

Part 3

The
transmission
pipelines



3.1

What are the transmission pipelines?

A buried 250 millimetre (10 inch) diameter pipeline would carry natural gas liquids from the Inuvik Area Facility to Norman Wells where it would connect with an existing crude oil pipeline. The right of way would be 50 metres wide for these 457 kilometres. A buried 750 millimetre (30 inch) diameter pipeline would carry natural gas. It would be built beside the liquids pipeline to Norman Wells, then would continue to Northern Alberta in its own right of way. The right of way would be 40 metres wide for these last 739 kilometres.

The Mackenzie Valley Pipeline would carry natural gas from the Inuvik Area Facility to a pipeline system in northern Alberta. The Mackenzie Valley Pipeline would have several distinct features compared to most natural gas pipelines in southern Canada:

- The temperature of the natural gas going into the pipeline must be controlled to reduce impacts on ground temperatures. This helps to avoid potential damage to the pipeline and the environment. The proposed pipeline route passes through areas with varying amounts of permafrost (see map, Figure 3-1). Ground surface temperature changes with the seasons and along the route. Gas temperature changes as it is compressed and flows down the pipeline. The operating temperature would vary to account for these conditions.
- The natural gas pipeline would operate at pressures of up to 18.7 megapascals (2710 pounds per square inch) and would have thicker walls than most pipelines.

This design makes it possible to use a smaller diameter pipe than would otherwise be the case. Because of the thicker walls, the pipe would be better able to withstand forces due to ground movement caused by frost heave and thaw settlement.

- The pipeline and right of way would be monitored more closely than most pipelines.

The liquids pipeline would carry natural gas liquids from the Inuvik Area Facility to Norman Wells. The liquids would be a mixture of propane, butane and other hydrocarbons similar to those in gasoline; the most common component would be heptane (22 percent of the mixture). The liquids would be shipped south in the existing Norman Wells Pipeline, which has sufficient spare capacity. To avoid thawing the permafrost, the natural gas liquids would be chilled at the Inuvik Area Facility and would flow through the pipeline at a temperature similar to the temperature of the ground along the right of way.

