



Independent Environmental Monitoring Agency

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Ian Goodwin
Manager of Environment, Community and External Affairs
BHP Billiton Diamonds Inc.
1102 4920-52nd Street
Yellowknife, NT X1A 3T1

Re: Agency Comments Concerning BHPB Nitrate Toxicity Study

The Independent Environmental Monitoring Agency has reviewed the document "2003 Nitrate Toxicity Study Scope and Budget, February 2003". We commend BHPB for initiating the study and appreciate that concerns we've expressed regarding nitrate toxicity and northern fish species are being addressed. We have the following comments regarding the methodology proposed.

1. The proposed study largely mimics Kincheloe *et al.* (1979). One difficulty with their methodology, as they note themselves, is that it is difficult to distinguish the relative sensitivity of the various early life history stages (un-eyed and eyed eggs, alevins and fry). This is because mortality at the egg stage may select those individuals most resistant to the effects of nitrate at later stages. We recommend that, aside from duplicating Kincheloe's experiment, BHPB conduct a series of 96-hour tests of young previously unexposed to experimental concentrations of nitrates, to determine the sensitivity of individual life history stages (e.g. at fertilization, as eyed eggs and alevins, and as swim-up fry). As it is planned to take eggs from four females of the two experimental species, there should be a surplus of thousands of eggs for such experiments.
2. There is reason to believe that very soft, dilute water found in lakes near Ekati may enhance the toxicity of nitrate and other ammonia compounds. We suggest that instead of using Vancouver tap water, water from Counts Lake should be used, the same source as the eggs. This water has a TDS of

about 10 mg/L, even late in winter (Table 1.5-3, Appendix 1, AEMP), lower than Vancouver water.

3. The proposed light regime after hatching (16 hours light, 8 dark) should be adjusted to reflect the situations likely to be faced by alevins when they hatch in the wild. Hatching probably occurs no later than the end of December in conditions of almost continuous darkness. A regime of 8 hours light, 16 hours dark would be better.
4. The literature review should focus on differences between the sensitivity of various early life history stages to toxicants in general and to inorganic compounds (nitrates, nitrites, and ammonia) in particular.

Because rainbow trout is the standard laboratory fish for toxicity studies, we recommend that your studies be replicated using the eggs, alevins, and fry of rainbows. This would provide a standard basis for comparison with other toxicity studies.

We would be pleased to meet with BHPB to discuss any questions or concerns you may have with our comments above.

Sincerely,

-ORIGINAL SIGNED BY-

Red Pedersen
Chairperson

Cc. DFO, Society Members