File No./Référence: 2620-C-18-7
23 December 1997

1710
CEAA

Water Resources Division
Indian and Northern Affairs Canada
3rd Floor, 4914 - 50th Street
P.O. Box 1500
Yellowknife, NT X1A 2R3

Attention: Mr. Sevn Bohnet, Regulatory Technician

Re: NEB Environmental Screening Report for the Inuvialuit Petroleum Corporation Development Plan for the Ikhil Gas Reservoir to Supply Inuvik, Northwest Territories

Mr. Bohnet:

Enclosed is a copy of the Environmental Screening Report for the subject Development Plan. Further environmental assessments will be required for the individual project components as Inuvialuit Petroleum Corporation applies for authorizations.

Should you have any other questions please call me at (403) 292-6614 or e-mail at korejohn@neb.gc.ca.

Yours truly,

John Korec

John Korec, P.Geol., P.Geo.
Environmental Assessment Officer

jek/enclosure

311 Sixth Avenue S.W. 311, sixième avenue s.-o.
Calgary, Alberta Calgary (Alberta)
T2P 3H2 T2P 3H2

Telephone/Téléphone:(403) 292-4800
Facsimile/Télécopieur:(403) 292-5503

APPENDIX III

National Energy Board/Office National De L'Énergie

ENVIRONMENTAL SCREENING REPORT

OF

Inuvialuit Petroleum Corporation's

Development Plan

for the

Ikhil Gas Reservoir Development

to Supply

Inuvik, Northwest Territories

22 December 1997

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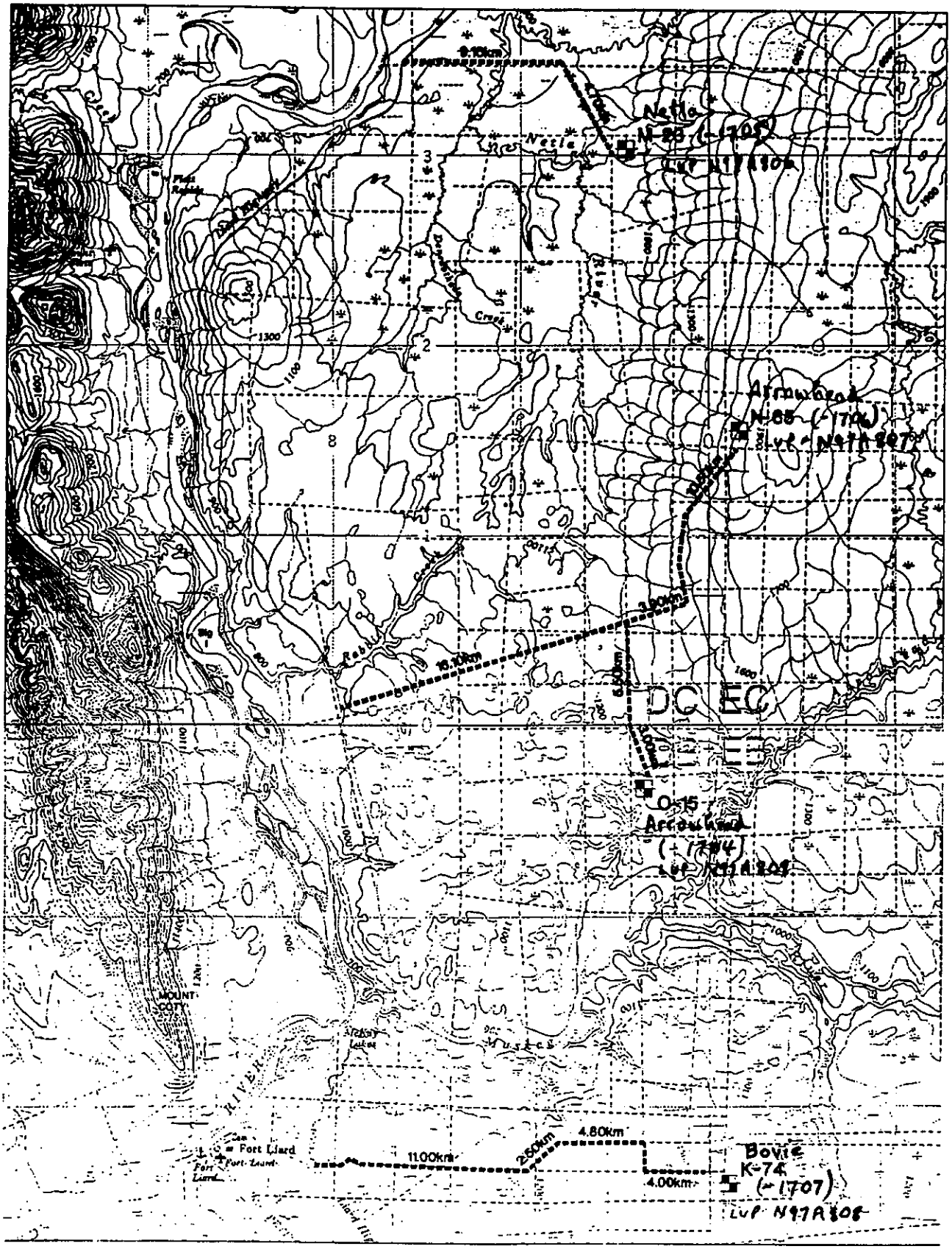


LEGEND

PROPOSED SEISMIC ACCESS ON EXISTING OUTLINES

REFERENCE

NTS MAP SERIES SHEET 95B, FORT LIARD, NORTHWEST TERRITORIES

SCALE 1:30,000

Golder Associates

National Energy Board/Office National De L'Énergie

ENVIRONMENTAL SCREENING REPORT

1.0 GENERAL INFORMATION

Applicant:	Inuvialuit Petroleum Corporation ("IPC")
NEB File No:	2620-C-18-7
FEAI No:	
Application Date:	29 August 1997
Screening Document Name:	f:\ipc\dev-plan.ea1
Environmental Assessment Type:	Screening
Screening Date:	22 December 1997

Title/Subject: Development Plan to Develop the Ikhil Gas Reservoir to Supply Inuvik, NWT.

1.1 Components of the Development Plan

IPC has applied to the Board pursuant to subsection 5.1(4) of the *Canada Oil and Gas Operations Act* ("COGOA") for approval of a Development Plan to develop and supply gas from the Ikhil field to the Town of Inuvik, NWT. The Development Plan outlines five projects or components, the first four of which would require further Board approval prior to implementation. For drilling of wells, construction of facilities, pipeline construction and production operations, applications would be required according to the appropriate Act and Regulations. The fifth project would require approval from the Town of Inuvik, as gas distribution systems are excluded from the COGOA. IPC refers to the five components in combination as "the Project". If approved, the Development Components would include:

1. Drilling, testing and completing of two additional wells to be drilled near the existing Ikhil K-35 gas well. The project is scheduled for January to the end of May 1998. Estimated cost is $5,525,000;

2. Installing the production facilities from mid-January 1999 to the end of April 1999. The production facilities consist of a well head building and a process building. Estimated cost of the production facilities, including their manufacture and installation, is $5,000,000.

