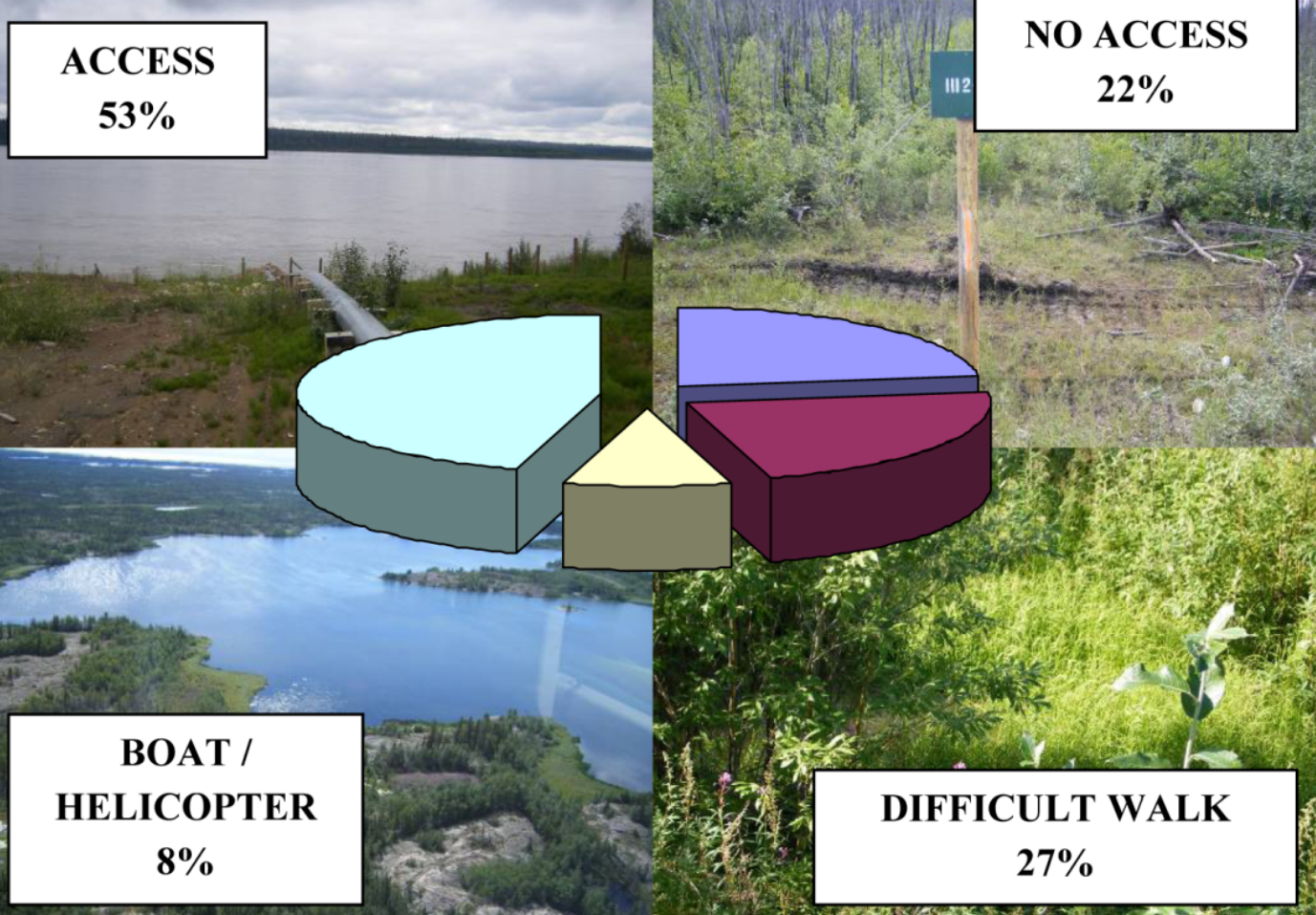


Blessing or Curse?

Wastewater Regulation Harmonization for the Canadian North

Ken Johnson
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Wastewater sampling points

The identification and accessibility of water licence compliance related points remains a challenge.



