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NUNAVUT WATER BOARD
NUNAVUT IMALIRIYIN KATIMAYINGI

File: NWB1JER0410/L10
July 20th, 2006 *By Fax: 1-416-777-1898*

Greg Missal
Vice-President Nunavut Affairs
Tahera Diamond Corporation
Suite 803, Richmond Street West
Toronto, Ontario M5H 2K1

Subject: Tahera Diamond Corporation; Review of the Aquatic Effects Monitoring Plan (AEMP); Licence NWB1JER0410

Dear Mr. Missal:

The Nunavut Water Board (NWB) has reviewed the Aquatic Effects Monitoring Plan received on March 24th, 2005 and has developed comments.

A. Technical Review

The NWB retained the technical advisement services of Dr. Paul F. Wilkinson and Dr. Mark Curtis of Paul F. Wilkinson Associates Inc. (PFWA Inc.) to provide a review of the Aquatic Effects Monitoring Plan documents. The remarks contained within Section A.1.0 are those of the NWB retained consultants.

1.0 MATERIAL REVIEWED

1.1 Primary Documents

The following primary documents were reviewed:

Primary document 1: Mainstream Aquatics Ltd. March 2005. *Jericho Diamond Project Aquatic Biota AEMP - 2004. Prepared for Tahera Diamond Corporation*. 46 pp. (NWB File No. 04006AF) (hereinafter referred to as "PD04006AF").

Primary document 2: Mainstream Aquatics Ltd. and AMEC Earth and Environmental. March 2005. *Jericho Diamond Project Aquatic Effects Monitoring Plan. Prepared for Tahera Diamond Corporation*. 55 pp. (NWB File No. 04006E) (hereinafter referred to as "PD04006E").

1.2 Background Information

Jericho Diamond Project Environmental Impact Assessment: Aquatic Biota (R. L. & L. Environmental Services Ltd. 2000a) and Jericho Diamond Project Aquatic Studies Program (R. L. & L. Environmental Services Ltd. 2000b).

2.0 COMMENTS ON PRIMARY DOCUMENTS

2.1 Observation: The titles of the two primary documents are so similar as to be confusing, the more so as they bear identical dates.

The distinction appears to be that PD04006E is the aquatic effects monitoring plan, whereas PD04006AF …*presents the results of the aquatic biota component of the 2004 Jericho AEMP*.

"AEMP" is defined as being the *Aquatic Effects Monitoring Program* required by the Project Certificate issued by the Nunavut Impact Review Board ("NIRB") on 20 July, 2004, and by Water License NWBJER0410 of 22 December, 2004.

The reader of PD04006AF is not told, however, whether its *Aquatic Effects Monitoring* ***Program*** (emphasis added) is the same as the …*Aquatic Effects Monitoring* ***Plan*** (emphasis added). Both reports use the same acronym ("AEMP"), but each assigns it a different meaning.

PD04006E is particularly confusing in that it states (Page 1) that the conditions of approval imposed by the NIRB included …*development and implementation of a comprehensive environmental monitoring* ***program****. An integral part of the plan will be the Aquatic Effects Monitoring* ***Plan*** (AEMP) (emphasis added). We assume that the Aquatic Effects Monitoring Plan forms part of the *comprehensive environmental program*, not of the *plan*.

We assume further that PD04006E constitutes the plan, being the corpus of methodological instructions, for monitoring the effects of the Jericho Diamond Mine on the aquatic environment, whereas PD04006AF reports on the implementation of that plan in 2004.

It is not obvious to us, however, how activities conducted in 2004 and published in March 2005, could have implemented a plan that was itself published in 2005.

Recommendation: *We recommend that the relationship between PD04006E and PD04006AF be clarified, and that future reports be titled in such a way as to avoid confusion.*

2.2 Observation: Table 1.1 of PD04006AF defines "runoff" as "unanticipated discharge". In other words, it is not part of the licensed discharge. In fact, it appears to be discharge that is beyond the capacity of the mine site drainage system (including pumps) to direct to the Processed Kimberlite Containment Area ("PKCA").

