

**Real Time Water Quality Report
Duck Pond Operations
(Teck Cominco Limited)
Deployment Period 2007-11-07 to 2008-01-09**

General

- The Water Resources Management Division’s (WRMD) staff monitors the real-time web page on a daily basis. Any unusual observations are investigated, with site visits being carried out as warranted.
- Management at Duck Pond Operations are informed of any significant water quality events or instrumentation problems by WRMD.
- The two DataSondes (Tributary to Gills Pond Brook Station and East Pond Brook Station) are set up to measure Ammonium and Nitrate however, technical problems with the instrumentation render readings of these parameters unreliable. Therefore, these parameters will not be discussed or interpreted until the technical problems have been overcome and the data are reliable.
- The Tributary to Gills Pond Brook Station is located 1700 m downstream of the final discharge point for the mine’s Polishing Pond. This station is located such that any impacts from the mine discharge on receiving waters can be measured. East Pond Brook Station is located several kilometres downstream of the Tailings Management Area. This station is located such that any impacts from the Tailings Management Area via seepage through Dam A can be measured.
- A Quanta G monitoring probe has been removed from a Station at MW 1 (Monitoring Well after Tailings Dam A) due to the fact that this well freezes at surface in the fall. This unit will be reinstalled once the well thaws in the spring.
- Raw (uncorrected) data has been used in the preparation of the graphs and subsequent discussion below.

Maintenance and Calibration of Instrumentation

- Following regular cleaning and calibration of the DataSondes at WRMD laboratory in Grand Falls – Windsor, the instruments were installed in both Tributary to Gills Pond Brook and East Pond Brook, on November 7, 2007 and remained deployed until January 9, 2008 (63 day period).
- Management at Duck Pond advised that discharge from Polishing Pond for 2007 ceased on December 21, 2007.
- This period is longer than normal, due to the longer than anticipated period required for de-watering the Polishing Pond. The instruments were not removed until several days following final discharge in an attempt to capture the change in water quality once all processed mine water had been released for the season, and water quality returned to its normal background level.
- *In-situ* measurements of ambient water quality were undertaken with a freshly calibrated Minisonde each time a Datasonde was installed or removed.
- The comparative results between the Minisonde and Datasonde values at the beginning and end of the deployment period are shown in **Table 1** for Tributary to Gill’s Pond Brook and **Table 2** for East Pond Brook.

Table 1: QA/QC Data Comparison Ranking During Deployment Period

Station	Date	Action	Minisonde vs. Datasonde Comparison Ranking			
			Temperature	pH	Conductivity	Dissolved Oxygen
Tributary to Gill’s Pond Brook	2007-11-07	Installation	Good	Excellent	Poor	Good
	2008-01-09	Removal	Excellent	Excellent	Poor	Poor

Table 2: QA/QC Data Comparison Ranking During Deployment Period

Station	Date	Action	Minisonde vs. Datasonde Comparison Ranking			
			Temperature	pH	Conductivity	Dissolved Oxygen
East Pond Brook	2007-11-07	Installation	Good	Poor	Poor	Excellent
	2008-01-09	Removal	Excellent	Marginal	Fair	Good

Data Interpretation

TRIBUTARY TO GILLS POND BROOK

- The water temperature (**Figure 1**) was somewhat variable until the first week of December, after which it remained fairly constant near zero, until the end of the deployment period. Temperature values ranged from a minimum of -0.29°C to 9.27°C over the deployment period.

