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	10,447.79	(mg/s)	119,290	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	583.80	(mg/s)	583.80	(mg/s)	583.80	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	879.28	(mg/s)	6,729.88	(mg/s)	6,729.88	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1,304.55	(mg/s)	1,304.55	(mg/s)	1,304.55	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	11.96	(mg/s)		(mg/s)	11.96	(mg/s)
ធ បំ	mass flux in seepage from cell 2W	M_s2w =	2,095.40	(mg/s)	2,095.40	(mg/s)	2,095.40	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 = M r13 =	175.29		2,316.47 23,489.86		24,483.86	
20		IM_113 =	Low Flo		Average		High Fl	
Convert mass flux to concentration		C_r12 =	5.205	(mg/L)	5.931	(mg/l) (mg/l)	5.993	(mg/l)

Case Parameter	Closure Nickel			
Faranielei	NICKEI			
	concentration of surface water into PM-12	C_s12 =	0.0012	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0012	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0012	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.0052	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.005498724	(mg/L)
<u>–</u>	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.098	(mg/L)
con	concentration in tailings basin cell 2W	C_s2w =	0.00688	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.007	(mg/L)
dul	concentration of ground water into PM-13	C_g13 =	0.007	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.43	(mg/s)	5	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.17	(mg/s)	0.17	(mg/s)	0.17	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
ıtra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	2.09	(mg/s)	24	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.83	(mg/s)	0.83	(mg/s)	0.83	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.04	(mg/s)	0.29	(mg/s)	0.29	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.27	(mg/s)	0.27	(mg/s)	0.27	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
<u>۽</u> ک	mass flux in seepage from cell 2W	M_s2w =	0.33	(mg/s)	0.33	(mg/s)		(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 = M r13 =		(mg/s) (mg/s)		(mg/s)		(mg/s) (mg/s)
			Low Flo	w	Average		High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.005	(mg/L)	0.002	(mg/L)	0.001	(mg/L)

Case	Closure			
Parameter	Lead			
		-		
	concentration of surface water into PM-12	C_s12 =	0.00015	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.00015	(mg/L)
-	concentration in Babbitt WWTP discharge	C_sBab =	0.00015	(mg/L)
tio	concentration in Area 5 Pit NW discharge	C_spit =	0.0003	(mg/L)
ntration	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.00095888	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0005	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	0.0012	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.0012	(mg/L)
법	concentration of ground water into PM-13	C_g13 =	0.0012	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.05	(mg/s)	1	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.03	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
ıtra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.26	(mg/s)	3	(mg/s)
ceu	mass flux of ground water into PM-13	M_g13 =	0.14	(mg/s)	0.14	(mg/s)	0.14	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.02	(mg/s)	0.02	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.05	(mg/s)	0.05	(mg/s)	0.05	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
<u>۽</u> ک	mass flux in seepage from cell 2W	M_s2w =	0.06	(mg/s)	0.06	(mg/s)		(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 =		(mg/s) (mg/s)		(mg/s)		(mg/s) (mg/s)
			Low Flo	w	Average	Flow	High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.001	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Case Parameter	Closure Antimony			
		a	1 005 05	<i>/</i> // // // // // // // // // // // // /
_	concentration of surface water into PM-12	C_s12 =	4.00E-05	
data	concentration of surface water into PM-13	C_s13 =	4.00E-05	(mg/L)
-	concentration in Babbitt WWTP discharge	C_sBab =	4.00E-05	(mg/L)
atio	concentration in Area 5 Pit NW discharge	C_spit =	2.50E-04	(mg/L)
ntration	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	1.16E-03	(mg/L)
conce	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.004	(mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	2.50E-04	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	1.50E-03	(mg/L)
iu I	concentration of ground water into PM-13	C_g13 =	1.50E-03	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.01	(mg/s)	0	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.04	(mg/s)	0.04	(mg/s)	0.04	(mg/s)
concentration flux	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itrai	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.07	(mg/s)	1	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.18	(mg/s)	0.18	(mg/s)	0.18	(mg/s)
conc	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
		M_fs =	0.06	(mg/s)	0.06	(mg/s)	0.06	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
<u>ء</u> ک		M_s2w =		(mg/s)		(mg/s)		(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =	0.04	(mg/s)	0.05	(mg/s)	0.20	(mg/s)
at a	mass flux in river at PM-13	M_r13 =		(mg/s)		(mg/s)		(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.001	(mg/L)	0.000	(mg/L)	0.000	(mg/L)
S II o	concentration in river at PM-13	C r13 =	0.001	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Case Parameter	Closure Selenium			
	concentration of surface water into PM-12	C_s12 =	0.0003	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0003	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0003	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.0016	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.003346354	(mg/L)
ncei	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.054	(mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	0.00109	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.00295	(mg/L)
qul	concentration of ground water into PM-13	C_g13 =	0.00295	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.11	(mg/s)	1	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.07	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
concentration	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.52	(mg/s)	6	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.35	(mg/s)	0.35	(mg/s)	0.35	(mg/s)
Б.	mass flux of Area 5 Pit NW discharge	M_spit =	0.01	(mg/s)	0.09	(mg/s)	0.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.16	(mg/s)	0.16	(mg/s)	0.16	(mg/s)
Convert	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
ິວ .	2 mass flux in seepage from cell 2W	M_s2w =	0.05	(mg/s)	0.05	(mg/s)	0.05	(mg/s)
		_	Low Flo	W	Average	Flow	High Fl	ow
Mass balance	mass flux in river at PM-12	M_r12 =	0.07	(mg/s)	0.18	(mg/s)	1.29	(mg/s)
Mas	mass flux in river at PM-13	M r13 =	0.66	(mg/s)	1.36	(mg/s)	7.91	(mg/s)
			Low Flo		Average		High Fl	
Convert mass flux to	concentration in river at PM-12	C_r12 =		(mg/L)		(mg/L)		(mg/L)
C =	concentration in river at PM-13	C_r13 =	0.003	(mg/L)	0.001	(mg/L)	0.000	(mg/L)

Case	Closure			
Parameter	Sulfate			
	concentration of surface water into PM-12	C_s12 =	4.00	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	4.00	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	4.00	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	1046.27	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	176.50	(mg/L)
Cel	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	7347.00	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	152.40	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	8.50	(mg/L)
du	concentration of ground water into PM-13	C_g13 =	8.50	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	1,427.45	(mg/s)	16,206	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	206.87	(mg/s)	206.87	(mg/s)	206.87	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	37.36	(mg/s)	37.36	(mg/s)	37.36	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	6,965.20	(mg/s)	79,526	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	1,012.72	(mg/s)	1,012.72	(mg/s)	1,012.72	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	7,698.43	(mg/s)	58,922.60	(mg/s)	58,922.60	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	8,647.39	(mg/s)	8,647.39	(mg/s)	8,647.39	(mg/s)
Convert	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	344.66	(mg/s)	344.66	(mg/s)	344.66	(mg/s)
ပိ မ	mass flux in seepage from cell 2W	M_s2w =	7,206.92	(mg/s)	7,206.92	(mg/s)	7,206.92	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance	mass flux in river at PM-12	M_r12 =	244.23	(mg/s)	1,671.68	(mg/s)	16,449.94	(mg/s)
Ma	mass flux in river at PM-13	M_r13 =	25,154.34	(mg/s)	84,771.16	(mg/s)	172,110.62	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to	concentration in river at PM-12	C_r12 =	7.252	(mg/L)	4.280	(mg/l)	4.027	(mg/l)
fiu Co	concentration in river at PM-13	C_r13 =	98.064	(mg/L)	35.268	(mg/l)	7.101	(mg/l)

