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Ministry of Environment
Mining Operations Environmental Protection
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WEEKLY UPDATE REPORT – OCTOBER 21 TO OCTOBER 27, 2016

Water Management

Springer Pit

Water elevations are recorded daily at the Springer Pit. Surrounding groundwater elevations are recorded daily with a few exceptions. The summarized weekly data are presented here in Table 1.

Water quality monitoring is conducted at the Springer Pit (sample point E11a) weekly and the surrounding groundwater wells monthly. The groundwater wells were purged and sampled this week. All results are reported to the Ministry of Environment (MoE) 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.

Water Treatment and Discharge

Discharge of treated water continued this week; the total amount of treated water discharged between October 18th and October 23rd was 152,036 m³ with an average discharging rate of 0.294 m³/s throughout this same period.

Rehabilitation Work

Hazeltine Creek Rehabilitation

Placement of till material and coarse woody debris on the east side of the Polley Flats has been completed. Construction of fish habitat features within upper Hazeltine Creek has been completed. Seasonal planting of shrubs at lower Hazeltine near Quesnel Lake, and in the lower flood plain at upper Hazeltine has been completed. Terrestrial restoration in the upper reaches is ongoing, including the installation of wildlife habitat features and seeding of native grass and forbe species.

Environmental Monitoring Program

Water Quality Monitoring

Samples were collected at end of pipe at the water treatment plant (station HAD-03) and throughout Hazeltine Creek on October 24th. Results for HAD-03 from the October 18th sampling event are shown in Table 3.

The most recent profile data for QUL-58 is provided in Figure 1. Results from QUL-58 sampling events compared to the BC Water Quality Guidelines (WQG) for aquatic life are reported here when they become available.

For previous results see the October 20, 2016 report available on the Imperial Metals website:
<https://www.imperialmetals.com/assets/docs/mt-polley/10.20.16.weekly-update-SEC.pdf>

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

The update for the Post-Event Environmental Impact Assessment Report is available on the Imperial Metals website:
https://www.imperialmetals.com/assets/docs/mt-polley/2016-06-03_1411734-124-R-Rev0-10000.pdf

Figure 1

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. Increases in turbidity along the creek between June and early October 2016 were generally a result of the construction in the upper reaches of the creek and quickly dropped out in the sedimentation pond at lower Hazeltine.

Figure 3 shows a time series graph of turbidity readings at site QUR-1/QUR-11 in the upper Quesnel River.

Table 1. Water elevations for Springer Pit and groundwater wells

	Last Week	This Week	Change
	19-Oct-16	26-Oct-16	(m)
Springer	1023.62	1022.30	-1.32
GW12-2a	1016.54	1016.53	-0.01
GW12-2b	1017.41	1017.34	-0.07
GW15-1a	1026.96	1026.35	-0.60
GW15-1b	1027.00	1026.41	-0.59
GW15-2a	1025.69	1025.57	-0.12
GW15-2b	1027.17	1026.96	-0.20