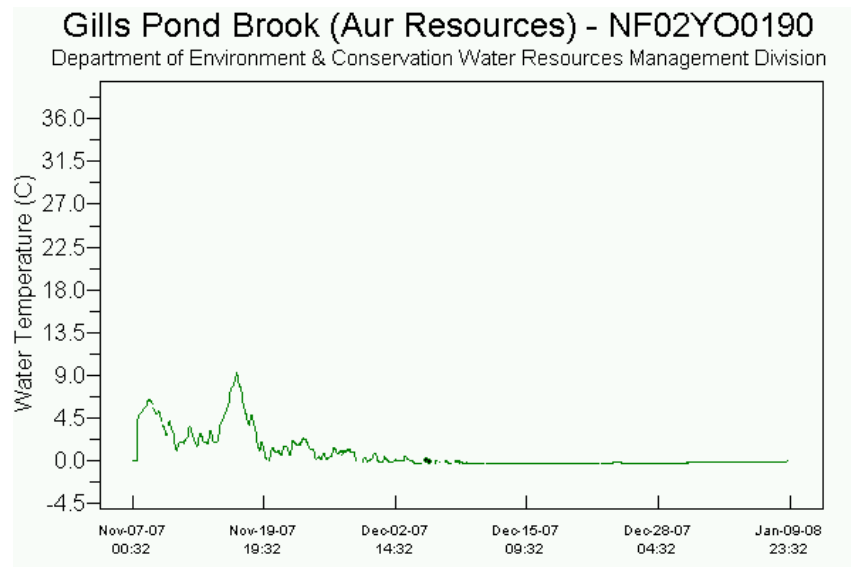


Figure 1

- pH values (**Figure 2**) decreased throughout the deployment period, with a marked decrease immediately following the cessation of discharge from the Polishing Pond on December 21, 2007. The pH values ranged from a minimum of 6.09 to a maximum of 7.18 with some of the values falling below the recommended range (6.5 – 9.0) for the CCME *Canadian Water Quality Guidelines for the Protection of Aquatic Life*, particularly after December 21, 2007. The background pH of this stream can normally be lower than the recommended range, with the pH being elevated when water is being discharged from the Polishing Pond.

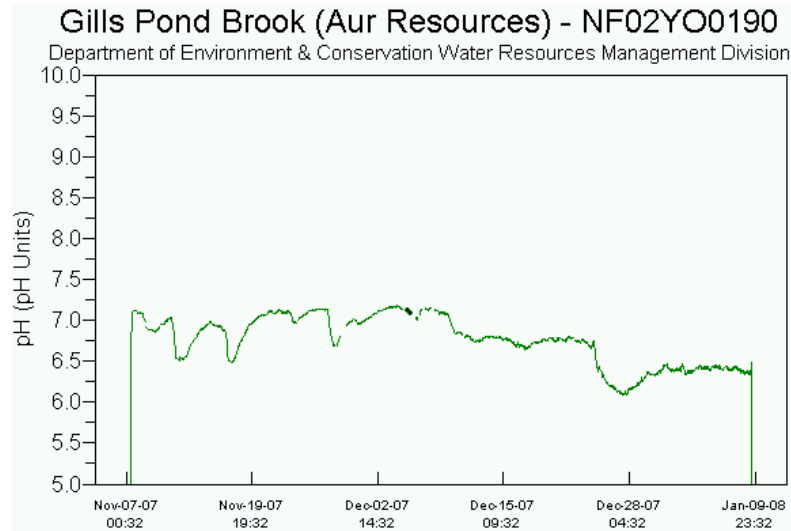


Figure 2

- The specific conductance (**Figure 3**) ranged from a minimum of 36.1 $\mu\text{S}/\text{cm}$ to a maximum of 418 $\mu\text{S}/\text{cm}$ over the deployment period. There is a significant reduction in specific conductance, as the Polishing Pond was dewatered and discharge volumes were reduced beginning on December 9, 2007. Specific conductance values were reduced to normal background levels by December 26, 2007.