3. Constructing a 50 km, small diameter (152 mm) gas transmission pipeline from the Ikhil production facilities to Inuvik. The construction of the pipeline is scheduled from mid-November 1998 to mid-June 1999, at an estimated cost of $11,875,000;

4. Operation of the facilities and pipeline and transmission of the gas beginning in July 1999, with an estimated annual operating cost of $1,013,000;

5. Construction of the Inuvik gas distribution system, scheduled from June 2000 to the end of September 2000. Estimated cost is $3,730,000.

1.2 Description of the Environment

The description of the existing environment is provided by Golder Associates Ltd. in its August 1997 report for IPC entitled *Report on Environmental Impact Assessment for the Ikhil Gas Development to Supply Natural Gas to the Town of Inuvik* (IPC's "Project EIA Report" or "Report"). The Report describes key aspects of the regional setting including: climate; hydrology; permafrost, terrain and soils; vegetation; wildlife; land use issues; resource use; archaeological, historical and scientific values; as well as a socio-economic overview. Further descriptions of the environment are also provided by Golder Associates Ltd. in its August 1997 technical report for IPC entitled *An Ecological and Archaeological Survey of the Ikhil Gas Development Study Area* (IPC's Project "Ecological and Archaeological Survey" or "Survey"). The study area is a 1 km area around the Project.

Location

In IPC's Project EIA Report, the location for the Ikhil K-35 well is given as latitude 68° 44' 43.7" N, longitude 134° 09' 16.1" W. The wellsite is located in the Caribou Hills approximately 50 km northwest of Inuvik (Figure 1). According to IPC's application, two proposed gas development wells would be located within 1.5 km of the Ikhil K-35 well; one to the northwest and one to the south. The proposed production facilities would be near the existing Ikhil K-35 wellsite. A small diameter (152 mm), buried pipeline is proposed to be constructed along an upland east of the Caribou Hills Escarpment, approximately parallel to the East Channel of the Mackenzie River, then across Douglas Creek and into Inuvik. The Caribou Hills Escarpment is a west facing escarpment overlooking the East Channel of the Mackenzie River.

Project Setting - Southern Arctic Terrestrial Ecozone

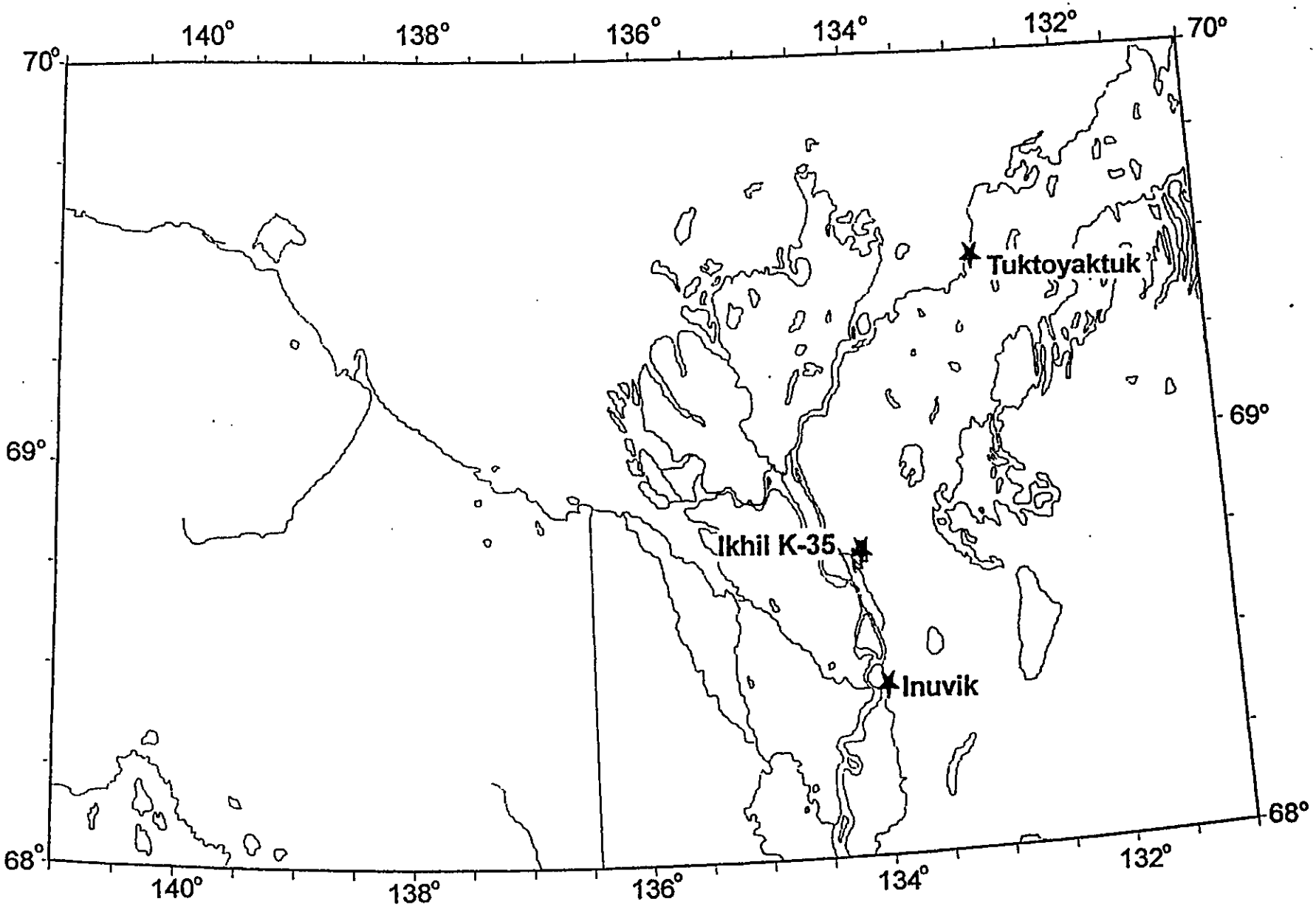
The Caribou Hills, a rolling glaciated upland adjacent to the Caribou Hills Escarpment, lie in the Southern Arctic Terrestrial Ecozone. IPC indicates that the Ecozone contains the major shrublands in the tundra with dwarf birch, willows and heath species commonly mixed with various herbs and lichens. It is noted in the Project EIA Report that wetlands are common in low-lying areas and mainly support sedge-moss cover.

Climate

IPC describes the climate as consisting of long cold winters and short summers, featuring persistent temperature inversions, particularly in winter. Continuous snow cover in the area generally lasts from mid-November through to the end of April. However, within the study area, strong winds from the northwest and southeast often bare upland ridges of snow and create drifts in the lees of hills.

Hydrology

IPC notes that the principal water body within the area is the East Channel of the Mackenzie River which, at Inuvik, carries up to 2% of the river's total flow. The channel each year is ice covered from late September or early October until at least May and can support light vehicle traffic beginning in November. According to IPC's Project EIA Report, the escarpment creeks, from the Caribou Hills to the East Channel, run intermittently with flows mainly at peak runoff periods. The creek valley, used for winter access to the Ikhil site, is identified as supporting a minor channelled drainage-way with no winter flows and no significant delta at its confluence with the East Channel.



