Federal Research

Mackenzie Gas Project & Induced Oil and Gas Activities

and

Environmental Studies Research Funds

Northern Oil and Gas Research Workshop
Inuvik, NWT
November 1-3, 2005

Purpose

- Need for federal science
- Historical perspective
- Process for identifying gaps
- Federal research projects
- Next Steps
- Environmental Studies Research Funds

Why Science Information is Critical

- Science is an integral element in **preparing** for northern oil and gas development
- Enables federal and territorial governments, northern boards and agencies to **respond to the environmental assessment and regulatory processes** re. Mackenzie Gas Project and the associated exploration and development activities on shore and in the Beaufort Sea
- Necessary to make **informed decisions** so that environmental impacts related to northern hydrocarbon development can be identified and **mitigative** measures can be taken
- Supports **sustainable development**

Why Science is Important During the Stages of Northern Oil and Gas Development

Exploration, Development and Transportation

Seismic activity and temporary road access

- Loss/change/fragmentation of terrestrial & freshwater species & habitats
- Permafrost disturbance
- Impacts on marine mammals, fish & their habitats

Well drilling and waste disposal

- Impact of drilling pads on terrain/permafrost
- Waste handling (sumps) & emergency response (blowouts or spills)
- Ice scour and ice issues
- Impacts of noise on wildlife, fish & marine mammals

Production of hydrocarbons and pipelines

- Air emissions from processing plants and compressor stations
- Impacts of climate change on construction & ability to predict & assess risk
- Impacts on permafrost, wildlife, fish habitat, stream crossings

Historical Perspective

- 1970s and 1980s northern oil and gas activity was at its peak
- Several federal funding programs directed substantial resources to fill northern oil and gas science gaps (Program on Energy Research and Development, Environmental Studies Research Funds etc.)
- Northern Oil and Gas Action Program (NOGAP) 1984 - major federal research and planning program to deal with northern oil and gas
  - received approximately $68 Million dollars and 210 positions over 7 years
  - Beaufort Environmental Monitoring Project (BEMP)
  - Mackenzie Environmental Monitoring Project (MEMP)
  - Beaufort Region Environmental Assessment and Monitoring Program (BREAM)
- Since late 80's a steady decline in federal northern science capacity
- Partnering on research activities is now essential to lever funds e.g. PERD, ESRF
- Federal Government made an important decision to identify science gaps

How Science Gaps Have Been Identified

March 2001 - Preliminary Review of material

- Report on Key Issues and Data Gaps Related to Development and Transportation of Gas from Western Canadian Arctic and Alaska

November 2001 - Federal Science Experts Meeting - Calgary

- Federal Northern Oil and Gas Science Steering Committee established Indian and Northern Affairs Canada, Natural Resources Canada, Fisheries and Oceans and Environment Canada with linkages to NEB, NRC, Parks and IC

January 2002 - Workshop in Inuvik

- Research Gaps for Natural Gas Exploration and Development and Gathering Lines in the Mackenzie Delta and Near shore Beaufort Sea

How Science Gaps Have Been Identified

- Workshop Identified **knowledge gaps** re:
  - **Oceanography**
  - **Air quality and climate change**
  - **Permafrost, Soils and Terrain Stability**
  - **Waste Management**
  - **Fisheries and Aquatics**
  - **Marine Mammals**
  - **Terrestrial Vegetation**
  - **Wildlife and Migratory Birds**
  - **Biodiversity**

November 2002 - study to identify biophysical knowledge gaps

- Gaps associated with oil and gas exploration, development and a potential pipeline in the Mackenzie Valley (ISR boundary south to Alberta)
- Background Report, workshop reports, action plan

Federal Government Addressed Science Gaps

- Federal government took steps to ensure that it was prepared to participate effectively in the environmental assessment and regulatory review of the MGP and oil and gas activity
- 2002 funded gaps study and Nahidik
- Budget 2004 provided funds to federal science departments - $25 million over 3 years
  - for MGP (Mackenzie Valley and Delta)
- Budget 2005 funds –$38 million over 4 years
  - for MGP and exploration and development in Mackenzie Valley, Delta and Beaufort Sea

Federal Science Projects

DFO, EC, INAC and NRCan

- Science projects that filled information gaps identified by stakeholders including community input and necessary for EA & regulatory review processes

  (MGP and induced exploration and development)

Environment Canada

- **Kendall Island Bird Sanctuary** -assessment of the impacts of oil and gas activity- sumps, baseline info on migratory birds & habitat and impacts monitoring
- **Shorebirds** (rare breeding distribution), **Marine Migratory Birds** Programs and **forest birds** -collect baseline info (Delta and Offshore) for future monitoring

Environment Canada Research Continued

- **Polar Bear Program -** track adult and sub adult male bears- baseline information for impacts
- **Water Quality -** increase water quality monitoring along Mackenzie River, collect baseline info on natural sources of hydrocarbons and info on aquatic ecosystem health
- **Hydrology Program –** information for critical hydrologic conditions - groundwater, permafrost, flow rates, lake drainage, ice jams, modeling, channel migration, etc.
- **Water Flow Monitoring Program -** EC & INAC add 4 hydrometric stations to monitor water levels and flow on Mackenzie River
- **NWT Protected Areas Strategy** -Mackenzie Valley Five Year Action Plan - INAC and EC