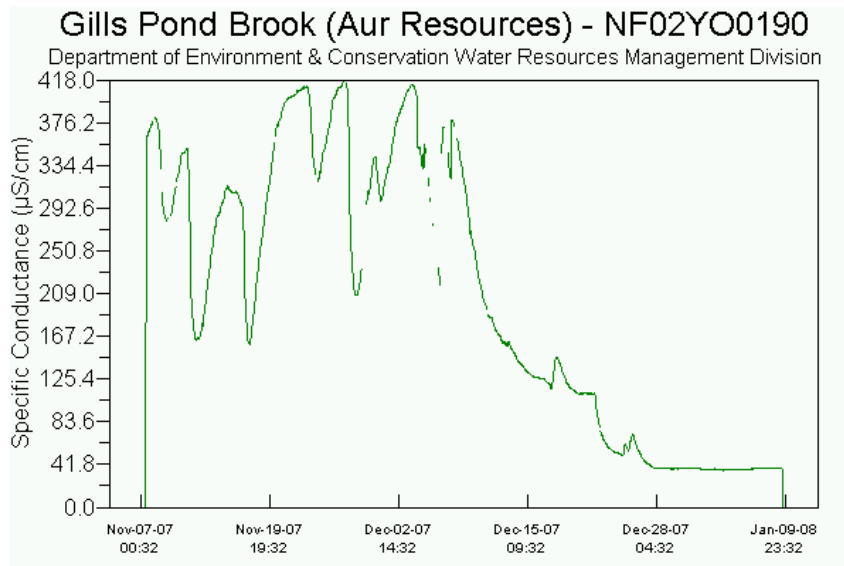


Figure 3

- The dissolved oxygen (**Figure 4**) values ranged from a minimum of 10.62 mg/L to a maximum of 14.59 mg/L over the deployment period. Dissolved oxygen increased slightly over the deployment period, which would be expected as the water temperature decreased. All dissolved oxygen values fall within the recommended CCME *Canadian Water Quality Guidelines for the Protection of Aquatic Life* for dissolved oxygen (cold water/other life stages – above 6.5 mg/L; cold water/early life stages – above 9.5 mg/L; warm water/other life stages – above 5.5 mg/L; warm water/early life stages – above 6 mg/L).

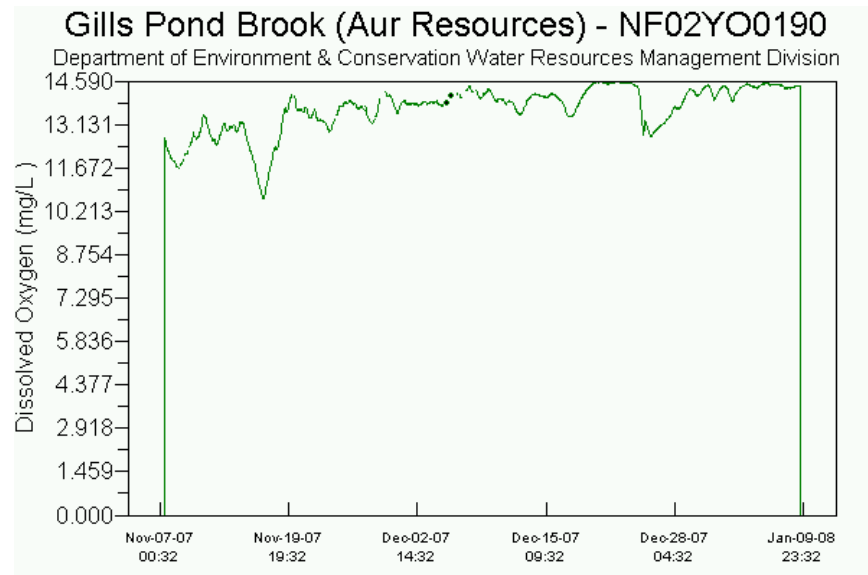


Figure 4

- The turbidity values (**Figure 5**) are artificially elevated during this deployment period due to a calibration problem. Turbidity values ranged from a minimum of 24.1 NTU to 126 NTU. Actual numbers should be 24 NTU less than those shown on the graph below and in the real time data. A number of spikes in turbidity are obvious throughout the deployment period both during and after the mine discharge period. These small spikes are typical of this stream and are somewhat more obvious when greater volumes are being discharged. The variable turbidity at this site is continuing to be investigated.