MACKENZIE DELTA / BEAUFORT SEA AREA

Figure 1

IPC indicates that Douglas Creek, as well as an unnamed tributary to Douglas Creek, and the outlet to Twin Lakes in Inuvik, are the only continuous flowing creeks that would be crossed by the pipeline. At the proposed crossing, approximately 7 km upstream of the East Channel, the Project Ecological and Archaeological Survey recorded discharges for Douglas Creek and its tributary of 0.131 and .001 m^3/s respectively. The outlet from Twin Lakes to the Mackenzie River enters the East Channel approximately 50 m downstream of the proposed crossing

Permafrost, Terrain and Soils

The Caribou Hills are located in the Continuous Permafrost (90-100%) Zone. The Report notes that ground ice content in the upper 10-20 m of the ground can be above 20% and the active layer, with soil temperature controlled by vegetation cover, thickness of surface organic layer, moisture content and topographic location, is subject to seasonal freezing and thawing,

The terrain in the vicinity of the proposed wells and production facilities is a rolling glaciated upland adjacent to the Caribou Hills Escarpment. The Ikhil K-35 well is located in a minor depression that drains eastward to Peter Lake during runoff periods. The upland at the wellsite is overlain with morainal overburden and has irregular topography.

The northern half of the proposed pipeline would traverse the glaciated upland of the Caribou Hills, and then descend a colluvial slope into Douglas Creek valley at the southern end of the Caribou Hills. The Report notes that the Environmental-Social Committee (Indian and Northern Affairs Canada)rated the escarpment colluvium as Category 7 sensitive terrain and the adjacent upland as Category 6 - the next lower sensitivity. The southern half of the proposed line would traverse hummocky till on a 2 km wide sloping plane which has potential for thermokarsting.

Vegetation

Vegetation in the general area of the proposed Project is noted by IPC as showing influences of three phytogeographic provinces at their range extremities in North America. The Project EIA Report indicates that the tree line on the uplands adjacent to the Mackenzie River valley stops at Douglas Creek. The Project Survey identified various vegetation communities in the 1 km wide study area around the Project, with tundra tussocks dominant in the north and mixedwood limited to the southern areas. The table of vegetation communities is outlined below.

Vegetation Communities in the Study Area (Table 1 from the IPC Project Survey)

Topographical Position	Vegetation Communities	Dominant Plants	Location (near turn points)
Upland / Escarpment Slopes	Tundra Tussocks	• cottongrass/sedge	TP00-TP08
	Low Shrub	• salix/dwarf birch/Labrador tea/bearberry/blueberry	TP00-TP19
	Sedge Meadows	• sedge	TP00-TP09
	Tall Shrubs	• willow/alder	TP00-TP19
	Mixedwood (deciduous dominant)	• white birch/white spruce	TP07-TP19
Lowland/River Valleys/Drainages	Lake/Shallow Open Water	• north (absence of vegetation) • south yellow waterlily	TP00,TP03 TP04, TP05 Peter Lake TP10-TP12
	Lake Edge/Marsh	• sedge/cottongrass/marsh cinquefoil	TP00,TP03-TP04, TP07, TP10-TP11
	Sedge Meadows	• sedge	Peter Lake TP00-TP19
	Riparian Complex	• willow/alder/sedge/bluejoint	TP00, TP01, TP07, TP08 TP10-TP19

The Report notes that 18 plants species of National Significance in the vicinity of the Project require special attention in terms of impact mitigation. However, the Project Survey observed that there were no rare plants along the proposed pipeline route or elsewhere in the Study Area. The proposed route avoids the slumped or unstable slopes associated with the escarpment where most rare plants had previously been recorded.

Wildlife - Birds

The Project EIA Report states that, notwithstanding that the Mackenzie Delta area is important as a spring and fall staging area for geese, ducks and other water birds, the Study Area has not been identified as key terrestrial habitat site for migratory birds. Peter Lake and other water bodies of the adjacent upland support moderate to high numbers of breeding and staging diving ducks, particularly greater scaup, white-winged scoter and oldsquaw. The drier Caribou Hills support passerines, willow ptarmigan, sandhill cranes and some shorebirds such as the whimbrel. The Project EIA Report notes that, with respect to wintering species, only a few bird species such as snow buntings, redpolls and snowy owl may occur in late fall and early spring, while ravens and ptarmigan are common throughout the year.

Wildlife - Mammals

Primary mammals in the Study Area according to the Project EIA Report are caribou, reindeer, moose, grizzly bear, wolf, red fox, muskrat, mink, ermine, snowshoe hare, Arctic ground squirrel, red-backed vole and lemming. The Report notes that the Caribou Hills is on the periphery of the extended range of a segment of the Bluenose caribou herd which began to reappear near the delta in fall and winter in the early 1970's.

Fish

Species using the East Channel at the Project area latitude in spring and early summer according to the Project EIA Report include boreal smelt, northern pike, trout-perch, fourhorn sculpin, burbot, longnose sucker, inconnu, humpback whitefish, broad whitefish and Arctic and least cisco. Douglas Creek, as well as an unnamed tributary to Douglas Creek, and the outlet to Twin Lakes in Inuvik, are believed by IPC to be the only continuous flowing creeks to be crossed by the pipeline. Douglas Creek is capable of supporting small juvenile Coregonids (whitefish) and possibly Arctic grayling. Lake trout and some less economically important species occur in Peter Lake.

Land Use

The IPC Project would be located entirely on Inuvialuit private lands except for the southernmost portion of the pipeline as it enters the Inuvik (Figure 2). As described under section 7(1)(a) of the Inuvialuit Final Agreement ("IFA"), both surface and subsurface rights are held and administered by the Inuvialuit Land Administration ("ILA"). The ILA issues Land Use Permits in respect of projects on these lands.

With respect to lands with designated or special status, IPC notes the following:

- the Project is within land use Category B of the Inuvik Conservation Plan which calls for permit terms and conditions to protect resource significance and sensitivity;
- the Project is partly within Site 71, the Bluenose Caribou Herd winter range and Site 72, the Caribou Hills historical and berry picking area;
- the Caribou Hills area was identified as proposed International Biological Program ("IBP") Site No. 4-9 because of the unique vegetation, primarily along the escarpment's west face;
- 16 ecological sites, including the Caribou Hills, were reviewed in the 1980s, though few have been given formal protection, in part because an "ecological reserve" program has not been formally legislated for the north;
- the proposed production facilities are within both the old Reindeer Grazing and Beaver Preserves; and
- the IFA and subsequent land use and conservation plans have supplanted all protective designations in effect for the old Reindeer grazing and Beaver Preserves.