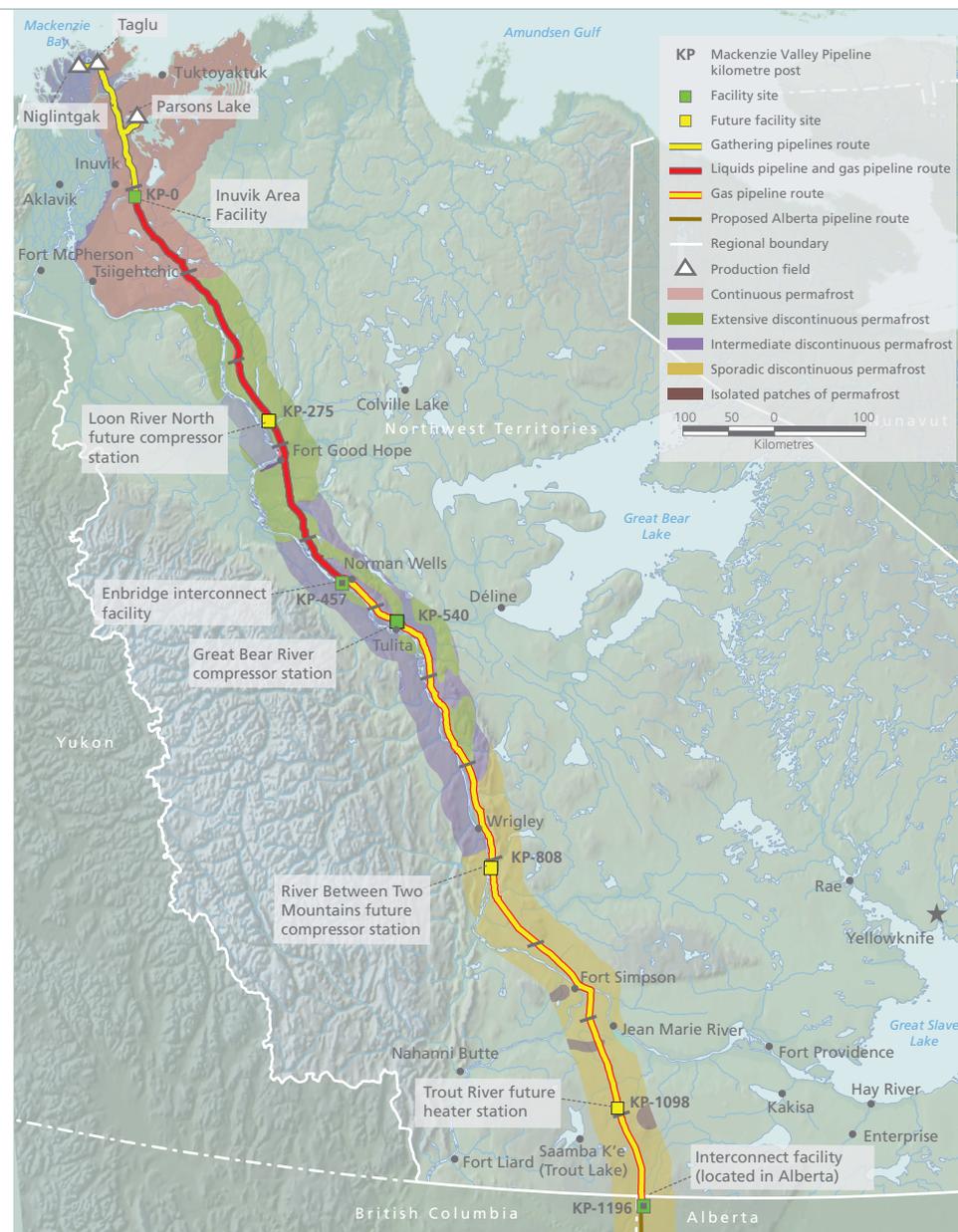


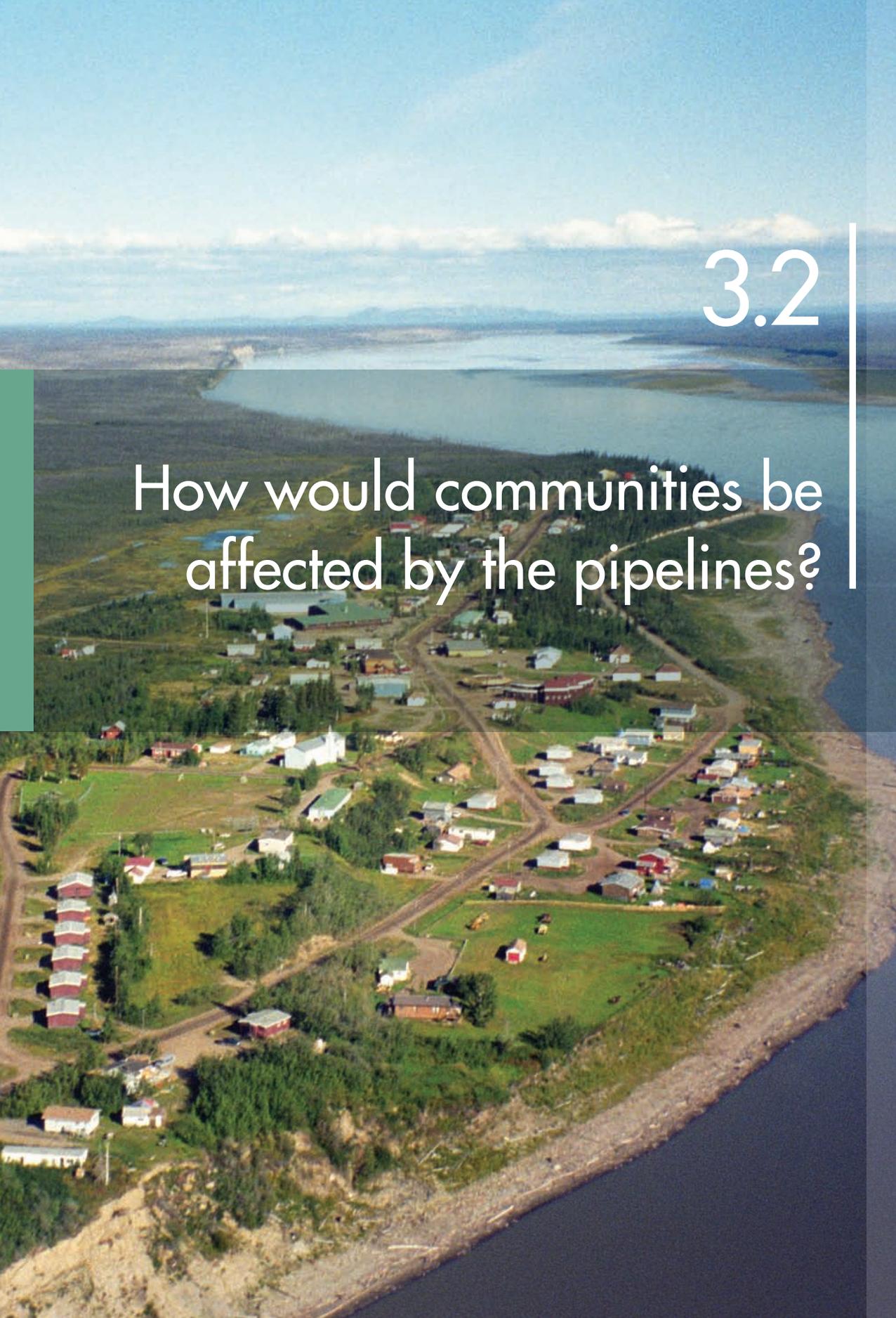
Figure 3-1

Mackenzie Valley pipeline corridor

The companies proposed a one kilometre wide corridor in which the right of way would be located. The exact location within that corridor would be determined after detailed engineering studies if the project proceeds. The detailed route would be subject to approval by the National Energy Board. If anyone objected to the detailed route, there could be a public hearing.

The Mackenzie Valley Pipeline and the natural gas liquids pipeline would be located in a 50 metre wide right of way to Norman Wells. South of Norman Wells, the Mackenzie Valley Pipeline right of way would be 40 metres wide. It would generally follow the route of the existing crude oil pipeline.



An aerial photograph of a small community, likely a village or town, situated on a peninsula or near a large body of water. The community consists of numerous small buildings, some with red roofs, and a few larger structures. There are green fields and some trees scattered throughout. A dirt road or pipeline route winds through the area. In the background, there is a large body of water, possibly a lake or a wide river, and distant mountains under a blue sky with some clouds. The number '3.2' is overlaid in the top right corner of the image.

3.2

How would communities be affected by the pipelines?

Many people were concerned about a pipeline passing through this huge and largely untouched area. Aboriginal people have lived here for thousands of years. They expressed concern about possible impacts on wildlife and on sacred places. There could be employment opportunities. Some communities could gain access to natural gas to use for heat and to generate electricity.

The largest effects on communities would occur during construction. Camps for workers would be located along the right of way and would be "closed." That is, there would be no unplanned contacts between the camps and the communities.

In addition, construction would require barge landings, storage sites, and roads to deliver pipe, equipment and supplies to the right of way. Heavy equipment would clear the ground, dig the trenches, lay the pipe, weld it, test it and cover it. Nearly all of the work would have to occur in winter, avoiding unnecessary disturbance of vegetation and soils. Most of the roads would be winter roads made of snow and ice.

Samuel Elleze
Fort Providence

September 25, 2006



Herb Norwegian
Dehcho Elder
Yellowknife

April 15, 2010



The effects on communities would vary depending on the amount of traffic in the area, how close people are to the right of way, the amount of economic activity occurring, and whether the activity affects hunting, trapping, fishing, cultural sites or traditional land use. There were concerns the project could worsen problems such as alcohol and drug abuse and gambling, and that it could put strains on police, medical and social services, housing supply and affordability, and municipal infrastructure. There could also be employment and business opportunities created by construction and operation of the pipelines.

Communities that currently depend on heating oil and diesel generators would have the opportunity to establish natural gas distribution systems and electric power generation systems. Natural gas would be less polluting than diesel.

