



# Mount Polley Mining Corporation

an Imperial Metals company

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## Summary of Mount Polley Toxicity Testing Program – January 2015

Since the tailings dam breach of August 4, Mount Polley Mining Corporation (MPMC) has been doing extensive environmental monitoring and studies, including testing the toxicity of affected waters and sediments. The attached memorandum, prepared by Minnow Environmental, summarizes the results of toxicity testing on water samples collected in late summer 2014. We are awaiting the reporting of results of sediment toxicity testing samples from the test laboratory and additional samples have been submitted by Mount Polley.

In toxicity tests, aquatic organisms are exposed to a water sample at full strength and at various dilutions to directly test whether or not the waters might be harmful to those organisms. Toxicity tests, sometimes referred to as bioassays, are run with a variety of organisms including fish, invertebrates, aquatic plants, and algae, which have different sensitivities to contaminants and represent different components of the ecosystem. The tests follow standardized methods that have been developed by Environment Canada and are used in government and private laboratories throughout Canada to provide information on environmental conditions. These tests have the advantage that they directly measure the toxicity of the entire mixture of substances in an environmental sample.

Toxicity is measured by recording the biological response of the organism to the water sample. The responses measured vary among the specific tests employed but typically include survival, growth and reproduction. The percent effect can be related to the chemistry of the water sample to identify whether or not the measured response is associated with chemicals from the event of interest. An example of an endpoint that is measured in the *Ceriodaphnia dubia* (water flea) test is the concentration that inhibits reproduction by a given percentage. The  $IC_{25}$  denotes the inhibitory concentration, expressed as a percentage by volume of the original sample, that results in 25% reproductive inhibition. It is calculated based on the number of young produced by *C. dubia*, compared with a control (uncontaminated laboratory water) sample.

A total of 53 toxicity tests using 6 different species were carried out on water samples collected from Polley Lake, the discharge to Hazeltine Creek, Quesnel Lake and the Quesnel River. The tests included:

- Acute toxicity testing using Rainbow trout;
- Acute toxicity testing using *Daphnia magna*, a copper sensitive crustacean;
- Survival and growth testing using fathead minnow (*Pimephales promelas*);
- Survival and reproduction testing using *Ceriodaphnia dubia*, a copper sensitive crustacean;
- Plant growth inhibition using the aquatic plant *Lemna minor*; and
- Algal growth inhibition using the alga *Pseudokirchneriella subcapitata*.

The results of this testing did not find toxicity that could be attributed to metals concentrations. This is not surprising because the water quality monitoring program that MPMC has carried out since the tailings dam breach has showed low levels of metals such as copper, especially in their dissolved forms (which are the forms that are understood to impact aquatic species). In a small number of tests, some responses were noted. While these effects were not related to metals, it is appropriate in such situations to resample and retest those samples, which Minnow Environmental has recommended. MPMC has commenced retesting as per these recommendations.

Additional toxicity testing of the sediments has been carried out. When the reports are available from the toxicology laboratory, Mount Polley will be providing these results in a similar release to this one.

[Memorandum: Minnow Environmental Report – January 9, 2015](#)