Resource Use

The Project EIA Report notes that the Inuvialuit harvest many species of fish and wildlife in the area, primarily during open water season when local campsites and cabins are actively used. The Report also notes the following wit respect to resource harvesting:

- 13 fish species are taken throughout the delta, most commonly the broad and lake whitefish, burbot, inconnu and northern pike, all of which occur in the East Channel; and

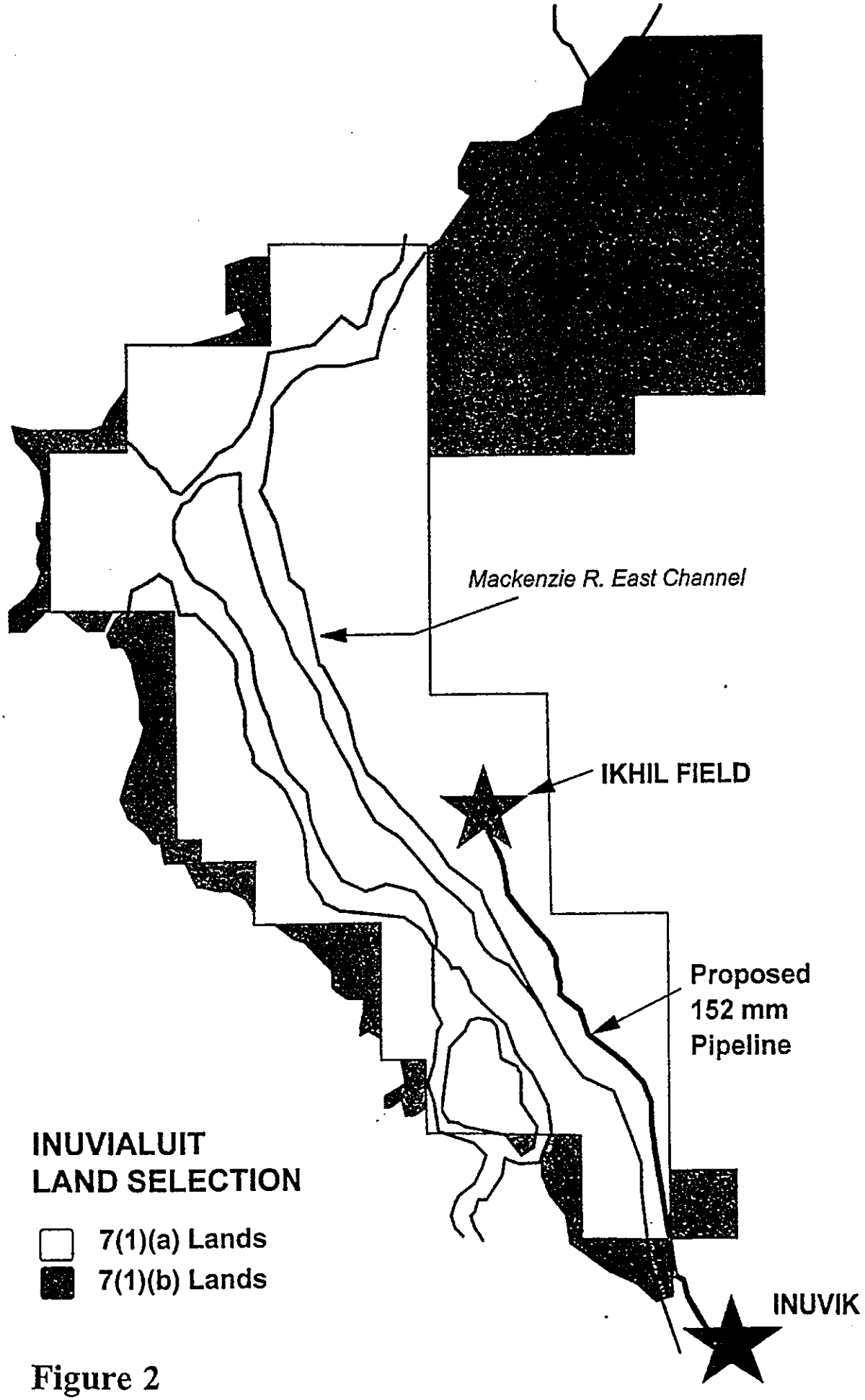

Mackenzie R. East Channel
IKHIL FIELD
Proposed
152 mm
Pipeline
INUVIALUIT
LAND SELECTION
7(1)(a) Lands
7(1)(b) Lands
INUVIK

Figure 2

- blueberry picking is an important activity in the Reindeer Station area, and some occurs in blueberry fields accessed via the old wellsite trail.

IPC notes that most of the caribou harvest occurs 5 to 15 km northeast of the proposed production facilities since caribou present over the past few years have been generally located there. IPC's Project EIA Report provides Inuvialuit Harvest Reports for Inuvik for the years 1986 to 1994 as shown below.

Inuvialuit Harvest Reports for Inuvik (Table 5 from the IPC Project EIA Report)

Mammal	1994	1993	1992	1991	1990	1989	1986-88
Beluga	42	42	53	37	51	31	167
Polar Bear	0	1	1	1	1	0	0
Ringed Seal	0	1	0	0	0	0	0
Muskox	0	0	0	0	0	5	0
Moose	8	14	11	12	10	16	40
Caribou	458	370	615	436	549	559	1347
Dall's Sheep	0	0	0	0	0	0	2
Grizzly	5	1	0	4	1	3	1
Black Bear	0	0	0	0	0	2	5
Wolf	4	1	4	3	1	3	11
Lynx	20	34	100	35	3	13	40
Fox	68	26	61	20	43	196	503
Wolverine	0	2	0	0	0	4	10
Ermine	3	4	2	37	7	28	213
Marten	26	10	221	35	226	368	777
Muskrat	3405	657	2320	3607	4010	5771	35068
Beaver	10	2	0	3	2	9	32
Rabbit	43	86	216	385	1725	862	1449
Geese	512	430	491	134	977	578	1535
Ducks	113	159	242	269	723	691	1380

Archaeological, Historical and Scientific Values

With respect to archaeological and historical sites, IPC notes that five sites were identified from the Archaeological Survey of Canada database, however none were located within the 1 km wide study area around the Project.

IPC submits that scientific values are high in the Study Area as a result of the rich investigative history of terrain, vegetation and wildlife studies that have focused on Reindeer Station and adjacent areas for over 60 years.

Socio-Economic Overview

IPC notes that a number of oil and gas developments have been proposed for this area in the past, though none have been implemented. The Parsons Lake gas discovery, identified by IPC as the closest gas find to Ikhil, would require processing facilities and a pipeline in order to deliver gas to southern markets. IPC's Project EIA Report notes that there is also potential for development of other small oil and gas reservoirs in the area.

IPC notes that, at present, the main land uses in the Study Area are hunting, trapping, fishing, and berry picking. IPC further notes that subsistence harvesting is still of vital importance to the community.

With respect to the benefits for the local community, IPC submits that the primary benefit associated with the Project is that it would provide lower fuel costs for Inuvik. IPC's economic evaluation suggests that Project gas can be delivered to the consumer at an equivalent price of 38 cents per litre compared to the current 50 cents per litre. Further, IPC submits that the gas would provide a cleaner burning fuel than diesel which is currently used and it would significantly reduce the volumes of diesel required to be barged down the Mackenzie River from Hay River.

