

## Water Quality Monitoring Workshop



September 8-11, 2003  
Recreation Complex, Kugluktuk, Nunavut

### WORKSHOP REPORT

Prepared for:  
**Environmental Monitoring Advisory Board**  
Yellowknife, NT

Prepared by:  
**Terriplan Consultants**  
Yellowknife, NT  
October, 2003



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## **Introduction**

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The following is a full report of the Environmental Monitoring Advisory Board's Water Quality Workshop in Kugluktuk, Nunavut September 8 – 11, 2003.

### **Participation**

Twenty-four (24) participants, including Board members, representatives from communities and resource people, attended the workshop. Board Chair Robert Turner (North Slave Metis Alliance), Vice-Chair Floyd Adlem (EMAB), Secretary-Treasurer Doug Doan (RWED, GNWT), and Johnny Weyallon (Dogrib Treaty 11 Council, Board Member) were unable to participate.

The four resource people in attendance were: the Board's water quality consultant Wanda Goulden (Komex Environmental Ltd.); Gord MacDonald (Diavik Diamond Mines Inc. [DDMI]); Bart Blais (DIAND – Water Resources); and Julian Kanigan (DIAND Water Inspector). Appendix A provides a list of participants and their contact information.

### **Workshop Report Organization and Presentation**

The workshop report is organized and presented in the actual sequence in which the discussion occurred. Formal presentations were copied on to a CD and distributed to all participants by the Board. As such, the detailed content of the presentations is not summarized in this report.

Copies of the CD are available from EMAB.

### ***Kugluktuk, Nunavut***



## **Public Meeting/Boat Tour**

A public meeting was held during the evening of Wednesday September 10, and was attended by approximately 15 community members.

Workshop participants also went on boat tours of the Coppermine River hosted by the Department of Sustainable Development/Government of Nunavut, Mayor Stanley Anablak, and local community members.

### ***Workshop Participants Depart for a Tour of the Coppermine River***



## **Workshop Summary – Day One**

### ***Agenda Item 1: Workshop Introduction/Opening Remarks***

**Opening Prayer** (August Enzoe, Lutsel K'e Dene First Nation)

**Welcome** (Stanley Anablak, Mayor of Kugluktuk)

Mayor Stanley Anablak welcomed the workshop participants to the community. Mayor Anablak informed participants that the Department of Sustainable Development, Government of Nunavut, himself, and local community members will host boat tours of the Coppermine River, and he encouraged participants to take this opportunity to enjoy the natural beauty of the Coppermine River. He also encouraged participants to explore the community and take advantage of the many community activities during the evenings, such as lacrosse games. Mayor Anablak closed his remarks by stating how pleased he was that EMAB decided to hold its water quality workshop in Kugluktuk and welcomed everyone to Nunavut.



## **Opening Remarks** (John McCullum, EMAB Executive Director)

John McCullum, EMAB's Executive Director, provided words of welcome on behalf of the Board and updated some of the workshop logistics. He noted that on Wednesday night EMAB would be hosting a public meeting to discuss Diavik's water license amendment application with the community and get feedback from the community. Water quality is a priority for the Board and Kugluktuk is the community downstream from the Diavik diamond mine. McCullum closed his remarks by thanking the community of Kugluktuk for hosting the workshop.

## **Workshop Purpose, Objectives and Outcome** (Facilitator – Vicki McCulloch, Terriplan Consultants)

Vicki McCulloch reviewed the workshop purpose, objectives and outcome, as described in an August 27 document. The purpose of the workshop was to enhance the Environmental Monitoring Advisory Board's (EMAB's) understanding of Diavik's water quality monitoring activities for the diamond mine on Lac de Gras.

The workshop objective was to provide the Board members and other participants with a basic understanding of the following topics:

- Community concerns / observations of water quality effects from diamond mines, Diavik in particular
- Overview of General Water Quality and Monitoring Concepts:
  - Basic water quality concepts
  - Water quality monitoring and sampling concepts
- Diamond Mines and Water Quality:
  - The Regulatory Perspective – Water Quality Monitoring and Diamond Mines
  - Diamond Mining and Water Quality Effects
  - Coppermine River Monitoring
- Diavik Diamond Mine and Water Quality:
  - Diavik's Approach to Water Quality Management
  - Diavik's Water Quality Monitoring Program and Results
- Identification of 'next steps' with respect to EMAB's water quality interests

Presentations for specific agenda items addressed each of these topics, and there were many opportunities for questions and discussions throughout the workshop. The workshop addressed water quality monitoring topics with an increasing level of detail and specificity over the four days.

Representatives from Diavik and DIAND, as well as EMAB's own water quality expert, made the workshop presentations and participated in the discussions along with Board members to provide their perspectives on various agenda items.

As an outcome of the workshop, individual members and the Board as a whole will be better able to fulfill their roles and responsibilities under the Environmental Agreement, specifically with respect to reviewing the water quality monitoring information provided by Diavik, and providing informed comments for consideration by the company and regulators. The Board will



also be in a better position to communicate with the Parties to the Agreement, including communities, on water quality issues related to the mine.