During our hearing, we heard many views about a pipeline passing through this huge and largely untouched area where Aboriginal people have lived for thousands of years. Some said they had seen no benefit from the last major industrial activity in the region (the Norman Wells Pipeline) and they wanted a better arrangement this time. The lack of a land claim settlement with the Dehcho First Nations was an issue that many Dehcho said should be resolved. However, other people in the region were enthusiastic about the creation of the Aboriginal Pipeline Group,

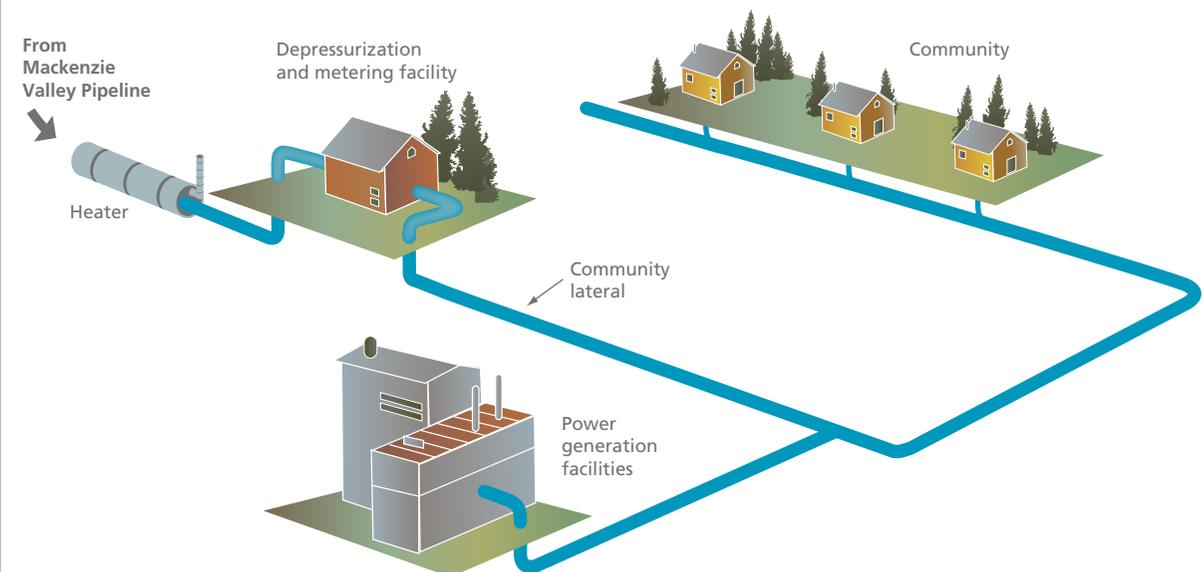
As we stay here, we do harvesting. We harvest our animals, and we also do our trapping all year round. When you talk about the pipeline like this, it's going to be right beside us. We know that, and we will feel the impact of it.

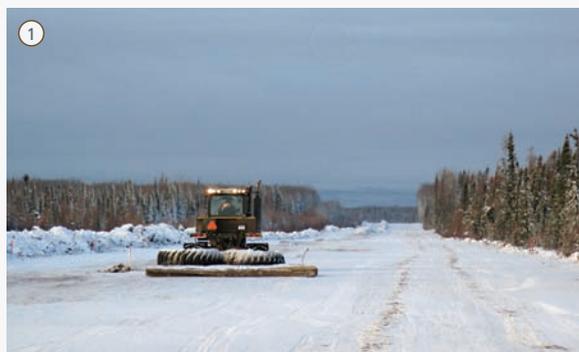
Unlike other regions in the Northwest Territories affected by this project, the Dehcho Dene have not resolved our outstanding land and self-government relationships with Canada. Our rights with the pipeline access in the Dehcho Territory should be delayed until the Dehcho Process has been concluded.

The conclusion of the Dehcho Process with a final agreement would provide the Dehcho Dene with a clear and necessary authority to ensure that this project could only proceed in a manner acceptable to us and with our full involvement in all aspects of the project.

Figure 3-2

Community gas pipeline





Typical pipeline construction activities

① **Clearing and grading** The right of way is cleared of trees and brush and levelled for construction.

② **Stringing** Lengths of pipe are moved from stockpile sites on trucks with special trailers and lined up along the right of way.

③ **Bending** Some pipe needs to be bent to the shape of the land so that it will lie flat on the bottom of the trench.

④ **Welding and coating** Lengths of pipe are joined together using mainly automatic welding machines. Every weld is inspected using ultrasound or x-rays so that defects can be detected and removed. The pipe is pre-coated in a factory, but the welds are coated on the right of way to help prevent future corrosion.



⑤ **Trenching** A trench is dug deep enough to bury the pipe 60 to 90 cm below the surface. The pipe is installed deeper at water and road crossings.

⑥ **Lowering** Machines with special arms called sidebooms are used to lower the joined pipe into the trench. The pipe coating is checked just before the pipe is put in the ground.



⑦ **Backfilling** The trench is filled back in, taking special care not to damage the pipe coating.

⑧ **Reclamation** The land is reclaimed, contoured and re-vegetated as necessary.



James Andre
Fort McPherson

December 5, 2006



the chance to share financial benefits, and the opportunities that might be created for young people. Worries about effects on wildlife and on sacred places were common, whether people supported or opposed the pipeline.

The Aboriginal Pipeline Group includes many communities in the project area. It was formed in 2000 while the companies were still studying the possibility of this project. After more than a year of negotiation, the Aboriginal Pipeline Group signed a Memorandum of Understanding with the companies. The agreement included an option for local Aboriginal groups to own up to one-third of the Mackenzie Valley Pipeline.

The ownership share of the Aboriginal Pipeline Group in the Mackenzie Valley Pipeline would depend on the proportion of gas shipped by companies other than owners of the anchor fields. The minimum ownership share is based on a formula and is expected to be in the range of two to three percent. If the pipeline's full capacity with three compressor stations were achieved, then the Aboriginal Pipeline Group could acquire up to 33.3 percent ownership in the Mackenzie Valley Pipeline.

And when you have—you know, like during the big oil boom—that was the late seventies, I believe a lot of our people were working and came back and, you know, the community was just constantly drinking, drinking, drinking.

And now our young people are—you know, like drinking is put aside and a lot of drugs are starting to show up in our community.