Case Parameter	Closure Thallium			
	concentration of surface water into PM-12	C s12 =	0.0002	(ma/L)
data	concentration of surface water into PM-13	C_s13 =	0.0002	
	concentration in Babbitt WWTP discharge	C_sBab =	0.0002	(mg/L)
ntration	concentration in Area 5 Pit NW discharge	C_spit =	0.0006	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000106288	(mg/L)
d)	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0002	(mg/L)
conc	concentration in tailings basin cell 2W	C_s2w =	0.0002	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.000004	(mg/L)
u L	concentration of ground water into PM-13	C_g13 =	0.000004	(mg/L)

			Low Flo	w	Average	Flow	High Fl	low
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.07	(mg/s)	1	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.35	(mg/s)	4	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
Co to	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
			Low Flo	w	Average	Flow	High Fl	low
Mass balance at each node	mass flux in river at PM-12	M_r12 =		(mg/s)		(mg/s)		(mg/s)
M ₈ at	mass flux in river at PM-13	M_r13 =	0.02	(mg/s)	0.47 Average	(mg/s)	4.84 High Fl	(mg/s)
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L) (mg/L)

Case	Closure			
Parameter	Zinc			
		-		
	concentration of surface water into PM-12	C_s12 =	0.016	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.016	(mg/L)
-	concentration in Babbitt WWTP discharge	C_sBab =	0.016	(mg/L)
ntration	concentration in Area 5 Pit NW discharge	C_spit =	0.003	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.012754048	(mg/L)
(D)	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.01	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	0.01435	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.0115	(mg/L)
별	concentration of ground water into PM-13	C_g13 =	0.0115	(mg/L)

			Low Flo	w	Average	Flow	High Flo	ow
ma	ss flux of surface water into PM-12	M_s12 =	-	(mg/s)	5.71	(mg/s)	65	(mg/s)
ma	ss flux of ground water into PM-12	M_g12 =	0.28	(mg/s)	0.28	(mg/s)	0.28	(mg/s)
ma:	iss flux in Babbitt WWTP discharge	M_sBab =	0.15	(mg/s)	0.15	(mg/s)	0.15	(mg/s)
ma	iss flux of surface water into PM-13	M_s13 =	-	(mg/s)	27.86	(mg/s)	318	(mg/s)
ma:	iss flux of ground water into PM-13	M_g13 =	1.37	(mg/s)	1.37	(mg/s)	1.37	(mg/s)
concentration flux www. www. www. www. www. www. www. ww	iss flux of Area 5 Pit NW discharge	M_spit =	0.02	(mg/s)	0.17	(mg/s)	0.17	(mg/s)
	uss flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.62	(mg/s)	0.62	(mg/s)	0.62	(mg/s)
Convert to mass main to mass	uss flux in hydrometallurgical residue cells liner leakage	M_rrs =		(mg/s)		(mg/s)	0.00	(mg/s)
<mark>ວິຊ</mark> mas	iss flux in seepage from cell 2W	M_s2w =		(mg/s)		(mg/s)	0.68	(mg/s)
			Low Flo	W	Average	Flow	High Fl	ow
ass ba each r	iss flux in river at PM-12	M_r12 =		(mg/s)		(mg/s)	65.25	(mg/s) (mg/s)
			Low Flo	w	Average	Flow	High Flo	ow
Convert mass flux to concentration	ncentration in river at PM-12	C_r12 =		<u>(mg/L)</u>		(mg/L)	0.016	
ວັ≓ ວັ con	ncentration in river at PM-13	C_r13 =	0.012	(mg/L)	0.015	(mg/L)	0.016	(mg/L)

Appendix F.15 Embarrass River Geotechnical Mitigation Post-Closure

### **FLOWS**

Case	Post-Closure				
Flows	Low Flow Conditions (no surface runoff)				Node
in River	flow in river at PM-12	Q_r12_L =	1.19	(cfs)	PM-12
Total flow in Embarrass F	flow in river at PM-13	Q_r13_L =	8.75	(cfs)	PM-13
Total Emb:	flow check	Q_ck_L =	8.75	(cfs)	
	surface water flow into PM-12	Q_s12_L =	0.00	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_L =	0.00	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_L =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_L =	0.26	(cfs)	PM-13
ta	seepage from Tailings Basin Cells 1E and 2E	Q_fs_L =	1.73	(cfs)	PM-13
/ da	hydrometallurgical residue cells liner leakage	Q_rrs_L =	0.00	(cfs)	PM-13
lov	seepage from cell 2W	Q_s2w_L =	1.36	(cfs)	PM-13
nput flow data	ground water flow into PM-12	Q_g12_L =	0.86	(cfs)	PM-12
dul	ground water flow into PM-13	Q_g13_L =	4.21	(cfs)	PM-13

Case	Post-Closure				
Flow	Average Flow Conditions (mean annual)				_
n River	flow in river at PM-12	Q_r12_M =	13.80	(cfs)	PM-12
Total flow in Embarrass F	flow in river at PM-13	Q_r13_M =	84.62	(cfs)	PM-13
Total Emb:	flow check	Q_ck_M =	84.62	(cfs)	4
	surface water flow into PM-12	Q_s12_M =	12.61	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_M =	61.53	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_M =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_M =	1.99	(cfs)	PM-13
ta	seepage from Tailings Basin Cells 1E and 2E	Q_fs_M =	1.73	(cfs)	PM-13
, da	hydrometallurgical residue cells liner leakage	Q_rrs_M =	0.00	(cfs)	PM-13
Įo	seepage from cell 2W	Q_s2w_M =	1.36	(cfs)	PM-13
nput flow data	ground water flow into PM-12	Q_g12_M =	0.86	(cfs)	PM-12
dul	ground water flow into PM-13	Q_g13_M =	4.21	(cfs)	PM-13

Case	Post-Closure				
Flow	High Flow Conditions (avg. annual 1-day ma	ax flow)			
n River	flow in river at PM-12	Q_r12_H =	144.35	(cfs)	PM-12
Total flow in Embarrace R	flow in river at PM-13	Q_r13_H =	856.17	(cfs)	PM-13
Total Embs	flow check	Q_ck_H =	856.17	(cfs)	
	surface water flow into PM-12	Q_s12_H =	143.16	(cfs)	PM-12
	surface water flow into PM-13	Q_s13_H =	702.53	(cfs)	PM-13
	Babbitt WWTP discharge	Q_sBab_H =	0.33	(cfs)	PM-12
	Area 5 Pit NW discharge	Q_spit_H =	1.99	(cfs)	PM-13
<u>t</u>	seepage from Tailings Basin Cells 1E and 2E	Q_fs_H =	1.73	(cfs)	PM-13
, da	hydrometallurgical residue cells liner leakage	Q rrs H =	0.00	(cfs)	PM-13
flow data	seepage from cell 2W	Q_s2w_H =	1.36	(cfs)	PM-13
		Q_g12_H =	0.86	(cfs)	PM-12
nn it	ground water flow into PM-13	Q_g13_H =	4.21	(cfs)	PM-13

