

# **Environmental Impact Statement for the Mackenzie Gas**

## **Proceedings from the First Regional Inuvialuit Settlement Region and Gwich'in Settlement Area Technical Workshop – Inuvik, Northwest Territories**

Document No. 000311-012-13-RPT  
File Key – 8.6.5

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**May 2003**

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**Abbreviations**

<b>BTEX</b>	Benzene, Toluene, Ethylene, Xylene
<b>DCR</b>	Deh Cho Region
<b>DTFN</b>	Dene Tha' First Nation
<b>EIA</b>	Environmental Impact Assessment
<b>EIS</b>	Environmental Impact Statement
<b>ENGO</b>	Environmental Non-Governmental Organization
<b>GNWT</b>	Government of the Northwest Territories
<b>GPS</b>	Global Positioning System
<b>GSA</b>	Gwich'in Settlement Area
<b>ISR</b>	Inuvialuit Settlement Region
<b>MPEG</b>	Mackenzie Project Environment Group
<b>PCBs</b>	Polychlorinated Biphenols
<b>QA/QC</b>	Quality Assurance / Quality Control
<b>RCMP</b>	Royal Canadian Mounted Police
<b>ROW</b>	Right-of-Way
<b>RWED</b>	Resources, Wildlife and Economic Development (GNWT Department)
<b>SEIA</b>	Socio-economic Impact Assessment
<b>SSA</b>	Sahtu Settlement Area

## 1 Introduction

Imperial Oil Resources Ventures Limited, the Aboriginal Pipeline Group (representing the interests of the Aboriginal people of the Northwest Territories in the Mackenzie Gas Project (the project)), ConocoPhillips Canada (North) Limited, ExxonMobil Canada Properties and Shell Canada Limited (hereafter referred to as the project proponents) are proposing to transport sweet natural gas from three of the largest discovered onshore natural gas fields in the Mackenzie Delta by pipeline to market. The three gas fields — Taglu, Niglintgak and Parsons Lake — will anchor the pipeline, and the pipeline will pass up the Mackenzie Valley through the Inuvialuit Settlement Region (ISR), Gwich'in Settlement Area (GSA), Sahtu Settlement Area (SSA), Deh Cho Region (DCR) and part of the Dene Tha' First Nation (DTFN) to connect with existing delivery systems in northwestern Alberta. Development of this project could produce significant changes in the fabric of many of the communities that border the proposed route of this pipeline, given their unique cultural and diverse environmental characteristics. In addition, changes in resource harvesting and the quality of the resources could also occur.

During the months of November and December 2002, a series of community engagement sessions were held within the ISR communities of Tuktoyaktuk and Aklavik, with the meetings in Tuktoyaktuk also being attended by representatives from key leadership organizations within the communities of Sachs Harbour, Holman and Paulatuk. Within the GSA, the communities visited included Inuvik, Fort McPherson and Tsiigehtchic. The main objective of the community engagement sessions was to identify potential key issues of concern to the community related to the technical, environmental, social and economic implications of developing the project.

Feedback obtained from these community engagement sessions, along with any subsequent issues that arose during the February 2003 field development consultation tour, were reviewed for regional perspectives at the First Technical Workshop held in Inuvik, Northwest Territories on April 8 and 9, 2003. This report outlines the methodology used at the regional workshop, and summarizes the results and proceedings from the workshop.

### 1.1 Purpose and Objectives

The purpose of this proceedings report is to present a regional perspective, in summary form, of the socio-economic and environmental issues associated with construction and operation of a natural gas pipeline. In doing so, this report will be used in the preparation of the environmental impact statement necessary for meeting the regulatory requirements outlined in the National Energy Board Guidelines and the requirements of the *Canadian Environmental Assessment Act (CEAA)*.

## 1.2 Methodology

The first technical workshop for the ISR and GSA was held at the Midnight Sun recreation complex in Inuvik, Northwest Territories on April 8 and 9, 2003.

Attendees at the workshop included representatives from the project proponents, accompanied by representatives of the Mackenzie Project Environment Group (MPEG), a consortium of four Canadian companies — TERA Environmental Consultants, Kavik-AXYS Inc., Golder Associates Ltd., and AMEC Earth & Environmental Limited (AMEC) — who provide the socio-economic and environmental services for the project, as well as representatives from ColtKBR, the engineering contractor to the project. In addition, representatives from federal and territorial regulatory agencies were in attendance, as well as representatives from the Inuvialuit and Gwich'in Co-management Boards. Finally, each of the communities of Tuktoyaktuk, Inuvik, Aklavik, Fort McPherson and Tsiigehtchic were asked to select three representatives from their key leadership organizations, while each of the communities of Sachs Harbour, Holman and Paulatuk, being geographically outlying communities to the project but still having the potential to be affected by it, were asked to select one representative from their key leadership organizations to attend (see Appendix A).

Prior to the workshop, each of the attendees was sent an information package containing a formal invitation to the workshop, along with a list of environmental- and community-related issues they were asked to consider for discussion at the workshop. In addition, each attendee from the communities also had travel and accommodation arrangements included in his/her information package.

The format of the workshop consisted of a combination of plenary sessions and small breakout group discussions. The opening plenary session consisted of an overview of the project involving a discussion of the components of the project, including the pipeline and the production areas as presented by Evan Birchard (Imperial Oil), Bruce Parent (Imperial Oil), Kim Johnson (Shell), Marie Mislán (ConocoPhillips), and Morris O'Bryan (ColtKBR). This was followed by a review of the Environmental Impact Assessment (EIA) and Socio-economic Impact Assessment (SEIA) process presented by Gord Rozon (MPEG) and Jeff Green (MPEG). The physical setting for the plenary sessions consisted of theatre-styled seating with flip charts and maps assembled at the front for ease of communication and presentation of key project information by the speakers.

Following the plenary session, six breakout discussion groups were created (see Appendix B) to review and discuss the possible effects of the project on the social and economic characteristics of the communities, and on the physical and biological environments associated with the project. As they registered, people were assigned to one of the breakout groups for the duration of the two-day workshop. Every attempt was made to assign participants to the groups in such a way as to ensure diversity in both communities and regulators represented in order to foster a good exchange of information and points of view. In addition,

various socio-economic specialists, aquatic and vegetation biologists and project engineers floated amongst the breakout groups to answer requests for specific information as the need arose.

The physical set-up for the breakout groups consisted of having approximately 10–12 people per group seated at six tables located around the perimeter of the room. Within each group, maps of the project, both for the ISR and GSA, were placed on tables, with chairs arranged around each table to facilitate discussion. Flip charts were also available for each group to document key points in their discussions. Previously selected facilitators and recorders were present for each group and each group selected group rapporteurs.

On the first day of the workshop each breakout group met after lunch for approximately 1½ hours prior to reconvening to a plenary session to have the group rapporteurs report back to the larger group highlights from their small group discussions. In the evening of April 8, a dinner was served in celebration of the attendees of the workshop.

On the second day of the workshop, the participants as a whole reviewed the outcomes from Day One prior to returning to their discussion groups for approximately 1½ hours. Following a short coffee break, workshop participants reconvened to each of their groups for the last round of small group discussions prior to coming together in a plenary session during which group rapporteurs reported back to the larger group. Light refreshments, lunch or both were served for both days of the workshop.

## **2 Issue Highlights**

The following summarizes the socio-economic and environmental themes associated with the construction and operation of the project. Each theme includes the main issues associated with it, as identified in the reports generated by each group at the regional workshop. Complete discussions of the issues as they were recorded at the workshop are reported in Appendix B of this report. For reasons of confidentiality, no names are provided for specific comments or concerns expressed by members of the individual groups.

### **2.1 Biological and Physical Environment**

#### **2.1.1 Placement of Pipe**

- Aboveground lines are likely to create snowdrifts, thereby minimizing movement of migratory species, resulting in loss of habitat and potential loss of harvesting opportunities, economic costs or both.
- Safety concern for people skidooing around aboveground lines.
- Height of aboveground lines becomes an issue of stability if the lines are too high.

#### **2.1.2 Noise**

- Constant versus intermittent noises from facilities, compressors or both (infrastructure); intermittent noise displaces movement of migratory species, resulting in loss of habitat and change in harvesting opportunities, economic costs, or both.
- Noise may potentially result in a loss of aesthetics; disturbance to peace and serenity (e.g., bird calls) of the natural environment.
- Attraction of wild animals to the noise (if constant) may result in spread of disease (e.g., inquisitive fox carrying rabies) to workers at the facility.

#### **2.1.3 Flare Stacks**

- Light from flaring potentially changing the behaviour of animals (possible attraction to the facility); attraction of wild animals to the light may result in spread of disease (e.g., inquisitive fox carrying rabies) to workers at the facility.

**2.1.4 Emissions**

- Emissions such as sulphur dioxide, nitrous oxide and others released into the atmosphere and the subsequent fallout in water bodies; effects on the food chain (fish; sensitivity of lichen to sulphur dioxide with caribou primarily eating lichen).
- Human health and the possible link between increased emissions in the atmosphere, water or both and the increase in cancers amongst the Elder population.
- Potential link between ice fog in Inuvik (and other community airports) and the resulting delays or restrictions in air traffic; potential safety issues.
- Chemical emissions, and the possible negative impact on vegetation, property damage and lake acidification.
- Increased vehicle emissions in towns resulting from idling vehicles in winter; decreased aesthetics from vehicles idling include visible black haze in the communities and poor air quality (smell).
- Dust in the summer (from construction equipment, and from moving equipment from staging areas and highways) and the use of calcium chloride to control dust; negative effect on plants and wildlife.
- Dust (from construction equipment, and from moving equipment from staging areas and highways), potentially increasing the rate of melting of the permafrost (may trigger slumping).
- Animals being attracted to certain smell emissions (e.g., bears to camp food kitchens); potential safety issue of bear-human interaction.
- Emissions from incinerators and potential fire hazards.

**2.1.5 Habitat Protection and Permafrost Protection**

- Increased access to previously inaccessible areas via Rights-of-Way (ROWs) may deplete resources (wildlife and timber resources).
- Increased access to previously inaccessible areas via ROWs, potentially disturbing the peace and tranquility of a pristine environment.
- Increased access to previously inaccessible areas via ROWs, potentially disturbing traditional land use camps.
- Increased activity in the Kendal Island Bird Sanctuary and disturbance to migrating bird species, potentially resulting in loss of habitat, potential loss of harvesting opportunities and inability of mature birds to protect their young.



- High temperature of the gas may cause melting of the permafrost, possibly resulting in slumping, erosion and flood problems.
- Concern with frost heaving and placement of the underground pipe, and the sensitivity of the permafrost.
- Use of pilings (either wood or steel) and the potential for permafrost degradation.
- Stability of the facilities becomes a concern when climatic changes result in slumping, permafrost degradation or both.
- Possibility of having a permafrost monitoring system in place during the construction phase to monitor changes to the permafrost.
- Possible degradation of the permafrost through the use of sumps.
- Construction activities within the permafrost zone may sufficiently alter the topography and morphology of the land to adversely affect future revegetation rates.

#### **2.1.6 Wildlife Protection**

- Development of the project may increase access and/or increase disturbance to grizzly, wolf and fox dens, forcing them to relocate, increasing the potential for miscarriage in pregnant animals.
- Concern with chemicals stockpiled at a site, the potential for access and ingestion of such chemicals by wildlife, and the possible negative effects on the food chain.

#### **2.1.7 River and Creek Crossings**

- Excess sediment (from construction and barge landing sites) potentially negatively affecting spawning beds in all waterways. There is a need to monitor slope control, and stabilize all river and creek (bank) crossings to decrease the amount of excess sediment, particularly around peak spawning periods.
- Monitor gravel extraction in relation to slope control around all river and creek crossings to decrease the amount of sediment.
- Increased use of barges and barge traffic possibly accelerating natural erosion processes through bank disturbances and slumping.
- Increased barge traffic (as a result of construction and operation activities) may impact small craft safety, especially during foggy mornings with decreased visibility.

- Concern expressed about the construction of docks for the barges, and that construction may produce changes in sediments and sand bars, thereby affecting fish populations and spawning.
- Increased barge traffic may adversely alter the scheduling of community activities such as fishing (community fishing net distributions).
- Increased barge traffic may extend the company limited closure time for barge use – an increase in barge traffic to accommodate the short season.
- There is a concern regarding storage of excess barges during the ice season and the potential community safety issues associated with storage of such equipment.