Anywhere where there's money involved, there's crime. All you have to do is look at Yellowknife. They made a big public statement, you know, like how many people are addicted to crack in Yellowknife. That's the same thing that is going to happen with us.



Chief Charlie Furlong
Aklavik Indian Band
Inuvik

January 28, 2006

The Gwich'in desire to become independent from government grants and influence. The Gwich'in desire to be masters of their own destiny. The Gwich'in desire to be self-governing, but we also realize that before we become self-governing, we must first become self-sufficient, and we believe if we are to become self-sufficient, we must take control of our nation, we must develop our resources. We must use those resources and those developments in order for us to benefit and to set up the governing régimes that our people today, tomorrow and in the future will become masters of their own destiny.

The Gwich'in feel that we need projects such as the pipeline, such as the mining industry, future hydro to build a needed capacity. Our people must become managers. No longer should we depend on a non-Aboriginal from down south coming in and telling us what to do.

3.3

How would the pipelines affect land use?

The project would have to conform to land use plans established under the *Mackenzie Valley Resource Management Act*.

The pipeline right of way would be either 40 or 50 metres wide depending on location. It would be located within a one kilometre wide corridor identified in the applications. The exact route would depend on detailed engineering and environmental studies. The National Energy Board could hold a hearing if anyone objected to the detailed route plan.

The project must conform to land use plans established under the *Mackenzie Valley Resource Management Act*. Approval from land use planning boards established under the Act is required before any federal agency can issue authorizations for a project. In addition, the companies must obtain rights for access to the land for the right of way and for roads, barge landings, camp sites, borrow pits and other uses.

Land use planning varies widely among settlement regions in the Mackenzie Valley. The Gwich'in Settlement Area has an approved land use plan. The Gwich'in Land Use Planning Board is in place. The Sahtu Settlement Area has a preliminary draft land use plan.

Shayla Snowshoe
Fort McPherson

December 5, 2006



The Dehcho First Nations have an interim land use plan that includes provision for a pipeline corridor.

Pipeline construction would be carefully planned to minimize impacts to the land. The companies would be required to schedule and locate their activities to minimize noise and disruption to wildlife. Several plans for environmental protection would be developed by the companies for approval by the National Energy Board before construction begins. Wildlife Protection and Management Plans would describe how workers would avoid areas used for bear dens, caribou movement, and sensitive times for caribou feeding and calving. Environmental Protection Plans would direct workers and contractors to measures that would protect the air, water, vegetation, and wildlife during construction. Waste Management Plans would guide the appropriate disposal of waste from construction sites.

The companies, in cooperation with local residents and northern authorities, would be required to monitor the effects of pipeline construction on the land and wildlife. The National Energy Board would conduct its own inspections, monitoring and audits to make sure the companies comply with their plans.

As a youth of this community, I often feel we need to listen to our Elders. They are wise. They know. Many of them know we need to make our land our priority. Our land and our Elders cannot be replaced.

When our Land Claims were signed, our leaders said they would protect our land for the future. I am the future. One day, I want to be able to take my children out to my Jijuu's fish camp and to where she used to go trapping with her dad, but that might not be possible if you build the pipeline. I am not guaranteed that our land will be safe.



Walter Landry
Fort Providence

September 26, 2006

I wish we could do this in a positive way that no one would get hurt from that oil company taking stuff out of the ground. I was thinking about a fire ceremony, have a fire ceremony, and that way when we go out in the land, we do a ceremony on the fire, and we go out, get berries. We do the same thing to the water, we put tobacco, and when we travel, so nobody gets hurt. So that's how we would take care of Mother Earth and the land through songs. We've got songs for Mother Earth and water, so that the land keeps all our values, that everybody has a value, I think it's inside the land gives.

The land nourishes you, it takes care of you. So through that ceremony, that fire, everything goes on your side, everything works with you. That's how we live on the land and—and protect the land. But that's good. I just wanted to share that with you guys. Mahsi.

The pipeline right of way would pass through habitat of boreal woodland caribou, listed as "threatened" by the Committee on the Status of Endangered Wildlife in Canada.

3.4

How would fisheries and water resources be protected?

The pipelines would cross 643 water bodies and would be buried at least two metres under them. Special measures would be taken to prevent thawing and erosion on slopes leading down to water bodies.

Watercourse crossings	Number of Watercourses	Classification	Crossing Method	Description
	576	Trench	Open cut	Trench dug, often in dry or frozen bed
	50	Trench	Isolation	Trench dug while water flow is diverted
	17	Trenchless	HDD	Horizontal directional drilling under water body