## **Agenda Review**

Participants reviewed the workshop agenda (a copy is included as Appendix B). The four-day workshop agenda aimed to provide the necessary information to understand water quality and provided many opportunities for questions and answers. The workshop was divided into four parts, from general to more detailed/specific topics. The first part addressed community concerns/ observations relating to water quality. This purpose was to aid those making presentations during the workshop in knowing what participants were interested in learning, and allowing them to focus their presentations more closely on the interests expressed.

The second part of the agenda provided an introduction to general water quality and monitoring concepts. The third part discussed diamond mines and water quality issues, including regulatory aspects. The fourth and final part dealt specifically with Diavik and its approach to water quality management and monitoring at the mine site. There was opportunity to discuss Diavik's water license amendment application with respect to ammonia. Because ammonia was a topic of timely interest to participants, it was used as an example throughout the workshop.

## **Round-table Introductions/Discussion of Workshop Expectations**

At the outset of the workshop, a round-table introduction took place, allowing participants to introduce themselves, their organization and their expectations of the workshop. Participants discussed their expectations of the workshop outcomes in terms of better understanding of:

- The questions, perspectives and concerns related to water quality (generally, and more specifically in terms of the Diavik mine and its approach to management/monitoring and the application to amend the water license with respect to ammonia etc.) on the part of the communities, Board members, DDMI, government, and the Board's independent water quality consultant;
- Opportunities for communities to be more involved in water quality monitoring, and current community-based water quality activities (e.g., Kugluktuk's proposed community monitoring);
- The basic technical information needed for Board and the community members to use in reviewing documents, and in communicating information at the community level, e.g.: monitoring, sampling, analysis;
- Water quality and its effects on people, plants, and animals;
- Current water quality conditions in the Lac de Gras area and in the Coppermine River; and
- Suggestions to the company and to regulators on how water quality monitoring may be improved.

While some of the participants with a substantial working knowledge of water quality management and monitoring felt that the initial workshop sessions aimed at providing a basic grounding in key monitoring concepts were perhaps too simplistic, others (particularly community members) felt that it was necessary to provide the basic foundations before moving into the more technical discussions later in the workshop.



## ***Part One: Community Concerns/Observations – Water Quality***

### ***Agenda Item 2: Community Concerns/Observations – Water Quality***

(Community/EMAB Members)

A round-table introduction took place, allowing participants to raise concerns/ observations regarding Water Quality. Common questions/concerns/observations from the discussion were:

- How valid/comprehensive is the quality and quantity of baseline information related to water quality?
- What are the short term and long-term effects of mining and related activities on the quality of drinking water in Kugluktuk (Coppermine River)?
- Who will be held accountable for any adverse effects on water quality? Will funding be available to deal with any adverse effects (for example: drinking water supplies)?
- How can the community be involved in water quality monitoring?
- What are the cumulative effects of mining and related activities on water quality?
- How can the pristine natural environment of the Coppermine River, important for ecological, cultural, resource and tourism reasons, be protected?
- Fish is an important community resource – what effects will mining and mining-related activities have on fish populations?

Other concerns/ observations that were raised, although not directly related to water quality, included:

- What effect will mining have on the quality of berries around the mine site?
- What effect will mining and related activities have on air quality?
- What effect does dust from mining and related activities (i.e., blasting) have on caribou herds? Elders are concerned because for the first time they are seeing sick and starved caribou.

## ***Part Two: Introduction to General Water Quality and Monitoring Concepts***

### ***Agenda Item 3: Water Quality (Wanda Goulden, Komex)***

W. Goulden, Komex Environmental Ltd.:

- Focus of this presentation was to provide an understanding on the basics of water quality – how the natural system works, what substances (chemicals) are found in the natural environment, and what affect changes in substances have on people and the environment; and
- Overview of water quality guidelines for safe levels of various substances – how the guidelines are chosen, developed and by whom.

The types of questions and concerns that were raised related to:

- Turbidity and Total Suspended Solids (TSS); and
- Water quality guidelines – namely differences between southern/ northern/ Federal guideline.

## Workshop Summary – Day Two

### **Agenda Item 6: Water Quality Monitoring and Sampling** (Wanda Goulden, Komex Environmental Ltd)

W. Goulden:

- Focus of this presentation was to explain the purpose of water monitoring programs;
- How, where and when to take samples;
- Sampling protocols and methodology; and
- How to interpret results.

The types of questions and comments that were raised related to:

- Sampling protocols and methodology;
- How samples are taken in permafrost areas (for example, at Diavik);
- How often water is tested (seasonally);
- Federal vs. provincial and other jurisdictions' guidelines for safe levels of ammonia;
- How the LC<sub>50</sub> test works – what the test results show, where the rainbow trout used in the test come from, their size, the reason why rainbow trout are used in the test; and
- Impacts of adding nutrients to an oligotrophic lake, such as Lac de Gras.