Case	Post-Closure			
Parameter	Silver			
		-		
	concentration of surface water into PM-12	C_s12 =	0.00011	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.00011	(mg/L)
_	concentration in Babbitt WWTP discharge	C_sBab =	0.00011	(mg/L)
tio	concentration in Area 5 Pit NW discharge	C_spit =	0.00015	(mg/L)
ntration	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.00124	(mg/L)
Incel	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.000125	(mg/L)
con	concentration in tailings basin cell 2W	C_s2w =	0.000100	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.00008	(mg/L)
du	concentration of ground water into PM-13	C_g13 =	0.00008	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.04	(mg/s)	0	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.19	(mg/s)	2	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.06	(mg/s)	0.06	(mg/s)	0.06	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
<u>ء</u> ک	mass flux in seepage from cell 2W	M_s2w =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s)		(mg/s) (mg/s)		(mg/s) (mg/s)
		1.12.13	Low Flo		Average		High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L)		(mg/L) (mg/L)		(mg/L) (mg/L)

Case	Post-Closure		
Parameter	Aluminum		
		-	
	concentration of surface water into PM-12	C_s12 =	0.12 (mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.12 (mg/L)
-	concentration in Babbitt WWTP discharge	C_sBab =	0.12 (mg/L)
ntration	concentration in Area 5 Pit NW discharge	C_spit =	0.01325 (mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	6.15E-01 (mg/L)
ICel	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.80E-01 (mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	1.5788 (mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.025 (mg/L)
브	concentration of ground water into PM-13	C_g13 =	0.025 (mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	42.82	(mg/s)	486	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.61	(mg/s)	0.61	(mg/s)	0.61	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	1.12	(mg/s)	1.12	(mg/s)	1.12	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	208.96	(mg/s)	2,386	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	2.98	(mg/s)	2.98	(mg/s)	2.98	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.10	(mg/s)	0.75	(mg/s)	0.75	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	30.13	(mg/s)	30.13	(mg/s)	30.13	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.01	(mg/s)	0.01	(mg/s)		(mg/s)
ទ បិ	mass flux in seepage from cell 2W	M_s2w =	60.72	(mg/s)	60.72	(mg/s)	60.72	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s) (mg/s)	44.55	(mg/s)	487.90	
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L) (mg/L)		(mg/L)		(mg/L) (mg/L)

Case	Post-Closure		
Parameter	Arsenic		
		-	
	concentration of surface water into PM-12	C_s12 =	0.00075 (mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.00075 (mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00075 (mg/L)
ţi	concentration in Area 5 Pit NW discharge	C_spit =	0.001325 (mg/L)
ntration	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.027915158 (mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.004 (mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	0.00291 (mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.00273 (mg/L)
법	concentration of ground water into PM-13	C_g13 =	0.00273 (mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.27	(mg/s)	3	(mg/s)
-	mass flux of ground water into PM-12	M_g12 =	0.07	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1.31	(mg/s)	15	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.33	(mg/s)	0.33	(mg/s)	0.33	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.01	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1.37	(mg/s)	1.37	(mg/s)	1.37	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
<u>ء</u> ک	mass flux in seepage from cell 2W	M_s2w =		(mg/s)		(mg/s)	0.11	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 =		(mg/s) (mg/s)		(mg/s)		(mg/s) (mg/s)
		1.1.2.1.9	Low Flo		Average		High Fl	( <b>e</b> /
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L)		(mg/L)	0.001	
ບ≓ະ	concentration in river at PM-13	C_r13 =	0.008	(mg/L)	0.001	(mg/L)	0.001	(mg/L)

Case	Post-Closure		
Parameter	Boron		
		-	
	concentration of surface water into PM-12	C_s12 =	0.027 (mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.027 (mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.027 (mg/L)
tio	concentration in Area 5 Pit NW discharge	C_spit =	0.1315 (mg/L)
ntration	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.150573845 (mg/L)
Icel	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.11 (mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	0.33 (mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.0212 (mg/L)
법	concentration of ground water into PM-13	C_g13 =	0.0212 (mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	9.64	(mg/s)	109	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.52	(mg/s)	0.52	(mg/s)	0.52	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.25	(mg/s)	0.25	(mg/s)	0.25	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	47.02	(mg/s)	537	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	2.53	(mg/s)	2.53	(mg/s)	2.53	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.97	(mg/s)	7.41	(mg/s)	7.41	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	7.38	(mg/s)	7.38	(mg/s)	7.38	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
Co to		M_s2w =	12.69	(mg/s)	12.69	(mg/s)	12.69	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =	0.77	(mg/s)	10.40	(mg/s)	110.16	(mg/s)
Ma at	mass flux in river at PM-13	M_r13 =		(mg/s)		(mg/s)	676.97	
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.023	(mg/L)	0.027	(mg/L)	0.027	(mg/L)
Con flux	concentration in river at PM-13	C_r13 =	0.098	(mg/L)	0.037	(mg/L)	0.028	(mg/L)

Case	Post-Closure		
Parameter	Barium		
		-	
	concentration of surface water into PM-12	C_s12 =	0.016 (mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.016 (mg/L)
-	concentration in Babbitt WWTP discharge	C_sBab =	0.016 (mg/L)
ntration	concentration in Area 5 Pit NW discharge	C_spit =	0.0044 (mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	1.95E-02 (mg/L)
ICEI	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	5.00E-03 (mg/L)
con	concentration in tailings basin cell 2W	C_s2w =	0.09298 (mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.0681 (mg/L)
d L	concentration of ground water into PM-13	C_g13 =	0.0681 (mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	5.71	(mg/s)	65	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	1.66	(mg/s)	1.66	(mg/s)	1.66	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	0.15	(mg/s)	0.15	(mg/s)	0.15	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	27.86	(mg/s)	318	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	8.11	(mg/s)	8.11	(mg/s)	8.11	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	0.03	(mg/s)	0.25	(mg/s)	0.25	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.95	(mg/s)	0.95	(mg/s)	0.95	(mg/s)
Convert	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
မိ န	mass flux in seepage from cell 2W	M_s2w =	3.58	(mg/s)	3.58	(mg/s)	3.58	(mg/s)
		_	Low Flo	w	Average	Flow	High Fl	ow
Mass balance	mass flux in river at PM-12	M_r12 =	1.81	(mg/s)	7.52	(mg/s)	66.63	(mg/s)
Ma		M_r13 =	14.48	(mg/s)	48.27	(mg/s)	397.63	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to	concentration in river at PM-12	C_r12 =	0.054	(mg/L)	0.019	(mg/L)	0.016	(mg/L)
Con flux	concentration in river at PM-13	C_r13 =	0.058	(mg/L)	0.020	(mg/L)	0.016	(mg/L)

Case	Post-Closure		
Parameter	Beryllium		
		-	
	concentration of surface water into PM-12	C_s12 =	0.0001 (mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0001 (mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0001 (mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.0001 (mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.001323498 (mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0 (mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	0.00075 (mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.000023 (mg/L)
duj	concentration of ground water into PM-13	C_g13 =	0.000023 (mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.04	(mg/s)	0	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.17	(mg/s)	2	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.06	(mg/s)	0.06	(mg/s)	0.06	(mg/s)
Convert	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	-	(mg/s)	-	(mg/s)	-	(mg/s)
ပိ .	2 mass flux in seepage from cell 2W	M_s2w =	0.03	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance	mass flux in river at PM-12	M_r12 =	0.00	(mg/s)	0.04	(mg/s)	0.41	(mg/s)
Ma	mass flux in river at PM-13	M_r13 =	0.10	(mg/s)	0.31	(mg/s)	2.50	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to	concentration in river at PM-12	C_r12 =		(mg/L)		(mg/L)		(mg/L)
o ≑ o	concentration in river at PM-13	C_r13 =	0.000	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Case	Post-Closure			
Parameter	Calcium			
		-		
	concentration of surface water into PM-12	C_s12 =	15	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	15	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	15	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	95.35	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	68.73996034	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	416	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	59.78	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	19	(mg/L)
브	concentration of ground water into PM-13	C_g13 =	19	(mg/L)