Fisheries and Oceans Research

- **Mackenzie Gas Project Rivers and Lakes Studies-** identify critical spawning and over wintering areas - link to habitat classification models, lake fish populations
- **Sensitive Fish Species Study** - investigate and record seasonal occurrence and habitat use of fish species- maps of seasonal distributions and biodiversity
- **Water Drawdown Study** - impacts of winter water withdrawal on fish and fish habitat
- **Seismic Survey Study** - behavioral responses of fish in Mackenzie River
- **Fish Habitat Modeling**
- **Sediment Studies** – sediment effects on fish

Fisheries and Oceans Research Continued

- **Beluga Monitoring** -Assessment of the habitat requirements of beluga whales-tagging
- **Seals Study-** evaluation of hydrocarbon exploration on the winter breeding populations of seals
- **Update Navigational Charts**
- **Reference Site Approach-Ecosystem Health**
- **Trophic Levels**

Fisheries and Oceans and Natural Resources Canada

- **Beaufort Sea Coastal Marine Program aboard the Nahidik-** seabed mapping, data on ice scours, artificial islands, seabed disturbance, navigation hazards, physical & biological sampling & data gathering, ecosystem assessment of impacts of dredging
- **Beaufort Sea Strategic Regional Plan of Action**

Natural Resources Canada Research

- **Beaufort Sea Geoscience -** Nahidik & BSSRPA
- **Permafrost Monitoring** - Delta & Mackenzie Valley
- **Surficial Mapping** -geological maps for environmental impact and terrain sensitivity
- **Seismic Hazards** - earthquake hazards
- **Geotechnical Evaluation of Slope Failures and Movement Mechanisms**
- **Regional Terrain Hazards and Landslide Mapping**

Natural Resources Canada Research Continued

- **Coastal and Near shore Conditions-** coastal stability
- **Resource Potential**
- **Ecosystem Classification**
- **Geospatial Database Coverage- topographic maps**
- **Materials Reliability- pipeline properties**
- **Telluric Current Hazard Evaluation**

Indian and Northern Affairs Canada Research

- **Pipeline Stream Crossings Study** - baseline water quality and hydrometric data for stream-crossings
- **Terrain and Permafrost Conditions** in the Mackenzie Delta Studies
- **Aerial Photography** of Valley & delta and development of a **Digital Elevation Model** for the Delta
- **Cumulative Effects** Assessment Management **Strategy-Regional Plans of Action**
- **Cumulative Effects Database**
- **Geology Proposal** for C.S. Lord- resource assessment
- **NWT Protected Areas Strategy** -non renew. res.
- Pipeline Readiness Office – **community projects**
- **Science Coordination** - Ottawa

Next Steps

- Develop accountability framework to report back to Treasury Board on:
  - how federal science research funds have been spent
  - to demonstrate their contribution to EA /regulatory processes
- Communicate research results back to communities and engage in setting future directions
- Build on existing research efforts and identify future areas for research

Environmental Studies Research Funds
Northern Study Areas 2005

ESRF funding is provided through levies on frontier lands paid by oil and gas exploration companies that are license holders

ESRF funding for 2005 (North and East coast) $1.4 million and for 2006 $1.3 million

Priority Area 1 –Gap analysis follow-on studies

- Assess potential effects of near shore exploration activity on ringed/ bearded seals in Beaufort Sea- 3rd year-final year 2006
- Effects of seismic exploration on migratory birds and habitats in Kendall Island Migratory Bird Sanctuary, Delta – Studies complete- peer review of bird paper and report to be published on vegetation
- Integrated database- postponed to 2006

- **Priority Area 2- Waste discharges and emissions**
- Inuvialuit Settlement Region Drilling Waste Disposal Sumps Study to be published
- Sumps Best Practices CD
- Sumps workshop November 3 &4 in Inuvik

Environmental Studies Research Funds
Northern Study Areas 2005

Priority Area 3 - Seismic

- Follow-on from the fish deterrents study-two part study on caged fish and tamping and plug methodology, improved techniques for setting charges – MOU with DFO, in kind support EnCana

  – to be completed in 2006

Priority Area 4 - Traditional knowledge and heritage resources

- Follow-on study from the traditional knowledge study in the ISR – Phase 2 manual for guidelines on use, collection and interpretation of TK in assessment studies based on work in the ISR-complete

- **Priority Area 5- Cumulative effects**
- *Follow-up study on thresholds in the Delta –Draft RFP*
- Post construction study of the Ikhil pipeline project, regulated under COGOA- RFP

ESRF 2006 Studies

- Gap analysis
  - Seals study
  - Integrated data base
- Cumulative Effects
  - No new studies
- Seismic
  - No new studies
- Heritage resources
  - Follow-on- review of existing work in NWT communities
- Waste Discharge
  - Sumps data base and follow-on work
- Marine (future priority area)

*NOTE- ESRF funds can be applied to **socio-economic issues** and **environmental/biophysical** issues*