### **Workshop Participants**



### **Part Three: Diamond Mines and Water Quality**

### **Agenda Item 7: The Regulatory Perspective – Water Quality Monitoring and Diamond Mines** (Julian Kanigan, DIAND)

J. Kanigan (DIAND Water Inspector):

- Purpose of this presentation was to provide an understanding of the roles and responsibilities of DIAND inspectors;
- Inspection frequency and products (i.e.: reports);
- Compliance and enforcement policy – education, prevention and enforcement;
- Water quality measures at Diavik; and
- How water quality is determined through the Surveillance Network Program, the Aquatic Effects Monitoring Program, confirmation sampling by Inspector and on site inspections.





The types of questions and comments that were raised related to:

- The process of amending a water license; and
- Results of ammonia sampling done by DIAND and Diavik.

**Agenda Item 8: Diamond Mining and Water Quality Effects** (Wanda Goulden, Komex Environmental Ltd)

W. Goulden:

- This presentation provided an overview of water quality issues related to mining – what kimberlite is, open pit mines vs. underground mines, etc.;
- Acid generation and acid rock drainage;
- Tailings and tailing management areas; and
- Cumulative effects from mining on water quality and the environment.

The types of questions and comments that were raised related to:

- How to minimize seepage of harmful substances used in mining onto the land; and
- How to increase communication and the number of workshops so that elders and scientists can gain a common, mutual understanding (traditional knowledge vs. scientific knowledge).

**Part Four: Diavik Diamond Mined and Water Quality**

**Agenda Item 9: Diavik's Approach to Water Quality Management** (Gord MacDonald, Diavik Diamond Mines Inc.)

G. MacDonald:

- This presentation provided a detailed account of the water quality management approach in each area of the mine site (Plant Site, PKC Area, North Country Rock Area, North Inlet Storage Facility, North Inlet Water Treatment Plant and Discharge area, and the A154 Dike and Pit Area); and
- Need for discussion on establishing a community-based water quality monitoring program.

The types of questions and comments that were raised related to:

- Procedures that have been established to prevent drainage of untreated water onto the land;
- The effect mining activity will have on the volume of water flow at the Coppermine River and Lac de Gras;
- Changes in turbidity and TSS around the dike;
- Volume capacity of the PKC;
- How rock temperature is measured;
- Diavik's expected volume seepage compared to BHP's Ekati Mine;
- Diavik's water treatment plant; and
- Diavik's sources of ammonia.



## Workshop Summary – Day Three

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### ***Agenda Item 12: Diavik's Water Quality Monitoring Program Results (Gord MacDonald, DDMI)***

G. MacDonald:

- Presentation provided a description of Diavik's water quality monitoring program;
- Diavik lab at the mine site which conducts tests for Total Suspended Solids (TSS), Turbidity, pH, Ammonia, and Dissolved Oxygen (DO); and
- Results to date from Diavik's water quality monitoring program.

The types of questions and comments that were raised related to:

- Details regarding the Surveillance Network Program (SNP) and Aquatic Effects Monitoring Program (AEMP);
- Seepage monitoring vs. run-off monitoring;
- How water samples are collected below water surface;
- Baseline information vs. water monitoring results for the mine;
- Trend analysis – methodologies and sensitivities to change;
- Ability to determine what is causing change (based upon results from water quality monitoring program);
- What happens if change is detected;
- Ammonia – detection, treatment and effects;
- Ability to reverse any potential adverse effects;
- Diavik's method of releasing treated water back into Lac de Gras; and
- Diavik's water monitoring program vs. standard/conventional monitoring program.

### ***Agenda Item 13: Ammonia and the Diavik License Application (Wanda Goulden, Komex Environmental Ltd)***

W. Goulden:

- Presentation reviewed Diavik's water license amendment application;
- Diavik's source(s) of ammonia;
- Ammonia chemistry; and
- Komex's conclusions/recommendation from their review of Diavik's water license amendment application.

The types of questions and comments that were raised related to:

- Different behaviour and effects from un-ionized ammonia ( $\text{NH}_3$ ) vs. ionized ammonia ( $\text{NH}_4^+$ );
- pH level and influence on ammonia effects;
- Effect of nitrate on the natural lake ecosystem;
- Effect of phosphorous on the natural lake ecosystem; and
- Diavik's phosphate source.



**Agenda Item 16 (revised): Diavik's Water Licence Ammonia Amendment (Gord MacDonald, DDMI and John McCullum, EMAB)**

G. MacDonald:

- Presentation explained Diavik's reason for the water license amendment application, an action consistent with their best management practice, and commitment to stay below safe level guidelines.

The types of questions and comments that were raised related to:

- What other options have been explored to deal with Diavik's ammonia discharges (other than amending the water license);
- Toxicity testing – methodologies and sensitivities;
- Diavik's reason for wanting to set a guideline that limits the amount of NH<sub>3</sub> that can be released, but does not set a total limit on total ammonia levels;
- Concerns that ammonia levels may not be accurately represented in samples from Diavik as a result of shipping/handling to Calgary, Alberta lab; and
- How arctic char, white fish and other species react to various ammonia types/levels.