			Low Flo	w	Average	Flow	High Flo	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	5,352.95	(mg/s)	60,771	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	462.42	(mg/s)	462.42	(mg/s)	462.42	(mg/s)
tion	mass flux in Babbitt WWTP discharge	M_sBab =	140.09	(mg/s)	140.09	(mg/s)	140.09	(mg/s)
tra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	26,119.49	(mg/s)	298,224	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	2,263.72	(mg/s)	2,263.72	(mg/s)	2,263.72	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	701.59	(mg/s)	5,369.83	(mg/s)	5,369.83	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	3,367.90	(mg/s)	3,367.90	(mg/s)	3,367.90	(mg/s)
Convert	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	19.51	(mg/s)		(mg/s)	19.51	
မိ နိ	mass flux in seepage from cell 2W	M_s2w =	2,299.27		2,299.27			(mg/s)
			Low Flo	W	Average	Flow	High Flo	ow
Mass balance at each node		M_r12 =	602.51 9,254.49		5,955.45		61,373.93	
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to	concentration in river at PM-12	C_r12 =	17.891	(mg/L)	15.249	(mg/l)	15.024	
	concentration in river at PM-13	C_r13 =	37.364	(mg/L)	18.956	(mg/l)	15.296	(mg/l)

Case	Post-Closure		
Parameter	Cadmium		
		-	
	concentration of surface water into PM-12	C_s12 =	0.00008 (mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.00008 (mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.00008 (mg/L)
ntration	concentration in Area 5 Pit NW discharge	C_spit =	0.0001 (mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.001182282 (mg/L)
ICEI	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0004 (mg/L)
cou	concentration in tailings basin cell 2W	C_s2w =	0.000188 (mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.0003 (mg/L)
du	concentration of ground water into PM-13	C_g13 =	0.0003 (mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.03	(mg/s)	0	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.14	(mg/s)	2	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.04	(mg/s)	0.04	(mg/s)	0.04	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.06	(mg/s)	0.06	(mg/s)	0.06	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
ទ បិ	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s) (mg/s)		(mg/s) (mg/s)		(mg/s) (mg/s)
2 0		W_110 =	Low Flo		Average		High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L) (mg/L)		(mg/L) (mg/L)		(mg/L) (mg/L)

Case	Post-Closure			
Parameter	Chloride			
	concentration of surface water into PM-12	C_s12 =	6.5	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	6.5	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	6.5	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	5.95	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	3.97E+00	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.76E+03	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	21.54	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	1.8	(mg/L)
브	concentration of ground water into PM-13	C_g13 =	1.8	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	2,319.61	(mg/s)	26,334	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	43.81	(mg/s)	43.81	(mg/s)	43.81	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	60.70	(mg/s)	60.70	(mg/s)	60.70	(mg/s)
itrai	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	11,318.44	(mg/s)	129,230	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	214.46	(mg/s)	214.46	(mg/s)	214.46	(mg/s)
concentration	mass flux of Area 5 Pit NW discharge	M_spit =	43.78	(mg/s)	335.09	(mg/s)	335.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	194.68	(mg/s)	194.68	(mg/s)	194.68	(mg/s)
Convert	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	82.56	(mg/s)		(mg/s)	82.56	(mg/s)
မိ နိ	mass flux in seepage from cell 2W	M_s2w =	828.47	(mg/s)		(mg/s)	828.47	
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance		M_r12 =	104.51		2,424.12		26,438.79	
			Low Flo		Average		High Fl	( ¢ /
Convert mass flux to	concentration in river at PM-12	C_r12 =	3.103	(mg/L)	6.207	(mg/L)	6.472	(mg/L)
Con	concentration in river at PM-13	C_r13 =	5.929	(mg/L)	6.430	(mg/L)	6.493	(mg/L)

Case Parameter	Post-Closure Cobalt		
	concentration of surface water into PM-12	C s12 =	0.0006 (mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0006 (mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0006 (mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.000555 (mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.002707554 (mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.005 (mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	0.001556 (mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.0011 (mg/L)
d L	concentration of ground water into PM-13	C_g13 =	0.0011 (mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.21	(mg/s)	2	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.03	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
concentration flux	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
ıtra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1.04	(mg/s)	12	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.13	(mg/s)	0.13	(mg/s)	0.13	(mg/s)
ŭ Xnjj	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.13	(mg/s)	0.13	(mg/s)	0.13	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
<u>و</u> ک	mass flux in seepage from cell 2W	M_s2w =	0.06	(mg/s)	0.06	(mg/s)	0.06	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s) (mg/s)		(mg/s)		(mg/s) (mg/s)
20	mass nux in river at PW-13	IVI_113 =	Low Flo		Average		High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.001	(mg/L)		(mg/L) (mg/L)		(mg/L) (mg/L)

Case	Post-Closure			
Parameter	Copper			
		-		
	concentration of surface water into PM-12	C_s12 =	0.0015	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0015	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.0015	(mg/L)
ntration	concentration in Area 5 Pit NW discharge	C_spit =	0.00345	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.014116893	(mg/L)
ICEI	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0015	(mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	0.004555	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.004	(mg/L)
브	concentration of ground water into PM-13	C_g13 =	0.004	(mg/L)