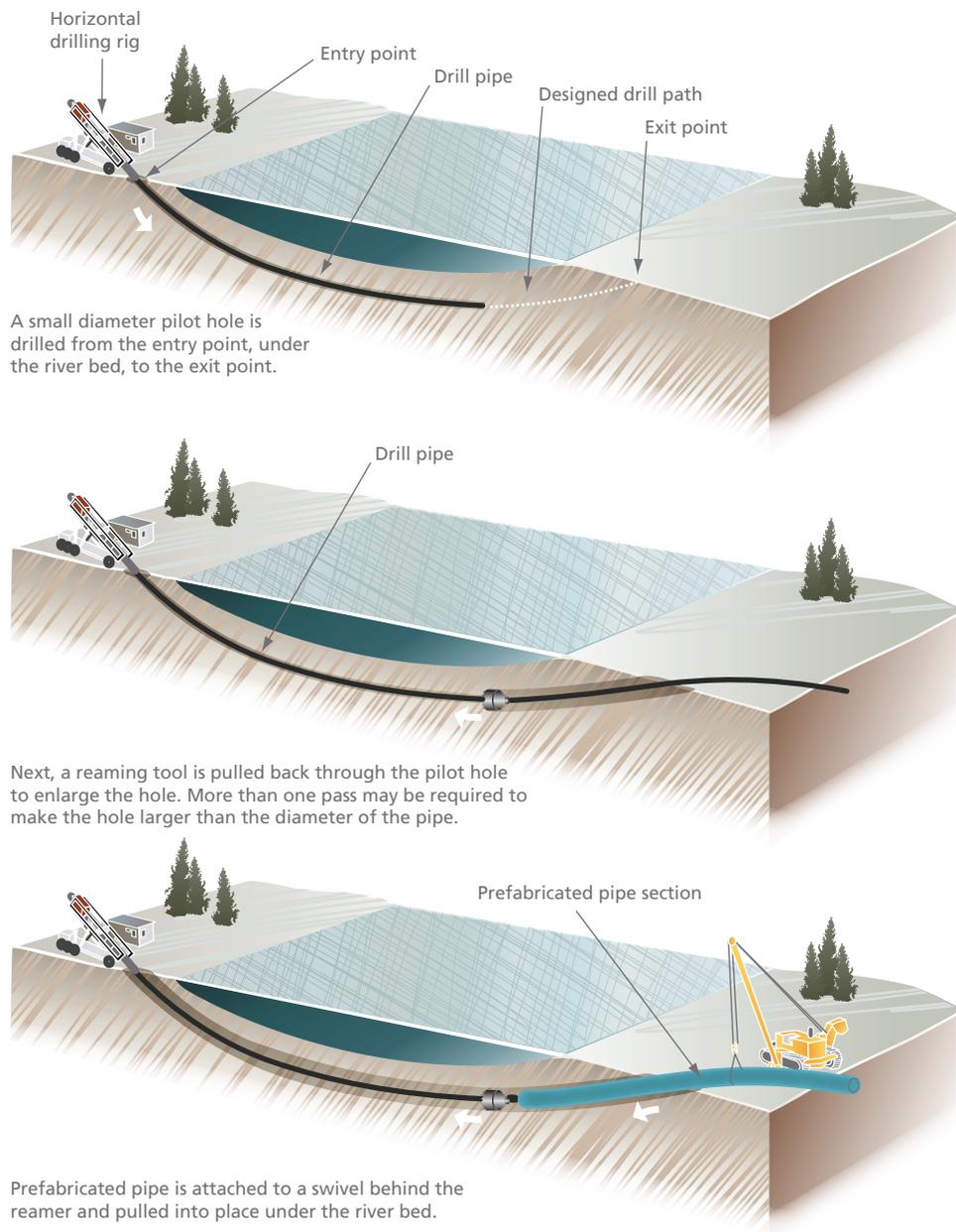
Construction and operation of the pipelines would be planned, monitored and regulated to avoid negative effects on fisheries and water quality. Construction would occur in winter when the majority of northern waterways are frozen.

The gathering system and the pipelines would cross 643 water bodies. These range from seasonal drainages to major rivers. At these crossings, the pipelines would be buried at least two metres below the bed of the stream or lake. This would protect the pipe from threats such as ice jams or shifts in the channel. The main risk to fisheries and water quality would be erosion or other disturbance of the banks.

For most crossings, an open trench would be dug while the water was frozen. In other instances, some water would still be flowing in winter. Barriers would block or divert any flowing water around the excavation during trenching and pipe-laying.



Figure 3-3
Water crossing
by horizontal
directional drilling



At 17 locations, the pipeline route would cross large, fish-bearing water bodies. At these sites, horizontal directional drilling would be used. A hole would be bored under the river bed, and pipe would be pulled through to the other side. The open cut method would be used if directional drilling does not work at a site.

It is important to control thawing and prevent erosion on the slopes leading down to water bodies—and on other, similar sloping terrain. Thawing and erosion could affect the stability of the slopes and deposit soil in water bodies. Insulation and thermosiphons would be used to reduce or prevent thawing.



Barge traffic, landings, roads and storage areas on or near the Mackenzie River would be required to comply with regulations to prevent impacts on water quality and fisheries.



Joe Lacorn
Fort Providence

September 26, 2006

It's going to be a big difference on the river where people are fishing and harvesting at this time of the year. And hunting season happens every year, too, so—well, anyway, but the river and the barges, there's a little bit of trouble here and there and nothing happening yet, but if there's a big rush and the barges happen to be moving back and forth upriver, I guess there's going to be a change into the river system with all the barges running back and forth.

Just concerning about the shallow parts, maybe if it could be done a little earlier during the summer where the water is high, transportation will be a lot easier. In the middle of summer where the water drops, it's going to stir up a lot of mud and weeds, whatever, in the bottom of the river.

So I don't know, with a big rush like that, maybe the fish will take an ill effect, and I don't know about harvesting during the time that people are going to be harvesting their fish for winter. So maybe in between there, where people are harvesting and hunting, I think it's got to slow down. The traffic has to slow down.

3.5

How would the pipelines be designed to deal with slopes, permafrost and climate change?

The pipelines pass through areas of permafrost. The temperatures of the pipe and the surrounding soil are taken into consideration in the design. The natural gas pipeline would have thicker walls, operate at higher pressures, and be monitored more closely than most other pipelines in Canada.

The Mackenzie Valley Pipeline and the natural gas liquids pipeline have been designed to be strong enough to contain the high pressures of the natural gas and liquids. They are also designed to withstand movement of the ground in which they would be buried.

The entire pipeline route passes through areas with varying amounts of permafrost, ranging from continuous permafrost near Inuvik to discontinuous permafrost near the Alberta end.

The companies proposing the pipelines propose to control the temperature of the natural gas and natural gas liquids at the outlet of the Inuvik Area Facility, at compressor stations and at the Trout Lake heater station. Natural gas would leave the Inuvik Area Facility at an average temperature of -1°C whereas

the compressor stations further south would have average discharge temperatures above 0°C. Natural gas gradually cools as it expands when it travels down the pipe. The design of the Mackenzie Valley Pipeline would account for thawing and freezing soil conditions, the temperature of the gas in the pipeline and the temperature of the ground around it. The natural gas liquids pipeline would operate at approximately the same temperature as the ground around it.

To determine how thick the pipe wall would need to be to contain the natural gas or

natural gas liquids, the companies used the same method of design as is commonly used for pipelines elsewhere in Canada, referred to as “stress-based” design. To determine whether the pipeline could safely withstand ground movement, they used another approach known as “strain-based” design. The general approach to the design was to first calculate the wall thickness and grade of steel required to withstand the pressure, and then to verify whether that pipe could withstand the expected movement under a range of conditions along the route.



Johnny Vital
Deline

October 2, 2006

So if you guys really damage the land, I wonder what's going to happen? There's going to be some way it's going to be—some land will be damaged when you're talking about the pipeline.