IPC estimates that the development would provide northern employment, training and business opportunities, with an estimated 315 person years of employment. Of that total, IPC estimates the northern content at 75% and the aboriginal content at 50%. As well, the development would provide the Inuvialuit Regional Corporation with income from land use fees and royalties.

The Minister of Indian and Northern Affairs Canada has accepted the Participation Agreement between the IPC and the ILA as fulfilling the benefits plan requirements of section 5.2 of the COGOA.

2.0 ROLE OF OTHER FEDERAL AGENCIES

In accordance with the *Canadian Environmental Assessment Act* ("CEAA"), the Board, as lead responsible authority, has notified the following federal agencies pursuant to section 5 of the CEAA *Regulations Respecting the Coordination by Federal Authorities of Environmental Assessment procedures and Requirements* to identify any other responsible authorities or specialist departments for this proposal.

2.1 Environment Canada - Yellowknife

Responsible Authority	Specialist Department	No Involvement
____	____	✓

2.2 Fisheries and Oceans Canada ("DFO") - Yellowknife

Responsible Authority ____ Specialist Department ✓ No Involvement ____

In its letter dated 9 October 1997, DFO notes that the IPC Project has potential to affect fish or fish habitat. DFO's concerns include:

- potential instream changes or release of deleterious substances into the watercourses as a result of drilling activities, winter road crossings or pipeline crossings over or under creeks flowing into the East Channel of the Mackenzie River; and
- potential bank destabilization and deposition of deleterious substances into the East Channel fisheries;

DFO notes that use of material other than ice or snow to construct temporary crossings is prohibited unless authorized by a Fisheries Officer and that all winter crossings should be removed prior to breakup. DFO also notes that if freshwater use for drilling or pipeline activities were permitted, then the freshwater intake end-of-pipe would require a fish guard or a screen over the or intake so as to prevent the passage of fish into the water intake.

DFO recommends that all sumps, wastes, sewage containments and fuel caches be located a minimum of 30 m from the normal high water mark of any nearby water body and that no drilling should be done within 30 m of the high water mark of any open water body. DFO further recommends that all drill cuttings, associated wastes and any slash, debris or sediment be disposed in a manner that they do not enter fish habitat or water frequented by fish. As well, DFO recommends that the proponent not erect camps or store materials on the surface of any water body.

Resolution of DFO's concerns are addressed later in section 4.2.2 of this environmental assessment screening.

3.0 CONSULTATION

3.1 Public/Interested Parties/Government Agencies

Public Participation

IPC has developed and carried out a public information and consultation program for the Project. Over the last two years, IPC has held over 25 meetings with various groups and taken public comments into account in the design of the project. These groups include:

- Inuvik Community Corporation ("ICC") - 7 meetings;
- Inuvialuit Regional Corporation - 3 meetings;
- Inuvialuit Land Administration ("ILA") - 5 meetings;
- Inuvik Hunters and Trappers Committee ("HTC") - 3 meetings;
- Inuvik Town Council and Mayor - 4 meetings;
- Government of the Northwest Territories ("GNWT") - 1 meeting;
- Inuvialuit Youth - 1 meeting; and
- Inuvialuit Environmental Impact Screening Committee ("EISC") - 1 meeting.

Various environmental issues and concerns were raised, including whether noise from an extended flow test could disturb caribou in the area, what effects a buried pipeline would have on permafrost, whether construction activities and subsequent operation would disturb caribou and other wildlife, whether compensation would be paid in the event that wildlife disturbance occurred, and whether camp owners in the area would be contacted by IPC prior to construction.

For each of the environmental issues and concerns raised, IPC provided explanations of proposed mitigation measures and confirmation that the Company would negotiate a wildlife compensation agreement with the HTC or the ICC. These environmental issues and concerns, and the proposed mitigation measures, along with other environmental issues are addressed in section 4.0 of this environmental assessment screening.

Further, IPC submitted that it is committed to consulting with camp owners as well as the Inuvik HTC.

Other questions from the meetings related to the economics of the Project. IPC indicates that sections of the Development Plan were explained and discussed as necessary. IPC states that attendees at the HTC meeting would have opportunity to pass any outstanding issues on to the EISC to be taken into account in EISC's screening of the Project. The EISC, as part of their screening process, contacted each HTC for comments on IPC's Development Plan. The EISC indicates that there were no outstanding environmental issues or concerns.

IPC indicates that public comments have been taken into account in project design and that support for the Project has been very positive. According to IPC, comments received on the Project have, in general been positive and the Town of Inuvik passed a motion of support at a recent meeting. Further, in a letter dated 15 September 1997 to the ILA, the ICC states that a Special Resolution was passed unanimously by the members of the ICC, that approves and ratifies the application by IPC to the ILA for a permanent right of way from the Ikhil gas field to the Town of Inuvik.

The Inuvialuit Environmental Impact Screening Committee ("EISC") reviewed IPC's Proposed Development Plan and determined on 5 August 1997 that:

> *the development will have no significant negative impact on the environment or Inuvialuit harvesting in the Inuvialuit Settlement Region.*

The EISC, in rendering its decision, stated that subject to regulatory procedures, the issuance of appropriate permits and approvals may proceed. On this basis, the ILA issued the Land Use Permit for the project.

IPC, in its Project EIA Report provides the criteria used by the EISC to identify occurrences of potential significant negative environmental impacts. The nine criteria are:

1. Conflict with Inuvialuit Community Conservation Plans where such conflict has not been waived by the affected Hunters and Trappers Committee ("HTC").
2. Potential to exceed territorial and/or federal air and water quality standards.
3. Proposed development in land use category C, D, or E Lands (as identified in the Inuvialuit Community Conservation Plans or the Regional Land Use Plan for the Mackenzie Delta - Beaufort Sea Region).
4. Unresolved environmental issue in the opinion of the HTC.

5. Potential for significant habitat loss, disturbance or population decline for any species with special conservation status, keystone species or species harvested by the Inuvialuit, as determined by the Wildlife Management Advisory Committee ("WMAC"), NWT and/or North Slope and/or Fisheries Joint Management Committee ("FJMC").
6. Encroachment on area with particularly high biodiversity potential.
7. Conflict with traditional Inuvialuit harvesting where this has not been waived by the affected HTCs.
8. Lack of confidence in mitigation proposed.
9. Exceeds activity threshold in area where these thresholds have been established.

3.2 Public Concerns

The public consultation process did not disclose any public concerns regarding the proposed Project that would not be resolved through proposed avoidance and mitigation measures.

4.0 ASSESSMENT PROCESS

4.1 Procedures

In accordance with section 18 of the CEAA, the Board has carried out an environmental screening for IPC's proposed Development Plan based on:

- IPC's Development Plan submitted 8 September 1997;
- Golder Associates Ltd., August 1997 report for IPC entitled *Report on Environmental Impact Assessment for the Ikhil Gas Development to Supply Natural Gas to the Town of Inuvik* ("Project EIA Report" or "Report");
- Golder Associates Ltd. August 1997 technical report for IPC entitled *An Ecological and Archaeological Survey of the Ikhil Gas Development Study Area* ("Project Ecological and Archaeological Survey" or "Project Survey");
- EISC decision regarding the proposed development as reported in a letter to IPC dated 5 August 1997;
- ILA Land Use Permit Number ILA 97IA26 dated 23 June 1997; and
- the ILA / IPC Participation and Access Agreement dated 2 June 1997

A CEAA environmental screening of an IPC proposed 3-D seismic program over the inferred Ikhil gas reservoir was previously approved on 13 March 1997 by the Board. The program is proposed to be conducted in November and December 1997.