#### **2.1.8 Accidental Spills**

- Potentially increased cleanup costs as a result of possible chronic accidental spills.
- Necessity of having a spill response plan in place (emergency preparedness, contingency plans, evacuation plan), and that adequate measure is taken during construction to mitigate potential spills.
- Ability of finding and completing a spill cleanup in winter, and the potential of spills impacting spring runoff into main lakes (such as Husky Lakes).
- The possibility of accidental spills (and odd dripping of engine oil) occurring if an airstrip is built at Parsons Lake, and the resulting environmental impact.
- Necessity of ensuring that Transportation and Dangerous Goods legislation is checked and enforced for all handling and transport of dangerous chemicals.
- Handling waste management — different in summer than in the winter? Garbage compacting onsite? Need to consider local capacity for handling waste.
- Concern about a possible delayed response in cleaning up accidental spills.
- Concern about a long-term pinhole leak under ice and the potential impact to fish.

#### **2.1.9 Construction**

- Concern expressed about the effects of sabotage, breaks, ruptures, vandalism and third-party damage to facilities, and such activities will be monitored.

### 2.1.10 Cumulative Effects

- The project may open the door for increased exploration offshore, potentially negatively impacting marine protected areas and beluga management zones, resulting in potential loss of harvesting opportunities and economic cost.
- Concern that the project may encourage subsequent development in the Delta to the point that a *spiderweb* effect (from lines, pipes, etc.) will be widespread, thereby taking away from the natural beauty of the Delta.

### 2.1.11 Subsidence

- Subsidence from natural causes combined with the potential of subsidence from gas extraction may result in topographic changes to the landscape, possibly leading to widespread flooding.
- Increased risk of flooding and the negative impact to the Kendal Island Bird Sanctuary may result in potential loss of harvesting opportunities, economic cost or both.
- Increased risk of flooding from ice jams (storm surges) and the potential for facility damage.
- Increased risk of flooding from subsidence or storm surges and the possibility of compensation for the more flood-prone communities.

### 2.1.12 Potential Bear–Human Interaction

- Increased human activities may increase human–bear interaction rates, causing a *nuisance bear* problem; if killed because of human–bear interaction, would reduce the bear quota ratio for the specific community, dependent on where the animal was killed.

## 2.2 Socio-economic Environment

### 2.2.1 Jobs and Benefits

- For the smallest communities, concern was expressed that most of the workforce may be away in the camps, leaving few people to draw on for community affairs.
- People don't like to work because of increased rent payments; rent is based on cumulative household income — the more money made, the more that is paid out for rent.

**2.2.2 Education**

- Want to hire northerners but need to identify necessary skills and experience based on qualification and need; training and capacity building done in the communities.
- Need more (Internet) access to facilitate online training in small communities to prevent a decrease in the community population as a result of people moving to Inuvik to access the technology.
- Young people, attracted to high paying jobs in industry, are leaving school before graduation, and are employed in short-term jobs providing instant money; this may encourage them to engage in unlawful activities because of peer pressure.
- With both parents employed outside of the home there is often no way for the children to get to school, leading to high rates of illiteracy amongst the communities.
- Needs to be encouragement for training for the long-term: encouragement for young people to stay in school, and recognition that many jobs with the project will be short-term, but that advanced training will facilitate any future employment opportunities that may happen outside of the project.

**2.2.3 Drugs and Alcohol**

- Sudden increase in wages coupled with poor money management is conducive to non-essential or illegal spending (or both) on gambling, drugs and alcohol.
- Increase in alcohol in the communities threatens the safety and security of the health care professionals (e.g., needing to deal with emergencies through the night that are alcohol or drug induced).

**2.2.4 Demands on Local Services and Infrastructure**

- Public institutions and services (fire, health, police and rescue services) geared to current demands may have to adjust to short-term project demands.
- Will the project be self-sufficient in terms of funding for infrastructure upgrades to meet project demands?
- Increased pressure on housing due to transient population coming into northern communities to access *boom times* in employment.
- Increased pressure on availability of groceries; cost for food increases, cost for hotels increases.

- Increased partying, alcohol or drug abuse or all three increases the stress on community health workers: high burnout rate for counsellors and nurses in northern communities. High turnover and a shortage of doctors and nurses in all communities.
- Increased transient population in northern communities; do not have longevity within the community and strains community relationships.
- Higher paying industry jobs are luring people away from community service jobs such as chambermaids, waitresses, carpenters, etc., creating a void in local services.

#### **2.2.5 Increased Supply and Demand on Local Products**

- Want to purchase local products, but need to ensure supply is sufficient to support local population.

#### **2.2.6 Money Management**

- With many people changing from a traditional lifestyle to a wage economy, there is a lack of understanding as to how to manage their money: fast money is often spent on drugs, alcohol and nonessential purchases rather than on basic family needs such as food, clothing and shelter.

#### **2.2.7 Preservation of Traditional Lifestyle**

- There is a need to recognize peak traditional harvest periods and the ability to access them when employed.
- Stresses associated with engaging in a dual lifestyle of traditional pursuits vs. wages earned through employment.

#### **2.2.8 Preservation of Family Unit**

- If both parents are employed on the project, extended daycare becomes a problem, especially in communities where no daycare facilities exist.
- In single-parent families, if the parent is employed outside of the home for extended periods of time, the children may be put in foster care for up to six months, potentially increasing the stress (trauma and psychological effects) on both the children and the single parent because of the family split.
- Sudden moves because of new job opportunities means many people moving in with family members and extending their stay, thereby straining family relations.

- Extended time spent away from home by one family member (because of a job opportunity) strains relationship, leading to a potential new relationship developing.
- Both parents employed on the project may result in less quality time being spent between the couple, potentially leading to communication breakdown and the potential for misunderstandings and family violence.

#### 2.2.9 Elder Abuse

- With more people employed in a wage economy, less time is spent on traditional harvesting activities, resulting in less procurement of traditional foodstuffs and a possible increase of cancer in Elder populations due to changes in their diets.
- With more members of the family being employed outside of the house, many Elders are being left alone and becoming more prone to Elder abuse — physical, financial and emotional.
- Less time spent with Elders because of outside employment opportunities means less time spent in educating young people in traditional lifestyles, potentially resulting in a loss of culture.

#### 2.2.10 Heritage Resources

- There is a need for increased recognition of heritage sites (burial sites) as a way of preserving traditional lifestyles and knowing the people.
- Need to use traditional names for landmarks and places to preserve culture; have stories and legends attached to places — *sense of place*.
- Need for cross-cultural training for southern workers to understand and appreciate northern lifestyles and uniqueness of culture.

### 3 Next Steps

Information received from communities through the first round of community engagement sessions and the Inuvik Technical Workshop was compiled and reviewed by the project team in defining the impacts associated with project development. The next step in the community engagement approach for the socio-economic and environmental impact study process involves visiting communities in the ISR and GSA to discuss impacts and the ways in which these impacts can be mitigated. This second round of community sessions will be followed by a second technical workshop to discuss the impacts and ways in which they can be mitigated on a regional basis.

Results from the focused community meetings and technical workshops will then be communicated back through subsequent followup meetings to all members of the project management team, the environmental and socio-economic assessment team, the routing team, and members of the engineering team. The Environmental Impact Statement (EIS) will address the specific issues and concerns raised through all community meetings, and the issues will be acted upon in the project design and through mitigation strategies.

**APPENDIX A**  
**List of Attendees**



**List of Attendees**  
**Environmental Impact Statement Technical Workshop**  
**Inuvik, Northwest Territories**  
**April 8 and 9, 2003**

**Project Proponents**

Alan Kennedy, Bruce Vincent, Terry Antoniuk, Doug Meads, Kim Johnson, John Brown, Marie Mislán, Evan Birchard, Dave MacKay, Jacqueline McArthur, Michelle LaPlante, Bruce Parent, Meghan Dalrymple, Roy Wilson

**MPEG**

Gary Willson, Gord Rozon, Katherine Bosch, Jeff Green, Michael Fabijan, Serge Metikosh, Jane Lancaster, Chuck Hobart, Bruce Ramsay

**ColtKBR**

Morris O'Bryan, Stan Dalidowicz

**Federal Agencies**

National Energy Board – Bonnie Gray  
Indian and Northern Affairs Canada – Heidi Heder  
Canadian Environmental Assessment Agency – Jann Atkinson  
Fisheries and Oceans Canada – Peter Cott  
Parks Canada – Ed McLean

**Territorial Agencies**

Government of the Northwest Territories Department of Resources, Wildlife and Economic Development (GNWT RWED) – John Nagy, Ian Butters  
GNWT Education, Culture & Employment – Sheila White  
GNWT Municipal and Community Affairs – Dennis Berry

**Inuvialuit Organizations**

Inuvialuit Game Council – Richard Binder  
Environmental Impact Screening Committee – Linda Graf  
Joint Secretariat – Chris Always, Robin Fonger  
Inuvialuit Land Administration – Mardy Semmler  
Inuvialuit Cultural Resource Centre – Elisa Hart

**Inuvialuit Co-management Boards**

Fisheries Joint Management Committee – Kevin Bill  
Wildlife Management Advisory Council (Northwest Territories) – Katherine Thiesenhausen, Frank Pokiak

**Gwich'in Organizations**

Tribal Council – Joe Benoît, Deb Bissom  
Gwich'in Social and Cultural Institute – Alestine Andre

**Gwich'in Co-Management Boards**

Renewable Resource Board – Jennifer Walker-Larsen

Gwich'in Land and Water Board – Darren Campbell, Leonard Debastien, Robert A. Alexie

**Environmental Non-Governmental Organizations (ENGOS)**

World Wildlife Fund (Canada) – Mike Preston

**Community of Aklavik**

Hamlet of Aklavik – Evelyn Storr

Aklavik Community Corporation – Leonard Dick

Aklavik Hunters and Trappers Committee – Evelyn Storr

Aklavik Elders Committee – Rhoda Kayotuk

**Community of Fort McPherson**

Hamlet of Fort McPherson – Gordon Clark, Brian Alexie

Tetlit Gwich'in Renewable Resource Council – Georgie Blake

**Community of Holman**

Holman Community Corporation – Adam Inuktalik

**Community of Inuvik**

Town of Inuvik – Jerry Veltman

Inuvik Community Corporation – William Gruben

Inuvik Hunters and Trappers Committee – Alex Kaglik

Inuvik Elders Committee – Billy Day

Nihtat Renewable Resource Council – Neil Firth

Nihtat Gwich'in Council – Barry Greenland

**Community of Paulatuk**

Hamlet of Paulatuk – Sharon Green

**Community of Tsiigehtchie**

Metis Council – Maureen Clark

Gwichya Renewable Resource Council – James Gardlund

**Community of Tuktoyaktuk**

Hamlet of Tuktoyaktuk – David Lucas Jr.

Tuktoyaktuk Community Corporation – Sheila Nasogaluak

Tuktoyaktuk Hunters and Trappers Committee – Emmanuel Adam

Tuktoyaktuk Elders Committee – Molly Nogasak

Tuktoyaktuk Development Corporation Limited – Tom Lie

**Interpreters**

Inuvialuit – Rosie Albert

Gwich'in – William Francis

**TOTAL ATTENDEES (including study team): 74**

## **APPENDIX B**

### **Proceedings of the Small Group Discussions**

## **Black Group**

### **Gord Rozon – Mackenzie Gas Project (Facilitator)**

John Brown – Mackenzie Gas Project (Recorder)

Bruce Parent – Mackenzie Gas Project (Engineering Specialist – floated amongst groups)

Serge Metikosh – Mackenzie Gas Project (Aquatics Specialist – floated amongst groups)

Jane Lancaster – Mackenzie Gas Project (Vegetation Specialist – floated amongst groups)

Chuck Hobart – Mackenzie Gas Project (Socio-economic Specialist – floated amongst groups)

Kevin Bill – Fisheries Joint Management Committee

Peter Cott – Fisheries and Oceans Canada

Dennis Berry – GNWT Municipal and Community Affairs

Adam Inuktalik – Holman Community Corporation

Rhoda Kayotuk – Aklavik Elders Committee

Richard Binder – Inuvialuit Game Council

Tom Lie – Tuktoyaktuk Development Corp. Limited

James Gardlund – Gwichya Renewable Resource Council

## **Biological and Physical Environment**

G. Rozon reviewed the preliminary list of biophysical issues associated with the development of the project in the ISR and GSA. The following are the group discussions that developed around disclosure of the list.