J. McCullum:

- Overview of application process and the Board's opportunities for involvement;
- Mackenzie Valley Land and Water Board (MVLWB) requested that all written interventions be submitted by September 17, 2003. The Komex and McCart reports on the amendment application were provided earlier to the MVLWB;
- Public hearing on the amendment application is tentatively scheduled for October 9<sup>th</sup> 2003. The Board can submit a written indication by September 29 if they intend to participate as an intervener. (If a hearing is to be held, the MVLWB has indicated a date of October 9, 2003; either way, the Diavik Technical Committee will still review the application)

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## Workshop Summary – Day Four

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**Agenda Item 16 (continued): Diavik's Water Licence Amendment Application**

The discussion initiated on Day 3 continued on the morning of Day 4. The types of questions and comments that were raised related to:

- When and where levels of ammonia are measured during monitoring activities;
- Implications of Diavik's ammonia amendment on the Coppermine River and Kugluktuk's drinking water in the future;
- Providing communities and organizations with adequate time to make informed decisions regarding the amendment application;
- Alternate approaches to the ammonia discharge levels at Diavik;
- Access to copies of the water quality workshop presentations;
- Effects of ionized ammonia (NH<sub>4</sub>) on people, as well as fish and wildlife;
- How to ensure adequate community consultation;

- Ability of Diavik to enhance its water quality monitoring at discharge locations if a change in ammonia levels occurs;
- Effect of ionized ammonia (NH<sub>4</sub>) on fish food sources;
- Role of EMAB;
- Options for establishing community-based monitoring; and
- Process for using Diavik's traditional knowledge camps.

### ***Coppermine River***



### ***Agenda Item 17 (revised): Coppermine River Monitoring (Bart Blais, DIAND)***

#### **B. Blais:**

- Presentation touched on the purpose of Coppermine River sampling program;
- Overview of water quality and cumulative impact monitoring for the Coppermine River;
- Hydrolab field data and profile;
- Water and sediment sampling; and
- Long-term monitoring and the effect of loss of government funding.

The types of questions and comments that were raised related to:

- How to design a government water monitoring program that ensures that monitoring location and techniques remain the same and data is relevant despite changes in government funding and employees;
- Environment Canada monitoring programs vs. DIAND monitoring programs;
- Ability to control substance levels found in the natural system; and
- The need to keep the government-run Taiga Lab in Yellowknife adequately funded in order to ensure high standards of quality, and operational.

### ***Agenda Item 18: Coppermine River (Peter Taptuna, Kugluktuk HTO)***

#### **P. Taptuna:**

- History of the Coppermine River;
- Importance of the Coppermine River to the people of Kugluktuk;
- Kugluktuks' strong sense of culture and spiritual feelings towards the Coppermine River;
- Fish is an important part of life in Kugluktuk – no commercial fishing in the area, and thus have always had a healthy fish stock. However, over the past few years the people of Kugluktuk have begun to notice changes in fish taste and texture, which has raised concern about why this is happening and future impacts.
- In July 2003, DFO released a study that showed that what community members had believed was arctic char, was actually two different species of fish. While the two fish are similar in appearance, they are genetically different. This raised concern in the

community – were these two types of fish always in the Kugluktuk area? If not, where did this new type of fish come from?

- Community wants proper consultation so they can make informed decisions about the future of the Coppermine River and its people;
- EMAB and Diavik are both good corporate citizens, and the community appreciates their efforts, and hopes to have continued support from Diavik, EMAB and the technical expertise of regulators in the future; and
- The Coppermine River has been nominated to become a Heritage River, and is awaiting the final signature to make it official. The community is still pro-development, but they want to ensure that the River's pristine nature is protected now and in the future.

### ***Workshop Participants Outside the Coppermine Inn***



### ***Agenda Item 19: Next Steps/Recommendations to the Board (Facilitator)***

While the focus of the workshop was to provide information to the Board members on water quality monitoring in general, and in particular Diavik's water quality management/monitoring and the company's application to amend their water license, participants did provide recommendations for the Board to address in more detail at their meeting on September 24-26, 2003, as summarized below.

1. Diavik's Application to Amend the Water License – Ammonia
  - Participants concluded that as a whole, the Board would not provide written interventions (to be submitted to the MVLWB by September 17). The Komex and McCart reports on the amendment application have already been provided to the MVLWB. The



regulators have provided /will be providing the MVLWB with their opinions on the proposed application.

- The Board members in attendance felt it was not possible to make recommendations regarding next steps with respect to the MVLWB's request for written indications on the intention to participate as an intervener if a public hearing is scheduled (to be indicated by September 29, 2003) until members had a chance to discuss the matter with their communities. (If a hearing is to be held, the MVLWB has indicated a date of October 9, 2003; either way, the Diavik Technical Committee will still review the application) The Board as a group would further discuss their next steps at their upcoming meeting on September 24-26.

