Effectively Managing Water Resources by the Use of Near Real-Time Water Quality Monitoring in Partnership with Industry

2010 National Monitoring Conference
Denver, Colorado
April 25th – 29th, 2010
Where Is This Real-Time Network?

Water Resources Management Division
Department of Environment & Conservation
NL Real-Time Water Quality Monitoring Network

The main objective of the NL Real-time Water Quality Monitoring Network is to act as an early warning system.

Use this system to reassure anyone that has concerns about the impacts of various projects on water resources.
Real-Time Communication for NL Network

Normal Transmission is generally every hour

GOES Satellite

National Environmental Satellite Data Information System (NESDIS).
Operated by NOAA in Maryland, USA.

Real-Time Monitoring Station

Real-Time Monitoring Instrument

New Graphs every 3 hours

Government Internet Web Server

Users access using Web Browser to view graphs
Can Government and Industry Work Together??

Absolutely!!

This program is not punitive in nature; government and industry work together to minimize impacts on the environment.
Real-time Network in NL

Network consists of:

- 4 stations - provincial government
  (3 stations established; 1 station under construction)

- 22 stations - industry partnership
  (17 stations established; at least 5 additional stations under construction summer 2010 & 2011)

- 3 stations - federal government partnership (3 stations established)
Partnership between government and industry can minimize the impact to aquatic ecosystems due to surrounding development

- Case Studies -
Case Study – Vale Inco NL Ltd. Voisey’s Bay

- In 1993 one of the most substantial mineral discoveries of Canada in the last 40 years was made at Voisey’s Bay, Labrador.

- A bowl-shaped ore deposit (known as the “Ovoid”) has surface dimensions of approximately 800 m by 350 m, extends to depths of about 125 m and is currently being mined using open pit methods.

- Concentrator produces a high-grade nickel concentrate, a mid-grade nickel concentrate and a copper concentrate.
Case Study – Vale Inco NL Ltd. Voisey’s Bay

- There are a total of five real-time water quality monitoring stations within the network.

- 4 surface water quality monitoring stations:
  - Upper Reid Brook
  - Lower Reid Brook
  - Tributary to Lower Reid Brook
  - Camp Pond Brook

- 1 groundwater quality monitoring station (to be established Summer 2010):
  - Well at Tailings Dam
Case Study – Vale Inco NL Ltd. Voisey’s Bay

- Able to identify and address water quality issues much more quickly, minimizing the damage to the aquatic ecosystem.

Increased turbidity due to dewater activity and failure of settling pond pump at Camp Pond Brook station (Sept-Oct. 2003) during mine construction activities; instituted mitigative measures

Increased turbidity at Lower Reid Brook station due to surface runoff from construction activity in the ovoid area (Sept. 2004); instituted mitigative measures
Case Study – Vale Inco NL Ltd.
Long Harbour

- New hydrometallurgical process developed by Vale Inco – “hydromet” process.

- Able to process the nickel concentrate directly to metal products without first having to smelt the concentrate.

- Vale Inco has selected a site near Long Harbour, NL as the location for the processing plant.

- More efficient and environmentally friendly since the sulphur dioxide and dust emissions associated with a smelter are eliminated.

- The process will also yield more of the valuable cobalt which is lost to a great extent in the smelting process.
Case Study – Vale Inco NL Ltd. Long Harbour

- Engineering, procurement and environmental planning for the processing plant in Long Harbour began in 2006.

- Initial construction began in April 2009 and is expected to be completed by February 2013.

- 3 surface water quality monitoring stations:
  - Rattling Brook Big Pond (established Oct. 2009)
  - Rattling Brook below Bridge (established Dec. 2006)
  - Rattling Brook below Plant Discharge (established Oct. 2009)

- Additional water quality monitoring stations will be established as the project moves further into construction and operation.
Throughout the fall months, construction continued onsite and coupled with the high precipitation, turbidity values were peaking frequently.
Case Study – Vale Inco NL Ltd.
Long Harbour

- Implemented an auto-alert system (through email) that notifies industry and government personnel when turbidity values have risen above a specified trigger.

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<th>Date and Time</th>
<th>Station Number &amp; Name</th>
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Alert for TURBIDITY at Rattling Brook below Bridge
adrs@gov.nl.ca

This message was sent with High importance.
To: Paterson, Renee
CC: Payli, Ryan, Chilton, Tara M.

At Jan-05-2010 2:30:09 AM station NFO2ZK0023 - Rattling Brook below Bridge reported a measurement of TURBIDITY = 113.9000, which is > than the alert value of 100.

THIS IS AN AUTOMATED EMAIL PLEASE DO NOT REPLY TO THIS MESSAGE.

- In Dec 2009, auto alert system identified high turbidity for several days on site. With this knowledge Vale Inco NL decided to temporarily stop work and focus on water management issues.
Government in partnership with industry is continually working to improve the situation by:

- monitoring the aquatic ecosystem hourly
- alerting of water quality events to allow timely response
- establishing settling ponds to combat the sediment
- educating subcontractors and on-site personnel to report/respond immediately to water quality events
Case Study – Nalcor Energy

Lr. Churchill Project

- The Churchill River in Labrador is a significant source of renewable, clean electrical energy; however, the potential of this river has yet to be fully developed.

- The existing Churchill Falls generating station, which began producing power in 1971, harnesses about 65% of the potential generating capacity of the river. The remaining 35% is located at two sites on the lower Churchill River, known as the Lower Churchill Project.

- The Lower Churchill Project is the most attractive undeveloped hydroelectric project in North America.
Case Study – Nalcor Energy
Lr. Churchill Project

► The Project consists of two sub-projects:
  - Generation
  - Transmission

► The Lower Churchill Generation Project’s two proposed installations, Gull Island and Muskrat Falls, will have a combined capacity of 3,074 MW and can provide 16.7 Terawatt hours of electricity per year.

► The joint Federal and Provincial environmental assessment process was initiated for the generation project in December 2006; continues to date.
Case Study – Nalcor Energy
Lr. Churchill Project

- There are a total of six real-time stations established on the Churchill River to date:
  - 4 real-time water quality and quantity stations
  - 2 real-time water quantity stations

- There will be three additional stations established on the Churchill River over the next two years.

- The overall aim of the network is to collect baseline water quantity and quality information prior to construction.

- Testing new technologies such as real-time cameras; iridium communication; automated GHG monitoring systems; etc.
Case Study – Nalcor Energy
Lr. Churchill Project
Conclusions / Path Forward

- Government agencies and industries can definitely work in partnership to proactively minimize impacts to aquatic ecosystems due to development.

- The NL Real-Time Water Quality Monitoring program is an example of successful partnership and stakeholder engagement.

- Will continue to partner with industry (through the EA process) to ensure the province’s ambient water resources are proactively being assessed and protected.

- Will continue to improve and re-evaluate the current real-time water quality monitoring program (ie: new protocols; improved QA/QC; timely reporting; etc.)

- Will continue to test and introduce new technologies to provide value-added products to partners.
Diversification!!

Instrumentation Options
Diversification!!

Communication Options

Water Resources Management Division
Department of Environment & Conservation
Diversification!!

Communication Options

Water Resources Management Division
Department of Environment & Conservation
3rd Real-Time Water Quality Workshop
to be hosted in
St. John’s Newfoundland & Labrador
in June 2011

All Are Welcome!!!
Thank You

Water Resources Management Division

Department of Environment & Conservation