### **Issue: Disturbance of fish habitat during watercourse crossings by the pipeline**

- [Extent of watercourse crossings by the pipeline]: 650 on entire route, 130 flowing year-round, approximately 20–30 year-round flowing in the ISR and GSA combined.
- Mackenzie River: What bothers folks about crossings in the river? Sediment. Sediment affecting spawning beds.
- Will there be directional drilling under main channels?
- Concern over sediment affecting spawning. Sediment load drops in fall at freezeup. If you can rule out spawning beds, is it okay to have sediment? Critical times identified [for fish habitat] were: early freezeup and spring.
- Stabilization of crossing to eliminate effects that may happen after the fact.
- Contingency plans for major crossings (open-cut vs. horizontal drilling).
- Should we worry more about smaller rather than larger [crossings] (such as the Mackenzie) and the sedimentation effect? Both. Yes, but the smaller are probably more easily affected. Slope control is an issue. Don't mess up over wintering or spawning areas. [Needs to be] criteria for selection of gravel extraction sites – effects of gravel extraction on [fish] habitat.

**Issue: Effects of facilities and possible aboveground flow lines on the distribution, movements, and local abundance of caribou and domestic reindeer**

- Do lines create snowdrifts (fences) that will hamper movement [of migratory animals]?
- Parsons Lake aboveground lines may set precedent that will allow more aboveground lines in the future.
- Effects of winter construction on caribou movements: how long will it last, and will they return to habitual ways? Caribou displacement? How much/how long?
- Facility noise and light and how will [this affect] the behaviour of animals? Could there be a change in their behaviour [attraction to the facility]?
- What is the correct height for aboveground lines to reduce effects on caribou?
- Long-term effects (cumulative) on caribou experience, particularly at Parsons Lake, [needs to be studied within the context of the Alaska project].
- Impacts on people skidooning around aboveground lines.
- At Parsons Lake: Although they are trying to bury the lines, they are unsure of whether or not they can bury the flow lines. 2.2 metres above ground is the height that ConocoPhillips thinks it will have to be installed at.

**Issue: Increased access along the pipeline ROW and associated access roads, and increased harvesting of fish and wildlife**

- Increased access to lakes and areas previously inaccessible will deplete resources – will increase the pressure to sensitive harvesting areas.
- Increased access to previously inaccessible areas will increase firewood and timber collection.
- [Increased access to previously inaccessible areas will lead to] disturbance of traditional use and camps. Right to quiet enjoyment of the land.

**Issue: Effects of all oil and gas development and other human activities on the natural environment**

- An increase in activity in Kendal Island Bird Sanctuary and the impacts with respect to migrating birds.
- Future offshore development and the impact with respect to marine protected areas and beluga management zones.
- Where do you draw the line on looking into the future?

- Need to look at value components [of the ecosystem] and try to predict the impacts on them. Need to use the project valued ecosystem components, and look for thresholds over space and time [to predict impacts].

**Issue: Effects of emissions from the production facilities and compressor stations on the environment**

- The continual transfer of emissions to the environment and their cumulative effect on the food chain.
- A flared event is not a major issue because of burning efficiency.
- [There will likely be] some emissions from power generation equipment [need to address these within the context of the environment].
- [Need to address] diesel emissions during constructions.
- Compression and power generation use natural gas with possible diesel backup.
- Will natural gas power the Northern Terminus? Yes.
- Does ice fog cause issues at the airport? Should there be a restriction on idling a vehicle in winter?
- Dust may be an issue in the summer. Calcium chloride (used in dust control) has a mixed benefit: it has a negative effect on plants/wildlife; it is slippery.
- Dust along the Dempster and the Inuvik by-pass is an issue — is paving an option?
- Incineration at camps is an issue — do we or don't we incinerate at camps? Potential fire hazard from incinerators in the summer.
- What impact does not incinerating waste have on the landfill sites?

**Issue: Disturbance of permafrost as a result of project construction and associated changes in slope stability**

- Once the [permafrost] is disturbed, how do you minimize and reduce the effects? Use ARCTIC Best Practices for Arctic/permafrost construction.
- How will the temperature of the gas coming up affect the permafrost?
- Can we avoid ice-rich areas to mitigate some of the permafrost problems? Geotechnical information is needed to make wise decisions.

**Issue: Localized flooding in the outer Delta due to land subsidence from gas extraction combined with effects from storm surges**

- [Facility designs] need to consider natural subsidence as well as subsidence due to gas extraction. Design needs to address storm surges and subsidence issues. There will probably be long-term monitoring on facilities to watch subsidence.

**Issue: Increased bank erosion along the Mackenzie River due to barge traffic, as well as bank disturbance during pipeline crossings**

- Increased barge traffic may accelerate the natural erosion processes. Take into account the natural variability of the river.
- Small boats and large barges cause safety issues.
- Need to consider erosion and maintenance issues and effects.
- If a bank is stabilized improperly, once bank disturbance has occurred there could be long-term effects. Monitoring [river] crossings could resolve some of these issues. Slumping in uplands affects streams.
- When doing extraction from gravel deposits there could be some [bank] slumping. There are some mechanisms to control gravel extractions already in place.
- There needs to be a reclamation plan for gravel extraction sites.

**Issue: Effects of accidental releases of natural gas and gas liquids on soil and vegetation**

- [Need to have an active program] of leak detection and repair.
- Reclamation plans [need to be in effect]. Every spill is a serious spill. Chronic spills increase the cleanup cost.

**Social and Economic Environment**

G. Rozon reviewed the preliminary list of possible effects of the project on the social and economic characteristics of the communities. The following are the group discussions that developed around disclosure of the list.

**Economic Environment**

- How do public institutions and services (such as fire, rescue services) geared to current demands adjust to large but short-term project demands?
- Will the project be self-sufficient in terms of funding, manpower dealing with infrastructure upgrades? Costs are sometimes borne by parties who do not always directly benefit.

- There is a conflict of [economic] objectives: want to purchase local products, but need to ensure supply is sufficient to support local population.
- Need to address the labour market in terms of size and capability — want to hire Northerners but must enhance capacity (stay-in-school; capacity training). Need to identify the necessary skills and experience based on qualification and need.
- Need to address money management training and services: royalties vs. transfer payments are always late and never enough. The people and localities who bear the brunt of the impacts are not necessarily the recipients of the benefits.

### **Social Environment**

- Needs to be two-way cross-cultural awareness and work conditions that are non-disruptive to traditional lifestyles (e.g., key harvesting periods and the ability to access them when employed).
- Times of high industry activities (e.g., increase in numbers employed) do not necessarily increase community problems. However, during times of low employment, community problems are exacerbated.
- [Look to experience from the past to provide answers to the future]: in the 70s and early 80s, initial spending binges were followed by relative stability.
- If receiving a cash income, it is good if used for traditional pursuits; however, if receiving income, there is a problem with a dual lifestyle of traditional pursuits vs. wages earned through employment.
- Economic prosperity leads to better health and higher literacy rates. Recognition that times have changed, and that people today want the best of both worlds: traditional lifestyle and local employment.
- If people are employed, needs to be shared responsibility amongst individuals, communities, governments and industry.

### **Red Group**

**Evan Birchard – Mackenzie Gas Project (Facilitator)**

Jacqueline McArthur – Mackenzie Gas Project (Recorder)

Marie Mislán – Mackenzie Gas Project (Engineering Specialist – floated amongst groups)

Jane Lancaster – Mackenzie Gas Project (Vegetation Specialist – floated amongst groups)

Bruce Ramsay – Mackenzie Gas Project (Socio-economic Specialist – floated amongst groups)

John Nagy – GNWT RWED

Robin Fonger – Joint Secretariat

Alestine Andre – Gwich'in Social & Cultural Institute

Emmanuel Adam – Tuktoyaktuk Hunters & Trappers Committee

Evelyn Storr – Aklavik Hunters & Trappers Committee



**Biological and Physical Environment**

E. Birchard reviewed the preliminary list of biophysical issues associated with the development of the Mackenzie Gas Project in the ISR and GSA. The following are the group discussions that developed around disclosure of the list.

**Issue:      Effects of emissions from the production facilities and compressor stations on the environment**

- Do we understand emissions from an industry viewpoint?
- We all know what it does.
- Tuk: outside of Tuk there was a black haze due to drilling and seismic, exploration drilling. When there was no wind, you could see black haze from Tuk.
- Must have been exhaust fumes.
- This was last winter. Every activity was happening.
- Does atmosphere up here create these effects?
- In town because people run vehicles, not clear.
- When you get out of town, [the atmosphere] is clear.
- Any type of aerial cooler can create exhaust (water vapour) in the atmosphere.
- Exhaust because of inversions.
- Ice fog – are there safety issues? What is the actual issue?
- The issues are anything in air that is not natural and because of high rate of cancer in region. This is a big concern for Elders. Anything out there within the air that is not natural that Elders are breathing in, they are concerned about. Anything in the air, goes into the water is also breathed in.
- Perception that it is a real health issue can be an issue because of worrying.
- This is a big concern.
- Ice fog – can be contributing to winter ice fog in town...
- ... and surrounding area.

- Concern for fish because of wind. Wind would blow emissions and would drop from the air into Sitidgi Lake.
- Cannot get flights because of ice fog. This is a safety issue, flying issue. Crew changes are very difficult.
- Contamination of nearby waterbodies for fallout.
- Lichens are very sensitive to sulphur dioxide. High concentrations of nitrogen oxide.
- Lichens are sensitive because they can absorb sulphur oxide and nitrogen oxide easily. Dust is another air emission from hauling on gravel roads.
- Even the disturbance of granular [resources].
- Yes.
- Centimetre of dust on vegetation.
- Water on nearby lakes (dust).
- Water quality, sedimentation (dust).
- If that happens, will have to check the water for all these things (dust).
- Sedimentation in the water will affect the birds (dust)...and little wee fish (dust).
- Albino effect (dust).
- More and faster melt taking place. Accelerated. Can trigger slumping.
- Dust effects can affect berries. It can change where people will go for berries and medicinal plants.
- Smell to some of these emissions. Animals have an acute sense of smell and may be attracted or repelled by smells. Bears – food smells will attract animals (kitchens.)
- Last fall when the polar bear went through the camp someone had been frying caribou. The polar bear walked up the road, up the steps to the house where someone was frying caribou. A truck scared it away.

**Issue: Disturbance of permafrost as a result of project construction and associated changes in slope stability**

- Disturbance to permafrost can easily happen by these pilings to be put in. [Use of] wood pilings – wood pilings have to be removed and replaced with a steel frame. Can we adequately use pilings for life of the project or are there stability problems?
- One home just collapsed.
- Yes – because of failure of pilings.
- Engineers try to design to avoid permafrost degradation and frost heaves.
- Last meeting an Elder brought up the question about whether the size of pipe will affect the permafrost. If the pipeline is aboveground, it must have something to hold it up. How long will these hold?
- House is shifting. How will shifting affect pipeline or facilities?
- What might be prone to slumping if climate changes affect the permafrost? Pipeline? Facilities?
- Formation is breaking away.
- I'm sure studies have been done on permafrost, effects over long periods of time.
- Need to collect more field data on pipeline route and use for final design.
- Soil/permafrost specialist should be along with them.
- I think the bigger the pipe, the greater the disturbance.
- Where there is nothing now, you will be disturbing...
- ...through a sensitive area.
- How much permafrost would 30" line impact?
- Actual ROW will be 40–50m.
- Elders still can't visualize; they don't realize the fill picture. They think it is just the pipe, not all the equipment. Even compressor stations with all that weight on pilings. All this impact on the ground where there is nothing there now.
- When is the pipeline communication education video going to be ready for community distribution?
- Impacts of horizontal directional drilling [on the permafrost].