## 2. Generally Improved Community Consultation by EMAB

- Participants felt that many of the processes that EMAB is involved in (e.g., review of the proposed amendments to Diavik's water license) do not allow for sufficient consultation between the Board members and their communities, and that as a result the communities are not able to provide informed opinions on various issues. The need for translation and ongoing capacity challenges must be acknowledged.
- EMAB itself, as well as other parties such as the MVLWB, need to take into account in designing their processes and timelines the time and effort necessary to consult and discuss in a meaningful way with communities.
- The practice of site visits to the mine by community members and elders, and meetings in the communities with the company and the Board, should be continued and encouraged; people need to talk to better understand each other.
- CDs with copies of the presentations made by Komex, DIAND, and Diavik at the water quality workshop will be prepared and distributed by the Board to participants for use in communicating information to other community members.

## 3. Enhanced Opportunities for Community-Based Monitoring

- Participants felt that the Board and DDMI should continue to encourage and provide additional opportunities for community-based water quality monitoring, including:
  - The parties to the Environmental Agreement should work together over the coming months to prepare a proposal for a water quality monitoring project at the on-site TK camp at the Diavik mine. (Proposals are due by March 1, 2004; detailed guidelines on proposal preparation have been distributed to EMAB members). In some cases, different groups may have different research needs/priorities, so joint proposals may not be appropriate. It was also noted that while the camp research is usually less than a week, a water quality monitoring project may require a much longer time period.
  - The Board and the company should consider ways to provide support (equipment, expertise, funding) to Kugluktuk's proposed community water quality monitoring program.
  - The Board and the company should explore ways that community-based monitoring and traditional knowledge might be used in Diavik's future water quality monitoring activities to complement the current approach.
  - The Board and the company should consider ways that training can be provided to community members to enhance capacity to monitor and manage their environment.

4. Continue to hold EMAB Workshops/Events in the Communities
  - Participants agreed that there are many benefits to holding EMAB events such as the water quality workshop in the communities, and that the Board should continue this practice with future events. Several communities indicated their interest in hosting such events.
5. Lobby DIAND to Reinstate Funding for Coppermine River Monitoring Activities
  - Participants felt that EMAB should lobby DIAND to reconsider its recent decision to no longer fund the long-term monitoring stations on the Coppermine River. The long-term monitoring information is needed to evaluate trends in water quality on the river over time.

### ***Workshop Participants***



### ***Agenda Item 20: Day 4 Final Workshop Wrap-Up (Facilitator)***

Over the course of the four days, a running list of comments/questions was recorded. In summary, these included:

- Effects of mining and specific mine-related activities (e.g., blasting, country rock pile) on water quality (Lac de Gras, Coppermine River):
  - Effects of changes in water quality on the plants and fish, wildlife, and people dependent on it
  - Long-term quality of Kugluktuk's water supply (Coppermine River)
- The Coppermine River is important to people for a number of reasons, having spiritual, cultural, resource (food, water) and tourism value. It is important that these values are not negatively affected by mining activities. Elders say the River used to be clearer, and have noted changes in taste and texture of fish.
- Longer-term cumulative impacts of multiple diamond mines in conjunction with other human activities and other factors such as climate change, natural variability etc.
- Uncertainty about application in northern environments of mining research, monitoring techniques, and guidelines/standards developed in the south (e.g., relevance for ultra-oligotrophic Lac de Gras, long-term behavior of country rock pile in Arctic conditions, permafrost changes, challenges with sampling/analysis in cold/'ultra clean'/remote environments, CCME Guidelines etc.)



- Concerns about the quality and quantity of water quality data:
  - Is there sufficient baseline information?
  - Are there changes to the baseline as a result of mining activities? Are there other factors contributing to observed changes (e.g., climate change)?
  - What are the criteria or 'triggers' to determine if environmental change is occurring? How long will it take to determine if change is occurring and why?
  - How will the significance of any observed changes be determined?
  - Will there be significant adverse effects on water quality in the future?
  - Will Diavik's water quality monitoring program, which is unconventional in some aspects, provide sufficient information and early warning of any negative changes in water quality?
- Different opinions regarding proposed amendment to Diavik's water license (e.g. regulate best practices related to ammonia, change the allowable level/type of ammonia in the discharge from the mine site, utilize toxicity testing for compliance purposes).  
Questions related to:
  - The current and proposed methodologies for sampling, conducting tests (e.g., LC<sub>50</sub> for trout), quality assurance/quality control
  - Whether the proposed allowable ammonia levels (total and unionized) are appropriate in terms of providing sufficient protection for water quality and aquatic life
  - Ability to measure/detect non-compliance
  - Alternative approaches to addressing the ammonia levels observed to date

### Outstanding Questions/Issues

Two questions were remained outstanding at the end of the workshop:

- 1) During the introductory round table discussion of workshop expectations, a community member from Kugluktuk noted their concern with possible contamination or loss of their drinking water supply from the Coppermine River as a result of mining activities upstream. They asked what mechanism(s) for accountability is in place – who would be responsible (e.g., for remediation, replacement of the water supply) if this were to occur, despite the monitoring and management systems in place?
- 2) Diavik currently studying blasting and possible options for improved practices to decrease resulting ammonia levels; EMAB members are interested in the results when available.

