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May 12, 2016

Ministry of Environment
Mining Operations Environmental Protection
2080 Labieux Road
Nanaimo, BC
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WEEKLY UPDATE REPORT – MAY 6 TO MAY 12, 2016

Water Management

Springer Pit

The total volume of tailings deposited in the Springer Pit as of May 10, 2016 is 4,178,825 tonnes (3,028,132 m^3 including water retained in tailings).

Water elevations are recorded daily at the Springer Pit and the surrounding groundwater wells and presented here in Table 1.

Water quality monitoring is conducted at the Springer Pit (sample points E11 and E11a) weekly and the surrounding groundwater wells monthly. All results are reported to the Ministry of Environment each quarter, and results are included here as they become available. Results for the Springer Pit from the last six sampling events are shown in Table 2. The wells were purged and sampled again this week; results will be reported here when available.

Water Treatment and Discharge

Discharge of treated water continued this week at an average discharging rate of 0.13 m^3/s.

Rehabilitation Work

Hazeltine Creek Rehabilitation

Rehabilitation work is ongoing in the creek including roughening and erosion control. A six person work crew from Xatsull First Nations continues to plant willows and native grass seed along the Hazeltine Creek corridor.

Environmental Monitoring Program

Water Quality Monitoring

All water quality monitoring as required by Permit 11678 is current.

Samples were collected at end of pipe at the water treatment plant (station HAD-03) and throughout Hazeltine Creek on May 10th after discharge recommenced. Results will be reported when they become available. Results from the May 5th sampling event are reported in Table 3.

Profile data and samples were collected on Quesnel Lake on May 5th and May 10th. The most recent profile data for QUL-58 is provided in Figure 1; results from the April 27th sampling event are presented in Table 4. New data will be provided in this report as it comes available from the lab.

For previous results see the May 5, 2016 report available on the Imperial Metals website.
https://www.imperialmetals.com/assets/docs/mt-polley/05-05-16-weekly_update_SEC.pdf

A map of monitoring stations is available on the Imperial Metals website.
http://www.imperialmetals.com/assets/docs/mt-polley/12.03.15.weekly-update.pdf

Figure 1 shows field parameter profile results for turbidity and temperature at station QUL-58 in Quesnel Lake (station 100m from the Hazeltine Creek outflow diffusers, at the edge of the initial dilution zone).

Figure 2 shows field turbidity readings for upper, middle and lower Hazeltine Creek. The increase in turbidity along the creek is being monitored and is generally a result of spring-like conditions and runoff along the creek.

Figure 3 shows a time series graph of turbidity readings at site QUR-1/QUR-11 in the upper Quesnel River. On April 6, 2016, the monitoring site on Quesnel River was moved from the Quesnel River Research Centre (QUR-1) to the Likely Bridge (QUR-11) to align with samples taken by MoE.

Table 1. Water elevations for Springer Pit and groundwater wells

	Last Week	This Week		Change
	4-May-16	**11-May-16**		(m)
Springer	1036.81	1037.45		0.64
GW12-2a	1018.07	1018.15		0.08
GW12-2b	1020.11	1020.30		0.19
GW15-1a	1034.76	1035.01		0.25
GW15-1b	1034.78	1035.04		0.26
GW15-2a	1029.80	1029.76		-0.04
GW15-2b	1032.32	1032.63		0.31

