



Mackenzie Valley Environmental Impact Review Board

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Date: November 20, 2003 Pages: 14 including this page
To: Consolidated Goldwin Ventures Fax:
North American General
Resources Corp.
New Shoshoni Ventures
CC: MVLWB
Subject: On Ice Exploration Drilling (EA-03-002, EA-03-003, EA-03-004)

NOTES:

The attached presentation was prepared by Anne Wilson on behalf of Environment Canada. Environment Canada has chosen to be an observer in the proceedings and will not be giving this presentation at the Public Hearing. However, this presentation is being circulated for the information of all parties.

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Sherry Sian

From: Wilson, Anne [Yel] [Anne.Wilson@EC.GC.CA]
Sent: Monday, November 17, 2003 11:37 AM
To: Sherry Sian
Cc: Fournier, Mike [Yel]
Subject: drybones.ppt

Hi Sherry,

Attached is a presentation summarizing work EC supported on on-ice drilling. Please give me a call at 669-4735 if any questions, or if you wish it edited.

Thanks

Anne

<<drybones.ppt>>

On Ice Mineral Exploration Drilling

Environmental Aspects

Anne Wilson
Environment Canada

On-Ice Mineral Exploration Drilling

- Impacts from drilling can arise from:
 - Disposal of wastewater from the drill, consisting of rock fines and drilling additives;
 - Spills of fuel or lubricants;
 - Addition of sediments to the water body through surface erosion or access roads;
 - Poor site cleanup.
- Research was done specifically on the disposal of drilling effluent to the water column.

On-Ice Mineral Exploration Drilling

- Return water from the cutting face of the drill contains rock fines plus residues of any additives used (such as polymers or clay).
- Solids may be removed for disposal to land sumps or landfills, using settling tanks or filtration systems.
- Wastewater handling may present difficulties in remote, fly-in operations in cold temperatures.

Overview

- Research has been done to identify the environmental effects of disposing of drilling waste to lake bottoms.
- Effluent toxicity and suspended solids present the main concerns to regulators.

Study Details

- This study was initiated early in 1997 to examine effects of drilling effluent on:
 - benthic invertebrate communities,
 - sediment quality, and
 - water clarity.
- Three study sites were used, two for gold targets, and one for kimberlite targets.