There's a road ahead of here and there's two rivers, and when we were talking about rivers and stuff like that, and it could be damage, too. And those kind of things, we have to worry about them. And even snow and water, we have to think about this.



Massive ground ice



Ice-rich



Ice-poor with ice lens



No visible ice

Core samples are taken of the soil to provide information for facility design. The samples are used to determine the nature of the soil and, in the case of permafrost, the amount of ice present. As shown in these 100 mm (4 inch) diameter cores, permafrost can vary from massive ground ice to ice-poor permafrost with no visible ice, depending on the location and type of terrain.

Figure 3-4
Frost heave

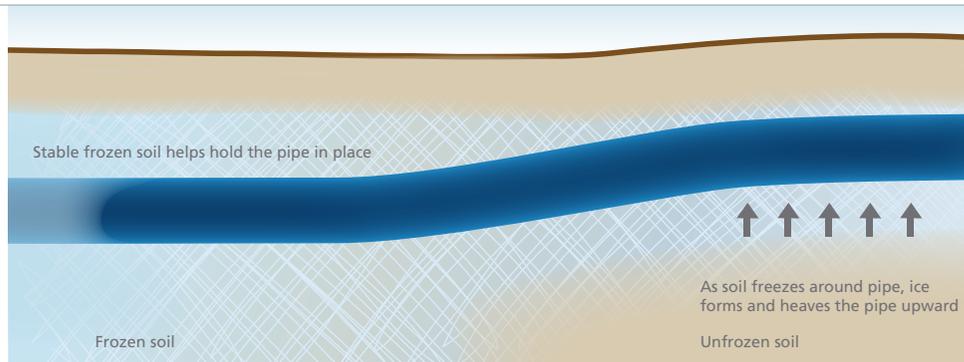
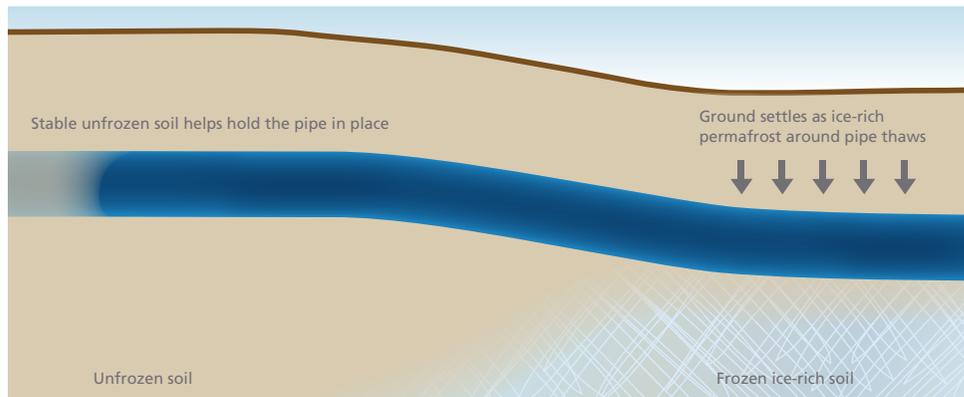


Figure 3-5
Thaw settlement



Melting and freezing of the water in the ground can result in thaw settlement or frost heave and can affect the stability of slopes along the route. Removing the vegetation to build the pipelines would allow the summer heat to penetrate the ground more deeply and lead to thawing of permafrost in the right of way. Climate change could increase the thawing of the permafrost but not as much as the clearing of the vegetation.

For the Mackenzie Valley Pipeline, the designers calculated a single wall thickness that would be used for the majority of the pipeline route. A heavier wall pipe would be used at the larger river crossings, road crossings and fabricated assemblies. In doing their calculations, they used an existing body of information about soil conditions previously collected by others as well as additional information gathered as they moved from conceptual to preliminary design. They said it would not be practical to collect more detailed, site specific soil data at an early stage of design since the precise route of the pipeline had not been fixed. Detailed design and gathering additional site-specific route information would not start unless the project is approved, and would continue until construction begins on each facility or pipeline construction spread.

As a consequence of this design approach, the pipeline companies would need to actively monitor where and how much the pipelines move during operation, and would need to take corrective action to repair, replace or relocate the pipe where necessary. Monitoring would include flying over the pipelines to observe ground disturbance, reading instrumentation installed at selected slopes, and using in-line inspection tools. The tools collect information as they travel through the pipeline.

Figure 3-6

Slope instability

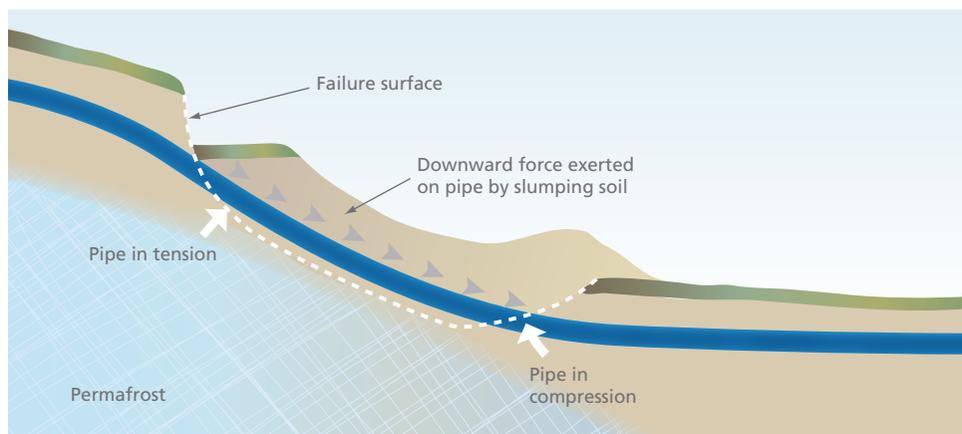
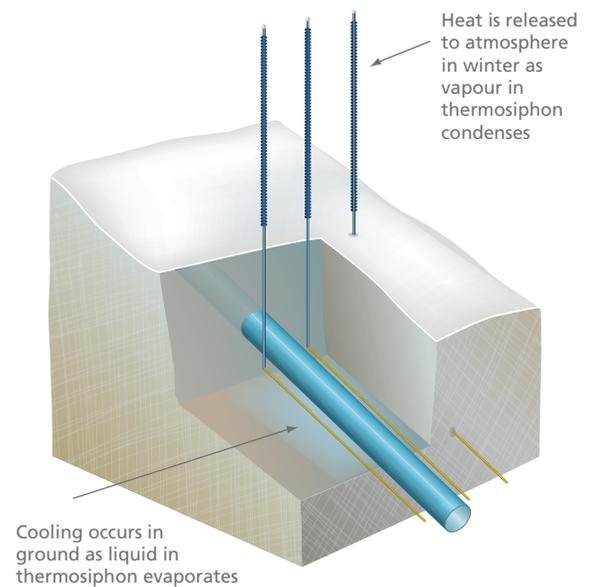


Figure 3-7

Thermosiphon

Thermosiphons, devices which draw heat from the ground, would be used where needed to reduce the rate of thawing and slow ground movement.