- Need to find permafrost when we horizontal directionally drill under the river.
- Has to be a monitoring system put into place during the construction phase to monitor permafrost. Has it been proven that after the pipeline is in that the pipeline can move? Will permafrost be monitored to ensure no changes?
- Sumps: if for any reason, had to use US sumps, would be a disturbance to permafrost.
- Shell is looking at an offsite sump.
- Parsons may have to use a sump. There is a history of sump failure here.

**Issue: Localized flooding in the outer Delta due to land subsidence from gas extraction combined with effects from storm surges**

- We are a high-risk community for flooding. If compensation, this would be a big concern for companies. If we ever get flooding, all the facilities and products will go directly into the water.
- To what degree of subsidence are we planning for in extracting resource? It would be over a foot over a long period of time in combination with other natural effects such as [natural] land sinking.
- Storm, ice covered everywhere last fall. Wrecked a lot of boats, smoke houses, wood all over the place.
- Nig, Taglu – will be some level of subsidence. Overlay this with storm surges for optimum level [height?] for facility construction.
- There is a possibility of a year of low water, prevents barges from getting in, can't get supplies. Then have to look at other options like airstrips — big concern because it is right on the banks of the water. Effects on fish? Concern with flooding. In compensation package? Community is high-risk flooding, compensation and insurance issues — not covered because we are in the flood zone.
- If there is flooding in Nig and Taglu, and the effects of the flooding are because of what is on that, what are the impacts? What is the resulting compensation?
- Two sites are in Kendal Island Bird Sanctuary. There is no guarantee. You may think you can catch all the runoff, or build the best pad, but sometimes nature has its own way. There is no guarantee.
- What about ice? Ice jams? This causes flooding. What is the effect on the project design?
- Low lying areas, effect of the ice coming on shore. (storm surges).
- Ice jam causing flooding, but also the ice itself could take out the facility.

**Issue: Noise generated by construction and production facilities (e.g., compressors, pile driving, flaring, aircraft)**

- Noise is an issue during construction and operation, at facilities, at pipeline. What are the implications for people?...for wildlife?
- Animals — this must really affect them, as there is nothing there now. Like smell. There is no noise now. We don't know how it will affect the wildlife. This is a concern from the Elders. Even to the smallest little animal. Even noise from planes, helicopters. An increase in activity disturbs the animals. Driving along the road now you see the fox and they perk up and they hear the vehicle and dash away.
- Or the opposite, where they could become accustomed or tame to the noise. Either it will scare them away or attract them. Tame fox could have rabies.
- Noise on caribou can lead to:
  - Displacement
  - Loss of habitat
  - Harvesting opportunities and economic costs.
- Noise affects people at camps — winter, spring, fish camps. Even if caribou are displaced, this will affect people's harvesting behaviour. [Noise] affects aesthetics. People go out to listen to birds and geese.
- Noise will be year-round so no break from it as compared to activity now. Especially construction.
- River: increased barge traffic creates noise.
- Barges: foggy mornings, forest fire smoke. Can't hear noise if barge is coming. Small craft safety due to decreased visibility and increased barge activity.
- Different levels of noise, direction of noise, frequency of noise.
- Variation in noise versus constant noise doesn't make a difference to caribou – all impact.
- Increased activity due to Parsons — especially air traffic, caribou leave earlier. Especially if an airstrip is being considered. [Caribou] usually hang out until March. [Noise] also affects the geese.
- Noise during flaring, during pile driving.

- Regulatory people will probably put restrictions on time we can do our activity because of concerns coming out. Seasonal and window constraints are an option.
- Then you need to know sensitive time of year for animals and birds. Includes fish [runs] as well.
- Noise impact on grizzlies at Taglu? Guess is that it would be minimal. Swan Hills in the 70s showed minimal impact. Is a low density of bears in the Delta. Mostly impacts on polars and grizzlies are camps and kitchens and garbage handling. Grizzlies don't care.
- What about white noise?
- Short- or long-term impact of white noise.
- Interesting that animals can become accustomed to noise (e.g., squirrels in camps).

**Issue: Effects of accidental releases of natural gas and gas liquids on soil and vegetation**

- How does natural gas behave if released? Gas goes up, liquids would pool. Gas rapidly disseminates to the atmosphere. Very often can have a fire with accident, where gas and liquids would burn.
- Effects of inversion on gas leak?
- Depending on temperature, propanes or butanes may be liquid or gas.
- Wind: possible forest fire associated with fire due to wind.
- How does snow or ice affect gas? If spill in winter, how will we see it in spring?
- Effects on vegetation and fish.
- All runoff would go into the lake during the spring. How would you find spill in winter? Contained by snow and ice? All that water flows into Husky Lake.
- Airstrip on Parsons Lake in winter. The odd dripping of engine oil at the end of the season melts and goes back into the lake. So need to consider small leaks and spills not just big spills. What about waste oil?
- Blowouts in South? How big is impacted area? Depends on how big of a leak or blowout, how long, the winds.
- If you have flames at ground level will they melt the permafrost?
- Every situation is unique. Drilling engineers in three companies are looking at common techniques and relief well capacity.

- What does a blowout look like? How would I know if there was a blowout? Would I notice it? Often there is a spark, subsequent fire. It would burn efficiently at location.
- Would it affect vegetation or soils? Goes back to same concern as emission (effects of spills on people).
- There are three sites: if something happens at Taglu, how will it affect Parsons or Nig? Could an accident affect other facilities because it is all connected?
- Emergency preparedness, contingency plans, evacuation plan is in place.
- Need to educate people. If Emmanuel hears or sees a blowout, he knows to duck. Educate people, make them aware of what to expect, how to react and how to notify hunters and outfitters also.
- Will Taglu noise, spills, etc. affect whales and whaling areas?
- Taglu is close to Kendall. Lots of people from Inuvik pass there (whaling).
- Restrictions during whaling and migratory season?
- Spills on rivers and lakes flow downstream into the ocean. Consider flow of stream of water and effects downstream. Through Delta and into the ocean. Where whitefish winter. Nesting areas for birds. Seals.
- Are we (Mackenzie Gas Project) a part of the Mackenzie Delta Spill Co-Op?
- What types of emissions will be released, and what odours and colours would they have? What are the health effects?

**Issue: Effects of facilities and possible aboveground flow lines on the distribution, movements and local abundance of caribou and domestic reindeer**

- We need to get away from talking about caribou generally and start talking specifics:
  - Cape Bathurst: winter at Parsons/Tsig Lake/ Husky Lake.
  - Blue Nosed West: winter in North Sahtu, overlaps with Cape Bathurst herd.
  - Boreal Woodland Caribou: listed as threatened in Canada. Are nonmigratory. The Woodland are along the pipeline route, below the tree line.
  - Be species specific and population specific. Extend to polar bears as well.
- Reindeer winter a little further south of Parsons down to Noell Lake. They summer at Richards Islands (in the hills not in Kendall Island Bird Sanctuary).

- Birds — not just water birds, but also birds of prey, songbirds. Need to expand the scope. (e.g., ravens and ptarmigans).
- Between Tuk and Inuvik is the key winter range. If the animals are displaced due to development:
 

Cape Bathurst and Blue Nosed West	<ol style="list-style-type: none"> <li>1. Loss of habitat</li> <li>2. Loss of harvesting opportunities. Will have to travel further. This is an economic issue and impacts GNWT RWED.</li> <li>3. Displacement.</li> <li>4. Negative impact on herd size.</li> </ol>
Woodland Caribou	<ol style="list-style-type: none"> <li>1. Amount of burnt habitat (historical fires).</li> <li>2. Loss of habitat due to pipeline ROW</li> <li>3. Increased access to harvesting.</li> </ol>

- Data is being collected using [Global Positioning System] GPS collars. The caribou do use burnt area during summer period and use old growth forests (lichens).
- Increased access, increased disturbance, increased access to predators. There is the loss of the old growth habitat and fragmentation of old growth. Habitat loss, but bigger zone of influence with increased light, no ice and activity (especially during construction.)
- Historically caribou disappeared in the Tuk area (with Husky Lakes) but they eventually came back. Cumulative effects — not only with the initial development but also with the ongoing exploration. Over the next 20 years the potential disturbance is huge because of all the activity beyond the project.
- Other furbearing mammals to consider: grizzly, polar and black bear, fox, wolf, martin, lynx, wolverine, mink, otter, muskrat, beaver, ground squirrel, groundhog, lemming.
- Worried about dens for grizzly, wolf and fox. Adequately identify these sites. Once you disturb them, they move. They may come back but to a new site in the area.
- Most dens collapse in early summer period, so the bears come back and may den on the same slope. Most bears dig dens depending on where they are at denning time. Lake banks with southerly exposure or slope. Distance from surface of the lake to den can be as little as three feet.
- Bears migrate miles and miles away from dens to forage, but generally come back to den. Same thing applies to foxes and wolves.

**Issue: Effects of human activities on grizzly bear and polar bear, and the increased risk of bear mortality**

- Need some kind of bear deterrent.
- Electric fencing, clean camps, garbage storage/handling, sprays, noise bangers.



- Dealing with low-density bears – 7–8/1000 km<sup>2</sup>.
- Niglintgak Field: pipeline travels through denning areas.
- Problem Bear Deterrent Programs – GNWT RWED.
- Rubber bullets, wildlife monitors — once a bear makes up its mind, it's tough to deter it.
- Issues are: bear and human interaction that leads to a nuisance bear; denning habitat.
- Bears feed on bare roots until vegetation freezes up. Then they feed on shoreline and marshline vegetation, then berries. In August, bears eat ground squirrels. Outside of this, they are opportunistic — reindeer, caribou.
- Narrow channels at Richard's island — large volume of water fish go onshore, bears line up and eat the fish.
- Grizzlies on both sides of Bathurst Bay hunt seal.

**Issue: Effects of barge traffic, and barge landing and stockpile sites on use of the Mackenzie River by migrating waterbirds**

- Lots of overflow so pipeline has to be high enough to avoid this. Overflow on Mackenzie River as well. What effect will increased barge traffic have on the fish run? Once fish start running, then they go. Will barge traffic interrupt fish movement?
- Bigger waves, swells are a result of barge. Has to make sure the barge doesn't get swamped. Safety — when checking nets, have to watch barge. Noise will increase. Nets aren't placed in middle of river but on side, in eddies.
- With respect to the river crossing at Swimming Point, how far is the crossing? Distance? 28" line. That's a long crossing and a big pipe. It's a major concern for the community in Tuk.
- Vegetation has to be taken into account across all elements: emissions, permafrost, flaring, flooding, bank erosion, spills.
- Caribou lichen is a sensitive area (where caribou graze).
- Moose habitat: usually around willowed area.
- Water fowl: feed on goose grass, grows on sandbars, Delta and river way (all inclusive.)
- Effects of non-native plants replacing indigenous plants.
- It would be good to have a map of plant habitat and wildlife habitat.

### **Social and Economic Environment**

E. Birchard reviewed the preliminary list of possible effects of the project on the social and economic characteristics of the communities. The following are the group discussions that developed around disclosure of the list.

- Population will decrease in smallest communities because most of the workforce will be in camps. Therefore less people will be available to draw on for community affairs as most people are drawn to the project because of money. Two-week rotations will draw people away and days off will bring people back.
- Stress on community and family. Some communities that are organized may have daycare. But if mother and father are gone for extended periods of time, we can't leave the kids at daycare.
- It will be hard on families. Kids (if there are four kids) will not all stay with one family; they'll be split up. This creates a break in the family. If they want to work, it puts single moms in a difficult position if the kids are put in foster care for six months. It creates a cycle of problems. She can see this in the limited work done to date. If there is no foster home in the community, then they have to go to the nearest community. This puts mom in a difficult position. Number of children in foster homes in the region is very high.
- Trauma and psychological effects will be carried forward in future generations.
- The project will enhance this problem. This is not only a direct employee population problem. It affects all populations. Don't take in reports that the project is the cause, some of these are already happening — but the project increases the problem.
- Go into schools and talk to kids about the project and its effects (e.g., talk to children that the project will take parents from home but they will come back). Work together — Mackenzie Gas Project and Social Services. Work at prevention and intervention programs. With the increase in development, increases are needed for the social department to work with the project. The government is aware of this . . . need for coordination between government agencies and industry.
- [Need to be as] proactive as possible. Focus on prevention and intervention.
- Education: people want to prepare themselves in training programs, so there is a decrease in population in smaller communities because people come to Inuvik to go to the college. This is prior to any construction starting. Families move to Inuvik with technology. You can do a lot online.
- Companies [need to] partner up with [Northern] companies here.
- People come up on spec and increase the population. Increases pressure on housing.