### Other Issues Raised at the Workshop of Relevance to the Board

During the workshop, there were some issues raised that, while not directly relevant to the water quality topic at hand, should be noted by the Board. These included:

- The North Slave Metis noted that community members had expressed concern about the safety of eating berries around the mine site.
- Lutsel K'e reported that starving, sick caribou have been observed by community members; this has not been seen in the past. There is concern about what may be causing this.





## **Closing Comments (Facilitator)**

At the end of the workshop, the facilitator thanked everyone for their contributions to the workshop:

- the resource people, the Board members, and community representatives for their information, questions and comments over a very ambitious and intensive four-day agenda
- those doing translation and providing audio support for the meeting
- to the people of Kugluktuk for their generosity in hosting the meeting in their community.

Many of the participants also echoed the gratitude to Kugluktuk, and several expressed interest in hosting similar meetings or workshops in their communities.

Closing Prayer (**August Enzoe, Lutsel K'e Dene First Nation**)



## Appendix A: Workshop Participants

EMAB Water Quality Workshop Participants				
Last Name	First Name	Organization/ Division	Contact Info: Phone/Fax/ E-mail	Mailing Address
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EMAB Water Quality Workshop Participants				
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<b>EMAB Water Quality Workshop Participants</b>				
<b>Last Name</b>	<b>First Name</b>	<b>Organization/ Division</b>	<b>Contact Info: Phone/Fax/ E-mail</b>	<b>Mailing Address</b>
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McCullum	John	EMAB	Tel: (867) 766-2982 Fax: 9867) 766-3693 Email: <a href="mailto:emab1@arcticdata.ca">emab1@arcticdata.ca</a>	Environmental Monitoring Advisory Board PO Box 340, Yellowknife, NT X1A 2N3 In person: 5006 - Franklin Ave. 50/50 Mini Mall, 2nd floor
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## Appendix B: Workshop Agenda

### WATER QUALITY WORKSHOP AGENDA

September 8 –11, 2003

Recreation Complex

Kugluktuk, Nunavut

#### *Working Agenda*



#### **Day 1: Monday, September 8<sup>th</sup> 2003**

- |  |  |  |
|--|--|--|
| <b>1:30 – 1:45 p.m.</b>  | Arrival and Registration ( <i>lunch be provided earlier, following arrival</i> )   |  |
| <b>1:45 – 2:30 p.m.</b>  | <b>1. Workshop Introduction/Opening</b><br><b>Remarks</b> <ul style="list-style-type: none"> <li>▪ Opening Prayer</li> <li>▪ Welcome</li> <li>▪ Translation/Interpretation</li> <li>▪ Workshop purpose, objectives, outcome</li> <li>▪ Agenda review</li> <li>▪ Round-table introductions/discussion of workshop expectations</li> <li>▪ Questions/discussion</li> </ul> | <i>Community elder, TBD</i><br><i>Vicki McCulloch, Terriplan</i><br><i>/Bob Turner, EMAB Chair</i><br><i>Vicki McCulloch, Terriplan</i><br><i>Vicki McCulloch, Terriplan</i><br><i>All</i><br><br><i>All</i> |
| <b>Part One: Community Concerns/Observations – Water Quality</b> |  |  |
| <b>2:30 – 3:15 p.m.</b>  | <b>2. Community Concerns/Observations – Water Quality</b> <ul style="list-style-type: none"> <li>▪ Roundtable discussion of community concerns / observations of water quality effects from diamond mines (Diavik in particular); community-based monitoring activities</li> <li>▪ Questions/discussion</li> </ul>   | <i>Community /EMAB members</i><br><br><i>All</i>   |
| <b>3:15– 3:30 p.m.</b>   | <b>Coffee Break</b>  |  |



**Day 1: Monday, September 8<sup>th</sup> 2003**

**Part Two: Introduction to General Water Quality and Monitoring Concepts**

- |                         |   |   |
|-------------------------|---|---|
| <b>3:30 – 5:15 p.m.</b> | <b>3. Water Quality</b> <ul style="list-style-type: none"> <li>▪ Overview of basic water quality concepts. e.g.:           <ul style="list-style-type: none"> <li>▪ groundwater/ surface water/ biota; natural systems/ background levels; key substances (ions, metals, nutrients, pH, salt etc.); water quality guidelines/ standards</li> </ul> </li> <li>▪ Related community concerns / Questions and discussion</li> </ul> | <i>Wanda Goulden, Komex</i><br><i>All</i>       |
| <b>5:15 – 5:30 p.m.</b> | <b>4. Day 1 Wrap-Up</b> <ul style="list-style-type: none"> <li>▪ Questions and discussion</li> <li>▪ Adjourn</li> </ul>   | <i>Vicki McCulloch, Terriplan</i><br><i>All</i> |

