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<http://www.miningwatch.ca/blog/copper-quesnel-lake-one-many-concerns-aftermath-mount-polley-tailings-spill>

Copper in Quesnel Lake, One of Many Concerns in Aftermath of Mount Polley Tailings Spill

It has been two months since the massive tailings spill occurred at the Mount Polley mine in the interior of British Columbia and we are all still trying to understand what its impact will be and how the mess will get cleaned up. This post provides an update on the spill, what is known about the impacts so far and an overview of the actions taken to address the spill, including company and BC government reactions.

The information for this post was gleaned from media reports, the Ministry of the Environment (MOE) Mount Polley [Incident Page](#) and the Imperial Metals [website](#), supplemented with information gleaned during a brief visit to the town of Likely, BC in September. Requests to Imperial for a meeting and site visit were not accommodated and subsequent written questions sent by email have not been answered.

For background on the spill, please see our [August 8th post](#).

In the coming days we'll also post an overview of First Nations' response to the spill and a commentary about failure of the regulatory and enforcement system leading up to the spill.

Tailings and wastewater spill worse than estimated, impacts down-played

A month after the spill, the estimated total volume of wastes that spilled from the tailings impoundment into the environment rose from 10 million cubic meters of wastewater and 5 million cubic meters of solid wastes, to 17.1 million cubic meters of wastewater (10.5 from the water at the surface of the impoundment and 6.5 from within the tailings slurry) and 7.3 million cubic meters of tailings solids. A further 0.6 million cubic meters of construction material went cascading downstream with the tailings and wastewater. The grand total of 25 million cubic meters of liquid and solid wastes is 70% higher than initially reported.

The physical impacts of so much waste being released uncontrolled into the environment are relatively obvious. What is much harder to understand are the impacts that potentially toxic metals, nutrients and processing chemicals within the wastes could have. Imperial Metals is

fond of repeating that the tailings are not “acid generating” meaning that the risk of the wastes creating the conditions for acid mine drainage conditions is low. Acid mine drainage occurs when sulphur minerals turn into sulphuric acid creating low pH wastewater that is laden with heavy metals.

While the risk of acid mine drainage may be low, mine wastes in neutral (non-acidic) conditions can still release harmful concentrations metals or other contaminants into the environment.

Though much has been made about the water being “safe to drink” samples taken by the MOE from near the outlet of Hazeltine in Quesnel Lake exceed guidelines for drinking water and protection of aquatic life. The MOE stated that the high levels of aluminium, manganese and iron for drinking water are aesthetic concerns rather than health issues and do not pose a risk for human consumption. A condition on the announcement stating water in most of the lake was safe to drink was qualified with an advisory to avoid drinking water if it has a cloudy appearance.

An increase in E Coli in the water is another concern for local residents many of whom used to take water straight from the lake for drinking and domestic use. E Coli is a bacteria that typically indicates if water has come in contact with human sewage, although it may also come from animal faeces. The MOE reported levels of E Coli above drinking water standards in tests following the spill. While MOE’s memo states that E Coli was at levels typical of other lakes in BC and that it was not related to the spill, residents say E Coli was not an issue previously. Notably, Imperial was depositing sewage from the mine site into its tailings impoundment and stockpiling biosolids (aka sewage sludge) from Vancouver at the tailings facility. The biosolids were used for reclamation activities, although less than a quarter of the material brought to the site since 2000 has actually been used for reclamation (see 2013 Environmental and Reclamation Report).

Quesnel Lake water samples taken on September 4 from near the spill greatly surpassed aquatic life guidelines for copper in several samples. These results are shown in the table below. Three other samples were below the guidelines, as was a sample taken at the outlet of the lake where it joins with the Quesnel River. Chromium, iron, vanadium and zinc were also above the guidelines in some samples.

September 4 water samples that exceed copper toxicity guidelines for aquatic life

	Aquatic Life Guideline	Below Breach	Quesnel Lake @ Hazeltine Crk				
Total Copper (µg / L)	Chronic 2	709	21.3	4.32	6.06	58.8	121

	Acute 7						
Dissolved Copper (µg / L)	(existing guidelines refer only to total copper)	21.1	2.6	1.48	1.56	5.1	7.77

Despite the exceedences, MOE's [memo](#) was understated. MOE remarked that the results exceeding guidelines were for total metals, which is not necessarily a reliable indication of toxicity given that metals bound up in solid waste are not necessarily "bioavailable" or able to have a toxic effect. This statement is misleading given that even the concentration of dissolved metals exceeded the total copper guideline to prevent chronic toxicity in four samples and the acute toxicity guideline in one of these.

The MOE's samples from the lake were purposefully taken from an observable "plume" of cloudy water. A recent [report](#) from the Quesnel River Research Centre notes that there is a plume that "extends over many tens of square kilometers".

There is a plume of fine sediment that extends over an area of many tens of square kilometres - See more at: <http://www.unbc.ca/releases/35250/unbc-releases-initial-findings-tailings-pond-breach#sthash.XRifGKgh.HfVSawto.dpuf> many tens of square kilometres

It is not surprising that copper is becoming a concern given extremely high levels of copper in the tailings solids – called "sediment" by MOE. Copper concentrations in tailings, as reported by MOE, range from 646 parts per million (ppm) to 931 ppm. The Canadian Council of Ministers of the Environment's guideline for residential and parkland use is 63 ppm. Ontario's soil quality guidelines indicate that at 110 ppm harmful effects can be expected on most soil organisms. Concentrations of arsenic, iron, manganese and vanadium also exceed guidelines, although not to the same degree as copper (see MOE [Memo](#) from September 24, 2014).