Table 2. Springer Pit supernatant water chemistry results

		Springer Pit Supernatant					
Date Sampled		06-Sep-16	13-Sep-16	19-Sep-16	27-Sep-16	03-Oct-16	11-Oct-16
Physical Tests							
Conductivity	µS/cm	1190	1190	1170	1150	1200	1150
Hardness (as CaCO ₃)	mg/L	496	492	500	509	505	505
pH	pH	7.85	7.84	7.77	7.86	7.77	7.85
Total Suspended Solids	mg/L	<1.0	<1.0	<1.0	1.10	<1.0	<1.0
Turbidity	NTU	0.29	0.28	0.50	0.39	0.41	0.43
Anions and Nutrients							
Nitrate (as N)	mg/L	9.10	9.01	9.28	8.97	8.85	9.10
Sulfate (SO ₄)	mg/L	563	556	572	549	547	567
Total Metals							
Aluminum (Al)-Total	mg/L	0.03	0.03	0.05	0.04	0.04	0.04
Arsenic (As)-Total	mg/L	0.00092	0.00086	0.00098	0.00098	0.00098	0.00111
Cadmium (Cd)-Total	mg/L	<0.000015	0.0000114	<0.000015	<0.000020	0.0000188	<0.000020
Copper (Cu)-Total	mg/L	0.00303	0.00315	0.00389	0.00384	0.00344	0.00375
Iron (Fe)-Total	mg/L	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead (Pb)-Total	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Molybdenum (Mo)-Total	mg/L	0.176	0.176	0.188	0.180	0.182	0.180
Selenium (Se)-Total	mg/L	0.0366	0.0374	0.037	0.0362	0.0362	0.0345
Dissolved Metals							
Aluminum (Al)-Dissolved	mg/L	0.0280	0.0238	0.0241	0.0220	0.0226	0.0201
Arsenic (As)-Dissolved	mg/L	0.00089	0.00089	0.00091	0.00092	0.00095	0.00099
Cadmium (Cd)-Dissolved	mg/L	<0.000015	0.0000152	<0.000015	<0.000020	0.0000136	<0.000015
Copper (Cu)-Dissolved	mg/L	0.00239	0.00236	0.00245	0.00264	0.00236	0.00255
Iron (Fe)-Dissolved	mg/L	<0.030	<0.030	<0.03	<0.030	<0.030	<0.030
Lead (Pb)-Dissolved	mg/L	<0.000050	0.000053	<0.000050	<0.000050	<0.000050	<0.000050
Molybdenum (Mo)-Dissolved	mg/L	0.164	0.168	0.182	0.174	0.171	0.171
Selenium (Se)-Dissolved	mg/L	0.0369	0.0389	0.0374	0.0337	0.0365	0.0356

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

	Lab Analysis Results for HAD-03		Permit 11678
		18-Oct-16	mg/L
Total Suspended Solids (mg/L)		<1.0	15
Nitrate (as N)- Total (mg/L)		8.96	9.7
Ammonia (as N) - Total (mg/L)		0.0294	0.41
Phosphorus (P) - Total (mg/L)		0.0058	0.09
Sulphate (mg/L)		559	720
Arsenic (As) - Total (mg/L)		0.00095	0.0034
Copper (Cu)-Total (mg/L)		0.00452	0.012
Cadmium (Cd)-Total (mg/L)		<0.000015	N/A
Chromium (Cr) - Total (mg/L)		<0.00050	0.0011
Iron (Fe) - Total (mg/L)		<0.030	0.11
Molybdenum (Mo)-Total (mg/L)		0.171	0.2
Selenium (Se)-Total (mg/L)		0.0345	0.06
Vanadium (V) - Total (mg/L)		0.00109	0.0081
Zinc (Zn) - Total (mg/L)		<0.0030	0.0083