**Day 2: Tuesday, September 9<sup>th</sup> 2003**

- |                           |  |   |
|---------------------------|--|---|
| <b>8:45 – 9:00 a.m.</b>   | <b>Arrival and Coffee</b>  |   |
| <b>9:00 – 9:15 a.m.</b>   | <b>5. Day 2 Introduction/Overview</b> <ul style="list-style-type: none"> <li>▪ Brief Recap of Day 1</li> <li>▪ Review Agenda</li> <li>▪ Questions and discussion</li> </ul>  | <i>Vicki McCulloch, Terriplan</i><br><i>All</i> |
| <b>9:15 – 10:30 p.m.</b>  | <b>6. Water Quality Monitoring and Sampling</b> <ul style="list-style-type: none"> <li>▪ Overview of water quality monitoring and sampling concepts, including:           <ul style="list-style-type: none"> <li>▪ Types of sampling; drinking water vs. environmental</li> <li>▪ Designing a sampling program</li> <li>▪ Quality control/sampling protocols and methodology</li> <li>▪ Indicators</li> </ul> </li> <li>▪ Interpreting results</li> <li>▪ Related community concerns / Questions and discussion</li> </ul> | <i>Wanda Goulden, Komex</i><br><i>All</i>       |
| <b>10:30 – 10:45 a.m.</b> | <b>Coffee Break</b>  |   |
| <b>10:45 – 12:00 p.m.</b> | <b>6. Water Quality Monitoring and Sampling (cont'd)</b>   |   |
| <b>12:00 – 1:15 p.m.</b>  | <b>Lunch (provided)</b>  |   |



**Day 2: Tuesday, September 9<sup>th</sup> 2003**

**Part Three: Diamond Mines and Water Quality**

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|-------------------------|---|--|
| <b>1:15 – 2:45 p.m.</b> | <p><b>7. The Regulatory Perspective – Water Quality Monitoring and Diamond Mines</b></p> <ul style="list-style-type: none"> <li>▪ Regulatory requirements for diamond mining / Diavik – water quality</li> <li>▪ Setting water quality guidelines / standards</li> <li>▪ Monitoring, inspection, enforcement activities</li> <li>▪ Analysis of samples and results</li> <li>▪ Regulatory process / roles and responsibilities (e.g., DIAND, company, EMAB, others)</li> <li>▪ Related community concerns/ Questions and discussion</li> </ul> | <p><i>Julian Kanigan, DIAND Inspector / Bart Blais, DIAND Water Resources, with comments/responses by Wanda Goulden, Komex and Gord MacDonald, Diavik</i></p> <p style="text-align: right;"><i>All</i></p> |
|-------------------------|---|--|

**2:45 - 3:00 p.m. Coffee Break**

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|-------------------------|--|---|
| <b>3:00 – 4:00 p.m.</b> | <p><b>8. Diamond Mining and Water Quality Effects</b></p> <ul style="list-style-type: none"> <li>▪ Overview of water quality issues / areas of concern related to diamond mining in general</li> <li>▪ Potential sources of effects: surface runoff, sediment, minewater, sewage</li> <li>▪ Specific substances of interest: e.g., ammonia, phosphorus, acid drainage, total suspended solids/turbidity</li> <li>▪ Regional/cumulative effects</li> <li>▪ Related community concerns / Questions and discussion</li> </ul> | <p><i>Wanda Goulden, Komex with responses / comments by Gord MacDonald, Diavik and DIAND</i></p> <p style="text-align: right;"><i>All</i></p> |
|-------------------------|--|---|

**Part Four: Diavik Diamond Mine and Water Quality**

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|-------------------------|--|---|
| <b>4:00 – 5:00 p.m.</b> | <p><b>9. Diavik’s Approach to Water Quality Management</b></p> <ul style="list-style-type: none"> <li>▪ Diavik’s approach to water quality management (including water control/treatment – North Inlet, processed kimberlite containment facility, sedimentation pond, collection ponds, sewage treatment, water treatment)</li> <li>▪ Monitoring and reporting</li> <li>▪ Role of traditional knowledge and communities in Diavik’s water quality monitoring</li> </ul> | <p><i>Gord MacDonald, Diavik with responses / comments by Wanda Goulden, Komex, Bart Blais and Julian Kanigan, DIAND</i></p> <p style="text-align: right;"><i>All</i></p> |
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**Day 2: Tuesday, September 9<sup>th</sup> 2003**

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|--|--|------------|
|  | <ul style="list-style-type: none"> <li>▪ Related community concern / Questions and discussion</li> </ul> | <i>All</i> |
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| <b>5:00 – 5:15 p.m.</b> | <b>10. Day 2 Wrap-Up</b> | <i>Vicki McCulloch,<br/>Terriplan</i> |
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  - Questions and discussion
  - Adjourn

**Day 3: Wednesday, September 10<sup>th</sup> 2003**

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| <b>8:45 – 9:00 a.m.</b> | <b>Arrival and Coffee</b> |  |
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| <b>9:00 – 9:15 a.m.</b> | <b>11. Day 3 Introduction/Overview</b> | <i>Vicki McCulloch, Terriplan</i> |
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  - Brief Recap of Day 2
  - Review Agenda
  - Questions and discussion
  