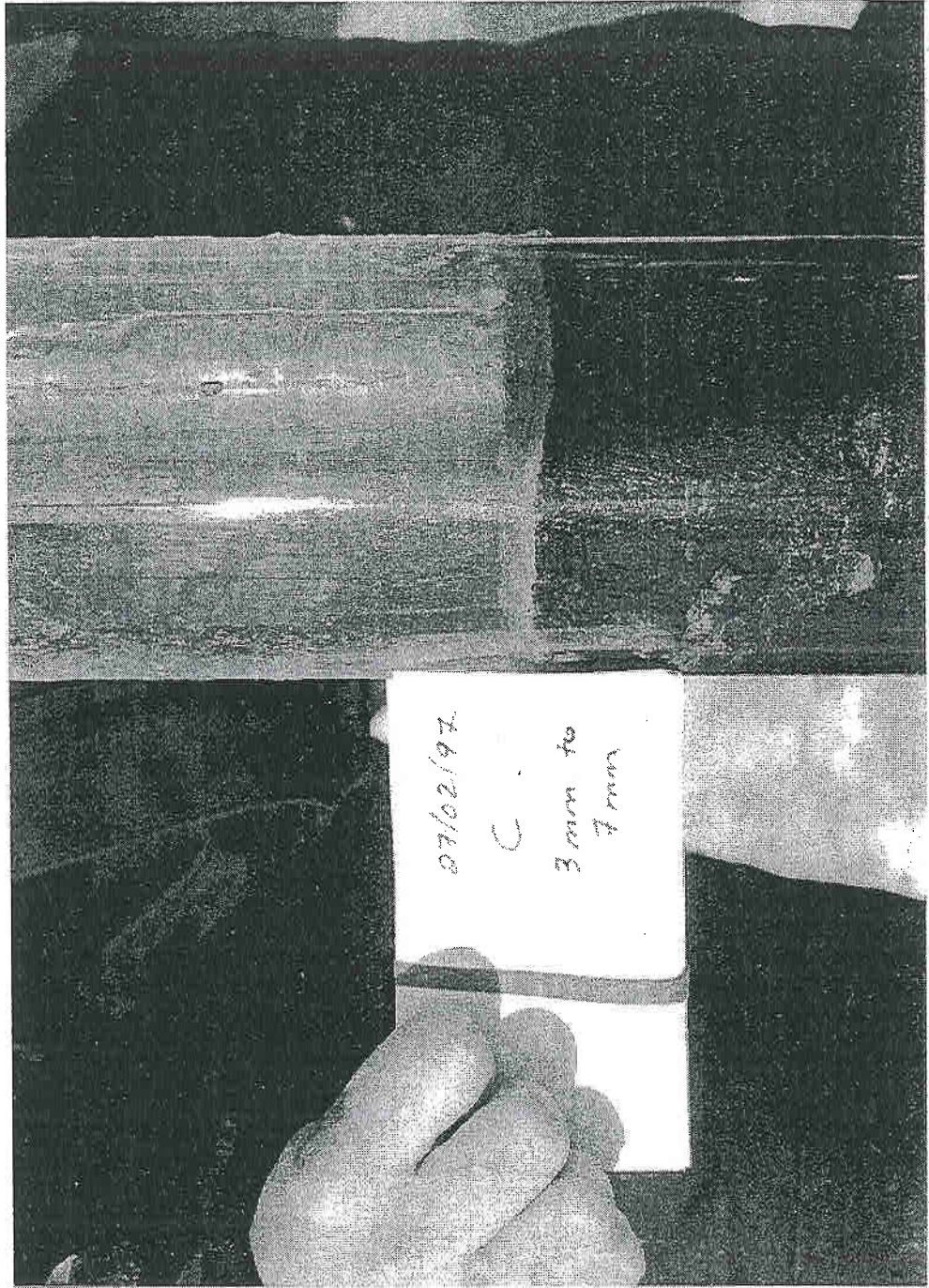
Great Slave Lake

- Drilling wastes containing from 0.2 to 0.6 cubic metres of solids were released at 8 sites.
- This resulted in a patchy cover up to 1mm thick.
- A significant difference in the benthic community was seen at the discharge point shortly after release, but there was no significant difference at 15 m from the discharge point.
- Sediment chemistry showed slight increases in calcium.
- Total suspended solids in the water column remained low (maximum 11 mg/L) during release.

Baton Lake

- Approximately one cubic metre of rock fines was deposited on the bottom of Baton Lake.
- At the discharge point, a layer of fines 3 to 7 mm thick was observed.
- Benthic results showed no significant changes when checked one year later.
- Water quality remained acceptable, with a maximum TSS of 11 mg/L, with most values in line with reference site values.

Baton Lake



Lac de Gras

- Release of kimberlite effluent at two short holes was studied in the winter of 1998, with follow-up sampling in both 1998 & 1999.
- Turbidity was monitored throughout the release, with average levels of 7-16 NTU during discharge, and dropping to 5-8 NTU very shortly after drilling.
- Metals levels were elevated in the lower water column during drilling, but dropped shortly afterwards.

Lac de Gras

- Changes to sediment chemistry were observed, with increases in aluminum, magnesium, manganese, calcium, potassium, sodium, carbon and ammonia.
- Numbers of individuals and species richness dropped right after drilling, but had rebounded one year later.
- Changes in species composition were observed.

Summary of Results

- Effluent from gold targets showed very limited effects when released in limited quantities (such as for first phase exploratory drilling) to sufficient water depths.
- Kimberlite-associated effluent resulted in decreases in both overall numbers and types of benthic animals in the short-term.
- Because of toxicity, drilling wastes from kimberlite target ores must be managed differently from non-kimberlite ore targets.

Other Considerations

- It is recommended that drilling effluent release occur:
 - In sufficient water depths that overwintering fish eggs are not covered;
 - Below the middle of the water column, to minimize effects on the algal production;
 - Sufficiently above the bottom sediments that scouring does not occur.

Other Considerations

- Release into shallow waters (< 12m) is not recommended, as these are the more productive areas of lakes.
- Standard mitigation measures can be applied to address environmental concerns with fuel handling, contingency planning and site cleanup.