The Board has an obligation to determine the scope of the Development Plan in relation to which an environmental assessment is to be conducted. Although further activities may require regulatory approval, the Board has determined that if the proposed IPC Development Plan were to be implemented, it does not make the decision to undertake any other projects inevitable. No other physical work or activity is required to be carried out in relation to the Development Plan which would not require a seperate application approval by the Board.

4.2 Project Components and Effects / Proposed Mitigation / Significance of the Effects

Overview of Potential Impacts, Mitigation Measures and Residual Impacts

IPC, in its Project EIA Report submits that, for the proposed wells and production facilities, the potential environmental effects include effects to air and noise, soils and vegetation, fish, wildlife, and cultural resources. Further, IPC submits that, for the proposed pipeline, potential environmental effects may include effects to soils and vegetation, wildlife, fisheries and stream crossings, and cultural resources. Those effects and the effects of malfunctions or accidents, and the mitigative measures proposed by IPC, were presented in its application and the Golder Associates Ltd. Report and Survey. IPC provided the following summary table on potential impacts and mitigation measures:

Summary of Potential Impacts, Mitigation Measures and Residual Impacts (Table 7 from IPC's Project EIA Report)

Potential Impact	Mitigation	Residual Impacts
Wells and Production Facilities		
Wildlife disturbance and reduction in opportunities for hunting, guiding (fishing), and trapping	Wildlife (including dens) surveyed before construction; will produce worker guidelines to limit disturbance.	Insignificant, but comments from HTC will be monitored. Winter road may ease access to the area and increase hunting; but access is already quite easy.
Soil and vegetation disturbance including reduced berry picking opportunities in special designated Site 72.	Winter construction will minimize impacts; rare plant survey took place before construction; gravel pads to protect permafrost.	Insignificant. Vegetation loss limited to small construction footprint.
Waste and/or spills could affect fish.	Waste disposal and spill contingency plans.	Insignificant.
Ice fog and NO_X from generators.	Standard emissions equipment.	Insignificant, very limited in time and area.
Noise from generator engine.	In insulated building; small engine.	Insignificant.
Pipeline		
Dens and nest sites of wildlife could be impacted.	Surveys took place before construction to allow for route fine-tuning.	Insignificant.
Caribou movements and hunting opportunities may be affected in special designated Site 71	Proven techniques will mitigate impacts; most pipe will be below ground; above ground sections will be high enough for caribou passage; routing of above ground sections will take into account caribou behaviour preferences (visibility) where possible.	Some caribou will still likely alter their movements around the short above ground sections. Right of way may ease [increase] access and cause increased hunting in the area, but access is already quite easy.

Potential Impact	Mitigation	Residual Impacts
Buried pipe will impact soil and vegetation in special designated Site 72.	Routing will avoid core rare plant area and slopes sensitive to erosion; winter construction will mitigate impacts; soil and vegetation reclamation work will protect permafrost; anti-erosion techniques will mitigate effects of surface water flow.	Insignificant. Limited to woody, mainly willow and alder shrub, vegetation clearance along 10 m wide right-of-way, for 50 km length of route.
Fish may be impacted, especially from sediment washing into creeks.	A fish habitat survey was done for Douglas Creek and others; a bored crossing is recommended for Douglas Creek and two other creeks; surface water flow control techniques will be used on slopes to smaller creeks as necessary.	Insignificant.
Camps, historic sites or archaeological sites may be impacted.	GNWT and Inuvialuit databases will be checked again as the route is finalized; an archaeological survey was conducted in the summer of 1997.	No impacts are expected after mitigation.
Biodiversity may be affected in Inuvik subregion special designated Site 74.	Routing will avoid key core area along escarpment; survey before construction has mitigated impact further.	Insignificant.

Further to IPC's proposed mitigative measures, IPC, in paragraph 2. of its Participation and Access Agreement with the ILA, IPC has agreed to:

a) preserve Inuvialuit cultural identity and values within changing northern society; and
b) enable Inuvialuit to be equal and meaningful participants in the northern and national economy and society; and
c) protect and preserve the Arctic wildlife, environment and biological productivity.

Determination of the Significance of the Environmental Effects

The Project EIA Report notes that some residual effects may remain after mitigation and that the significance of the residual environmental effects may be identified as: significant adverse effect; significant positive effect; unknown significance; no significant adverse effect; or no significant positive effects.

The determination of the significance of residual effects, as outlined in the Project EIA Report is based on the assessment of direction, geographic extent, duration and frequency, magnitude, confidence, and reversibility in the short term. IPC submits that, for each environmental component identified in the summary table above, the environmental effects would be insignificant.

4.2.1 Proposed Wells and Production Facilities - Effects / Mitigation / Significance

Air and Noise

A 215 kW generator, powered by a 325 hp natural gas generator, is proposed for the production facilities and which would produce emissions of CO_2, NOx and water vapour including ice fogs which may occur around the facility in periods of extreme cold. According to the Project EIA Report, the overall mechanical sound would be 96 dBA at 1 m and the overall exhaust sound would be 105 dBA at 1.5 m.

IPC submits that, compared to Alberta's Energy and Utility Board's ("AEUB") Information Letter IL88-5 for natural gas-driven compressors, the proposed engine's emission rate of 7.8 kg/hr is less than AEUB's allowable maximum emission rate of 16 kg/hr for NOx. Further, compared to AEUB's Noise Control Directive ID94-4 which sets a target sound level of 40 dBA at a distance of 1.5 km, the overall exhaust sound from the engine would translate to 39.8 dBA at 1.5 km.

IPC's mitigation measures include:

- housing the engine in an insulated building to provide additional noise control;
- designing the stack such that the stack height is not less than 1.2 times the building height; and
- designing the muffler exhaust diameter such that ambient NOx concentrations would be less than the federal objective value of 400 micrograms/m^3.

In its application, IPC notes that natural gas would flow in the production tubing at temperatures below the hydrate formation temperature. Hydrate, a water-methane gas crystalline substance, can restrict or block the normal natural gas flow. IPC proposes to inject methanol (CH_3OH) , through a small string strapped to the outside of the tubing, to inhibit hydrate formation. The natural gas was analyzed as 99.11% CH_4 , 0.55% NO_2 , 0.28% C_2H_6 , 0.05% CO_2 , and 0.01% He. The methanol/water/hydrocarbon mixture would be collected during production and then periodically flared. Combustion products would include mainly carbon dioxide and water vapour. IPC in its Project EIA Report submits that the only additional flaring would only be for emergency purposes. IPC has predicted that there would be no adverse impact on air quality as a result of flaring.