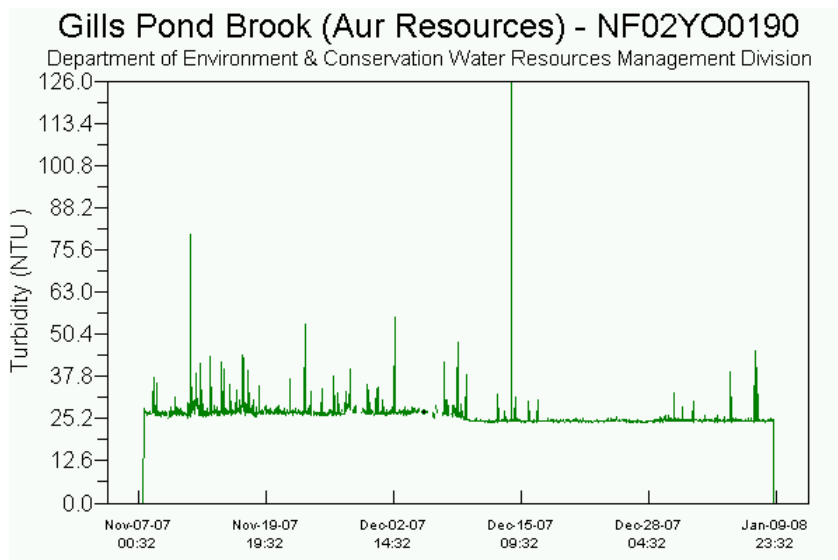


Figure 5

- The stage (**Figure 6**) or water level ranged from a minimum of 1.22 m to a maximum of 11.9 m (peak on December 21, 2007). All the peaks shown from the end of the first week of December to the end of December would be anomalous values likely due to the backwater effects during ice formation. It is most interesting to note that at the beginning of the deployment period (ice free conditions), the water level in the stream was 1.37 m, when discharging from the Polishing Pond, while at the end of the deployment period the water level was 1.29 meters (under continuous ice cover) when there was no discharge from the Polishing Pond.

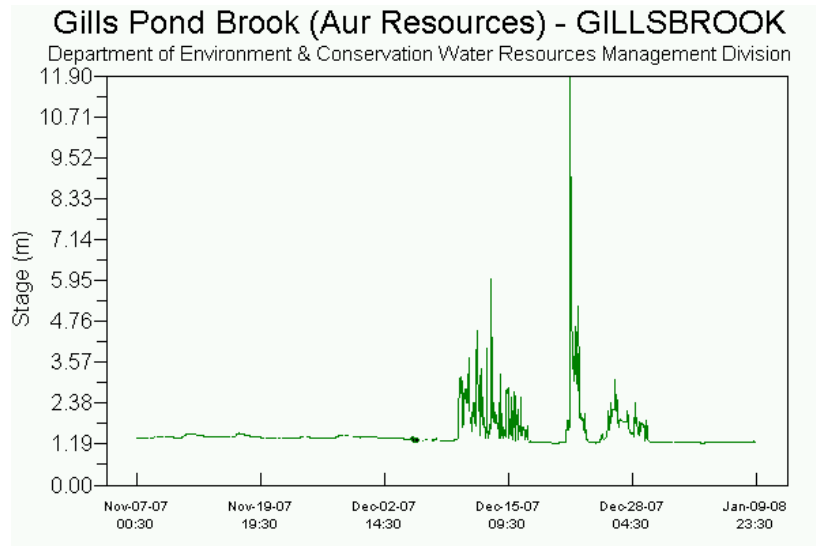


Figure 6

EAST POND BROOK

- The water temperature (**Figure 7**) was somewhat variable until the first week of December, after which it remained fairly constant near zero, until the end of the deployment period. Temperature values ranged from a minimum of -0.16°C to 9.59°C over the deployment period.