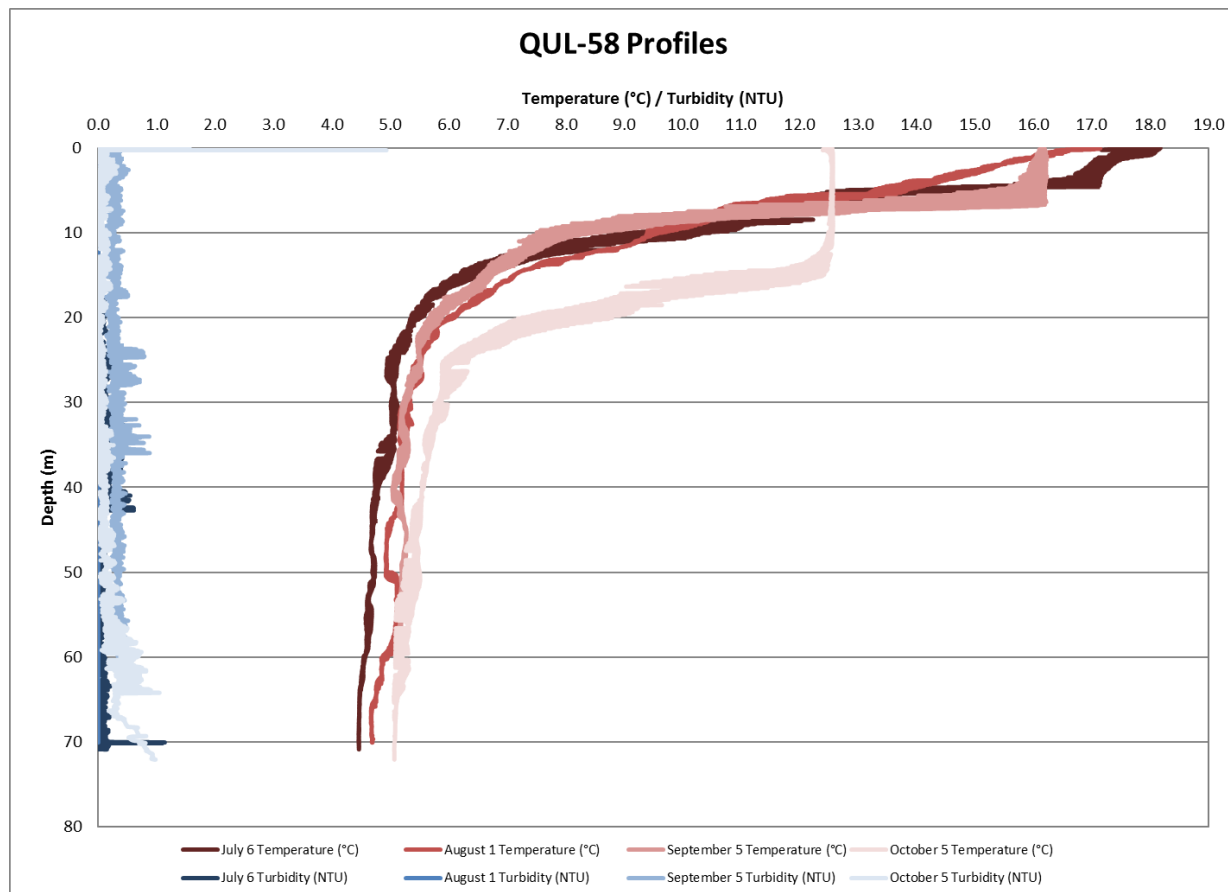


Figure 1. Turbidity and temperature profiles at QUL-58 on July 6, August 1, September 5, and October 5, 2016.

