

Government  
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Eastern Arctic Area Office  
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Igloolik, NWT  
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18 October 1993

Your file / Votre référence

Our file / Notre référence	
DEPARTMENT OF FISHERIES AND OCEANS	
OFFICE OF THE SECRETARY	
OCT 18 1993	
DIVISION	

*Yvette Morin*

Yvette Morin  
Secretary  
Technical Advisory Committee  
Box 1500  
Yellowknife, NT  
X1A 2R3

Dear Ms. Morin:

**Re: Grise Fiord - Sewage Disposal Improvements**

In response to your letter of October 6, 1993, please accept the following comments from the Department of Fisheries and Oceans (DFO) regarding the Sewage Disposal Improvements report for Grise Fiord:

**General:**

1. Better maps, or photos of the area, showing the lagoon, the exfiltration area and the adjacent stream would be helpful.
2. Indian and Northern Affairs Canada (INAC) did in fact test the sewage lagoon effluent on July 21, 1992 as part of an inspection. Mr. David Akeagok, Assistant SAO, was present during the inspection. Samples were taken from four different sites. Sample sites 1 and 2 (sewage effluent below breach in lagoon and solid waste disposal site effluent) showed elevated levels of copper, nickel and zinc, based on the 1986 U.S. E.P.A. Water Quality Criteria for Protection of Aquatic Life in the Marine Environment. Colour, turbidity, TDS residue and iron levels were also elevated, based on the 1989 Guidelines for Canadian Drinking Water Quality and the 1992 Guidelines for the Discharge of Treated Municipal Wastewater in the Northwest Territories (see Appendix). BOD and faecal coliform levels were not tested. Due to the remote location, samples for these parameters could not have been analyzed soon enough to be valid.

**Specific:****Section 2.5 - Important Considerations**

The new lagoon must not only accommodate future sewage loads and

drifting snow, as noted, but must also accommodate the sewage load from the old cell that will be drained into the new lagoon, as well as any sludge from that old cell. Was this extra volume taken into account when determining the volume requirements of the new lagoon?

#### Section 4.4.2 - Lagoon Systems

Where will the sewage from the lagoon be discharged to, exactly? Onto the ground? Into the nearby stream? Directly into the ocean? It is a requirement of the Fisheries Act that all effluent discharged into water frequented by fish, or discharged into a place where it may enter water frequented by fish, be non-deleterious, commonly defined as non-toxic. A non-toxic effluent would be one that meets the Canadian Water Quality Guidelines. Compliance with this requirement for non-deleteriousness is based on the acute lethality of the effluent measured at end-of-pipe. An effluent is acutely lethal if the undiluted (100%) effluent kills 50% or more of the fish or daphnids over a specified time period in their respective bioassay tests.

#### Section 4.2.3 - Treatment Concepts

This section seems to discuss the relative merits and treatment level obtainable with a storage lagoon, yet the proponents seem to be recommending a "seepage" storage lagoon for Grise Fiord rather than a storage lagoon. What sort of treatment level can be expected with a "seepage" storage lagoon? Will this type of lagoon be able to produce an effluent that is non-toxic to fish, as would a storage lagoon?

#### Section 5.1.1 - Design Criteria

Again, design criteria are given for storage lagoons rather than "seepage" storage lagoons, even though a "seepage" storage lagoon is the recommended concept. Would the design criteria be the same for a "seepage" storage lagoon as it is for a storage lagoon?

#### Section 5.2.1 - Recommended Configuration

A reduction in the sideslope from the recommended ratio of 4:1 to a ratio of 3:1 is suggested. Why is that? What are the advantages? What are the disadvantages?

Again, a "seepage" structure is recommended. Will such a structure guarantee non-deleterious discharge into the ocean?

#### Section 5.3 - Design Details

Why are there plans for a controlled "seepage" section as well as for a "seepage" section? What are the advantages of such a system?

In regards to the positioning of the inlet portion of the outlet

control system, will sludge accumulation ever plug the inlet? It was mentioned in Section 5.1.2 that the sludge on the bottom of the cell remains frozen year round. Could this become a problem in the new cell over time, once the sludge has accumulated to the point where it covers the inlet structure?

Section 7.3 - Snow Accumulation

Will snow accumulation be a problem in the bagged sewage area? Would extra moisture in the bagged sewage area cause a leachate problem? Will snow accumulation be removed from the bagged sewage area before the regular capping that is discussed in Section 7.2?

If you have any questions or comments, please contact me at (819) 979-6274.

Sincerely,



Tim Surette  
Eastern Arctic Area Manager

cc. R. Armstrong, MACA, Iqaluit  
C. Churchward, DFO Area Habitat Biologist  
D. McGowan, DFO A/Habitat Co-ordinator  
A. Theriault, INAC, Iqaluit

**Appendix**

<u>Parameter</u>	<u>Sample Site 1</u>	<u>Sample Site 2</u>	<u>Recommended Level</u>	<u>Reference</u>
Turbidity (NTU)	120	42.5	1	a
Colour (NTU)	300	200	<15	a
TDS Residue	716	528	<500	a
Copper (mg/L)	0.256	0.074	0.0029	c
Iron (mg/L)	1.73	4.27	0.3	a,b
Nickel (mg/L)	0.014	0.017	0.0071	c
Zinc (mg/L)	0.214	0.132	0.058	c

a = 1989 Guidelines for Canadian Drinking Water Quality

b = 1992 Guidelines for the Discharge of Treated Municipal  
Wastewater in the NWT

c = 1986 U.S. E.P.A. Water Quality Criteria for Protection of  
Aquatic Life in the Marine Environment