Recommendation: *The drainage system should be modified to be able to cope with all discharge.*

2.3 Observation: According to PD04006AF (Page 3), Stream W is used as a source of slimy sculpin for metal contaminant controls, even though it is in a different watershed from Cigar Lake and therefore outside the control watershed. Nor are slimy sculpin being collected in a tributary stream leading into Control Lake. Consequently, according to the AEMP there is no provision for collecting slimy sculpin from either of the two control localities.

Recommendation: *It should be demonstrated that there are no slimy sculpin in the streams connected with Cigar Lake if Stream W is to be accepted as a substitute control locality. Slimy sculpin must also be collected from a stream associated with Control Lake.*

2.4 Observation: PD04006AF designates stations only by number and general location (e.g., name of waterbody, location of map).

Recommendation: *At a minimum, the GPS coordinates, water depths and substrate types of each station should be presented.*

2.5 Observation: Table 2.1 of PD04006AF provides a useful summary of the variables ("indicators") measured at each of the stations in 2004. There is, however, no explanation of why on-site measurements of dissolved oxygen were not conducted at stations JER-AB19 (Carat Lake at Stream C1), JER-AB07 (Carat Lake outlet) and JER-AB20 (Lake C3 at Stream C3).

Recommendation: *Dissolved oxygen should be measured at stations JER-AB19, JER-AB07 and JER-AB20.*

2.6 Observation: PD04006E provides (Page 8) that …*water quality stations will be established at the same locations as the benthic macroinvertebrate stations and will be monitored once annually*…

It appears from the lack of any information on water quality in PD04006AF that no such water sampling stations were utilized in the 2004 baseline study. See also my comment in 3.11 below on the almost complete lack of reporting on water quality results at that time.

Recommendation: *Water quality stations should be established at the same locations as the benthic macroinvertebrate stations and monitored once annually.*

2.7 Observation: Based on PD04006AF (Table 2.1), sediment deposition was not measured at JER-AB04 (Lake C3) and JER-AB06 (Carat Lake). It seems to be the case, therefore, that there may be no comparators for measurements of sediment deposition at the control stations (Cigar Lake, Control Lake). As noted above, the depths of the control stations are not given, but their positions seem to indicate that they are positioned at depths similar to those of JER-AB04 and JER-AB06.

Recommendation: *Sediment deposition should be measured at JER-AB04 and JER-AB06.*

2.8 Observation: Table 2.2 of PD04006AF lists periphyton among the indicators monitored, but a footnote explains that, on the basis of Schedule L of Licence NWBJER0410, the periphyton was not analyzed. It is not clear as to why field work on periphyton is being done if the samples are not further processed and the resultant data reported.

Recommendation: *Periphyton sampling is not part of the Water Board licence. However, if such samples are being taken they should be processed and the data reported.*

2.9 Observation: Table 2.2 of PD04006AF states that fish were sampled only to monitor metal contaminants. No work on the characteristics of the fish communities in the study lakes was conducted, which seriously handicaps efforts to interpret the data on contamination by metals. The water licence (Schedule L, Section D) explicitly specifies that fish, fish habitat, and fish migration routes are to be included in the AEMP.

Recommendations: *A programme of study to characterize the fish communities in the study lakes should be initiated.*

2.10 Observation: If valid comparisons of levels of metals in fish from exposure and control sites are to be made, the samples compared for each species should be from individuals of the same sex and the same age class.

Recommendation: *The tissue samples analyzed for metal contamination should come from individuals of the same sex and age class.*

2.11 Observation: Section 3.0 of PD04006E describes in detail a programme of monitoring water chemistry, including the parameters to be measured, the sampling stations, the frequency and replication of sampling, the field and laboratory methods and the analytical techniques.

PD04006AF contains no section on water quality, and there is no explanation of that omission.

Recommendation: *A water chemistry monitoring programme that respects the requirements of Section 3.0 of PD04006E and Schedule K of the water licence must be implemented, and the results reported.*

2.12 Observation: Subsection 3.4.1 of PD04006E requires the collection only of surface water (0.25 m below the surface in Summer and 0.5 m below the surface of the water in holes drilled in the ice in winter). Given the mixing characteristics of the lakes in summer, the specified depth is probably appropriate. In late Winter and early Spring, however, it might be important to collect near-bottom (i.e., 1 m above the bottom) samples in the deeper basins of Cigar, Control, C3, Carat and Jericho to monitor for oxygen depletion.