		Low Flo	w	Average	Flow	High Fl	ow
mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.54	(mg/s)	6	(mg/s)
mass flux of ground water into PM-12	M_g12 =	0.10	(mg/s)	0.10	(mg/s)	0.10	(mg/s)
mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	2.61	(mg/s)	30	(mg/s)
mass flux of ground water into PM-13	M_g13 =	0.48	(mg/s)	0.48	(mg/s)	0.48	(mg/s)
mass flux of Area 5 Pit NW discharge	M_spit =	0.03	(mg/s)	0.19	(mg/s)	0.19	(mg/s)
mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.69	(mg/s)	0.69	(mg/s)	0.69	(mg/s)
mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
mass flux in seepage from cell 2W	M_s2w =					0.18	(mg/s)
		Low Flo	W	Average	Flow	High Fl	ow
mass flux in river at PM-12	M_r12 =						(mg/s)
mass flux in river at PM-13	M_r13 =						
concentration in river at PM-12	C_r12 =						(mg/L)
	mass flux of ground water into PM-12   mass flux in Babbitt WWTP discharge   mass flux of surface water into PM-13   mass flux of ground water into PM-13   mass flux of Area 5 Pit NW discharge   mass flux in seepage from Tailings Basin Cells 1E and 2E   mass flux in hydrometallurgical residue cells liner leakage   mass flux in river at PM-12   mass flux in river at PM-13	mass flux of ground water into PM-12 $M_g12 =$ mass flux in Babbitt WWTP discharge $M_sBab =$ mass flux of surface water into PM-13 $M_s13 =$ mass flux of ground water into PM-13 $M_g13 =$ mass flux of Area 5 Pit NW discharge $M_spit =$ mass flux in seepage from Tailings Basin Cells 1E and 2E $M_fs =$ mass flux in hydrometallurgical residue cells liner leakage $M_rrs =$ mass flux in river at PM-12 $M_r12 =$ mass flux in river at PM-13 $M_r13 =$	mass flux of surface water into PM-12 $M_s12 =$ mass flux of ground water into PM-12 $M_g12 =$ 0.10mass flux in Babbitt WWTP discharge $M_sBab =$ 0.01mass flux of surface water into PM-13 $M_s13 =$ mass flux of ground water into PM-13 $M_g13 =$ 0.48mass flux of Area 5 Pit NW discharge $M_spit =$ 0.03mass flux in seepage from Tailings Basin Cells 1E and 2E $M_sfs =$ 0.00mass flux in seepage from cell 2W $M_s2w =$ 0.18Low Flomass flux in river at PM-12 $M_sr12 =$ 0.11mass flux in river at PM-13M_r13 =1.48	mass flux of surface water into PM-12 M_s12 = - (mg/s)   mass flux of ground water into PM-12 M_g12 = 0.10 (mg/s)   mass flux in Babbitt WWTP discharge M_sBab = 0.01 (mg/s)   mass flux of surface water into PM-13 M_s13 = - (mg/s)   mass flux of ground water into PM-13 M_g13 = 0.48 (mg/s)   mass flux of Area 5 Pit NW discharge M_spit = 0.03 (mg/s)   mass flux in seepage from Tailings Basin Cells 1E and 2E M_fs = 0.69 (mg/s)   mass flux in seepage from cell 2W M_s2w = 0.18 (mg/s)   mass flux in river at PM-12 M_r12 = 0.11 (mg/s)   mass flux in river at PM-13 M_r13 = 1.48 (mg/s)	mass flux of surface water into PM-12 M_s12 = (mg/s) 0.54   mass flux of ground water into PM-12 M_g12 = 0.10 (mg/s) 0.10   mass flux in Babbitt WWTP discharge M_sBab = 0.01 (mg/s) 0.01   mass flux of surface water into PM-13 M_s13 = - (mg/s) 0.64   mass flux of ground water into PM-13 M_s13 = - (mg/s) 0.64   mass flux of ground water into PM-13 M_g13 = 0.48 (mg/s) 0.48   mass flux of Area 5 Pit NW discharge M_spit = 0.03 (mg/s) 0.69   mass flux in seepage from Tailings Basin Cells 1E and 2E M_fs = 0.69 (mg/s) 0.69   mass flux in hydrometallurgical residue cells liner leakage M_rrs = 0.00 (mg/s) 0.00   mass flux in seepage from cell 2W M_s2w = 0.18 (mg/s) 0.18   Low Flow Average   Low Flow Average   M_r13 = 1.48 (mg/s) 4.80   Low Flow Average	mass flux of surface water into PM-12 M_s12 = - (mg/s) 0.54 (mg/s)   mass flux of ground water into PM-12 M_g12 = 0.10 (mg/s) 0.10 (mg/s)   mass flux of ground water into PM-12 M_g12 = 0.10 (mg/s) 0.01 (mg/s)   mass flux of surface water into PM-13 M_s13 = - (mg/s) 2.61 (mg/s)   mass flux of ground water into PM-13 M_g13 = 0.48 (mg/s) 0.48 (mg/s)   mass flux of Area 5 Pit NW discharge M_spit = 0.03 (mg/s) 0.19 (mg/s)   mass flux in seepage from Tailings Basin Cells 1E and 2E M_fs = 0.69 (mg/s) 0.69 (mg/s)   mass flux in seepage from cell 2W M_s2W = 0.18 (mg/s) 0.18 (mg/s)   mass flux in river at PM-12 M_r12 = 0.11 (mg/s) 0.65 (mg/s)   mass flux in river at PM-13 M_r13 = 1.48 (mg/s) 4.80 (mg/s)   mass flux in river at PM-13 M_r13 = 1.48 (mg/s) 4.80 (mg/s)	mass flux of surface water into PM-12   M_s12 =   (mg/s)   0.54   (mg/s)   6     mass flux of ground water into PM-12   M_g12 =   0.10   (mg/s)   0.10   (mg/s)   0.10     mass flux in Babbitt WWTP discharge   M_sBab =   0.01   (mg/s)   0.01   (mg/s)   0.01     mass flux of surface water into PM-13   M_s13 =   -   (mg/s)   0.48   (mg/s)   0.48   0.48     mass flux of ground water into PM-13   M_g13 =   0.48   (mg/s)   0.48   (mg/s)   0.48   (mg/s)   0.48     mass flux of Area 5 Pit NW discharge   M_spit =   0.03   (mg/s)   0.19   (mg/s)   0.19     mass flux in seepage from Tailings Basin Cells 1E and 2E   M_fs =   0.69   (mg/s)   0.00   (mg/s)   0.00     mass flux in seepage from cell 2W   M_s2w =   0.18   (mg/s)   0.18   (mg/s)   0.18     mass flux in river at PM-12   M_r12 =   0.11   (mg/s)   0.65   (mg/s)   6.19     mass flux in river at PM-13   M_r13 =

Case	Post-Closure		
Parameter	Fluoride		
		-	
	concentration of surface water into PM-12	C_s12 =	0.2 (mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.2 (mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.2 (mg/L)
ntration	concentration in Area 5 Pit NW discharge	C_spit =	0.125 (mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	1.14E+00 (mg/L)
ICel	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	2.85E+00 (mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	1.55 (mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.385 (mg/L)
법	concentration of ground water into PM-13	C_g13 =	0.385 (mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	71.37	(mg/s)	810	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	9.37	(mg/s)	9.37	(mg/s)	9.37	(mg/s)
concentration flux	mass flux in Babbitt WWTP discharge	M_sBab =	1.87	(mg/s)	1.87	(mg/s)	1.87	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	348.26	(mg/s)	3,976	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	45.87	(mg/s)	45.87	(mg/s)	45.87	(mg/s)
uo xnjj	mass flux of Area 5 Pit NW discharge	M_spit =	0.92	(mg/s)	7.04	(mg/s)	7.04	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	55.70	(mg/s)	55.70	(mg/s)	55.70	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.13	(mg/s)	0.13	(mg/s)	0.13	(mg/s)
co to	mass flux in seepage from cell 2W	M_s2w =	59.62	(mg/s)	59.62	(mg/s)	59.62	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =	11.24	(mg/s) (mg/s)	82.61	(mg/s) (mg/s)	821.52	
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to concentration		C_r12 =		(mg/L) (mg/L)		(mg/L)		(mg/L) (mg/L)