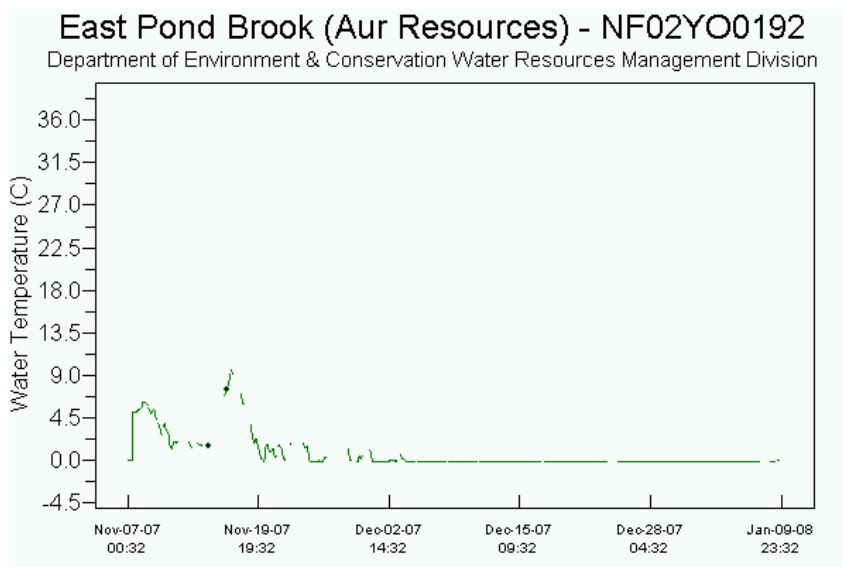


Figure 7

- pH values (**Figure 8**) remained fairly constant throughout the deployment period, ranging from a minimum of 6.00 to a maximum of 6.55 with most of the values falling below the recommended range (6.5 – 9.0) for the CCME *Canadian Water Quality Guidelines for the Protection of Aquatic Life*, particularly after December 21, 2007. The background pH of this stream is normally lower than the recommended range, with no measurable effects over the short term as a result of the mine activity.

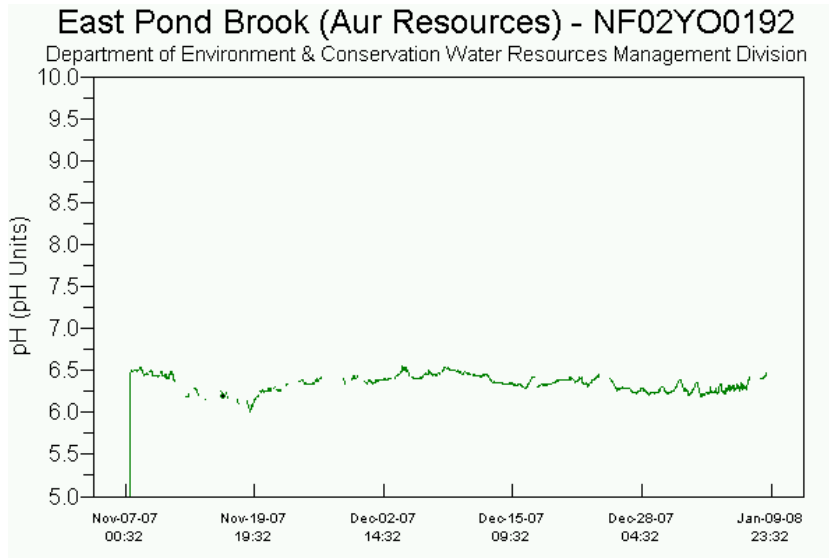


Figure 8

- The specific conductance (**Figure 9**) ranged from a minimum of 13.7 $\mu\text{S}/\text{cm}$ to a maximum of 21.8 $\mu\text{S}/\text{cm}$ over the deployment period. This normal variation is inversely proportional to the stage or water level. See Figure 12.