Recommendation: *A programme of near-bottom sampling in late winter and early spring should be implemented in the deeper water bodies to monitor for oxygen depletion.*

2.13 Observation: The sources cited in Subsection 3.5.1 are outdated, and the references are vague and incomplete.

Recommendation: *The citations for laboratory methods should be current, and detailed bibliographic information should be presented.*

2.14 Observation: The literature on methods cited in Sections 3.2 and 3.3 of PD04006AF is in some cases outdated. For example, the second edition of Pennak's treatise on freshwater invertebrates is cited, but there is already a fourth edition of that work.

Recommendation: *All citations should be current.*

2.15 Observation: The model of the Ekman grab sampler used to sample benthic macroinvertebrates (PD04006AF, Subsection 3.5.1) should be specified. The mesh size is specified as 0.243 microns, but it was actually 0.243 millimetres.

Recommendation: *The model of the Ekman grab sampler should be given, and the mesh size should be corrected.*

2.16 Observation: There is an unacceptable degree of vagueness in the methodological provisions of PD04006AF:

- *Methodology and analysis procedures will **generally follow** those described in DDMI (2003)* (emphasis added);

- *The design of the traps **was similar** to those described in the CRC Handbook of Techniques for Aquatic Sediments Sampling*… (emphasis added).

Recommendation: *Detailed descriptions of any modifications to standard procedures or equipment designs must be given.*

2.17 Observation: PD04006AF (Subsection 3.7.1) notes that variable-mesh gill nets with mesh sizes ranging from 25 to 140 mm were used. Set times were usually less than two hours, but overnight sets were occasionally employed if fish tissue quotas had not been met.

Particularly in the absence of a programme to monitor the status of the fish populations in the lakes, nothing must be done that might negatively affect them. It is disturbing that a 45-year-old Lake trout measuring 1,009 mm in length was taken from Carat Lake in 2004 and sacrificed for tissue analysis.

Recommendation: *Gillnet mesh sizes larger than 89 mm should not be used except when the nets are constantly monitored, and overnight sets should not be practised using gillnets having mesh sizes of greater than 89 mm.*

2.18 Observation: Dissolved oxygen and temperature are shown (PD04006AF, Section 4.1) in a series of figures that plot them against depth. Dissolved oxygen is presented as mg/L.

Recommendation: *The raw data should be presented in tabular form in an appendix, and the concentrations of dissolved oxygen should also be presented as percent saturation.*

2.19 Observation: The 2000 data on phytoplankton are not presented in PD04006AF Section 4.3, making it impossible to compare the situation in 2004 with that before construction.

The "controls" - Control Lake and Cigar Lake - seem to be problematic in that they frequently differ from those in the exposed system and under these conditions it should be explained why these results are so anomalous:

- Control Lake had the lowest mean number of phytoplankton taxa and the highest mean Cholorophyll *a* levels;

- Cigar Lake had the lowest mean total cell density and the lowest mean Chlorophyll *a* levels.

The quality control findings indicated large differences (>20%) between the parameters measured by the processing laboratory and by an outside expert respectively. The differences between replicate samples measured by the same laboratory were also large.

Recommendation: *The 2000 data on phytoplankton should be presented, and any differences observed in 2004 should be discussed. The differences in phytoplankton between control and exposure area lakes should be explained. The quality control problem with regard to phytoplankton processing must be rectified.*

2.20 Observation: The 2000 data on zooplankton are not presented in PD04006AF Section 4.4, making it impossible to compare the situation in 2004 with that before construction.

As was the case for phytoplankton, the controls exhibited different results from the other lakes:

- Cigar Lake had the lowest means for number of taxa, Simpson's D value and biomass;
- Control Lake had the highest means for number of taxa and density.