Insulation, such as wood chips, could also help protect the slopes or reduce the amount of soil freezing caused by the pipe.



The operating temperature of the pipelines is more driven by some of the pipeline design considerations in the environment in which we're working, so we're trying to strike a balance between thaw settlement and frost heave effects. That's one of the considerations in our pipeline design.



Rick Lucasavitch
Mackenzie Gas Project
Norman Wells

April 24, 2006



Part 4

Our decision



4.1

Should the Mackenzie Gas Project be approved?

We have decided that the project is in the public interest. In reaching this decision, we have considered the social, environmental and economic effects and listened to the views of Northerners and other parties. Our approval of the applications for the Mackenzie Gas Project depends on the companies meeting a combined total of more than 200 conditions to address the concerns that we heard. If it is built, the National Energy Board and other authorities will continue to oversee the project throughout its life.



We have reached the destination of our journey through the Mackenzie Valley. Over the past six years, we listened to the voices of Northerners and visited their communities. We considered the evidence of those who supported and those who opposed the project.

We looked at how the project would contribute to sustainability in the way it would affect the people, the land where they live, and the economy, now and in the future. Our conclusion is that the project is in the public interest and should be approved.

Our approval depends on the companies meeting many conditions. The conditions require the companies to undertake a large number of activities and consultations. The National Energy Board will enforce these conditions should the companies decide to go ahead with the project.

We examined the benefits the project could bring. We found that they are large and varied. We also looked at the negative impacts. We found that they can be minimized and

are acceptable. This allowed us to answer the key question before us, whether the North and Canada would be better off with the project than without the project. We find that the North and Canada would be better off with the project.

Our thinking required us to bring together many factors into a single decision. In doing so, we considered:

- the people, especially those who would be most directly affected;
- the land, in the broad sense, including the environment and natural resources;
- the economy; and
- safety, including design, construction and engineering plans.

Integrating our findings on these factors is how we reached our public interest decision.

The people

We found that the people of the North in all regions have hopes for better lives and a better future. We believe their aspirations are achievable.

Northerners want to see more people living proud and self-sufficient lives. They want better care for the land. They are looking for stronger communities that can take care of the social problems that come with limited means and rapid change. These economic, environmental and social objectives must be brought together to create the North that many people want. It takes a good economy to take care of the land and the people. We are convinced the Mackenzie Gas Project would bring the Northwest Territories closer to the vision of the North that many people have shared with us.

Some Aboriginal people opposed the project on grounds it could destroy their traditional way of life. Some said they would not get enough benefits from the project to make up for the impacts. Twenty-nine percent of the total length of the pipeline for the project, and 44 percent of the Mackenzie Valley Pipeline, would be in the Dehcho Region. Dehcho leaders and residents urged us not to approve the project until their land claims are settled with



the federal government. The Dehcho said a land claims settlement would be the starting point for talks with the pipeline company on access and benefits.

We note that the Dehcho claims process continues and an interim land use plan is in place for the region. Concerns from Dehcho communities also led to a number of route and design changes that now form part of the commitments the National Energy Board will enforce. A number of our conditions respond to Dehcho concerns such as environmental monitoring and wildlife management.

Leaders of the Inuvialuit and Gwich'in strongly supported the project. Leaders and residents from Colville Lake also said they hoped natural gas discoveries in their area would be developed and connected to the pipeline. Along with the Sahtu, the Inuvialuit and Gwich'in are partners in the Aboriginal Pipeline Group and stand to gain if the project is built. Their share increases if the project expands beyond the volumes already contracted from the anchor fields.

We were told that people in the Mackenzie Delta have waited more than three decades to see their natural gas resources developed, and we should not stand in their way. They said they now have land use plans and governing authorities in place to ensure responsible development.

People told us that social conditions required improvement in many communities, and some said that the project could make matters worse. People spoke often about problems of drug and alcohol abuse and gambling. They were also worried that the existing systems of health, social and policing services could not cope with the influx of project workers. However, many believed the economic opportunities from the project would help address these social concerns and would not make them worse.

We are persuaded that the project would contribute to improved social conditions. Without new economic activity, social conditions are not likely to improve. Economic benefits would include purchases of services, supplies and materials from local businesses, creation

of jobs, and increased flow of royalties, revenues and taxes. Short term impacts from workers would be addressed by closed camps during construction. Closed camps would avoid unplanned contacts with communities.

The project would contribute to strong, self-reliant communities that continue to take care of the land and the people in the North. This would be a benefit for all Canadians.

The land

Aboriginal people and their ancestors have lived in the Mackenzie Valley and the Delta for thousands of years. Their lives and culture centre on a deep attachment to the land and its resources. We heard various concerns about the effects the project could have on the environment. While any economic development in pristine areas has some negative impacts, our goal is to make sure those impacts are kept to a minimum and avoided wherever possible.

Some people were worried about specific impacts such as noise, odours or disturbance of fish and wildlife. Others urged us to look



at the more global impacts of the project and the end use of the natural gas. Some Northerners and environmental groups also urged us to consider the potential impacts of future developments beyond those in the applications before us. In response to these concerns, we have imposed many conditions that will protect wildlife, water, air, and vegetation. We are satisfied that our conditions and the project design would address specific concerns such as the effects of climate change and land settlement due to withdrawal of gas from producing fields.

We consulted with the Joint Review Panel regarding the recommendations they directed to us. They agreed that our conditions fulfilled these recommendations. We also consulted with the parties to our hearing, and they provided comments on our proposed conditions during final argument. Their suggestions resulted in improvements to our conditions.