Table 2. Springer Pit supernatant water chemistry results

		Springer Pit Supernatant					
Date Sampled		**29-Mar-16**	**04-Apr-16**	**11-Apr-16**	**21-Apr-16**	**26-Apr-16**	**02-May-16**
Physical Tests							
Conductivity	µS/cm	1150	1190	1190	1170	1210	1200
Hardness (as CaCO3)	mg/L	527	513	510	504	509	497
pH	pH	8.13	8.00	8.02	8.18	8.13	7.97
Total Suspended Solids	mg/L	3.10	6.50	3.10	14.40	7.00	2.70
Turbidity	NTU	1.56	2.08	1.55	4.43	2.12	1.38
Anions and Nutrients							
Nitrate (as N)	mg/L	8.58	8.49	8.43	8.90	8.71	8.72
Sulfate (SO4)	mg/L	532	521	519	546	537	540
Total Metals							
Aluminum (Al)-Total	mg/L	0.13	0.31	0.13	0.26	0.39	0.13
Arsenic (As)-Total	mg/L	0.00139	0.00137	0.00134	0.00117	0.00127	0.00098
Cadmium (Cd)-Total	mg/L	0.0000067	<0.000020	<0.000050	<0.000020	<0.000015	<0.000010
Copper (Cu)-Total	mg/L	0.00795	0.01510	0.00850	0.01130	0.01640	0.00605
Iron (Fe)-Total	mg/L	0.071	0.215	0.069	0.14	0.234	0.083
Lead (Pb)-Total	mg/L	<0.000050	0.000106	<0.000050	0.000085	0.000108	0.000077
Molybdenum (Mo)-Total	mg/L	0.177	0.169	0.168	0.167	0.171	0.158
Selenium (Se)-Total	mg/L	0.0323	0.0359	0.0342	0.0338	0.0365	0.0356
Dissolved Metals							
Aluminum (Al)-Dissolved	mg/L	0.0188	0.0178	0.0179	0.0208	0.0188	0.0247
Arsenic (As)-Dissolved	mg/L	0.00132	0.00124	0.00134	0.00113	0.00106	0.00102
Cadmium (Cd)-Dissolved	mg/L	<0.0000050	<0.000010	<0.000050	<0.000010	<0.000015	<0.0000050
Copper (Cu)-Dissolved	mg/L	0.00280	0.00277	0.00330	0.00301	0.00296	0.00186
Iron (Fe)-Dissolved	mg/L	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead (Pb)-Dissolved	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Molybdenum (Mo)-Dissolved	mg/L	0.167	0.165	0.163	0.167	0.158	0.164
Selenium (Se)-Dissolved	mg/L	0.031	0.035	0.0366	0.0344	0.0355	0.0372

Table 3. Sample analysis results for HAD-03 (end of pipe from the water treatment plant)

	Lab Analysis Results for HAD-03	Permit 11678
	05-May-16	mg/L
Total Suspended Solids (mg/L)	3	15
Nitrate (as N)- Total (mg/L)	8.79	9.7
Ammonia (as N) - Total (mg/L)	0.1440	0.41
Phosphorus (P) - Total (mg/L)	0.0058	0.09
Sulphate (mg/L)	542	720
Arsenic (As) - Total (mg/L)	0.00043	0.0034
Copper (Cu)-Total (mg/L)	0.0036	0.012
Cadmium (Cd)-Total (mg/L)	<0.000020	N/A
Chromium (Cr) - Total (mg/L)	<0.00050	0.0011
Iron (Fe) - Total (mg/L)	<0.030	1.0
Molybdenum (Mo)-Total (mg/L)	0.171	0.2
Selenium (Se)-Total (mg/L)	0.0371	0.06
Vanadium (V) - Total (mg/L)	0.00174	0.0081
Zinc (Zn) - Total (mg/L)	<0.0030	0.03

Table 4. Sample analysis from the Quesnel Lake initial dilution zone (QUL-58)

	27-Apr-16	27-Apr-16	27-Apr-16	BC Aquatic Life Guidelines	
	QUL-58-S	QUL-58-Mid	QUL-58-B	Maximum	30-Day Average Max
Hardness (as CaCO3) (mg/L)	53.7	54.6	54.4	-	-
Total Suspended Solids (mg/L)	<1.0	<1.0	<1.0	+25 from background	+5 from background
Nitrate (as N) (mg/L)	0.112	0.128	0.128	32.8	3
Copper (Cu)-Total (mg/L)	0.00102	0.00148	0.00151	see note[1]	see note[1]
Molybdenum (Mo)-Total (mg/L)	0.000425	0.000579	0.000583	2	1
Selenium (Se)-Total (mg/L)	0.000110	0.000141	0.000146	no max guideline	0.002
Sulphate (mg/L)	6.83	7.56	7.48	no max guideline	see note[2]
Cadmium (Cd)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	see note[3,4]	see note[3]

[1] Hardness dependent Cu guideline: BC max WQG (mg/L) = (0.094(hardness)+2)/1000;
BC 30-d WQG(mg/L) = 0.002 at hardness ≤50mg/L, at hardness >50mg/L = 0.04*hardness/1000.

[2] Hardness dependent sulphate guideline: BC-30d WQG (mg/L)=128 at hardness <30mg/L, at hardness 31-75mg/L =218, at hardness 76-180mg/L=309, at hardness 181-250mg/L=429, at hardness >250mg/L determine base on site water

[3] Hardness dependent dissolved Cd guideline: max BC WQG(mg/L)=(exp(1.03*hardness)-5.274))/1000;
BC 30-d WQG(mg/L) =(exp(0.736*ln(hardness)-4.943))/1000