Unlike the situation for phytoplankton, the quality control revealed little difference between the results of the laboratory and those from an outside taxonomist or between replicate samples.

Recommendation: *The 2000 data on zooplankton should be presented, and any differences observed in 2004 should be discussed. The differences in zooplankton between control and exposure area lakes should be explained.*

2.21 Observation: The data on benthic macroinvertebrates (PD04006AF, Section 4.5) are well described. They are sufficiently consistent that they can be considered more adequate than the phytoplankton and the zooplankton data for monitoring purposes.

Recommendation: *The 2000 data on benthos should be presented and any differences observed in 2004 should be discussed.*

2.22 Observation: Given the wide range in the size and the age of the fish collected for tissue metal contaminants (PD04006AF, Table 4.7), the data will be difficult to use for monitoring purposes. The sample sizes were too small to determine relationships between tissue metal levels and fish age and size, and in any case the effects of fish age on metal concentrations were not analysed.

It is impossible to know whether the apparent differences in metal concentrations in the fish from different lakes are real, or whether they are an artifact of random variability related to the small sample sizes, possibly compounded by differences in the age and size of the fish sampled.

Recommendation: *At a minimum, the effects of age on the metal concentrations should be analyzed, but, as stated in 3.10 above, the tissue samples analyzed for metal contamination should to the extent possible come from individuals of the same sex and age class.*

Preferably, PD04006E should be revised with respect to the procedure for sampling fish tissues for metal concentration, and additional field work conducted to determine the characteristics of the fish populations (see 3.9).

2.23 Observation: The statement (PD04006AF, Section 5.1) that the significant spatial differences for three out of five parameters for benthic invertebrates can be attributed in large part to the within-site variation at Cigar Lake is not explained.

Recommendation: *Future benthic sampling in Cigar Lake should be designed to ascertain whether the variation observed in Cigar Lake in 2004 is real and, if so, to identify its causes, possibly including sediment or other heterogeneities.*

2.25 Observation: PD04006AF (Section 5.1) states that:

- the mean concentration of cadmium in slimy sculpin whole fish was significantly higher in Stream W than in Streams C1 and C3;

- the mean concentration of zinc in lake trout muscle tissue was significantly higher in Cigar Lake than in Lake C3 and Carat Lake;

- fish in Carat Lake contained higher concentrations of mercury than those in other waterbodies;

- mercury concentrations in slimy sculpin muscle tissue were significantly higher in Stream W than in Stream C1.

Caution in interpreting the concentrations of mercury was urged on the grounds that fish can move between Carat Lake and Lake C3, but the possible influence of age and size differences in the fish was not mentioned.

Recommendation: *PD04006E should be revised with respect to the procedure for sampling fish tissues for metal concentrations.*

B. Intervention Statements and Supplemental Information

1.0 MATERIAL REVIEWED

1.1 Secondary Documents

Further to the technical review completed by Paul F. Wilkinson Associates Inc., the NWB, with assistance from PFWA Ltd., reviewed the following supplemental documents:

1. Dillon Consulting Limited. September 25th, 2005. *Review of Aquatic Effects Monitoring Program for the Jericho Diamond Project*. Letter from Ulysses Klee to Dionne Filiatrault.

2. Tahera Diamond Corporation. June 10, 2005. *Aquatic Effects Monitoring Plan*. Letter from Greg Missal, Vice President, Government and Regulatory Affairs, and Cheryl Wray, Environmental Supervisor - Jericho Mine Site, to Philippe di Pizzo, Executive Director, Nunavut Water Board.

3. Environment Canada. May 13, 2005. *Tahera Diamond Corporation, Jericho Diamond Project – Aquatic Effects Monitoring Plan.* Letter from C.A. Brumwell to Philippe di Pizzo.

4. Indian and Northern Affairs Canada. May 13, 2005. *Jericho Aquatic Effects Monitoring Plan (AEMP)*. Letter from Robert Eno to Phyllis Beaulieu.

5. Kitikmeot Inuit Association. May 13, 2005. NWB1JER0410/TR/L10 – *Aquatic Effects Monitoring Plan.* Memo from Lynn Carter to Phyllis Beaulieu.