- Social Services had to buy bus tickets for people who come here without a job. Need bus tickets to get home. This will have a big impact on Inuvik. Impacts groceries, etc. Hikes up prices.
- In Aklavik, not a big price difference between there and Inuvik. Not better prices in Inuvik, but should be cheaper in Inuvik. In Tsiig, two prices in town — one for industry, one for community, and even lower for Elders; same for housing. Because so many people are staying at hotels, the price of rooms has gone up. Makes it expensive for community organizations to come and stay here. Hotel prices are too high.
- In Tuk, in the 80s, there was a big influx of people because of industry coming in every day. There were jets coming in day and night. Had their own housing out of town. But it still affected the community because so many people worked in camp; it increased people's incomes. Now all [we have left is] these empty buildings.
- People (industry) lived in camps; locals worked in camps, lots of money, increased whiskey use.
- Not just soft drugs, hard drugs as well. Expensive drugs. Those who can afford it can buy them, but others will turn to what they can afford like Scope or Listerine mouthwash. In Inuvik at drug stores there are three whole rows just for mouthwash.
- If people move on impulse and move in with family members and stay too long, it leads to tension. Not very good! Can't live with family too long. Increasing homeless people. Increased number of cabins across the river. Squatters. People can't afford the housing.
- Family relations: we'll see an increase in family break-up. Parents are gone too long, leading to trouble with alcohol and drugs. One parent left at home may start up another relationship. Bad.
- Breakups and breakdowns. Because of increase in problems of being away, additional stress, communication breakdown.
- Individuals, families and communities will be affected. Breakdown in culture. Increase in family violence. Won't go out on land as much.
- It depends on what people do on land. Spring, March 1 to June 15 is the muskrat hunt, goose hunt. Go out in spring to do cultural activity. June to August or September — go out fishing. September or October to February — go trapping. These groups who do these activities may not be the same. Tuk is year-round. They do something every month. Seal is not as big as it used to be. Hershel Island — government used to take families sealing. Inuvialuit Game Council has a calendar that outlines hunting seasons. Gwich'in RRC has a calendar that outlines hunting seasons. Would be nice to have a regional (GSA & ISR) seasonal calendar of harvesting. In the 80s, oil and gas didn't have an appreciation of this calendar in scheduling work.

- Learning tool for the project and local children. Seasonal calendar for Tuk, Inuvik, Tsiig, and down the Valley.
- Northern communities want beluga. Lots of opportunities for exchange of food: geese, fish, berries, char, musk ox, caribou and beluga. Done through friends and word of mouth. Educate our own people and the gas people with this calendar.
- Elders struggling. Aren't getting caribou. Not getting food off land, have to go to Northern and buy chicken or beef. Concerns that the Elders are changing their diet. They are getting cancer. In private homes, only get a small pension and have to pay for housing, utilities and food. Left alone. Elder abuse — physical, financial, emotional. Elder neglect. Parents have to leave their homes because of drinking.
- This project will increase the problem. Whole lifestyle is different. Not enough time spent with Elders. Visiting with them, understanding them. Children are not taught how to talk to them.
- Very few Elders are out on the land. Red meat is a delicacy this time of year. Don't have big groups going out. Price of rat [muskrat] dropped so low, not worth the gas to go to the cabin. Not worth the time. People usually look after each other. Exchange food. Organized community hunts. Teach people traditional ways (e.g., how to cut up meat.) Targets mostly widows and Elders. Community Corporation gets caribou for all Elders. In Tuk, every fall, specifically hunt for the benefit of the Elders. In spring, all geese harvested are distributed. Every house gets what they need. Do the same with fish in the fall.
- Stress: because of family breakdowns and break-ups. More need for spiritual help. Caregivers. Counsellors. Community helpers. Need to help the helpers. High burnout. Carry around a big burden. Can happen also to spiritual leaders. Community wellness members need counselling. Doctors and nurses are overloaded. There is high turnover and a shortage. High doctor turnover because of all the added stress they have. With the increase in alcohol, they have to think of their safety, being disturbed in the night and security. High stress because they don't know the patients' conditions. Floating nurses don't pay rent, are treated better than nurses that are in for two to three years (have to pay rent.) No incentives to sign on; it is better for them not to be permanent. Community would rather go in to see someone they have a history with. Really stressful and frustrating for people to see someone new. Now have to set up appointments to see someone in health centre. They'll see babies and Elders but not the in-betweens. Staff at school, health centres and community centre all rotate frequently. To get service they need, they may go to leadership instead of waiting, so becomes a stress also on leaders.

- [Need to place importance on] heritage resources. Know people, way of life, burial sites, cabin sites (out on the land everywhere.) These are heritage sites. Place names — stories, family history associated with name of place. Names are used to tell where resources are. Just about every hill and lake has a name. (Especially towards the Husky Lakes.) All have names, stories. Are reference points. Are burial sites. Born on land. Died on land. Followed seasons and traveled where the resources are. If we use traditional names for landmarks and places then we can help carry on the use of these names. Campsite — repeated use of one place. Had to have a water source, fire wood source and to be flat to be a camp. Generally is an archaeological site. We will go back to these places over and over and over. Have stories and legends attached to place. People have a close association to the land. Collect traditional knowledge in an organized fashion. Ownership and sacredness of information must be respected. Mackenzie Gas Project [should] donate GPS [database information] to Gwich'in Social Cultural Institute and to its Inuvialuit counterparts. Pinpoint archaeological and cultural sites. Collect all information in one source.
- [Need to emphasize the importance of] education:
  - Cultural orientation is critical of any group that any developer is working for. For everyone — cross-cultural.
  - Scholarships should be very specific to anthropology (culture) and linguistics (language) at college, university, undergraduate and graduate levels.
  - Project leaves behind a cultural centre. As project unfolds, losing knowledge of culture and language will happen at an increasing pace.

## Orange Group

### **Terry Antoniuk – Mackenzie Gas Project (Facilitator)**

Dave MacKay – Mackenzie Gas Project (Recorder)

Chuck Hobart – Mackenzie Gas Project (Socio-economic Specialist – floated amongst groups)

Marie Mislán – Mackenzie Gas Project (Engineering Specialist – floated amongst groups)

Roy Wilson – Mackenzie Gas Project

Jann Atkinson – Canadian Environmental Assessment Agency

Heidi Heder – Indian and Northern Affairs Canada

Billy Day – Inuvik Elders Committee

Leonard Dick – Aklavik Community Corporation

Jennifer Walker-Larson – Gwich'in Renewable Resources Board

Deb Bisson – Gwich'in Tribal Council

Sheila Nasogaluak – Tuktoyaktuk Community Corporation

William Francis – Gwich'in Interpreter

T. Antoniuk reviewed the preliminary list of biophysical issues associated with the development of the project in the ISR and GSA. The following are the group discussions that developed around disclosure of the list.

**Issue: Effects of barge traffic and barge landing and stockpile sites on use of the Mackenzie River by migrating waterbirds**

- What types of wildlife are affected by barge traffic? Fish and waterfowl — there is a critical habitat at barge areas. Important for fish migrations and spawning.
- Important to note the scheduling of barge traffic with community activity such as community fishing — will the increase in barge traffic interfere with the fishing nets?
- There is spawning up the river past the settlement region — conflicting information between Fisheries and Oceans Canada and community knowledge: we need scientific knowledge, but need to combine it with traditional knowledge and community experience.
- You're behind on fish research — equal time needs to be spent on fish research as that presently being given to studies on caribou and grizzly. Need to understand what and communicate what and how the conclusions in studies are reached.
- Concern with [stockpile sites: chemicals stockpiled] and the chemical ingestion by animals entering the food chain.
- Concern that the barge season will be extended beyond the company limited closure time; will this mean an increase in traffic to accommodate the short season?
- Concern with the storage of barges during ice seasons; this becomes a safety issue and requires notification of the community.

**Issue: Disturbance of fish habitat during watercourse crossings by the pipeline**

- Timing of crossings is important for both stream and river crossings: need to take into account silts and spawning periods. Local people with particular knowledge should be consulted when crossings occur; change in fish habitat effects harvest.

**Issue: Disturbance of wildlife and fish as a result of increased noise levels from construction and production facilities (e.g., compressors, pile driving, flaring, aircraft)**

- Need to consider the effects of constant noise versus undulating noise.

**Issue: Effects of climate change and weather on the project design**

- More slides and erosion effects lately. With the amount of carbon dioxide released into the atmosphere, how much contributes to global effect? There is more vegetation growing in lakes where there wasn't any before.

**Issue: Effects of all oil and gas development and other human activities on the natural environment**

- Pilings will damage the permafrost.
- Setting precedents with aboveground pipes — becomes a safety hazard.
- Increased access along the pipeline ROW and associated access roads may mean illegal hunting or increased access to hunting. Geese are no longer in the same places. Migration routes are changing. Whose responsibility is it to monitor, enforce and protect the traditional hunting grounds?

**Issue: Effects of emissions from the production facilities and compressor stations on the environment**

- Concern with local effects on health from nitrous oxide, and excess carbon dioxide: vegetative damage, property damage and lake acidification.
- Concern with the amount of vehicle and aircraft emissions affecting air quality in Inuvik and in other communities. Will the increase in emissions that is project-induced add to the changes that we already see?
- Emissions may be worse in winter and in the mornings.
- Concern with effects of emissions on food and water sources. Bioaccumulation of above as well as emissions from chemical spills.

**Issue: Disturbance of permafrost as a result of project construction and associated changes in slope stability**

- Will colour help in reflecting the heat? Concern with using steel in the pilings: is there something else that is heat reflective?
- Issue has to do with frost heaves in swampy areas, and the fact that they freeze and could lift pipeline or facilities.
- If all the gravel is taken up [in a particular location], will this cause depressions to be formed that will somehow capture the heat?
- You need to go in with answers already in place: Arctic Best Practices, combine science with local practices and experiences: the local communities have a lot of experience with what they have done in the construction of roads, houses, etc.
- Natural slumping needs to be considered during all construction.

**Issue: Localized flooding in the outer Delta due to land subsidence from gas extraction combined with effects from storm surges**

- Will Niglintgak be able to withstand the storm surges that drive ice up on the land? Experience has shown that levels can rise dramatically if there is a storm in the ocean that is on level with what is happening in the Delta.
- What is the emergency shutdown procedure for fields and pipeline? Effects of ice jams and ice scouring — what happens and how are you going to prepare?

**Issue: Effects of accidental releases of natural gas and gas liquids on soil and vegetation**

- Need to know if Transportation and Dangerous Goods legislation will be checked and enforced for handling and transport of dangerous chemicals.
- Waste management: will there be an effective plan? How will you be handling downhole injection? Will waste treatment be different in summer than in winter (hauled in winter; treated in summer)? Need to consider local capacity for handling waste. Will there be garbage compacting on site?

**Social and Economic Environment**

T. Antoniuk reviewed the preliminary list of possible effects of the project on the social and economic characteristics of the communities. The following are the group discussions that developed around disclosure of the list.

- What social issues are important to you or your community? What are the last effects of the boom/bust?
- Transient population does not leave a good impact on the community; they do not have the investment in the community.
- Young people are attracted to high-paying jobs in industry and are leaving school; everything changes with money, whiskey and drugs — no place to go for sports or positive venues.
- There is a lot of illiteracy, not many people have driver's license: will need to upgrade. Problem is that with many parents working, there is no way for the children to get to school, and many of them, as they get older, decide not to go to school, which has long-term effects. Age group (30–32 years) were *victims* of last boom as they were left by parents who went to work and the kids did not get to school.
- Short-term jobs for young people: provides instant money that has created access to liquor, and encourages young people to engage in activities because of peer pressure.