Case	Post-Closure			
Parameter	Iron			
	concentration of surface water into PM-12	C_s12 =	2.9	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	2.9	(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	2.9	(mg/L)
ntration	concentration in Area 5 Pit NW discharge	C_spit =	0.037761905	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	9.94E-02	(mg/L)
ICel	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	4.00E-01	(mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	4.594	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.035	(mg/L)
du	concentration of ground water into PM-13	C_g13 =	0.035	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	1,034.90	(mg/s)	11,749	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.85	(mg/s)	0.85	(mg/s)	0.85	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	27.08	(mg/s)	27.08	(mg/s)	27.08	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	5,049.77	(mg/s)	57,657	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	4.17	(mg/s)	4.17	(mg/s)	4.17	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.28	(mg/s)	2.13	(mg/s)	2.13	(mg/s)
		M_fs =	4.87	(mg/s)	4.87	(mg/s)	4.87	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.02	(mg/s)	0.02	(mg/s)	0.02	(mg/s)
ဒု ပိ		M_s2w =	176.69		176.69		176.69	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s)	1,062.84	(mg/s)	11,777.08	(mg/s)
at a	mass flux in river at PM-13	M_r13 =	213.97		6,300.48		69,621.59	
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.829	(mg/L)	2.721	(mg/L)	2.883	(mg/L)
Conve flux to conce	concentration in river at PM-13	C_r13 =	0.864	(mg/L)	2.631	(mg/L)	2.873	(mg/L)

Case Parameter	Post-Closure Hardness			
	concentration of surface water into PM-12	C s12 =	70	(mg/L)
data	concentration of surface water into PM-13	C_s13 =		(mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	70	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	942.7142857	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	4.02E+02	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	8.61E+03	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	436.6	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	87.5	(mg/L)
du	concentration of ground water into PM-13	C_g13 =	87.5	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	24,980.41	(mg/s)	283,600	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	2,129.58	(mg/s)	2,129.58	(mg/s)	2,129.58	(mg/s)
tion	mass flux in Babbitt WWTP discharge	M_sBab =	653.73	(mg/s)	653.73	(mg/s)	653.73	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	121,890.93	(mg/s)	1,391,712	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	10,425.01	(mg/s)	10,425.01	(mg/s)	10,425.01	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	6,936.49	(mg/s)	53,090.84	(mg/s)	53,090.84	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	19,699.16	(mg/s)	19,699.16	(mg/s)	19,699.16	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	403.90	(mg/s)	403.90	(mg/s)	403.90	
ទ បិ	mass flux in seepage from cell 2W	M_s2w =	16,792.56	(mg/s)	16,792.56	(mg/s)	16,792.56	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 = M r13 =	2,783.31		27,763.72		286,383.27	
20		1113 =	Low Flo		Average		High Fl	
Convert mass flux to concentration		C_r12 =	82.647		71.091	(mg/L)	70.104	(mg/L)

Case	Post-Closure			
Parameter	Potassium			
		-		
	concentration of surface water into PM-12	C_s12 =	0.60	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.60	(mg/L)
-	concentration in Babbitt WWTP discharge	C_sBab =	0.60	(mg/L)
ntration	concentration in Area 5 Pit NW discharge	C_spit =	53.80	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	21.31	(mg/L)
<b>A</b>	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	1.80	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	7.77	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	1.60	(mg/L)
du	concentration of ground water into PM-13	C_g13 =	1.60	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	214.12	(mg/s)	2,431	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	38.94	(mg/s)	38.94	(mg/s)	38.94	(mg/s)
tior	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.08	(mg/s)	0.08	(mg/s)	0.08	(mg/s)
ıtra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	1,044.78	(mg/s)	11,929	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	190.63	(mg/s)	190.63	(mg/s)	190.63	(mg/s)
concentration flux	mass flux in Babbitt WWTP discharge	M_sBab =	5.60	(mg/s)	5.60	(mg/s)	5.60	(mg/s)
	mass flux of Area 5 Pit NW discharge	M_spit =	395.86	(mg/s)	3,029.85	(mg/s)	3,029.85	(mg/s)
Convert to mass	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1,043.93	(mg/s)	1,043.93	(mg/s)	1,043.93	(mg/s)
Co to	mass flux in seepage from cell 2W	M_s2w =	298.85	(mg/s)	298.85	(mg/s)	298.85	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12	M_r12 =		(mg/s)	253.14		2,469.88	
a 2	mass flux in river at PM-13	M_r13 =	1,973.89 Low Flo		5,866.78 Average		18,967.70 High Fl	
Convert mass flux to concentration	concentration in river at PM-12 concentration in river at PM-13	C_r12 =	1.159	(mg/L) (mg/L)		(mg/L)	0.605	

Case	Post-Closure			
Parameter	Magnesium			
		-		
	concentration of surface water into PM-12	C_s12 =	5.90	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	5.90	(mg/L)
-	concentration in Babbitt WWTP discharge	C_sBab =	5.90	(mg/L)
tio	concentration in Area 5 Pit NW discharge	C_spit =	271.00	(mg/L)
ntration	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	55.96	(mg/L)
(D)	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	213.00	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	69.97	(mg/L)
out	concentration of ground water into PM-12	C_g12 =	10.65	(mg/L)
Input	concentration of ground water into PM-13	C_g13 =	10.65	(mg/L)

			Low Flor	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	2,105.49	(mg/s)	23,903	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	259.20	(mg/s)	259.20	(mg/s)	259.20	(mg/s)
concentration flux	mass flux in Babbitt WWTP discharge	M_sBab =	55.10	(mg/s)	55.10	(mg/s)	55.10	(mg/s)
tra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	10,273.66	(mg/s)	117,301	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	1,268.87	(mg/s)	1,268.87	(mg/s)	1,268.87	(mg/s)
ŭos	mass flux of Area 5 Pit NW discharge	M_spit =	1,994.02	(mg/s)	15,261.91	(mg/s)	15,261.91	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M fs =	2,741.51	(mg/s)	2,741.51	(mg/s)	2,741.51	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =		(mg/s)		(mg/s)		(mg/s)
<u>م</u> ک		M_s2w =	2,691.19		2,691.19		2,691.19	(mg/s)
			Low Flor	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =	314.30 9,019.88		2,419.79		24,217.73	
~ 0	mass nux in river at PM-13	IVI_113 =	9,019.66		Average		High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	9.333 36.417	(mg/L)	6.196	(mg/l) (mg/l)	5.928	

Case	Post-Closure			
Parameter	Manganese			
		-		
	concentration of surface water into PM-12	C_s12 =	0.30	(mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.30	(mg/L)
_	concentration in Babbitt WWTP discharge	C_sBab =	0.30	(mg/L)
tio	concentration in Area 5 Pit NW discharge	C_spit =	0.49	(mg/L)
ntration	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.14	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.00	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	1.18	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.19	(mg/L)
d L	concentration of ground water into PM-13	C_g13 =	0.19	(mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	107.06	(mg/s)	1,215	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	4.58	(mg/s)	4.58	(mg/s)	4.58	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	2.80	(mg/s)	2.80	(mg/s)	2.80	(mg/s)
ıtra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	522.39	(mg/s)	5,964	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	22.40	(mg/s)	22.40	(mg/s)	22.40	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	3.57	(mg/s)	27.31	(mg/s)	27.31	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	7.03	(mg/s)	7.03	(mg/s)	7.03	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
ទ ប័	mass flux in seepage from cell 2W	M_s2w =	45.50	(mg/s)	45.50	(mg/s)	45.50	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s)	114.44		1,222.81	
Ma at	mass flux in river at PM-13	M_r13 =		(mg/s)	739.07		7,289.53	
			Low Flo	w	Average	FIOW	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	0.219	(mg/L)	0.293	(mg/l)	0.299	(mg/l)
Conve flux to concel	concentration in river at PM-13	C_r13 =	0.347	(mg/L)	0.309	(mg/l)	0.301	(mg/l)