6. AMEC Earth & Environmental, Burnaby, BC. April 2005. Quality Assurance/Quality Control Plan. Water Licence NWB1JER0410. Jericho Diamond Mine, Nunavut, Canada. This document relates to the QA/QC component of the NWB licence as specified in Item 5 and Schedule L, Item 2 and as such is outside the scope of the present review, but relevant sections pertaining to the AEMP were reviewed.

1.2 Review of Secondary Documents

Following a review of the above listed documents in Section B.1.1 the NWB requests the following information:

1. The Dillon Consulting Limited review suggests that the conceptual basis for the AEMP could be strengthened by focusing …*on those changes and effects that have ecological significance from the perspective of being deleterious and not just statistically significant*… and that …*it would be of significant value if the criteria for what constitutes a deleterious effect were clearly defined so that*

meaningful endpoints can be applied to any of the observed changes. TDC is to provide a detailed response to the information contained within this bullet.

2. As indicated in the Dillon Consulting Limited review, that toxicity testing should be included as part of the monitoring program unless the nature of the material to be discharged is not conducive to that type of analysis, and that this should be done proactively in advance of finding any significant impacts. TDC is to implement toxicity testing (testing the effluent from the PKCA) as indicated under this bullet.

3. After consideration of Tahera Diamond Corporation's (TDC) June 10th, 2005 response the NWB requests from TDC that near-bottom water quality data in the late winter at water sampling stations of the central basins of lakes to test from BOD and dissolved oxygen levels be included in the aquatic monitoring regime.

4. The NWB is in full agreement with Environment Canada's statement that "*If water or sediment quality changes are detected the company should not wait until biological changes are observed to take action"*. Environment Canada also states that "*The sampling locations, frequency, parameters, QA/QC and proposed data analyses will form the basis of the aquatic effects monitoring program, and therefore should be rigorous enough to detect changes associated with the project"*. The NWB requests that TDC give appropriate consideration to these statements with respect to the triggering of management action and the tightening of the statistical basis for the monitoring program design and for data analysis.

5. The NWB requests a detailed response to INAC's comment listed under the **General Comments** section bullet 1.

6. After a review of INAC's Intervention statement the NWB requests the following:

    a. The watershed flowing north into the Jericho River below Jericho Lake should be included in the monitoring plan (Section 2.1.1, Table 2.1)
    b. Water Quality and flow should be monitored at WQ4 (Section 3.2, Table 3.2)
    c. Table 3.3 should cross-reference historical and current station numbering systems, and that historical and current detection limits should be specified
    d. The codes in Table 3.4 should be explained.
    e. Pre-construction water chemistry data should be collected at JER-WQ2 and JER-WQ16.
    f. "Before-after-control-impact" should be identified in Section 3.6 as the basic statistical analytical tool for water chemistry.
    g. The NWB is in agreement with INAC that at least one lake (Lynne Lake) should be included in the sampling program to detect metals from ARD (As describe in INAC's Interventions Tables 4.2 &4.3, Page 24).
    h. The questions listed in INAC's Intervention Section 4.3, Page 26 are important and must be answered.
    i. Dissolved oxygen should be monitored in Lynne Lake.
    j. As per Section 7.1, Table 7.1 of INAC's Intervention, Tahera shall identify gut contents of the fish sampled.
    k. As found in INAC's Intervention Section 7.3, Table 7.4 Tahera shall repeat baseline sampling for lake trout, whitefish, and slimy sculpin to ensure that fish are known with certainty to come from Cigar Lake. TDC is to refer to Section A.2.3 in applying this provision. Slimy sculpin and other fish shall not be collected from sites other than Cigar Lake and its immediate tributaries if the lake is to function as an outside control.
    l. The NWB shares the concern with INAC (Section 7.3, Page 43) about the absence of any protocol for collecting data on the community characteristics of the concerned fish populations. TDC is to formulate a detailed response to this provision listed in INAC's Intervention statement.

7. PD04006E should be clearly cross-referenced to the other components of the Jericho water testing programs, including all those associated with the plant and the PKCA.