In addressing the effects of the project we considered the Joint Review Panel Report including the recommendations addressed to us, our own conditions and the fact that the National Energy Board will hold companies

accountable for the implementation of these conditions throughout the life of the project. Moreover, many northern institutions and government agencies would also monitor the project so that companies minimize the effects. On this basis, we find the impacts of the project on the land to be acceptable.

The governments of Canada and the Northwest Territories in their response stated the actions and commitments they were prepared to implement should the project proceed. These are aligned with the outcomes we seek to achieve in the conditions to our approval.

If it were the case that the lack of full implementation of the Joint Review Panel Report means that we should accept that some significant adverse environmental effects are likely, we would find these effects to be justified in the circumstances. We reach this conclusion after looking at all the positive and negative effects this project might have and after concluding that the North is considerably better off with than without the project. These potentially significant adverse environmental effects include impacts on Kendall Island Bird Sanctuary and impacts on woodland caribou

and other listed species without the early identification of critical habitat as part of species recovery strategies and action plans.

The economy

We observed that sharing is an important value for Northerners. There are several ways that Aboriginal people and other Northerners will be able to share in the economic benefits if the project goes ahead. There would be the direct benefits from employment, contracting, providing supplies and services, and a general increase in economic activity. The Aboriginal Pipeline Group would share in the pipeline's profits. Northerners would gain from other programs such as the Socio-Economic Agreement, the Mackenzie Gas Project Impacts Fund, the benefits plans for the development fields and the gathering system, and the benefits and access agreements. Governments would earn revenues from royalties and taxes.

The economic benefits would be real and large. During the four years of construction, the companies proposing the project estimate they would spend about \$16.2 billion on the project. This would increase Canada's gross domestic product by more than \$13 billion, and almost



\$6 billion in labour income would be generated. Governments would gain about \$2.9 billion in tax revenues.

During 20 years of operation, the companies estimate they would spend \$5 billion to operate facilities. The increase in Canadian gross domestic product from the project during that period could range from \$26 billion to \$42 billion. More than \$2.3 billion in labour income would be generated, and tax revenues would range from \$8.8 billion to \$12.5 billion. The federal government would also get between \$500 million and \$1.8 billion in royalties on production.

In the Northwest Territories, the companies forecast that gross domestic product would increase \$500 million annually during construction and by a total of between \$1.3 billion and \$2.1 billion during 20 years of operations. Annual labour income would increase by \$120 million during construction and \$48 million during operations. Annual revenues to governments in the Northwest Territories would grow by \$12 million during construction and \$70 million during operations.

Another benefit to Northerners would be the opportunity to use natural gas in their communities. We are directing the pipeline owners to provide laterals to communities upon request, providing certain economic conditions are met.

In keeping with the principle of sharing, our decision also requires that the gathering and transmission pipelines be “open access.” We heard that the North would benefit if the pipelines were open to all shippers, like other pipelines regulated by the National Energy Board. Other companies told us that anything less than open access would discourage them from exploring in the North for additional natural gas resources. We agree with this. We have also provided direction on the tolling and tariff regime that would apply to the mainline and gathering facilities.

With respect to concerns about the design capacity of the Mackenzie Gathering System, we are satisfied that the capacity matches well the capacity of the Mackenzie Valley Pipeline given that other sources of gas could enter the pipeline at various locations, including locations downstream of the Inuvik Area Facility.

As soon as possible—no later than the end of 2011—the companies must file a tariff, reflecting this decision, making it very clear how others may gain access to the system.

We also examined the project based on how well it would serve Canada’s economy. We are satisfied that there is sufficient natural gas in and around the Mackenzie Delta to supply the pipeline, and there is a large enough market to use the gas.

Safety

People sought assurances that the project would be designed to address the unique environment in which it will operate. The engineering challenges in the North include cold temperatures, the presence of permafrost, and the potential for ground movement due to frost heave, thaw settlement, earthquakes and slope instability. We heard concerns about whether there was enough detail available about the design and the land along the pipeline route to allow the project to proceed.

We are confident that the companies are fully capable of designing, constructing and operating the proposed facilities. The Mackenzie



Gas Project requires close monitoring throughout the lifespan of the system. We accept the companies' view that part of the design philosophy is to take action when and if issues arise. Our conditions would require that the pipelines be inspected frequently to monitor their performance based on this approach.

The National Energy Board will conduct its own reviews, inspections and audits to make sure everything is done properly from now until the facilities are no longer needed sometime in the distant future. The National Energy Board will work with others throughout. When facilities are no longer needed, the National Energy Board will ensure there is money available and procedures in place so the surface facilities can be removed and the land restored.

Moving forward

Our decision is subject to approval by the federal government. Also, the companies, governments and Northerners have more work to do to prepare for this project. This work includes detailed permitting by land and water boards, completing benefit and compensation arrangements, and deciding on fiscal arrangements for the project. Our decision is a major step towards allowing

the project to proceed, but it does not mean the project will be built.

Natural gas markets are still recovering from recession. Other forms of natural gas—including shale gas, tight gas, coalbed methane and liquefied natural gas—are competing in the markets that would be served by the Mackenzie Gas Project. Natural gas price trends remain uncertain. We do not agree with those who say these are reasons to deny the project. Our approval gives Mackenzie Delta gas an opportunity to compete. Denial would block that opportunity.

It is up to the companies to decide whether the project makes economic sense for them based on their view of natural gas prices and project costs. They told us they need until the end of 2013 to conclude fiscal arrangements, put their project teams together, do the detailed route planning and engineering, obtain all the necessary approvals and permits and take a decision to construct. They requested an expiration date of 2016 for our approvals.

Northerners told us that it is important to know how the project is progressing after our decision so that they can prepare and

plan for construction. They want to be ready to take advantage of job and business opportunities. We respect these planning needs. By the end of 2013 we require the companies to file an updated cost estimate and report on their decision to build the pipeline. In keeping with these needs, we do not agree with the companies that they should be given until 2016 to begin construction of the project. Actual construction must begin by the end of 2015 for our approvals to remain valid.

Our journey to reach a decision has ended.

K.W. Vollman
Presiding Member

G. Caron
Member

D. Hamilton
Member