Source - Dillon Consulting Ltd - 2008 Report to Northern Research Working Group

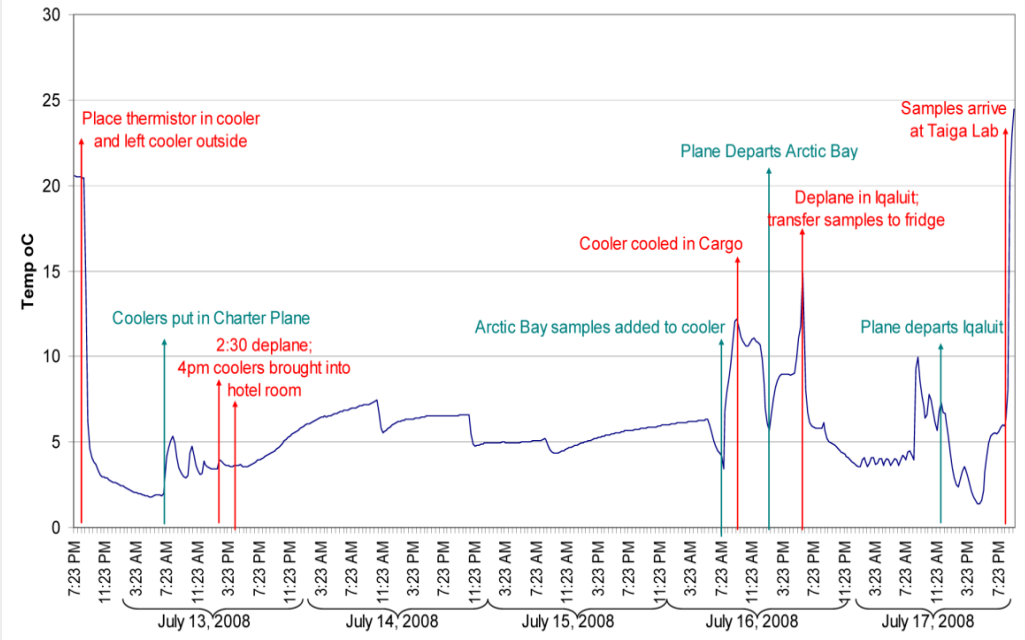
Transportation of wastewater samples

The transportation of time sensitive samples will always pose some degree of challenge in the far north.

Source – Dillon Consulting Ltd – 2008 Report to Northern Research Working Group



b) Sample Shipment from Grise Fiord, NU to Taiga Environmental Lab, Yellowknife, NT



BLESSING: One Stop Shop

Multi portal system of wastewater regulation is anticipated to be simplified into a single portal.



BLESSING: Ongoing wastewater research

The current level of sampling and research activity on northern wastewater treatment is at an all time high.



BLESSING!

Consultant work

A significant amount of consulting related work has been initiated in association with the CCME guidelines





BLESSING! Dialogue with regulators

Federal regulators have been actively organizing workshops and participating in NTWWA conferences and the NTWWA Journal.

Jane Urbanic at 2010 NTWWA Conference

Mary Kelly at 2010 NTWWA Conference



CURSE: Inuvik Wastewater

Inuvik is advancing a water licence compliance clause that requires “an assessment of potential sewage treatment options” ... and a “plan ... how the licensee intends to meet territorial and federal guidelines for the discharge of municipal wastewater by the end of the term of this licence (2016).”



Primary Lagoon



Secondary Lagoon



Lagoon Discharge



CURSE: Inuvik Wastewater

Current Discharge Limits in Inuvik :

Total Suspended Solids (TSS) in mg/L – 70 mg/L

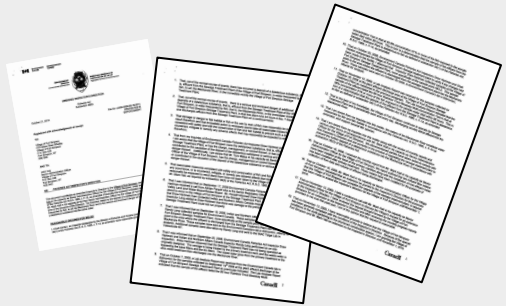
Biochemical Oxygen Demand (BOD) in mg/L – 150 mg/L

FC (fecal coliforms) CFU / 100 mL – 1×10^6



CURSE: Fort Simpson Wastewater

I am aware that the Village of Fort Simpson owns the deleterious substance, that is, effluent from the Sewage Treatment Plant, or has the charge, management, or control thereof, or has caused or contributed to the causation of the deposit of the deleterious substance or serious and imminent



associated with the project the total was approximately \$8,000,000 with an additional \$1,000,000 in annual maintenance and operational costs per year. MACA advised the Village of Fort Simpson that they did not support the project due to the fact that the Village of Fort Simpson did not have the funding to carry out the project and sustain it in the future.



Mechanical Treatment Facility Building



Bioreactors

Fort Simpson is under regulatory directive for sewage treatment improvements for discharging into the Mackenzie River, which has a dilution ratio of more than 300,000 to 1.

CURSE: Fort Smith Wastewater

Fort Smith is currently in the process of renewing their water licence and significant effluent quality improvements were requested by the regulatory interventions.