8. Throughout PD04006E, the monitoring protocols should be compatible with the MMEEM guidelines (Metal Mining Guidance Document for Environmental Effects Monitoring Aquatic Environmental Effects), citing appropriate documents as necessary. All analyses must adhere to the well-established templates provided in those guidelines (**See Appendix 1**).

9. The results of the monitoring program should be reported with reference to earlier studies done in the water bodies concerned during the preparatory phases of the environmental assessment statement.

10. The characteristics of the fish populations in the area must be monitored. This can be achieved through catch-per-unit-effort (CPUE) records from non-lethal harvest devices (e.g. trap nets). Small-mesh gill nets and electrofishing apparatus can be used to obtain growth characteristics and condition indices for young fish of the target species (lake trout, round whitefish, burbot, slimy sculpin). Despite concerns about depleting fish populations, this need not be an issue if small young fish are utilized for monitoring purposes, because they have high natural mortality rates in any case.

11. Consistent sizes and ages of fish must be used for tissues (liver and muscle) metals testing, but under no circumstances should it be permitted to capture and kill large, old fish from the lakes for this or any other purpose. The structure of fish communities in the lakes is such that the removal of large predatory fish from the systems can have very large effects on fish community dynamics.

12. The monitoring field should be expanded to take into account the need to monitor the system immediately to the east of the runway and the Lynne Lake watershed.

In summary the NWB requests a revised Aquatic Effects Monitoring Plan that encompasses all recommendations set under Section A.2.0 and all direction given in Section B.1.0. TDC should also develop a covering letter identifying how each recommendation/issue identified in this letter document has been satisfied in the revised AEMP. This shall include appropriate page referencing that laces TDC responses to the NWB recommendations/issues to sections of the revised AEMP. The NWB requests a revised AEMP no later than sixty (60) days from the date of this correspondence.

If you have any questions whatsoever please feel free to contact the undersigned as necessary.

Sincerely,

Original signed by:

Joe Murdock
Coordinator of Technical Services

cc. Paul Wilkinson (Paul F. Wilkinson and Associates Inc.)
Mark Curtis (Paul F. Wilkinson and Associates Inc.)
Jim Rogers (INAC)
Ian Rumbolt (INAC)
David Abernethy (INAC)
Peter Kusugak (INAC)
Robert Eno (GN-DOE)
Mike Atkinson (GN-DOE)
Tania Gordanier (DFO)
Colette Spagnuolo (EC)
Geoff Clark (KIA)
Joshua Gladstone (NIRB)

Appendix 1

Standardization of Methods for Aquatic Effects Monitoring Programs
For the Canadian Mining Sector

Over the past several decades a variety of sampling methods, laboratory protocols and data analyses have been utilized by the mining industry and by regulatory agencies for environmental assessment and monitoring. Considerable effort has been directed towards optimizing and standardizing field and laboratory procedures, so that useful and meaningful scientific results can be obtained in a cost-effective manner. Consequently, sampling and analysis procedures for aquatic baseline environmental assessment and follow-up aquatic effects monitoring programs can now be designed so as to provide for consistent, meaningful data sets that better enable us to preserve and protect the receiving waters adjacent to mining complexes.

For the mining industry in Canada much progress in this area has been through work done during two sequential and complementary programs aimed at documenting, evaluating and recommending appropriate procedures for characterizing the environmental impacts of mine effluents. These were the Assessment of the Aquatic Effects of Mining in Canada (AQUAMIN) program, starting in 1993, and the Aquatic Effects Technology Evaluation (AETE) program, running from 1994 to 1999.