Water sampling results considered together with observations from community members suggest that the spill has also resulted in "fertilization" of the lake by phosphorus. One source of evidence is observations that the lake changed colour, becoming greener, after the spill. This could be due to increased algal growth from increased phosphorus in the water. The company's response to these concerns is that it's light reflecting on the fine particles in the water, not any sort of chemical change to water quality. But, residents have also observed an increase in water weeds, with mats of vegetation reaching the surface – something they claim to have never seen before. Elevated levels of phosphorus have been found in water samples, in some cases exceeding guidelines.

Despite empirical and anecdotal evidence to the contrary, Imperial continues to insist that the tailings are not harmful and has posted links to two incredibly misleading articles on its webpage about the spill. One article, which ran in the [Northern Miner](#) compares the

concentrations of some toxic metals in the tailings to the natural sediments of the area. The article is extremely limited in its scope. For example it makes no mention of copper. The second article posted [here](#) compares the spill to natural processes of glaciations and erosion, ignoring that such processes happen over millennia not in a few days, and don't involve processing reagents or sewage.

“Clean Up” Process Underway?

To date neither Imperial nor MOE have made public the impact assessment or remediation plans the company submitted to the government under the pollution abatement order. (We are working to get the assessment and plan released to the public.) Some information about the company's plans has, however, been revealed through the media and during community information sessions. The *Vancouver Sun* [reported](#) that Imperial is not planning on removing tailings from Hazeltine Creek and does not have a immediate plan to remove tailings from Quesnel Lake, though is going to be studying the plume.

The company has provided general updates at community meetings, but many residents remain frustrated over the timeliness of information sharing and the lack of concrete details about what the company plans to do. This frustration applies equally to the MOE for the delay in publicizing information and their failure to commit to or disclose any specifics about a monitoring program. The company has also started holding community meetings in an “open house” format where various company reps are available to answer questions to individuals or small groups, but there is no opportunity for everyone to hear the questions posed and answers provided.

There is work ongoing at the site and so far Imperial has focussed its attention on fixing the gaping hole in the tailings impoundment and lowering the water level in Polley Lake. By late September, the flow of tailings from the impoundment was finally stopped.

Polley Lake is a small lake near the mine, its outlet was plugged by the spill causing water levels to rise. This raised safety concerns about working downstream in the Hazeltine Creek watershed where most of the wastes remain. To address the situation water from Polley Lake is being pumped into Hazeltine Creek (or what's left of it) where it is washing more mine wastes downstream into Quesnel Lake. A small silt curtain has been put at the outlet of the creek to reduce discharge of solid wastes into the lake.

With the rainy fall and snowy winter seasons on their way, there is great concern about the erosion of more and more mine wastes downstream into Quesnel Lake. In a [half-baked effort](#) to address this problem, the company spread 22,500 kg of grass seed over spilled tailings and the tailings that remain in the impoundment. The chance that this measure will be successful is low given that there has already been frost in the area, so seed germination and growth this fall will be minimal. Concentrations of copper in the tailings may also deter plant growth. Success with establishing vegetation on tailings is hit and miss at the best of times and successful efforts usually involve a number of soil amendments to help plants get established.

The Vancouver Sun also reported that “the general thrust of Imperial Metals’ creek rehabilitation plan is to create a series of collection pools along Hazeltine Creek so that sediment can be filtered out before water reaches Quesnel Lake.” According to some local residents who work for Imperial, now that water levels in Polley Lake have been lowered and safety concerns addressed, work in the Hazeltine Creek watershed is underway.

The company has also been working to remove the woody debris from Quesnel Lake and its beaches, and has provided water filters to some residents who have been without a safe water source since the spill occurred. Some residents still remain without ready access to water.

Investigations and Inquiry Underway, Public Left in the Dark

The BC government issued an August 18 [update](#) explaining that BC Conservation Officers with the support of DFO, Environment Canada and the RCMP are carrying out an investigation into the spill. According to this statement “The Conservation Officer Service is an independent law enforcement body, and forwards recommendations for charges when warranted directly to provincial Crown Counsel.”

On August 18, the province also [announced](#) an independent engineering review under the Energy and Mines Act. Three mining engineers were appointed to the panel and they are due to issue a report at the end of January 2015. As a result of their ongoing-negotiations with the province, Xat’sull First Nation will have their own expert engineer shadow the panel and conduct a review of their process. BC has not provided any updates on the review and calls to a Ministry spokesperson confirmed that there are no plans for any information about the review to be released prior to publication of the panel’s final report. While the panel will likely identify some important technical factors involved in the spill, we are concerned that it will not address the fundamental questions of management and oversight responsibility and lack thereof on the part of the company and BC regulators.

The spill also prompted BC to require third-party dam safety inspections at the 98 other tailings impoundments in the province and a re-examination of their risk rankings. The Canadian Nuclear Safety Commission is also asking companies with active and de-commissioned uranium tailings facilities to submit safety reviews.

Despite the creation of the MOE’s [registry](#) of information several key documents related to the inspections of the tailings impoundment have not been released with requests from journalists and public interest law groups being refused. The government cites a concern about biasing the investigations if the information were to be released. The [Globe and Mail](#) quotes University of Victoria Environmental Law Clinic’s Calvin Sandborn stating that “The provincial government’s refusal to provide timely access is not only highly troubling, but verges on the absurd,”