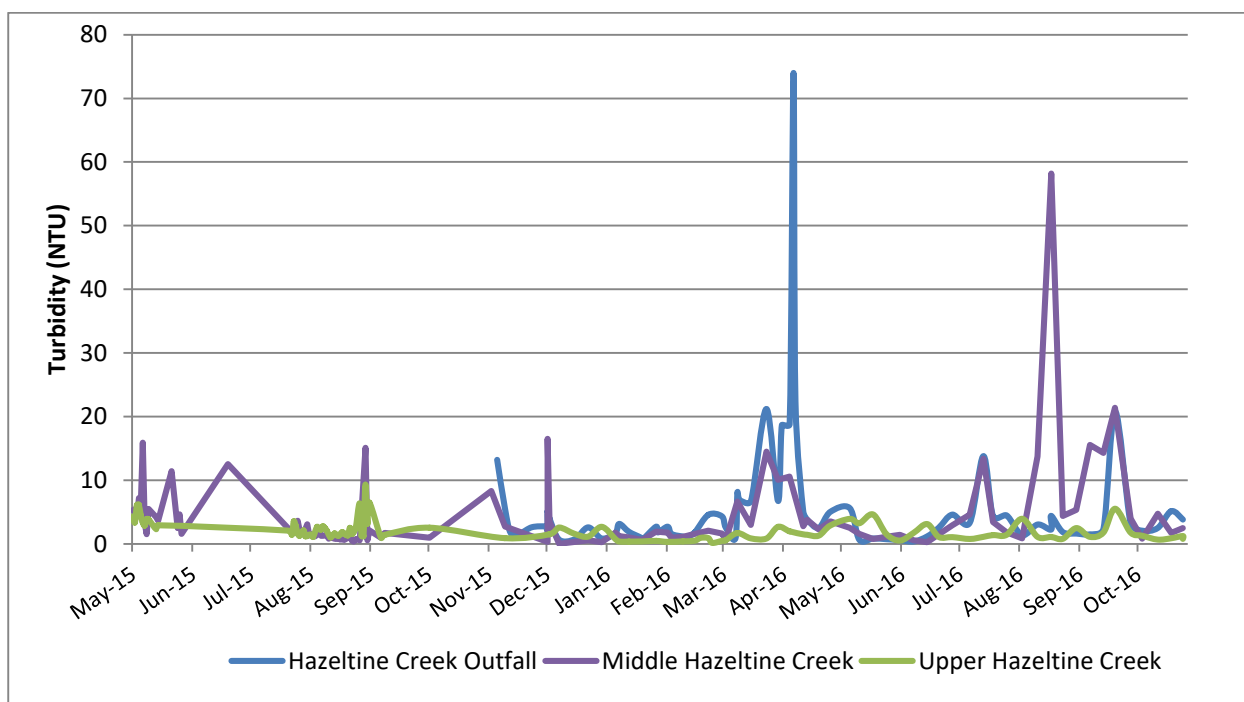


Figure 2. Time series graph for May 15, 2015 – October 24, 2016 showing turbidity levels at monitoring locations in upper and lower Hazeltnine Creek

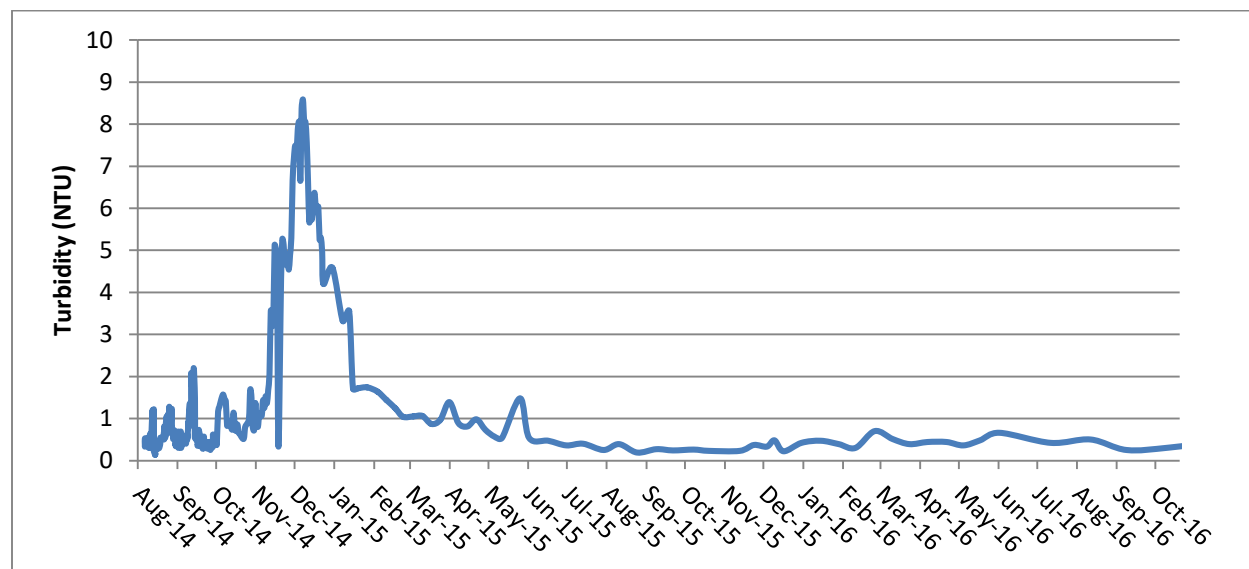


Figure 3. Time series of turbidity readings at site QUR-1/QUR-11 in the upper Quesnel River. Samples are collected monthly from this site.