- Problem is that there are a lot of social resources available, however, it is often difficult to get immediate help of either nurse or police – usually always a delay. For example: we need an appointment to go to the nursing station and we need to phone for the appointment. However, many of us don't have phones, and there is a shortage of people and resources to help out.
- Need some direction in financial management: many of us are *hopping to a wage-based economy* and moving from income support to a temporary salary. We need some help in managing our money.
- Big problem with rent: the more money you make, the housing association charges more in rent. When you don't work, the rent is small, so there is a disincentive to work.
- Benefits from the project lie in the area of trades, education and opportunities on the job.
- The problem with short-term jobs is it is difficult to manage home care issues. Home relationships can degrade by shift work and time spent away from home.
- With respect to jobs: think a lot of jobs would be a good thing. Berger said not ready for a pipeline; land will not be the same after development; but people feel ready for development this time. Indian and Northern Affairs Canada is much better recently at stewarding the land.
- Have never seen a really good socio-economic impact assessment report: difficult to put a dollar figure on thing that you cannot really do. But, good or bad, we will do better as the land claims are settled. There is now a higher level of awareness with respect to family and finance. Now recognized that minimum education levels may act as barriers.
- If people are looking for a job, they will take a job in the labour and service sector based on skill and education level. People are looking for advancement, apprenticeships, encouragement for seeking better opportunities and upgrading. There needs to be encouragement for training for the long term. There is not a good understanding of what is required in terms of skill sets, educational levels and opportunities. Need to encourage people to stay in school to get their *tickets*. There also needs to be *on-the-job* training opportunities for people to advance to higher employment.
- There is a general knowledge of opportunities, but a lack of knowledge in: bid process, financing, business planning considerations.
- People need to be told why some people may not be hired. Need to detail what is available for jobs through pamphlets explaining how many jobs are available and qualifications needed.
- You need to focus [your discussions] on the *anchor fields* rather than on what we think might happen in the future with subsequent development.

- Trust needs to be a part of the planning process: need to tell people the truth about the various opportunities available for them, and the pros and cons involved in each opportunity. The best decisions are made when people are well informed. If I read the socio-economic impact assessment report, I should be able to understand the impacts to the communities.
- Well-informed decisions involve knowledge of: geographic scope, training, duration, equipment, are realistic, how many and capacity of community, type (employment/business), description (rotation/camps).
- Important to have time off during key harvesting periods to preserve the traditional lifestyles.

## **Green Group**

### **Michael Fabijan – Mackenzie Gas Project (Facilitator)**

Kim Johnson – Mackenzie Gas Project (Recorder)

Bruce Ramsay – Mackenzie Gas Project (Socio-economic Specialist – floated amongst groups)

Stan Dalidowicz – Mackenzie Gas Project (Engineering Specialist – floated amongst groups)

Morris O'Bryan – Mackenzie Gas Project (Engineering Specialist – floated amongst groups)

Bonnie Gray – National Energy Board

Ian Butters – GNWT RWED

Ed McLean – Parks Canada

David Lucas Jr. – Hamlet of Tuktoyaktuk

Molly Nogasak – Tuktoyaktuk Elders Committee

Gordon Clark – Hamlet of Fort McPherson

Jerry Veltman – Town of Inuvik

Mardy Semmler – Inuvialuit Land Administration

Barry Greenland – Nihtat Gwich'in Council

Robert Alexie Jr. – Gwich'in Land and Water Board

## **Biological and Physical Environment**

M. Fabijan reviewed the preliminary list of biophysical issues associated with the development of the project in the ISR and GSA. The following are the group discussions that developed around disclosure of the list.

- Parsons Lake: noise and satellite wells and equipment, please describe. With aboveground piping, and heating power, continuous noise. Concern about impacts to caribou, predators, wolves, and foxes.
- Single wells: keep them as simple as possible if needed. Will require heat or a chemical. Heater is generally not noisy (no satellite compressor). We will need power, but just a cable from the north pad. Possible to have a compressor at single well but it is very expensive, so not likely. Noise will be only from the heater, so very little noise. In the winter, drilling for two to three months so there will be people and noise.
- Possible to put a barrier around the compressor?

- If the design is not finalized at Parsons Lake; you are still guessing on how to file an application — you will then need an amendment, and therefore a repeat of process.
- Parsons Lake design is close to being finalized (i.e., next month). We have been keeping you informed along the way, we anticipate having a fixed design by the end of June.
- With the elevated pipes, how will they interact with our caribou? It may be different than Alaska.
- Pads will have a life of 20–25 years, and the satellites will have less at 15–20 years. Aboveground pipes is not our preference, but may be needed. Lateral from gathering will be belowground.
- What is the reclamation plan at Parsons?
- You can make an all weather road with the gravel.
- What about remote valves for emergency control especially at river crossings?
- Gravel may be left in place so habitat will be left in place.
- So when will we know what the plans are when finalized? What about the cabins out there (i.e., Husky Lakes); the pipeline will interfere with my access.
- South to north intrafield flow line may be aboveground.
- If aboveground, need to look at how high to be out of the way. 2.2 m (7 feet) is current design, 18 m between piles.
- You need to ensure that we can get by, and that the caribou can pass too.
- What about increased access along the ROW?
- 2.2 m at Husky Lakes is not high enough – caribou have big antlers! Why not go higher?
- Becomes a stability issue; we took measurements of snow depth, people on skidoos, caribou height.
- How high to the highest point?
- Top will be at 2.7 m; we will put reflectors on the pipeline.
- We had a low snow year this year.
- We were using Tuk and Inuvik snow depth measurements.
- Water survey probably has the best snow cover data. Georgie Lennie is the guy.

- Are ROWs used in the summer?
- Too buggy, we don't use ATVs much in the summer, just planes and boats — except for the north around Tuk; people get out [in the interior] more. People respect the trapper's areas and stay out. If nuisance bears are killed around Parsons, then that is for Tuk's quota, if in the west, then that is for Aklavik's quota.
- What is the gathering system block valves emergency response? If no valves, then how will valves be closed in the major river crossings?
- Where is not exactly defined, but the code Z662 does not require block valves anymore except at compressor stations. Used to be 20 km apart, but Z662 does not require them.
- There will be some block valves (i.e., at Parsons Lake aboveground pigging and scraper stations. Swimming Point and Taglu might be one block valve.
- Valves can be powered by pressured gas (i.e., nitrogen). Remote sensing with a control (remote) system using satellite communications. 18 m x 18 m square footprint. Z662 changed since it has been determined that gas lines do not fail due to Quality Assurance and Quality Control (QA/QC) on construction.
- What about liquids line spacing for emergency block valves?
- Yes. Liquid line needs block valves, but at crossings approximately 20 m x 20 m. Likely have emergency valves on gathering line since multi-phase. No set rule on spacing, but likely at Swimming Point, Taglu, and Parsons (at least two). No emergency valves are likely necessary on the gas transmission line except at the compressor station.
- Kendall Island Bird Sanctuary: migratory birds have staging areas, nesting areas; increased noise means they are unable to protect their young, impact to harvesters, etc. Especially in May, August and September.
- It is cumulative development — not well monitored on wildlife, nothing documented. The patterns aren't well established because no one is looking. With increased exploration, caribou patterns are being changed.
- Any Alaska studies?
- Alaska studies showing caribou stress, decreasing birth rate (i.e., if noisy, the birds and caribou will move).
- When will the study be done on cumulative effects? Impacts?

- Some of the work is complete, some is ongoing. Bird work was started in 2001. We flew the river and the pipeline route into the Delta. We did surveys for breeding, nesting, after hatch, moulting and before flying south; lots of surveys in 2001 and 2002. In 2002, we focused on shorebirds in the Delta area. Earlier Arctic Gas studies on noise showed pulsing noise from compressors bothered birds, but if the noise was more constant, the birds were more accepting. Lots of Canadian Wildlife Service surveys have been done in the last 30 years, but now we don't have the money to do many years of studies as the project is only paying to look at the last 10 years.
- Government agencies need to fund the additional research for the next 20–30 years. This will be needed to help identify and mitigate any impacts.
- John Nagy did caribou studies and movement in the Delta area. The project is funding him to continue. Also good opportunity to collaborate with traditional knowledge studies and people to combine with scientific studies. Gwich'in Social and Cultural Institute will be doing the traditional knowledge work.
- We need a definitive schedule to allow us to be involved. We don't want all the information to come in at once.
- We need the capacity and time to review the studies!
- I will not review on your tight schedule with our Council! Put a time frame on the work so we can plan our review work!
- If there is a major oil spill, will there be an immediate response? Don't leave it for a few days to spread. Concern about a delayed response.
- Concern of remote site operation — what liquids will be on site? Glycol, diesel, gathering line, hydrocarbon liquids.
- Concern about a long-term pinhole liquid leak under ice and the potential impact to fish.
- Smart pigs will run to check QA/QC of pipeline. Leak detection system may not be able to detect a pinhole leak.
- How will you check coating problems?
- We can run instruments to check and repair if necessary. Odorant is usually added at the distribution system. Not in the transmission systems.
- How do you warn of a leak from a remote facility? Do you use an odorant?
- Horns and lights signal a gas release.
- What is stabilized hydrocarbon liquid? A liquid flash at atmospheric pressure so that remaining liquid is stable.

- Liquid line crossings controls? There will be a valve (not usually two) at each crossing. Produced water? Yes, produced then re-injected.
- Drilling waste sumps?
- Taglu has availability to inject cuttings since cuttings are from development drilling and not exploration.
- Is there a concern for leakage with the drill sumps?
- Niglintgak is looking at a remote sump, which would be offsite in chosen geotechnical conditions to improve containability.
- Who will monitor the sump? How long?
- Industry may collaborate on a remote sump, but if not, Shell would be monitoring the sump.
- Camp sump issues another potential problem: that of transporting the concentrate or sludge.
- Camp Farewell sewage system works well and passed tests. McPherson dumpsite gets filled; it takes 12 hours to drain one big lagoon into a creek then into a river.
- Town sewage system, water system all stresses municipal services. Roads (e.g., Dempster) and airport sewage from all the increased traffic impacts airport sewage system (pump out).
- Concern about big temperature changes: + 25°, -45° etc. What is the operating pressure? How fast does the gas or liquid flow in the pipeline?
- Taglu to Northern Terminus: 2–3 days; 8–12 days from Northern Terminus to Norman Wells.
- Where are the meters located on the system? Leaving Niglintgak, leaving Taglu, leaving Parsons and leaving Northern Terminus.
- Where do the liquids come from? Niglintgak has virtually no liquids; Taglu and Parsons supply most of the liquids.
- When working in permafrost, how are the strains managed? Since it's buried, how does it work? Add climate change variability.
- Big issue, pipeline people spend a lot of time looking at this issue. Very good issue to ask. Within permafrost it is very changeable. Transition zones are critical areas.
- What are the other gas pipelines operating in permafrost?

- Both at Ikhil and in Alaska the gas lines are above. Ikhil line starts at -5 or -6°C and cools towards Inuvik at -20°C. We may have to heat along the line. Pipeline needs to operate within a certain temperature range.
- What is the temperature of the gas as it comes out? 40–50°C at Parsons and Taglu; 10°C at Niglintgak.
- Products from incomplete combustion? Energy and Utilities Board says 98 percent flare efficiency. There will be compressor emissions: water-ice fog; carbon dioxide — climate change; nitrous oxide — acidifying emission; [Benzene, Toluene, Ethylene, Xylene] BTEX emissions from glycol regeneration; fugitive emissions; and concerns regarding reported mercury emissions from natural gas reservoir production.
- NORM emissions are a concern in the south. The real question is the impact or amount of emission.
- What about the subsidence that has been talked about?
- Subsidence occurs slowly over the length of the production — in a very dynamic environment in the Delta. Not a lot of information is available about this.
- There may be a need to do more work to determine the subsidence. Why is the pipeline happening now? Is the United States forcing us to build it now? Have you done studies on subsidence? What about [Polychlorinated Biphenyls] PCBs?
- Shell has done subsidence studies on shores — about a 0.5-m depression under the river. PCBs are not normally associated with natural gas production.

### **Social and Economic Environment**

M. Fabijan reviewed the preliminary list of possible effects of the project on the social and economic characteristics of the communities. The following are the group discussions that developed around disclosure of the list.

#### **Economic Issues**

We need clarity on the project from the economic perspective — what employment is available?