The Project EIA Report states that the residual effects on plants and soil would be local, low in magnitude and can be reversed at the end of the Project. IPC submits that the residual effects can be predicted with high confidence and would be insignificant.

Soil and Vegetation

There is some potential for surface disturbance of the tundra vegetation and ice-rich soils during the drilling of two new wells and installation of production facilities and their subsequent operation. According to the Project EIA Report, damage on slopes could lead to erosion and disturbance of polygonal terrain can induce ponding. It is submitted in the report that, since no rare plants were found in the vegetation communities near the proposed wellsites or production facilities, no special mitigative measures are suggested with regard to rare plants.

With respect to disturbance of ice-rich soils, vegetation and permafrost, IPC's proposed mitigative measures include:

- preventing or at least minimizing effects to soil and vegetation through winter construction and the use of the existing access routes;
- constructing gravel pads around the wells and under the production facilities to protect the permafrost from thawing during the summer months;
- setting the flare stack, to be used for well testing emergency purposes, on a gravel pad; and
- placing timber mats on the snow pad to accommodate any necessary piping and auxiliary equipment.

The Project EIA Report states that the residual effects on plants and soil would be local, low in magnitude and can be reversed at the end of the Project. IPC submits that the residual effects can be predicted with high confidence and would be insignificant.

Fish

Spills of fuel or stored methanol constitute a potential hazard to surface waters and organisms. Improperly disposed wastes such as those typical generated during construction including flagging, broken skids, spent welding rods, paint, etc., can cause contamination. The Project EIA Report states that secure containment using standard procedures is feasible.

With respect to contamination from wastes or spills of fuel or stored chemicals which could affect surface waters and organisms, IPC's proposed mitigation measures include:

- installing spill containment trays or berms for fuel and chemical storage tanks;
- putting in place prior to construction, a contingency plan that takes local environmental values into account;
- developing an acceptable plan for handling and disposal of wastes; and
- collecting construction wastes daily and disposing the wastes off the Project site.

IPC submits that any spill amounts would not be unduly large. Regarding potential effects on fish, IPC submits, that the residual effects can be predicted with high confidence and would be insignificant.

Wildlife

The use of construction vehicles and equipment carries some potential for wildlife harassment in winter, particularly for caribou. As well, nesting birds in summer could be impacted by the facilities and their operational maintenance. Construction wastes can attract wildlife. IPC submits that there may be some reduction in local harvest opportunity, especially during construction and the first two years of operation.

IPC proposes to undertake a detailed analysis of wildlife use within and adjoining the Study Area in cooperation with the Inuvialuit Joint Secretariat with such information to form a baseline when discussing compensation agreements (note Table 5 of the Project EIA Report as shown in the Description of the Environment section above).

Further, the general terms and conditions of the ILA's Access Agreement with IPC directs IPC to:

- compensate the inuvialuit or any directly affected third person(s) for any damage or accidents caused as a result of the Occupancy or Operation carried out during the Term of the Right;
- prevent damage to the wildlife and its habitat and to avoid disruption of Inuvialuit harvesting activities, and if damage occurs;
- restore wildlife and its habitat as far as is practicable to its original state; and
- compensate Inuvialuit hunters, trappers and fisherman for loss of their subsistence or commercial harvesting.

IPC's proposed mitigation measures with regards to effects on wildlife include:

- developing an acceptable plan for handling and disposal of wastes that could attract wildlife;
- collecting construction wastes daily and disposing the wastes off the Project; and
- housing the engine in the production facility in an insulated building to provide additional noise reduction.

IPC submits that impact to nesting birds in the summer would be small and affected species would, to some degree, become accustomed to the production facility. Further, IPC submits that the reduction in local harvest opportunity would likely be temporary. In succeeding years, as the animals become accustomed to the seldom visited but constant source of noise and light from the power generator, loss of harvesting opportunities should be less according to IPC.

With respect to wildlife, the Project EIA Report indicates that the residual effects would be insignificant, local in extent and can be reversed at the end of the Project.

Cultural Resources

IPC submits that there are a number of camps in the general region and that it is committed to consulting with the camp owners, however IPC notes that none would be directly affected by the wells or facilities.

IPC submits that the effects on camps would be insignificant.

During the Golder Associates Inc. 1997 archaeological and ecological survey near the planned production facilities, no archaeological or historical sites were found and no further archaeological work was recommended in the Study Area. The Report notes that site NeTs-4 was visited at the north end of Peter Lake, and while this area was initially considered as a potential quarry for wellsite pad gravel, it was recommended that the area should not be used as a source of gravel. The site contains artifacts such as quartzite flakes, spalls and cobble cores collected from the surrounding area.

IPC states that the residual effects on archaeological sites would be insignificant.

4.2.2 Pipeline - Effects / Mitigation / Significance

Route Selection

In its application, IPC states that the pipeline route has been selected based on a surficial geology investigation using air photo interpretation of the terrain along a 10 km wide corridor from Ikhil to Inuvik. IPC submits that the pipeline has been routed to avoid core rare plant areas and slopes sensitive to erosion. Following its summer 1997 ecological and archaeological survey of the Ikhil gas development Study Area, a two routing revisions are proposed. A route change at TP07 (Figure 1) is proposed by IPC in order to move the pipeline farther away from the escarpment edge and to avoid potential impacts. Further, IPC proposes to revise the Douglas Creek crossing location (near TP10) to follow a gentler slope and to be farther away from two small lakes in the valley.

IPC indicates that several pipeline design configurations were considered including:

- an above-ground option supported on piles;
- an above-ground option supported on sleepers; and
- a buried configuration.

IPC selected the buried pipeline option based on cost, reliability, aesthetics, minimized environmental impact, and susceptibility to damage.

Soils and Vegetation

According to the Project EIA Report, most of the eighteen plant species within the Study Area identified to be of National Significance, occur on the west-facing escarpment to the Mackenzie River. Further, the summer 1997 survey of an approximately 500 m corridor around the Project did not locate any of the listed species.

IPC notes that winter construction of the pipeline would necessitate clearing and construction of a 10 m wide snow pad to accommodate movement of the pipe and excavation of a 0.35 m wide by 1.2 m deep ditch. Woody vegetation, where it occurs in the southern half of the route, would be cut within the 30 m right-of-way. IPC further notes that the buried pipeline construction will damage vegetation on a narrow (less than 50 cm) strip of land, which carries some potential for very local destabilization of sensitive terrain. However, a geotechnical program by North of 60 Engineering Ltd. confirmed that the proposed pipeline alignment would not significantly affect slope stability.

With respect to effects to soils and vegetation, IPC proposes the following mitigation measures:

- constructing the pipeline in winter to mitigate potential negative effects of construction equipment on vegetation in the herbaceous layer of the right-of-way;
- minimizing long term consequences by routing the pipeline to avoid important vegetation and sensitive terrain from the Caribou Hills Escarpment to the East Channel of the Mackenzie River;
- restoring disturbed lands quickly and efficiently to minimize long term consequences;
- making specific route changes, such as near TP10 at Douglas Creek to follow a gentler slope and to avoid two small lakes in the valley, and at TP07 to move the line further from the edge of the escarpment;

construction activities would involve the exposure of mineral soils in areas that drain into watercourses (approaches), and that stormwater runoff over these areas can introduce suspended solids into the river.