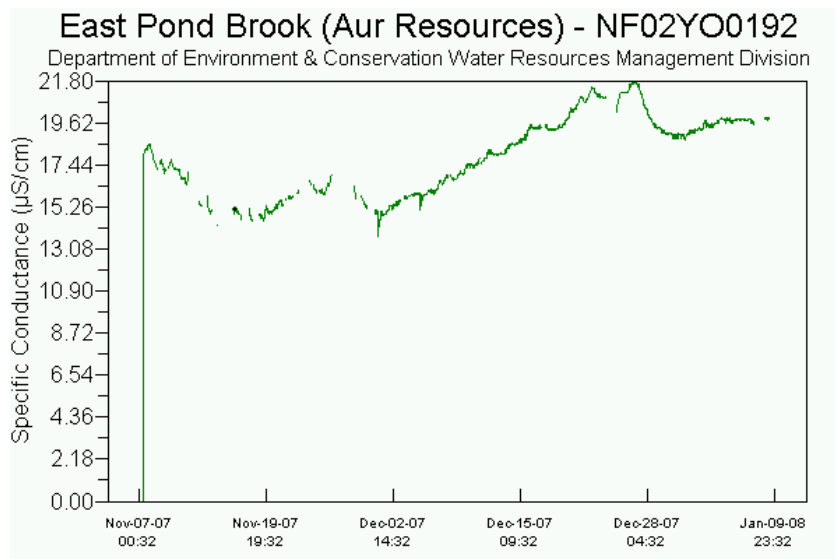


Figure 9

- The dissolved oxygen (**Figure 10**) values ranged from a minimum of 10.98 mg/L to a maximum of 14.83 mg/L over the deployment period. Dissolved oxygen increased slightly over the deployment period, which would be expected as the water temperature decreased. All dissolved oxygen values fall within the recommended CCME *Canadian Water Quality Guidelines for the Protection of Aquatic Life* for dissolved oxygen (cold water/other life stages – above 6.5 mg/L; cold water/early life stages – above 9.5 mg/L; warm water/other life stages – above 5.5 mg/L; warm water/early life stages – above 6 mg/L).

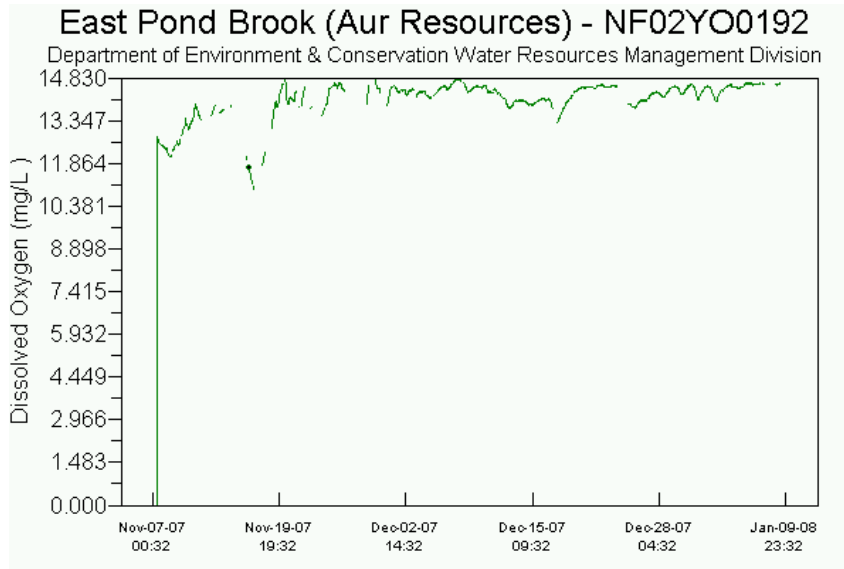


Figure 10

- The turbidity values (**Figure 11**) are fairly consistent at 0 NTU throughout the deployment period with two exceptions. On November 11, 2007 the turbidity spiked to 17.7 NTU and on November 14, 2007 the turbidity spiked to 6.4 NTU. These minor spikes, which are of short duration are normal, and do not indicate any water quality impairment.