- We already have job-seekers as attendees [at this workshop]; maybe we are the wrong group to ask. Should ask community folks and the unemployed.
- But we are representing the communities; i.e., Tuk want jobs. What local training is available in Tuk? What has been done in the colleges for specific courses [such as welding]; could also be taught in Tuk.
- Job brochure is available — we have seen it; it has been distributed. The generic information is available.

- Are they adequate? They are in the communities.
- It gives direction to the people, but what are the opportunities? (i.e., construction is short-termed, therefore may have to travel [to find other construction jobs]). The information is available in town on jobs.
- We need to be aware of short-term jobs and the lure to high school kids into jobs but not careers — a chance of losing a generation of kids from high school [for this project]. Therefore, companies need to be aware of that and plan to help the students back in to high school so they have options at the end of construction. Make sure people know the consequences of job chasing and allow opportunities.
- You need to go to the high schools with messages that [construction] employment is only a two-year thing. Getting an education is more important than short-term jobs.
- [School] counsellors have the information. Make sure they get the right information.
- [The problem is that] young people don't listen to adults so you need to put in place the options.
- Norman Wells was a union job for two years; people that joined did not get called to go south [at the end of the job]. Therefore, don't give people false impressions – 500 welders with no work! Need to focus on operations phase careers.
- Need to give the reality check to the people interested in jobs and provide the right information to people.
- Need to get the message out that [in terms of longevity of employment] the pipeline is not a big thing. Lifelong jobs are what is needed.
- Town of Inuvik is crying for trades; there is a real lack of skilled help. Backfill employment will happen.
- Maybe the jobs are short, but the skills may go on (e.g., they can go on to start new business).
- This is not happening in a vacuum. Regional Training Partnerships are working on these issues. Minor construction boom; there is a group of people working on this issue but focused locally.
- Are we ready as a territory to get the employment training thing started? Great to have trained people, but need to look to future and build a skilled workforce in the area.
- There is a Pipeline Operators Training Committee that focuses on pipeline operations. Should there be a committee that combines government and industry efforts?
- Norman Wells is an example of how not to do the training and employment.



- Indirect jobs (e.g., nursing) will increase. This project can be viewed positively and optimistically since the whole economy will improve and therefore future careers, etc.
- There needs to be a regional training committee (partnership) between GNWT Education, Culture and Employment and Aurora College – regional combining both Gwich'in and Inuvialuit representatives.
- What about manpower competition? (e.g., wildlife co-management volunteers going to other seismic programs).
- Do you think the project will draw people away from existing jobs in northern communities? There will be more competition; e.g., wardens, managers, interpreters, management jobs, and professional. It is already difficult to get workers such as chambermaids, carpenters.
- It will happen because higher wages available for short term.
- Tuk jobs drew away people because of higher wages. Need better training.
- Already a grab from the Diamond mines. Need to know how to upgrade training to make it transferable for other work in the region. However, there is not a lot of unemployment available for those that are trained. We can't compete with the money.
- Are employment standards to be the same or flexible with subcontractors? Every company should have pre-employment testing for alcohol and drugs — one rule for everybody. Rules and regulations need to be enforced; they are not in terms of drugs and alcohol — these are safety issues!
- Training is important — we need local training!
- Problem is that Tuk people go south to train, but they do not finish courses because they are away from home.
- What is the best way to get the information to the youth? Open houses? In Tuk, many of the students came to the open house. Summer school is an opportunity to target them early. Mentorship is important for the kids to see the work firsthand.
- Summer students in these areas work very well; they can write their ticket for summer work. Lots of programs have Claim for Beneficiaries, scholarships, etc. You need to work with Aurora [College] to design the proper programs.
- Experience, reliability and track record are important for all workers, even for the short-term jobs of pipeline construction.
- There needs to be pre-qualification work to ready existing businesses for pipeline opportunities also for joint ventures.

- Safety is critical, but who will enforce it? Northerners are very conscious of the need for safety.
- Some people will get organized, but prequalifications favour the larger organizations. Processes are already in place to register business (i.e., Inuvialuit business list need to get the tenders).
- Definition of a Northern business needs to get more specific; i.e., is it one month, one year?
- Companies need to get organized to be qualified. It has been hard for smaller businesses since high expectations for work, and the boom-and-bust nature of oil business.
- Lenders are wary of the boom-and-bust cycle; they need to establish how much risk they want to take on.
- What about issues like trucks running all the time (e.g., diesels) — lineups at banks, parking competition, higher rent, etc.
- Money management is an issue; no banking in some communities. What about credit unions?
- Put a bank in Tuk – we need one.
- People spend money as soon as they make it. Company can set up direct deposit with people accessing their funds through ATM — save money that way.
- Need accessibility to money management tools.
- Employer can set up programs for child education, registered savings plans, bank accounts, etc.
- Problem is that some people can't have bank accounts at CIBC due to prior banking issues with CIBC – what do we do then? CIBC is the only bank in town.
- Credit union was studied, but they didn't start up.
- Looking at setting up business with Indian (?) Bank to joint venture in Inuvik.
- Have the Gwich'in or the ISR discussed setting up a credit union or a portable bank? Whose responsibility is it for teaching money management?
- It is hard to tell what people do with their money. Coaching, teaching — there needs to be a joint responsibility between employer and employee to improve the issue. Companies can help in orientation — can try to train them in camps; need to take the opportunity to teach money management.

- There is the situation with dual economy of wages versus traditional lifestyle. Wages allow you to buy equipment (such as boats and skidoos) that enables you to do better harvesting.
- Seasonal jobs are good — you bring in the wages, but then there is also time to go out on the land. With the workers' schedules, you make the money, but you miss the [harvesting] opportunities or have the sense of being discouraged [by peers] to go out harvesting; i.e., peers that are not employed are resentful of those that do earn wages and didn't need to go out on the land.
- Winter work may detract from winter hunting — wife works, husband can go hunting [problem is in most traditional societies, husband and wife do harvesting activities together]. But, if people need to work in the winter then that might be the only way. People can still manage a day hunt — even trappers go out one day a week now.
- Early fall is a critical time for hunting caribou; a work schedule should not conflict with this time period.
- There needs to be high school age limits for hiring (i.e., no hiring under the age of 18). Need to encourage the subcontractors to do the same.
- How do the high school kids get experience?
- Maybe when hiring high school grads [for summer jobs], encourage them to stay in school.
- Will the jobs be union jobs? Will the production facilities, drilling be union? If the jobs can be isolated (i.e., if they can be fenced in), then they can be non-union. Chances are the pipeline will likely be unionized since it is so large a task.

### Social Issues

- Archaeological sites need to be added to the list of social issues that need consideration. Policing and health are other issues that need to be addressed with the startup of this project.
- Include daycare — losing one-half of the parenting to a job. There is a lack of daycare and a high cost of putting a kid in daycare.
- GNWT Education, Culture and Employment recipients may not qualify for daycare services.
- More money into the communities will bring more parties. There will be problems with insufficient numbers of [Royal Canadian Mounted Police] RCMP, abuse, violence, drug and alcohol and addiction centre lack of funding — government passing responsibility to the Land Claim.
- More dollars will bring drugs into the community, creating broken families, new people coming to communities — high transient population.

- More money into the communities will increase the amount of traffic into the communities: cost of housing will increase, cost of fuel will increase, chipped windshields, harder to get reservations on airlines, heavy equipment impact on roads, sewage from camps, garbage from camps.
- It is disappointing that all seismic exploration activity is going offshore.
- National Energy Board sees that all [onshore] land is taken up — there are cycles of activity. Onshore exploration companies are scheduling their exploration activity around the project. The onshore exploration companies have paid a lot of money to explore onshore, and have hopes for finds in the future [and getting it to market].
- Did lots of people come to Inuvik to look for work [when exploration was happening]? There is not a lot of capacity to handle transients. People were commuting but acting like Northerners (e.g., get an address but living somewhere else). Expensive place to live, expensive to leave.

## Yellow Group

### **Doug Meads – Mackenzie Gas Project (Facilitator)**

Michelle LaPlante – Mackenzie Gas Project (Recorder)

Morris O'Bryan - Mackenzie Gas Project (Engineering Specialist – floated amongst groups)

Jeff Green – Mackenzie Gas Project

Chris Always – Joint Secretariat

Mike Preston – World Wildlife Fund (Canada)

Sheila White – GNWT Education, Culture & Employment

Linda Graf – Environmental Impact Screening Committee

Rosie Albert – Inuvialuit Interpreter

Brian Alexie – Hamlet of Fort McPherson

Joe Benoit – Gwich'in Tribal Council

Neil Firth – Nihtat Renewable Resource Council

## **Biological and Physical Environment**

D. Meads reviewed the preliminary list of biophysical issues associated with the development of the project in the ISR and GSA. The following are the group discussions that developed around disclosure of the list.

### **Issue: Effects of emissions from the production facilities and compressor stations on the environment**

- Why flare? Why not release or test in another way?
- What are the distance emissions will travel?
- How can you capture heat from compressor station exhaust?

- Is heat considered as issue? Where does it fit into environmental assessment?
- How tall is the pilot?
- Are animals and birds in particular attracted to the flare stack?
- Are there flares at each well or only at the facility? How often will flaring take place?
- How far will emissions go and how will they affect lakes and caribou? Nitrous oxide emissions should be considered.
- What will be used to cool the gas? What happens and how often do flares go out?
- Strobe lights . . . how well do they work?

**Issue: Disturbance of permafrost as a result of project construction and associated changes in slope stability**

- If a fire starts, is there the potential for damage to the permafrost?
- Question with respect to length of time for gas dissipation [pipeline leak] in relation to cabin proximity.
- Question with respect to slope stability after pipeline has been installed, and secondary uses of the slope such as skidooing.
- Question with respect to the heat conductance of piles in relation to preservation of the permafrost.
- Question with respect to the facilities sitting on gravel pads and the potential for permafrost degradation.
- Concern with the use of sumps and the potential for permafrost degradation. Some sumps in the Yukon have turned into lakes.

**Issue: Increased bank erosion along the Mackenzie River due to barge traffic, as well as bank disturbance during pipeline crossings**

- Comment made that visible signs of [bank] erosion are widespread in the Delta. Question of how far should facilities be from the shoreline.

**Issue: Localized flooding in the outer Delta due to land subsidence from gas extraction combined with effects from storm surges**

- Comment made that the potential for flooding is high [in the Delta] and this concern needs to be factored into any design.
- Flooding causes new habitat for fish and allows migration between lakes. Could natural flood patterns be disturbed affecting migration?
- [In the] staging areas, the [river] banks need to be built up sufficiently to prevent erosion. What design [for these staging areas] is being put in place to minimize erosion?

**Issue: Noise generated by construction and production facilities (e.g., compressors, pile driving, flaring, aircraft)**

- Will noise mitigation be put in place?
- At what point does compressor noise cause problems for birds and people? Would steady noise cause shifting of [wildlife] populations?
- Concern expressed that intermittent noise could cause hibernating [grizzly] bears to wake from dens, thereby increasing the bear to human interaction ratio.
- With respect to noise and the Taglu field (and Kendal Island Bird Sanctuary?), there may be a more sensitive time [that needs to be considered] to reduce or mitigate noise. [If respecting these *sensitive periods*] means slowing down the period to drill at Taglu, how will this affect the overall project?

**Issue: Effects of accidental releases of natural gas and gas liquids on soil and vegetation**

- Concern expressed with the amount of chemicals stored onsite. Will there be [additional storage onsite for chemicals] for contingency purposes?
- Questions with respect to the storing of glycol onsite: where stored? How much? Alternatives to use?
- Issue has to do with the dissipation of spills by the prevailing winds and the proximity of cabins.

**Issue: Effects of facilities and possible aboveground flow lines on the distribution, movements and local abundance of caribou and domestic reindeer**

- Issue with aboveground lines stopping caribou herds.
- Need to see what the *spider web* of pipelines will look like; what will be the effect of subsequent development?

**Issue: Effects of all oil and gas development and other human activities on the natural environment**

- Potential for smaller companies with not as good environmental record to have projects that become economical.
- Land use plans (e.g., Gwich'in) are becoming more important.
- Baseline data is important, but there is a need to evaluate outside corridor due to wildlife migration.
- [Communities] need commitments for long-term monitoring of project effects. There is a recognized government role in the [collection] of regional baseline data, but there is not enough dollars being put to this.
- Concern expressed that oil and gas development is [negatively] affecting plant life and migration patterns of wildlife. Example given of muskox moving further south because of roads.
- Comment made that there seems to be no evidence of erosion on a steep slope when *worked* by another oil company.
- Question regarding the *ease* of repairing the pipeline, and the need to *dig it up* and the potential for environmental degradation as a result.