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| <b>9:15 – 10:30 a.m.</b> | <b>12. Diavik’s Water Quality Monitoring Program and Results</b> | <i>Gord MacDonald, Diavik<br/>with responses /<br/>comments by Wanda<br/>Goulden, Komex and<br/>Julian Kanigan, DIAND</i> |
|--------------------------|--|---|

  - Diavik’s water quality monitoring program
  - How monitoring results are used
  - Monitoring results at Diavik to date, e.g., Surveillance Network Program, Aquatic Effects Monitoring Program
  - Related community concerns / Questions and discussion
  
- |  |  |            |
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|  |  | <i>All</i> |
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| <b>10:30 – 10:45 a.m.</b> | <b>Coffee Break</b> |  |
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| <b>10:45 – 12:00 p.m.</b> | <b>12. Diavik’s Water Quality Monitoring Program and Results (cont’d)</b> |  |
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| <b>12:00 – 1:15 p.m.</b> | <b>Lunch (provided)</b> |  |
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| <b>1:15 – 2:45 p.m.</b> | <b>13. Ammonia and the Diavik License Application</b> | <i>John McCullum, EMAB<br/>Wanda Goulden, Komex /<br/>John McCullum, EMAB<br/>with responses /<br/>comments from Gord<br/>MacDonald, Diavik</i> |
|-------------------------|---|---|

  - Overview of application process/status
  - Discussion of EMAB experts’ reports on the application
  
- |  |  |            |
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|  |  | <i>All</i> |
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| <b>2:45 - 3:00 p.m.</b> | <b>Coffee Break</b> |  |
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**Day 3: Wednesday, September 10<sup>th</sup> 2003**

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| <b>3:00 – 4:00 p.m.</b> | <b>14. Coppermine River Monitoring</b> | <ul style="list-style-type: none"> <li>▪ Overview of water quality cumulative impact monitoring for the Coppermine River</li> <li>▪ Community-based monitoring</li> <li>▪ Related community concerns/ Questions and discussion</li> </ul> | <p><i>Bart Blais, DIAND Water Resources</i><br/> <i>KAA/Kugluktuk HTO</i><br/> <i>All</i></p> |
| <b>4:00 – 4:15 p.m.</b> | <b>15. Day 3 Wrap-Up</b>               | <ul style="list-style-type: none"> <li>▪ Questions and discussion</li> <li>▪ Adjourn</li> </ul>   | <p><i>Vicki McCulloch, Terriplan</i><br/> <i>All</i></p>                                      |

**Day 4: Thursday, September 11<sup>th</sup> 2003**

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|---------------------------|---|--|---|
| <b>8:45 – 9:00 a.m.</b>   | <b>Arrival and Coffee</b>                   |  |   |
| <b>9:00 – 9:15 a.m.</b>   | <b>16. Day 3 Introduction/Overview</b>      | <ul style="list-style-type: none"> <li>▪ Brief Recap of Day 3</li> <li>▪ Review Agenda</li> <li>▪ Questions and discussion</li> </ul>  | <p><i>Vicki McCulloch,</i><br/> <i>Terriplan</i><br/> <br/> <i>All</i></p>                                  |
| <b>9:15 – 10:15 a.m.</b>  | <b>17. Discussion of Public Open House</b>  | <ul style="list-style-type: none"> <li>▪ Roundtable discussion of the key issues and questions raised at the public open house Wednesday evening</li> <li>▪ Identification of any needed follow-up activities</li> </ul>   | <p><i>All</i></p>   |
| <b>10:15 – 10:45 a.m.</b> | <b>Coffee Break</b>                         |  |   |
| <b>10:45 – 11:45 a.m.</b> | <b>18. Roundtable Discussion/Next Steps</b> | <ul style="list-style-type: none"> <li>▪ Roundtable discussion of workshop and its outcomes</li> <li>▪ Recommendations stemming from the workshop, e.g.:               <ul style="list-style-type: none"> <li>▪ Approach to the ammonia application</li> <li>▪ Water quality testing/on-site TK camp</li> <li>▪ Other</li> </ul> </li> <li>▪ Identification of 'next steps' with respect to EMAB's water quality interests</li> <li>▪ Workshop report</li> </ul> | <p><i>All</i></p>   |
| <b>11:45 - 12:00 p.m.</b> | <b>19. Day 4 Final Workshop Wrap-Up</b>     | <ul style="list-style-type: none"> <li>▪ Closing observations and comments</li> <li>▪ Questions and discussion</li> <li>▪ Closing prayer</li> </ul>  | <p><i>Vicki McCulloch,</i><br/> <i>Terriplan</i><br/> <i>All</i><br/> <br/> <i>Community elder, TBD</i></p> |



***Day 4: Thursday, September 11<sup>th</sup> 2003***

- Adjourn (*the workshop will adjourn early on Day 4 to allow for flight departure in the afternoon*)

**12:00 – 1:15 p.m.    Lunch (provided)**