[4] Dissolved Cadmium WQG

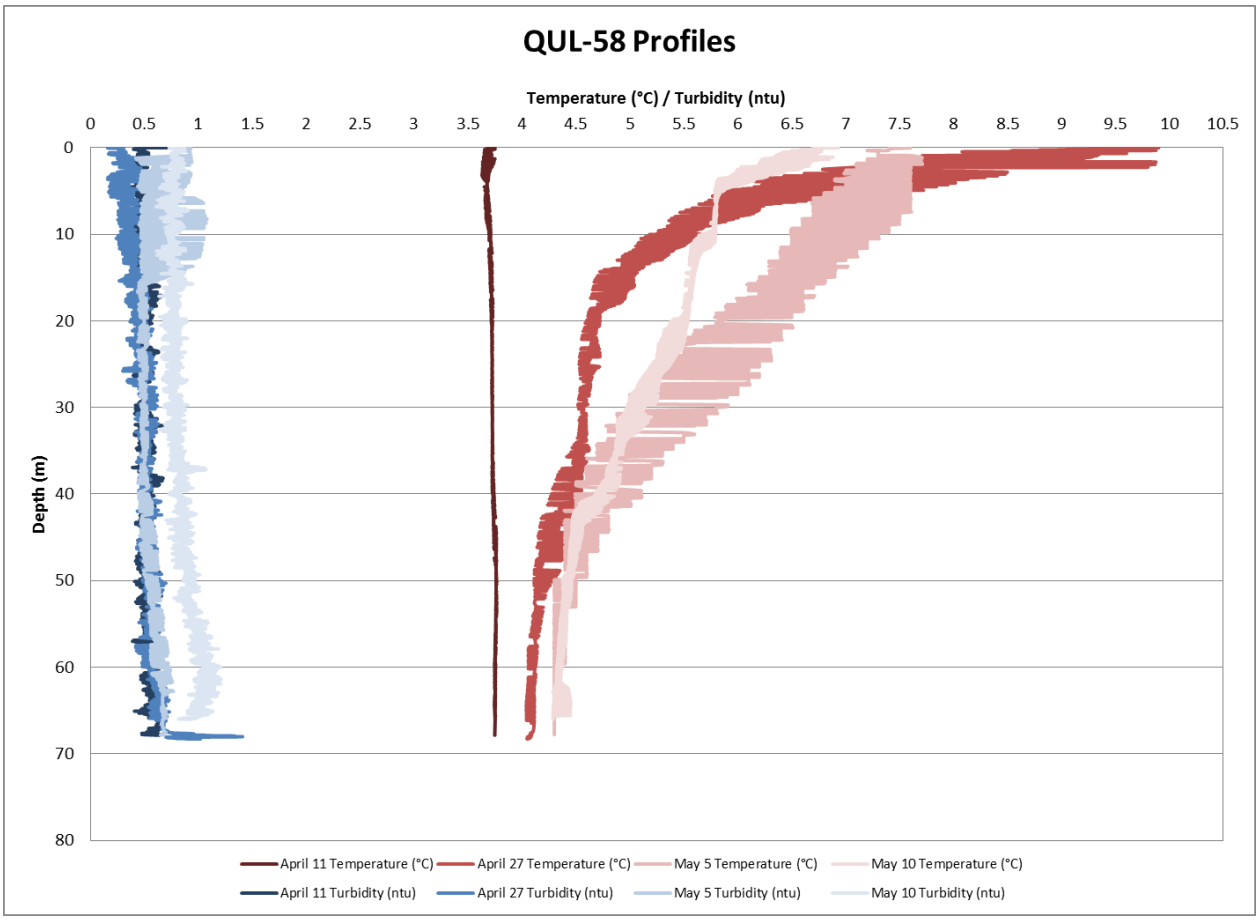

Figure 1. Turbidity and temperature profiles at QUL-58 on April 11, April 27, May 5 and May 10.