**Issue: Disturbance of fish habitat during watercourse crossings by the pipeline**

- Biggest issue with water crossings is erosion and the resulting sediment entering streams.

**Social and Economic Environment**

D. Meads reviewed the preliminary list of possible effects of the project on the social and economic characteristics of the communities. The following are the group discussions that developed around disclosure of the list.

- Loss of culture is a big issue, loss of language. Few grew up on the land . . . big issue is residential schools [and what they did to traditional culture].
- There is a need for youth representation [during all planning meetings for the project].
- Communities expect that *someone* is working the issues through joint management committees, but this is not always the case because of the mandate of the committees.
- Concern that there is a lack of people for employment in the service industry because they are all employed through the oil and gas industry due to the higher wages offered.

- Short-term versus long-term training. There are not enough electricians and plumbers in the communities; need to take advantage of apprenticeships. People do not think about *long-term vs. short-term* employment; people concerned about immediate satisfaction of getting a *few bucks*. That is why apprenticeship is so important — they learn while on the job.
- It is important to have *standards* in place to control who will be hired.
- Need planning *now* so people have qualifications in a few years for the peak jobs.
- Community donations and commitments must be negotiated with groups.
- Not enough funding or capacity training at the college level.
- Childcare is difficult in Inuvik.
- Noted the importance of scheduling work around traditional harvesting periods so people can provide for families.

## Blue Group

### **Bruce Vincent – Mackenzie Gas Project (Facilitator)**

Meghan Dalrymple – Mackenzie Gas Project (Recorder)

Bruce Ramsay – Mackenzie Gas Project (Socio-economic Specialist – floated amongst groups)

Frank Pokiak – Wildlife Management Advisory Council (Northwest Territories)

Katherine Thiesenhausen – Wildlife Management Advisory Council (Northwest Territories)

William Gruben – Inuvik Community Corporation

Darren Campbell – Gwich'in Land and Water Board

Maureen Clark – Tsiigehtchic Metis Council

Sharon Green – Hamlet of Paulatuk

Alex Kaglik – Inuvik Hunters & Trappers Committee

Georgie Blake – Tetlit Gwich'in Renewable Resource Council

B. Vincent reviewed the preliminary list of biophysical issues associated with the development of the project in the ISR and GSA. The following are the group discussions that developed around disclosure of the list.

- What is loss? Where is it? Who does it affect? Are there general losses applicable to the project?
- . . . migrating routes — with production facilities, it will interfere with migrating routes. Yes, the noise will alter migrating routes as well.
- Yes, for birds.
- . . . land animals?
- Will they follow the pipeline or not?



- If you're an animal, it will affect prey and hunter relationships.
- Buffalo thrive on cut lines. Does anyone know what the pipeline will do in this regard?
- Are you concerned about caribou following the pipeline?
- Caribou routes already changing because of noise (seismic), by the time you build a pipeline, they might not even be there.
- Yes, caribou patterns have changed — hunting time is down.
- . . . effect on harvesting . . . harvesting impacted.
- What about the impact of the facilities?
- Is noise disturbing caribou? Burning or flaring? Is this an issue?
- Traveling to Yukon in last two years, once they started staggering pipeline routes, less damage to caribou.
- Effects can be positive and negative (example given of cut lines on bison, moose populations).
- There are less caribou.
- . . . even in Tuk.
- This year — two caribou hunts didn't get the caribou in between Eagle Plains and Dawson City.
- Helicopters also have an effect.
- . . . effects of barge traffic — what will docks be built out of? Construction of docks produces changes in sediments, sand bars, etc.
- Fifteen years ago there was construction but it's only been within the last few years that we are beginning to study the impacts of [it].
- On McPherson side of the Mackenzie, changes in crossings (environmental?).
- Issues identified are: What will the docks be built of? What will it do to the river?
- Sixteen plus years for the project — need to do it right the first time. Need to have a dock that is removable.
- If you put in a barge [landing] site, there is a change in the bottom of the river. What is the impact of this?

- Changes to fish habitat – changes texture of fish too. Changes amount of harvest. Issue: quality and quantity of harvest changes.
- What is comfort zone of parts of pipeline that go under river? Two ways for pipes to cross river: protect from undercuts. Concern that this will impact the banks, flooding, erosion, pipe exposure.
- Fisheries and Oceans Canada: look at effect on habitat changes, and then changes to harvesting.
- Hunting geese in the [bird] sanctuary, increase in water traffic: will birds still frequent the sanctuary? How will this affect the whale habitat?
- Seismic lines (15 years old/50 years old?): People don't or can't hunt where the lines are (disturbance to animal patterns?)
- Need to look at effect on the permafrost: changes in topography, travel patterns, permafrost becomes boggy — nothing grows there. Will they revegetate?
- If top layer of ground removed, sawdust put down, then ground on top.
- Anything comparable to the Alaska pipeline? Examples?
- Should test the depth of the permafrost first, assess whether or not you would put the [pipe] in — see if it will melt.
- Cases of gravel permits around the Dempster, layer back, re-seed it, developed into a mudslide. On sloping areas, if the pipeline is buried, will there be slumping, [will the ground be] soupy?
- Climate changes have decreased the populations of beaver, black duck and muskrat in the last seven years. Also, edges of the lakes have been collapsing, melting.
- A change in habitat that results in a reduction of habitat will result in lower populations and a change in harvesting.
- Taglu is close to the ocean; later on, will the shoreline have to be protected?
- Impacts in harvest — natives realize they can't eat southern foods.
- What about an insensitive activist that puts a hole in the pipeline? What will you do?
- Spawning: does it coincide with barge traffic? Should there be restraints on when the [barge traffic] can operate?
- Are there seasonal hunts? We hunt grizzly bear in the spring, also birds and muskrat.

- Elders have said that when helicopters are used, bird migration paths are disturbed.
- Island north of river: snow geese used to stage, Tuk used to hunt them there, now this has all changed because of drilling activities. We now travel to other side of the [Tuk] peninsula to hunt geese.
- [Facilities] larger footprint — aboveground lines means more habitat loss, especially for moose, bear and beaver. More habitat loss translates into a loss of harvesting.
- Loss of harvesting [traditional foods] means an increase in diabetes [because of having to resort to foods procured from the Northern stores]. Diet changes means cultural lifestyle changes.
- From an economic perspective, it costs you more with snowmobile gas to hunt; costs you more to buy groceries. Have to go further to hunt.
- It is difficult to accept exploration because all of exploration is on our subsistence land. I was against it from the beginning, but if you can re-route it to meet our needs . . .
- [Travaillant Lakes] is a staging area for geese and ducks — using it will affect our harvests. If you affect our harvests, you affect our livelihoods, diet, women use the down [from many of these birds].

Discussion around routing issues:

- Should follow Ikhil route; it is already disturbed.
- Route should follow Dempster Highway; crosses Mackenzie River: skirt around wetlands altogether.
- What depth is the marshland? What depth and width is the trench?

Discussion around Polar Gas route:

- Happy with Polar Gas or Dempster Highway route — raises concern that if pipeline is there, it will be used in future as argument for more development (highway, etc.) because it's all disturbed anyway.
- Proposed highway route — takes less wetland, pipeline to run parallel along it? This is fine, but the flyway will be affected. The flyway is an important staging area. Geese nest in the ISR as well as ducks.
- We don't want this habitat lost. Disturbances to habitat result from repeated impacts — repeated as a result of construction activities, operation activities; have to look at not only start up, but impact of running it — repeated impacts.

- Will there also be buildings? Compressor stations . . . how frequent? Every 100 km possibly.
- Can you put compressor around where we already have the noise? If you follow Ikhil.
- Deposition of oil-based drilling muds? We don't want sumps.
- Possible to separate the cuttings from mud. Plan is for all waste to be removed from sites; producers not using sumps.
- What are the effects of sand on permafrost? We will be using gravel in the trench, not sand. This is an erosion prevention measure.
- Other examples of low ground pipeline in permafrost — do we know effects? There have been a number of trench trials over the year.
- What about the size of the Ikhil trench? It is six-inch diameter pipe, one metre wide, 1.5 metres deep.
- Will the buildings be on piles? If they are, the higher, the better because of snow.
- What if people are not in agreement with a surface pipeline? Allowing pipe to be on surface — will other companies want this? If producers wanted to put it on surface and it wasn't supported, what would happen — concerned that we set precedent by having one.
- Over ground is more expensive, want to keep it buried unless we have to.
- Concerned about emissions from production facilities, flares and compressor stations. How are we powering facilities, generators, etc.? Plan is to take dry gas and use it as fuel to generate electricity. Diesel will be used as backup.
- Volumes? 750-barrel tank of gasoline will be onsite because of trucks and skidoos.
- How much gasoline?
- Once emissions settle, they are noticeable on the ground. Need to look at truck emissions; emissions stay in area (create odour) — could they also contribute to the ice fog?
- What about [emissions] from flare stacks? Some nitrogen; creates nitrous oxide, carbon dioxide, water.
- Acid rain? Affects water and fish quality.

- How big is the flare? They are larger than your hand.
- What is average maintenance cycle for gas plant? What is well and plant maintenance cycle requiring flaring (constant use of pilot flare)? Not known now.

#### Discussion around spills:

- Are all employees trained for response? What level of emergency response training for well site employees?
- How fast to respond? Will equipment be on the site?
- What about unpredictable events — sabotage, break, rupture, vandalism, and third party damage — how are you aware of that? How is well or pipeline monitored to recognize incidents?
- Sensors along site.
- How well do you recognize incident? When you find one, who and how long to respond to it?
- What about hunters shooting pipeline accidentally?
- Misguided activism. Communities live with it.

#### Social and Economic Environment

B. Vincent reviewed the preliminary list of possible effects of the project on the social and economic characteristics of the communities. The following are the group discussions that developed around disclosure of the list.

- The issue is the extended absence of parents because both of them are working, leading to changes in children's stability. Children without one or both parents for extended periods of time [no supervision being given]; results in children becoming involved in drugs and alcohol.
- Would access to phones help while the parents are at work? Yes – provides ability to call home [and check on the children].
- But harvest time . . .? Children help out at harvest with their parents. This relates to a dual economy; no time to prepare foods that are traditional during nonharvest periods so at harvest, all help out.
- Do you see any positives in the project that will be contributed to the community? [With additional income], we can buy good equipment to improve our harvesting. This increases our traditional heritage.

- With kids not being disciplined — it is an issue of proper parenting regardless of whether you work or not.
- People don't like to work because of [increased] rent payments [rent is based on a cumulative household income]. The more money you make, the more is paid out to rent; disincentive to work. Must report all incomes — bingo included.
- Problem in many communities is the lack of daycares — the costs for operating a daycare are \$700/month.
- Issue is to rotate the work schedule around traditional harvest periods; flexible employment required. Should be an opportunity for harvesters to supply the construction camps with food; better for Northern workers to eat their traditional foods. [Better for local economy]. Perhaps also an opportunity to supply native crafts because of increase in personnel in the camps [gifts, etc.]?
- What kinds of impacts do you see on the community infrastructure? Roads/sewage/water? There needs to be policies in the camps: drug tests — everyone needs to be tested, but now it is not consistent within a camp as to whom is tested and who not tested. It makes everyone look bad when one is caught. Drug testing needs to be extended to the environmental and wildlife monitors. If someone gets caught, it also looks bad on the community. Everyone feels the loss — general feeling of mistrust, and a stereotyping of people in camps; common stereotype is that Aboriginals are the ones with the problems.
- If a camp is near a community, should it be able to interact with the community? No interaction; there should be limited access between camps and communities.
- Access to community results in a transient population, increasing alcoholism and leading to decreased work performance (absenteeism); communities want business but not parties.
- Contact between camps and community should be through a bulletin board announcing specific cultural events (such as the Arctic Winter Games) that camp employees might be interested in. People who wish to visit the camps should be at designated times only.