Case	Post-Closure			
Parameter	Sodium			
	concentration of surface water into PM-12	C_s12 =	6.00	(mg/L)
ata	concentration of surface water into PM-13	C_s13 =	6.00	(mg/L)
σ	concentration in Babbitt WWTP discharge	C_sBab =	6.00	(mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	119.50	(mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	26.63	(mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	255.00	(mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	44.31	(mg/L)
Input	concentration of ground water into PM-12	C_g12 =	4.90	(mg/L)
비	concentration of ground water into PM-13	C_g13 =	4.90	(mg/L)

			Low Flo	w	Average	Flow	High Flo	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	2,141.18	(mg/s)	24,309	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	119.26	(mg/s)	119.26	(mg/s)	119.26	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	56.03	(mg/s)	56.03	(mg/s)	56.03	(mg/s)
itrai	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	10,447.79	(mg/s)	119,290	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	583.80	(mg/s)	583.80	(mg/s)	583.80	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	879.28	(mg/s)	6,729.88	(mg/s)	6,729.88	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	1,304.55	(mg/s)	1,304.55	(mg/s)	1,304.55	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	11.96	(mg/s)	11.96	(mg/s)	11.96	(mg/s)
Co to	mass flux in seepage from cell 2W	M_s2w =	1,704.26	(mg/s)	1,704.26	(mg/s)	1,704.26	(mg/s)
		-	Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =	175.29	(mg/s)	2,316.47	(mg/s)	24,483.86	(mg/s)
Ma at	mass flux in river at PM-13	M_r13 =	4,659.15		23,098.72		154,107.91	
		-	Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =	5.205	(mg/L)	5.931	(mg/l)	5.993	(mg/l)
Cor Cor	concentration in river at PM-13	C_r13 =	18.811	(mg/L)	9.645	(mg/l)	6.360	(mg/l)

Case	Post-Closure		
Parameter	Nickel		
	concentration of surface water into PM-12	C_s12 =	0.0012 (mg/L)
ata	concentration of surface water into PM-13	C_s13 =	0.0012 (mg/L)
σ	concentration in Babbitt WWTP discharge	C_sBab =	0.0012 (mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.0052 (mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.005498724 (mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.098 (mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	0.00688 (mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.007 (mg/L)
브	concentration of ground water into PM-13	C_g13 =	0.007 (mg/L)

			Low Flo	w	Average	Flow	High Fl	low
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.43	(mg/s)	5	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.17	(mg/s)	0.17	(mg/s)	0.17	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	2.09	(mg/s)	24	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.83	(mg/s)	0.83	(mg/s)	0.83	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.04	(mg/s)	0.29	(mg/s)	0.29	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.27	(mg/s)	0.27	(mg/s)	0.27	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
to to	mass flux in seepage from cell 2W	M_s2w =	0.26	(mg/s)	0.26	(mg/s)	0.26	(mg/s)
		_	Low Flo	w	Average	Flow	High Fl	low
Mass balance at each node		M_r12 =		(mg/s)		(mg/s)		(mg/s) (mg/s)
20		IVI_113 =	Low Flo		Average		High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L) (mg/L)		(mg/L) (mg/L)		(mg/L) (mg/L)

Case	Post-Closure		
Parameter	Lead		
	concentration of surface water into PM-12	C_s12 =	0.00015 (mg/L)
ata	concentration of surface water into PM-13	C_s13 =	0.00015 (mg/L)
σ	concentration in Babbitt WWTP discharge	C_sBab =	0.00015 (mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.0003 (mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.00095888 (mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0005 (mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	0.0012 (mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.0012 (mg/L)
법	concentration of ground water into PM-13	C_g13 =	0.0012 (mg/L)

			Low Flo	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.05	(mg/s)	1	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.03	(mg/s)	0.03	(mg/s)	0.03	(mg/s)
tio	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.26	(mg/s)	3	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.14	(mg/s)	0.14	(mg/s)	0.14	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.02	(mg/s)	0.02	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.05	(mg/s)	0.05	(mg/s)	0.05	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
<u>ء</u> ک	mass flux in seepage from cell 2W	M_s2w =	0.05	(mg/s)	0.05	(mg/s)	0.05	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance at each node		M_r12 =		(mg/s) (mg/s)		(mg/s) (mg/s)		(mg/s) (mg/s)
		<u></u>	Low Flo		Average Flow		High Fl	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L) (mg/L)		(mg/L) (mg/L)		(mg/L) (mg/L)

Case	Post-Closure			
Parameter	Antimony			
		-		
	concentration of surface water into PM-12	C_s12 =	4.00E-05 (r	mg/L)
data	concentration of surface water into PM-13	C_s13 =	4.00E-05 (r	mg/L)
-	concentration in Babbitt WWTP discharge	C_sBab =	4.00E-05 (r	mg/L)
Itio	concentration in Area 5 Pit NW discharge	C_spit =	2.50E-04 (r	mg/L)
ntration	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	1.16E-03 (r	mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.004 (r	mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	2.50E-04 (r	mg/L)
Input	concentration of ground water into PM-12	C_g12 =	1.50E-03 (r	mg/L)
브	concentration of ground water into PM-13	C_g13 =	1.50E-03 (r	mg/L)

			Low Flo	W	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.01	(mg/s)	0	(mg/s)
_	mass flux of ground water into PM-12	M_g12 =	0.04	(mg/s)	0.04	(mg/s)	0.04	(mg/s)
concentration	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.07	(mg/s)	1	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.18	(mg/s)	0.18	(mg/s)	0.18	(mg/s)
Б.	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.06	(mg/s)	0.06	(mg/s)	0.06	(mg/s)
Convert	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
ວິ.	mass flux in seepage from cell 2W	M_s2w =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Mass balance	mass flux in river at PM-12	M_r12 =	0.04	(mg/s)	0.05	(mg/s)	0.20	(mg/s)
Ma	mass flux in river at PM-13	M r13 =	0.28	(mg/s)	0.38	(mg/s)	1.25	(mg/s)
			Low Flo	w	Average	Flow	High Fl	ow
Convert mass flux to	concentration in river at PM-12	C_r12 =		(mg/L)		(mg/L)		(mg/L)
ŬĘ	concentration in river at PM-13	C_r13 =	0.001	(mg/L)	0.000	(mg/L)	0.000	(mg/L)

Case	Post-Closure		
Parameter	Selenium		
		-	
	concentration of surface water into PM-12	C_s12 =	0.0003 (mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.0003 (mg/L)
-	concentration in Babbitt WWTP discharge	C_sBab =	0.0003 (mg/L)
ntration	concentration in Area 5 Pit NW discharge	C_spit =	0.0016 (mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.003346354 (mg/L)
ICEI	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.054 (mg/L)
con	concentration in tailings basin cell 2W	C_s2w =	0.00109 (mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.00295 (mg/L)
dul	concentration of ground water into PM-13	C_g13 =	0.00295 (mg/L)