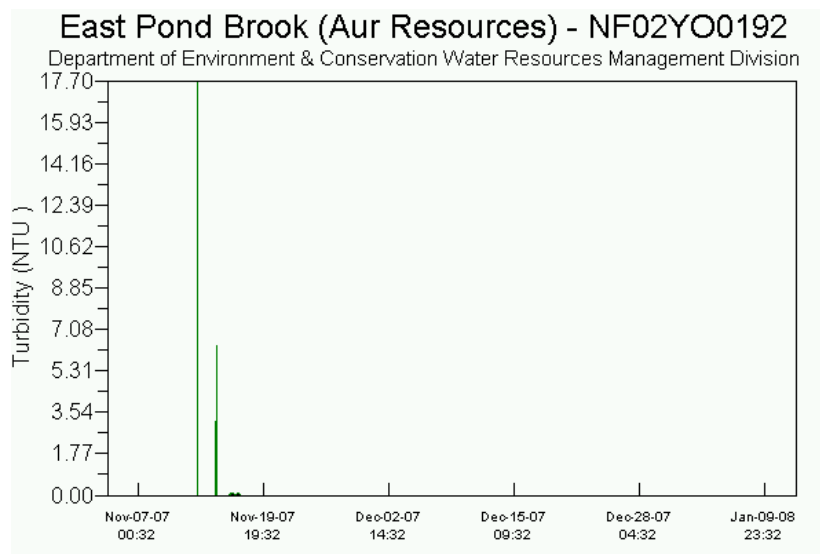


Figure 11

- The stage (**Figure 12**) or water level ranged from a minimum of 0.45 m to a maximum of 2.91 m (peak on December 29, 2007). The peaks above the regular curve and the dips below it, are anomalous values likely due to the backwater effects during ice formation, and data transmission problems. There is a significant drop in stage (0.6 m) on December 1, 2007. This is the result of an instrument calibration problem which was remedied on January 9, 2008.

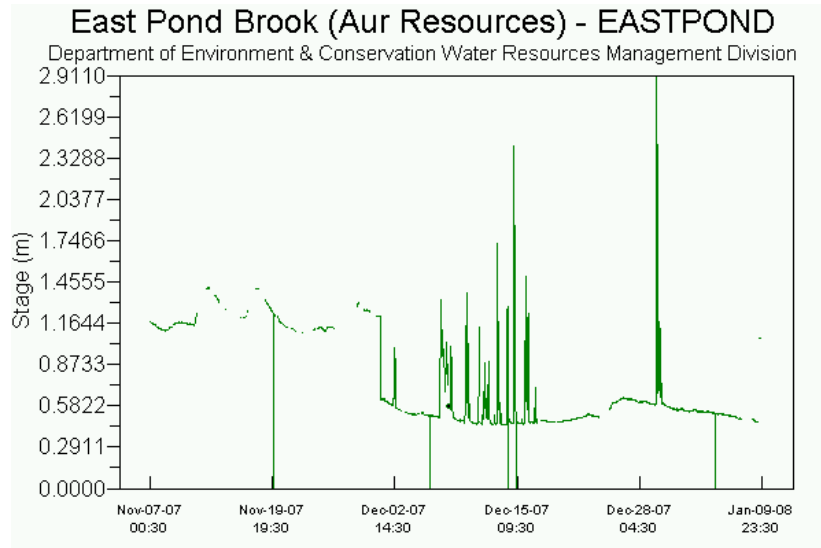


Figure 12

WELL AFTER TAILING DAM A

- Due to the instrument being removed prior to freeze-up, there is no data for this period.

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