Erin Rykken

From: Peter J. Hinck <PHinck@barr.com>
Sent: Wednesday, July 08, 2009 2:27 PM
To: David Blaha; 'Stuart Arkley'
Cc: Tina Pint; John Borovsky; Miguel Wong; 'Jim Scott'
Subject: RE: TB seepage
Attachments: TB_Flows_08July2009.xls

Dave,

Please see the attached spreadsheet in answer to your question below regarding Tailings Basin seepage rates. We can discuss this further tomorrow during the morning meeting if you have additional questions.

Peter

Peter Hinck
Water Resources Engineer
Barr Engineering
(952) 832-2795
phinck@barr.com

-----Original Message-----
From: David Blaha [mailto:David.Blaha@erm.com]
Sent: Monday, July 06, 2009 9:06 AM
To: Tina Pint
Cc: John Borovsky
Subject: TB seepage

Tina - I need **a spreadsheet that shows for key years (existing, 1, 5, 10 ,15, 20, steady state closure) the volume of polymet, LTV, and total seepage from 1E/2E (distinguish between volume seepng to second creek and toward ER) and 2W (broken out separately)**

Is that possible and is my question clear? I would think these data would exist for you to do the modeling work that you have. I have some of this info but not all of it

Thanks

TAILINGS BASIN - PROPOSED ACTION (FORMER GEOTECHNICAL MITIGATION) FLOWS (gpm)

	Total 1E/2E Seepage to Embarrass River	1E/2E Seepage to Embarrass River via North	1E/2E Seepage to Embarrass River via West	Recovered (pumped) 1E/2E Seepage	Total 1E/2E Seepage to Second Creek	Hydromet. Cell Seepage	Unrecovered PolyMet Seepage to Embarrass River	Total 2W Seepage
Existing	900	--	--	--	550	--	--	895
Year 1	1600	1570	30	--	*455*	0.5	1600	895
Year 5	2260	1710	550	--	*410*	6.7	2267	895
Year 10	2490	1830	660	--	*597*	7.7	2498	895
Year 15	2700	1900	800	--	*671*	7.8	2708	895
Year 20	2900	1950	950	--	*737*	8.7	2909	895
Post-Closure	780	585	195	--	*290**	0.7	781	610

Notes:

Except for existing conditions, the total 1E/2E seepage to Embarrass River is all considered PolyMet seepage. This flow is the sum of seepage to the north and to the west.

1E/2E seepage to Second (Knox) Creek is recovered and returned to the Tailings Basin during operations. For post-closure, part of the 780 gpm assumed to go to the Embarrass River would be actually going to Second Creek (i.e., 290 gpm). However, the water quality predictions for the Embarrass River have been based on the conservative assumption that the entire 780 gpm will go to the Embarrass River.

Unrecovered PolyMet Seepage to the Embarrass River equals the total 1E/2E seepage plus the Hydrometallurgical Residue Cell seepage.

Total 2W seepage to the Embarrass River represents seepage from the existing LTVSMC basin and is unchanged during operations. This flow does not include any Cell 1E/2E seepage that travels to the Embarrass River via the west.

TAILINGS BASIN - ALTERNATIVE (NO RECYCLE and MAX RECYCLE) FLOWS (gpm)

	Total 1E/2E Seepage to Embarrass River	1E/2E Seepage to Embarrass River via North	1E/2E Seepage to Embarrass River via West	Recovered (pumped) 1E/2E Seepage	Total 1E/2E Seepage to Second Creek	Hydromet. Cell Seepage	Unrecovered PolyMet Seepage to Embarrass River	Total 2W Seepage
Existing	900	--	--	--	550	--	--	895
Year 1	1600	1570	30	1520	*455*	0.5	80	895
Year 5	2260	1710	550	2147	*410*	6.7	120	895
Year 10	2490	1830	660	2366	*597*	7.7	132	895
Year 15	2700	1900	800	2565	*671*	7.8	143	895
Year 20	2900	1950	950	2755	*737*	8.7	154	895
Post-Closure	780	585	195	741	*290**	0.7	40	610

Notes:
Columns highlighted in yellow present values that are different from those under Tailings Basin-Proposed Action (formerly referred to as Geotechnical Mitigation).

Total 1E/2E seepage to Embarrass River is before any recovery by vertical wells. Except for existing conditions, this flow is all considered PolyMet seepage. This flow is the sum of seepage to the north and to the west.

1E/2E seepage to Second (Knox) Creek is recovered and returned to the Tailings Basin during operations. For post-closure, part of the 780 gpm assumed to go to the Embarrass River would be actually going to Second Creek (i.e., 290 gpm). However, the water quality predictions for the Embarrass River have been based on the conservative assumption that the entire 780 gpm will go to the Embarrass River.

Unrecovered PolyMet Seepage to the Embarrass River equals the total 1E/2E seepage plus the Hydrometallurgical Residue Cell seepage minus the recovered 1E/2E seepage.

Total 2W seepage to the Embarrass River represents seepage from the existing LTVSMC basin and is unchanged during operations. This flow does not include any Cell 1E/2E seepage that travels to the Embarrass River via the west.