			Low Flor	w	Average	Flow	High Fl	ow
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.11	(mg/s)	1	(mg/s)
-	mass flux of ground water into PM-12	M_g12 =	0.07	(mg/s)	0.07	(mg/s)	0.07	(mg/s)
tior	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
itra	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.52	(mg/s)	6	(mg/s)
cen	mass flux of ground water into PM-13	M_g13 =	0.35	(mg/s)	0.35	(mg/s)	0.35	(mg/s)
concentration flux	mass flux of Area 5 Pit NW discharge	M_spit =	0.01	(mg/s)	0.09	(mg/s)	0.09	(mg/s)
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.16	(mg/s)	0.16	(mg/s)	0.16	(mg/s)
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)
Co to	mass flux in seepage from cell 2W	M_s2w =	0.04	(mg/s)	0.04	(mg/s)	0.04	(mg/s)
			Low Flor	w	Average	Flow	High Fl	ow
Mass balance at each node	mass flux in river at PM-12	M_r12 =		(mg/s)		(mg/s)		(mg/s)
Ma at	mass flux in river at PM-13	M_r13 =	0.65 Low Flor	(mg/s)	1.35 Average	(mg/s)	7.90 High Fl	(mg/s)
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L)		(mg/L)		(mg/L)

Case	Post-Closure			
Parameter	Sulfate			
		-		
	concentration of surface water into PM-12	C_s12 =	4.00 (	mg/L)
data	concentration of surface water into PM-13	C_s13 =	4.00 (	mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	4.00 (	mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	1046.27 (	mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	176.50 (	mg/L)
concel	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	7347.00 (	mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	152.40 (	mg/L)
Input	concentration of ground water into PM-12	C_g12 =	8.50 (	mg/L)
별	concentration of ground water into PM-13	C_g13 =	8.50 (	mg/L)

			Low Flow		Average Flow		High Flow		
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	1,427.45	(mg/s)	16,206	(mg/s)	
_	mass flux of ground water into PM-12	M_g12 =	206.87	(mg/s)	206.87	(mg/s)	206.87	(mg/s)	
tion	mass flux in Babbitt WWTP discharge	M_sBab =	37.36	(mg/s)	37.36	(mg/s)	37.36	(mg/s)	
concentration flux	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	6,965.20	(mg/s)	79,526	(mg/s)	
cen	mass flux of ground water into PM-13	M_g13 =	1,012.72	(mg/s)	1,012.72	(mg/s)	1,012.72	(mg/s)	
inx	mass flux of Area 5 Pit NW discharge	M_spit =	7,698.43	(mg/s)	58,922.60	(mg/s)	58,922.60	(mg/s)	
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M fs =	8,647.39	(mg/s)	8,647.39		8,647.39	(mg/s)	
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	344.66		344.66		344.66		
ຊີ ວິ		M_s2w =	5,861.63		5,861.63		5,861.63	(mg/s)	
			Low Flow		Average Flow		High Fl	High Flow	
Mass balance at each node		M_r12 =	244.23 23,809.05		1,671.68		16,449.94		
2 0	mass nux in river at PW-13	IVI_113 =	23,809.05		Average		High Fl		
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L)		(mg/l)	4.027		

Case	Post-Closure		
Parameter	Thallium		
	concentration of surface water into PM-12	C_s12 =	0.0002 (mg/L)
ata	concentration of surface water into PM-13	C_s13 =	0.0002 (mg/L)
ρ	concentration in Babbitt WWTP discharge	C_sBab =	0.0002 (mg/L)
ration	concentration in Area 5 Pit NW discharge	C_spit =	0.0006 (mg/L)
ntra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.000106288 (mg/L)
	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.0002 (mg/L)
conce	concentration in tailings basin cell 2W	C_s2w =	0.0002 (mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.000004 (mg/L)
dul	concentration of ground water into PM-13	C_g13 =	0.000004 (mg/L)

		Low F		Low Flow		Average Flow		High Flow	
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	0.07	(mg/s)	1	(mg/s)	
_	mass flux of ground water into PM-12	M_g12 =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)	
tio	mass flux in Babbitt WWTP discharge	M_sBab =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)	
concentration flux	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	0.35	(mg/s)	4	(mg/s)	
cen	mass flux of ground water into PM-13	M_g13 =	0.00	(mg/s)		(mg/s)	0.00	(mg/s)	
u xul	mass flux of Area 5 Pit NW discharge	M_spit =	0.00	(mg/s)	0.03	(mg/s)	0.03	(mg/s)	
	mass flux in seepage from Tailings Basin Cells 1E and 2E	M_fs =	0.01	(mg/s)	0.01	(mg/s)	0.01	(mg/s)	
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)	
<u>ء</u> ک	mass flux in seepage from cell 2W	M_s2w =		(mg/s)	0.01	(mg/s)	0.01	(mg/s)	
			Low Flow		Average Flow		High Fl	High Flow	
Mass balance at each node		M_r12 =		(mg/s) (mg/s)		(mg/s)		(mg/s) (mg/s)	
<b>–</b> 0		W_110 =	Low Flo		Average		High Fl	( <b>e</b> /	
Convert mass flux to concentration	concentration in river at PM-12	C_r12 =		(mg/L) (mg/L)		(mg/L) (mg/L)		(mg/L) (mg/L)	

Case	Post-Closure		
Parameter	Zinc		
		-	
	concentration of surface water into PM-12	C_s12 =	0.016 (mg/L)
data	concentration of surface water into PM-13	C_s13 =	0.016 (mg/L)
	concentration in Babbitt WWTP discharge	C_sBab =	0.016 (mg/L)
ntration	concentration in Area 5 Pit NW discharge	C_spit =	0.003 (mg/L)
ıtra	concentration in seepage from Tailings Basin Cells 1E and 2E	C_fs =	0.012754048 (mg/L)
ICE	concentration in hydrometallurgical residue cells liner leakage	C_rrs =	0.01 (mg/L)
cor	concentration in tailings basin cell 2W	C_s2w =	0.01435 (mg/L)
Input	concentration of ground water into PM-12	C_g12 =	0.0115 (mg/L)
법	concentration of ground water into PM-13	C_g13 =	0.0115 (mg/L)

			Low Flow		Average Flow		High Fl	High Flow	
	mass flux of surface water into PM-12	M_s12 =	-	(mg/s)	5.71	(mg/s)	65	(mg/s)	
_	mass flux of ground water into PM-12	M_g12 =	0.28	(mg/s)	0.28	(mg/s)	0.28	(mg/s)	
tio	mass flux in Babbitt WWTP discharge	M_sBab =	0.15	(mg/s)	0.15	(mg/s)	0.15	(mg/s)	
concentration flux	mass flux of surface water into PM-13	M_s13 =	-	(mg/s)	27.86	(mg/s)	318	(mg/s)	
cen	mass flux of ground water into PM-13	M_g13 =	1.37	(mg/s)	1.37	(mg/s)	1.37	(mg/s)	
con	mass flux of Area 5 Pit NW discharge	M_spit =	0.02	(mg/s)	0.17	(mg/s)	0.17	(mg/s)	
		M_fs =	0.62	(mg/s)	0.62	(mg/s)	0.62	(mg/s)	
Convert to mass	mass flux in hydrometallurgical residue cells liner leakage	M_rrs =	0.00	(mg/s)	0.00	(mg/s)	0.00	(mg/s)	
<u>ء</u> ک	mass flux in seepage from cell 2W	M_s2w =	0.55	(mg/s)	0.55	(mg/s)	0.55	(mg/s)	
			Low Flow		Average Flow		High Flow		
Mass balance at each node	mass flux in river at PM-12 mass flux in river at PM-13	M_r12 =		(mg/s)		(mg/s)		(mg/s)	
20	mass flux in river at PM-13	IVI_F13 =	3.00 Low Flor	(mg/s)	Average	(mg/s)		386.07 (mg/s) High Flow	
Convert mass flux to concentration	concentration in river at PM-12	C r12 =		(mg/L)		(mg/L)	0.016		