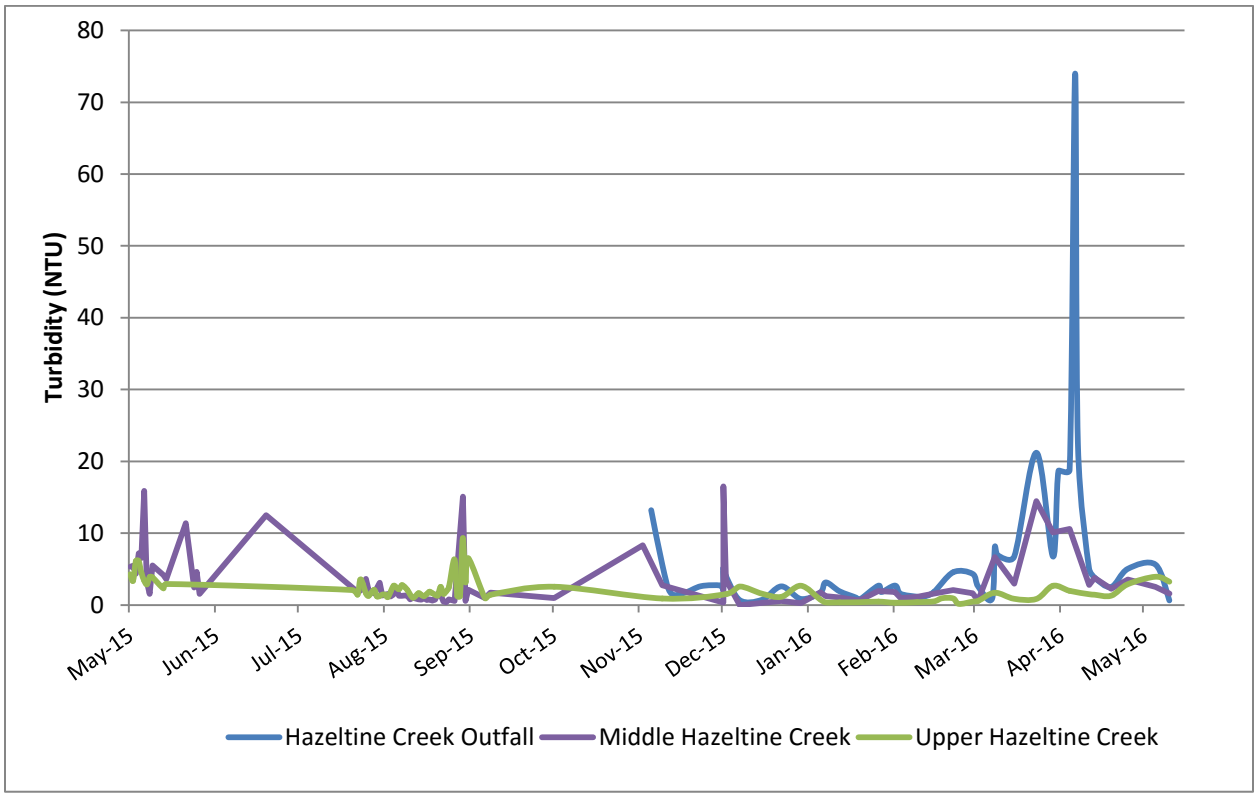

Figure 2. Time series graph for May 15, 2015 – May 10, 2016 showing turbidity levels at monitoring locations in upper and lower Hazeltine Creek

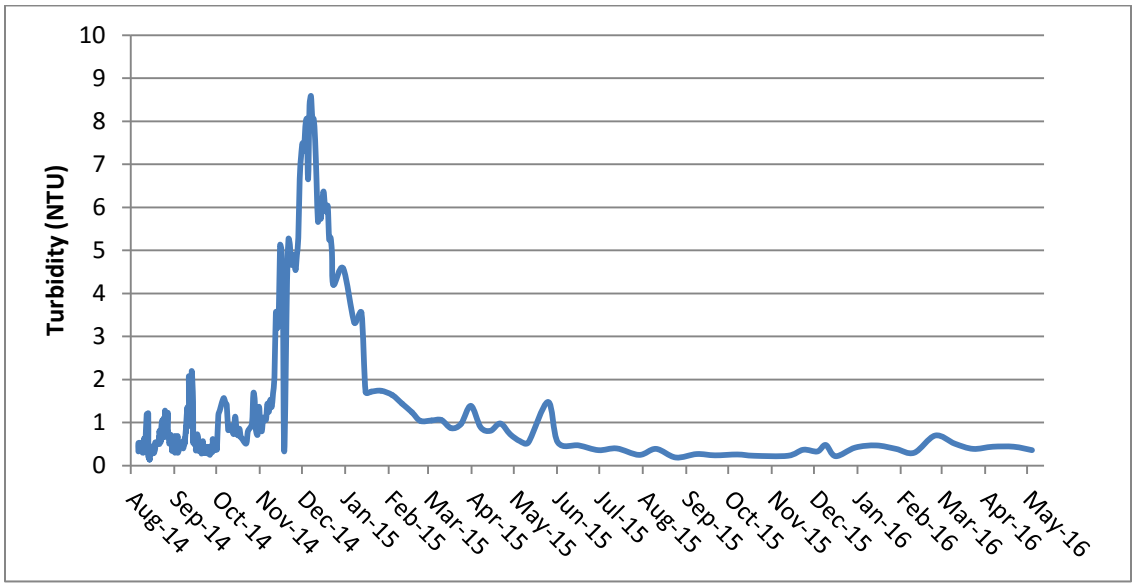

Figure 3. Time series of turbidity readings at site QUR-1/QUR-11 in the upper Quesnel River. Samples are collected every second week from this site.