Secondary Lagoon



Discharge Pipeline



Shore Discharge into Slave River



CURSE: Fort Smith Wastewater

Table 3: Comparison of Water Quality and Technology-Based Effluent Quality Criteria

Parameter	Units	Water Quality-Based Average Monthly Limit	Technology-Based Average Monthly Limit
BOD ₅	mg/L	10,590	300
Fecal coliforms	CFU/200m	1.80 x 10 ⁶	1.00 x 10 ⁶
Total suspended solids	mg/L	54,550	200
pH ^(a)	pH units	2.4	6
Total phosphorus	mg/L	2,540	not available
Nitrite+nitrate	mg as N/L	31,310	not available
Nitrite	mg as N/L	520	not available
Ammonia	mg as N/L	3.8 ^(b)	not available

CURSE: Dawson City Wastewater

- A Case Study

2010	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
TSS	16	23	17	80	30	32	38	37	42	14	19	5
BOD	14	21	11	10	46	66	41	57	22	75	19	--
FC	0.52	0.25	0.14	0.08	1.1	4.9	--	0.2	0.2	0.2	0.2	0.0 2

1994 to 2010	Minimum	Maximum	Median	Average
TSS	3.0	137	21.0	27.0
BOD	7.3	146	31.0	39.8
FC	0.0016	54	0.5	1.5

- ▲ Total Suspended Solids (TSS) in mg/L;
- ▲ Biochemical Oxygen Demand (BOD) in mg/L;
- ▲ FC (fecal coliforms) million MPN / 100 mL

- ▲ Turbidity difference between Yukon River and Klondike River.

Effective September 1, 2004, effluent discharged from the sewage treatment facility to the Yukon River shall meet the following effluent quality standards based on any grab sample:

Parameter	Maximum Concentration
Faecal Coliforms	20,000 MPN/100 mL
BOD ₅	45 mg/L
pH	6 - 9
Total Suspended Solids	60 mg/L
Oil and Grease	5 mg/L
96-hour Static LC ₅₀ Bioassay (100% concentration)	Non-toxic



Conclusions

Inuit communities have limited resources available to them, and the reality of sewage treatment in the Inuit regions of Canada is that most communities can only make incremental improvements to their community sewage treatment infrastructure. Those systems which are technologically simple, and engineered for sufficient capacity tend to perform well.

The majority of communities of the Inuit regions of Canada are “very small”, very remote, and very cold; therefore the sewage treatment technology must be appropriate to these conditions and must be applied in the context of these conditions. The knowledge of the appropriateness and context for arctic sewage treatment may only gained through research in science, applied science and social science.

Unless significant resources and commitment are applied the research into all aspects of arctic sewage treatment the Canada-wide Strategy for Management of Municipal Wastewater Effluent will have significant impacts and produce significant hardship on the Inuit regions of Canada. These impacts will be financial (capital cost and operation-maintenance cost), human resource, and administrative.

CURSE!

ITK Position Paper

on CCME Strategy

**National Inuit Position Paper regarding the CCME
Canada-Wide Strategy for the Management of
Municipal Wastewater Effluent and Environment
Canada's Proposed Regulatory Framework for
Wastewater**



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INUIT TAPIRIIT KANATAMI

January 31, 2008

Ottawa, Ontario

Back to 1st Principles

Principles and apparent practices that are “rolling” out:

- ▲ Be driven by the need to ensure continuous improvement in environmental protection
- ▲ Allow for flexible implementation reflecting cross Canada variability in ecosystems, local, regional provincial and territorial conditions



Back to 1st Principles

Principles and apparent practices
that are “rolling” out:

Use the water quality guidelines and other guidance developed through
the CCME for **site specific considerations**



Environment Canada is undertaking 5 years of studies on wastewater treatment facilities in the far north to obtain performance related parameters for sewage lagoons in cold climates. However, a particular problem associated with this effort is delivering wastewater samples to testing laboratories in a timely manner.

Back to 1st Principles

Principles and apparent practices
that are “rolling” out:

Be based on an **environmental risk management** model that will provide for a level playing field across the country

Biologists have suggested that the turbidity in the Yukon River is more deleterious to fish than the sewage discharge from Dawson City



Back to 1st Principles

Principles and apparent practices
that are “rolling” out:

Be **fiscally responsible and sustainable** by identifying costs and taking into account other environmental issues



The capital budget for the Dawson City wastewater facility is \$25 million – this is in addition to approximately \$8 million previously spent on “work” that was never implemented. The operation and maintenance budget is estimated to be \$300,000 per year.

Conclusion



There is a significant gap associated with wastewater management between regulatory principles, and reasonable practices for the communities of the far north.



We are poised to either implement solutions which are appropriate to the administrative, financial, technical, and human resource capacities of northern communities OR create legacies which will unreasonably burden the communities for a generation.