The findings and recommendations of the AQUAMIN[1] and AETE initiatives, including their case studies, technical evaluations and consultations with experts, were then instrumental in developing the Environmental Effects Monitoring (EEM) requirements associated with the Metal Mining Effluent Regulations (MMER), the final version of the MMER being published in the Canada Gazette in June 2002 and put into force in December 2002 as a statute under the *Fisheries Act.* An amendment to the MMER was published in the Canada Gazette in April 2006[2]. These metal mining regulations and their supporting protocols, together with parallel work done for the pulp and paper industry, can now be regarded as setting the standards which ensure best practice across the board for related industries in Canada, *including non-metal mines such as Jericho.*

Some primary documents and literature on biomonitoring to assess aquatic impacts of mining

Listed below are some documents offering up-to-date perspectives on appropriate biomonitoring protocols and which could usefully have been alluded to in the sections of PD04006E covering the monitoring study design, field sampling methods, laboratory analyses, data analyses and interpretation of results:

- Schedule 5 of the Metal Mining Effluent Regulations (SOR/2002-222) addresses Environmental Effects Monitoring Studies including "Part 2 Biological Monitoring Studies" which specifies basic regulatory requirements under the *Fisheries Act*[3];

- the Metal Mining Guidance Document for Aquatic Effects Environmental Monitoring[4] contains chapters on sampling program designs, site selection, fish monitoring, benthic invertebrate community surveys, water quality monitoring, sublethal toxicity testing, sediment monitoring, field and sampling methods, invertebrate taxonomy, data assessment, statistics and interpretation;

- the Aquatic Effects Technology Evaluation (AETE) Reports[5] are a series of documents on appropriate, cost-effective methods of determining the biological and non-biological impacts of mine effluents on Canada's lakes, rivers and streams;

- the final 2002 AETE Synthesis Report on Monitoring Methods[6]also provides useful summary information on all aspects of the material covered in the other reports;

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[1] The AQUAMIN Final Report, "Assessment of the Aquatic Effects of Mining in Canada", was published in 1996 and can be downloaded at http://www.ec.gc.ca/eem/english/metalmining/background/final.cfm .

[2] "Regulations Amending the Metal Mining Effluent Regulations. Canada Gazette Vol 140, No 14 – April 8, 2006 http://canadagazette.gc.ca/partI/2006/20060408/htmlregle2-e.html

[3] Schedule 5 is at http://laws.justice.gc.ca/en/F-14/SOR-2002-222/119900.html#rid-119931 and the entire body of the MMER is at http://laws.justice.gc.ca/en/F-14/SOR-2002-222/index.html .

[4]Guidance Document at http://www.ec.gc.ca/eem/English/Publications/MMdoc/default.cfm with updates at http://www.ec.gc.ca/eem/pdf_publications/English/MMEEM_TGD_Corrections_e.pdf .

[5]The AETE Reports are listed at http://www.nrcan.gc.ca/mms/canmet-mtb/mmsl-lmsm/enviro/metals/aete.htm where most can be accessed directly.

- the *Water Quality Research Journal of Canada*, also in 2002, published a useful series of articles on various aspects of the EEM program, among which is an "Overview of the Metal Mining Environmental Effects Monitoring Program" (authors: Dumaresq *et al*.);

- the National Environmental Effects Monitoring Office (National Water Research Institute, Environment Canada) published a number of updates on its recommendations for field methods and sample processing, including, for example: "Revised Guidance for Sample Sorting and Subsampling Protocols for EEM Benthic Invertebrate Community Surveys"[7] (2002); "Guidance for Fish Tissue Analysis for Mercury using Non-Lethal Methods for the Metal Mining Environmental Effects Monitoring Program"[8] (2005); and "Further Guidance for Non-Lethal Sampling"[9](2005);

- finally, in 2005, the National Environmental Effects Monitoring Office published the Pulp and Paper EEM Guidance Document[10], which also contains much additional information of direct relevance to the monitoring needs of metal and non-metal mines.

[6] The AETE Synthesis Report is not accessible via the regular AETE Report site (footnote 3) but is available at http://www.nrcan.gc.ca/mms/canmet-mtb/mmsl-lmsm/enviro/reports/final414.pdf .
[7] http://www.ec.gc.ca/eem/pdf_publications/English/Revised_subsampling_guidance.pdf .
[8] http://www.ec.gc.ca/eem/pdf_publications/English/mm_fish_tissue.pdf
[9] http://www.ec.gc.ca/eem/pdf_publications/English/Further_non_lethal.pdf
[10] Can be downloaded from: http://www.ec.gc.ca/EEM/English/PulpPaper/Guidance/default.cfm