IPC submits that episodic turbidity events where the waters become very cloudy are generally infrequent in the watercourses in the region under investigation. As a result, resident fish species are unaccustomed to episodes of high suspended sediment concentrations. IPC notes however, that during the 1997 summer survey, Douglas Creek appeared to be very turbid and may only support species more tolerant of such conditions.

In IPC's Project EIA Report, it is noted that a pre-development fisheries habitat survey that was conducted around the proposed crossing locations of Douglas Creek, its tributary and the outlet watercourse from Twin Lakes. The primary objective was to identify techniques that might be used to install the pipeline efficiently and safely while maintaining the productive capacity of fish habitat within the watercourse, in accordance with the Department of Fisheries and Oceans policy of *No Net Loss of Fish Habitat.*

With respect to DFO concerns identified in section 2 of this environmental assessment screening, the ILA, in the general terms and conditions of its Participation and Access Agreement with IPC, directs IPC to:

- construct and maintain winter roads with a minimum of 20 cm packed snow and ice unless authorized by the ILA Administrator;
- ensure that all fuelling of equipment and vehicles is made directly from the storage facility or fuel truck, provided such refuelling is not carried out within 31 m of the ordinary high watermark of any stream or waterbody;
- not excavate at a point that is below the normal high water mark of a stream when excavating Inuvialuit Land within 100 m of that stream;
- provide and maintain adequate erosion controls designed to minimize the disturbance of natural drainage, accelerated erosion and increase in normal sedimentation process into inland streams and waterbodies.
- not deposit on the bed or on the ice of any waterbody any excavated material; and
- not place fuel or supply cache below the normal high water mark of a stream or waterbody within 100 m of the stream or waterbody.

Mitigative measures proposed by IPC with respect to potential effects on fisheries and streams include:

- constructing the pipeline in the winter to minimize disturbance to sensitive vegetation cover in all areas of the right-of-way and to ensure that long-term erosion problems along the right-of-way are not created;
- constructing an elevated or a bored crossing of Douglas Creek;
- using on-land sediment control strategies to reduce erosion along approach areas or to curtail sediments transported by runoff waters from entering the system;
- using site-specific on-land sediment control strategies as described in the previous *Soils and Vegetation section;*
- installing diversion berms in steep areas of the right-of-way at approaches to watercourses to divert surface waters into vegetated areas adjacent to the right-of-way and to mitigate erosion, as well as reducing the runoff entering the watercourse; and
- possibly using the boring crossing method for Douglas Creek, the Douglas Creek tributary, and the outlet to Twin Lakes.

IPC submits that residual effects would be of local extent, can be reversed after construction, can be predicted with high confidence and would be insignificant.

Cultural Resources

IPC submits that the pipeline would cross Special Designated Areas, but is unlikely to encroach on camps or historic sites and, as well, IPC is committed to ongoing dialogue with camp owners. IPC notes that the historic camp near Reindeer Station is away from the proposed right-of-way and already identified archaeological sites would be avoided.

IPC submits that, should archaeological materials be uncovered during the course of the Ikhil Project, the EISC *Operating Guidelines and Procedures* require the Holder (IPC) to immediately suspend the operation on the site and notify the Administer or an Inspector of the location of the site and the nature of the unearthed materials, structures or artifacts. IPC submits that the residual effects can be predicted with high confidence and would be insignificant.

4.2.3 Community Conservation Plans

In IPC's Project EIA Report, the potential is noted for negative impact on local caribou hunting, trapping, fish guiding to Peter Lake, and berry picking. Individual animals or small groups of wildlife species given special status in the Inuvik and Aklavik Community Conservation Plans, or by the committee on the Status of Endangered Wildlife in Canada ("COSEWIC"), could be affected by the Project. The Caribou Hills and Middle Mackenzie Delta (Special Designated Site 74), is noted in IPC's Report as being mentioned within the Inuvik and Aklavik Conservation Plans as a potential candidate for ecological reserve status, and although the community nor any government agency is actively promoting candidacy, the area's values remain intact and scientific interest remains. IPC further notes that the core area of IBP Site 9, within Site 74 corresponds with the Mackenzie Valley escarpment. The escarpment is considered an area of high biodiversity potential because of unique floral values.

IPC states that the Project largely avoids the escarpment and steps have been and would continue to be taken to minimize impact on these areas, including importantly, the use of the existing access trail and pipeline routing to avoid escarpment valleys. IPC further states that the presence or absence of important wildlife species have been investigated through fieldwork. IPC submits that there would be no significant residual impacts on wildlife species.

4.3 Cumulative Environmental Effects Assessment

Potential Cumulative Environmental Effects and Other Projects / Activities

IPC submits that potential cumulative effects that could result from the proposed Ikhil Gas Development Plan Project include:

- wildlife habitat loss;
- wildlife disturbance during construction and operation/maintenance;
- increase of access into a remote area; and
- emissions to the atmosphere.

According to the Project EIA Report, the IPC Project is the only project currently being planned for the Caribou Hills region. The winter road between Inuvik and Tuktoyaktuk, which passes up the Mackenzie River west of the Project area, is identified as the only existing development in the region. However, IPC submits that it is expected that future exploration would confirm new reserves in the Ikhil area and so prolong the life of the project, or alternatively there is a possibility that the Parsons Lake discovery could be developed. IPC submits that such an eventuality would obviously require a separate impact assessment at the time.

IPC states that, as previously discussed and as summarized in the attached table, when impacts are assessed individually, no significant residual impacts would remain after mitigation. IPC further states that when all impacts from the Project are compared for multiple effects on each environmental feature, there is little potential for significant additive or synergistic effects, and likewise, cumulative effects resulting from other projects or activities would not occur.

4.3.1 Wells and Production Facilities - Cumulative Environmental Effects

With respect to the wells and production facilities, the four potential cumulative effects outlined above were discussed and significance determined in IPC's Project EIA Report as follows:

- Wildlife habitat loss is confined to the small 4.2 ha footprint of the wellsites, production facilities and gathering system. No additional projects or activities exist to compound loss. No significant residual cumulative effects would occur.

- Wildlife may be disturbed by noise, sound, and emissions combined. However, all are of low impact and local extent. In other parts of the Northwest Territories, caribou seek out mine buildings for shade and can therefore habituate to sources of higher constant significant disturbance than would occur at Ikhil. No significant residual cumulative effects would occur.

- The existing winter road and access route to Ikhil will be used during construction. Thus no cumulative effects would occur with respect to access. During operation it is expected that any occasional access for maintenance would be by helicopter.

- No other projects exist or are planned in the Caribou Hills that would result in cumulative impacts from emissions.

4.3.2 Pipeline - Cumulative Environmental Effects

With respect to the pipeline, potential cumulative effects were discussed and significance determined in IPC's Project EIA Report as follows:

- Wildlife habitat loss would occur over the 50 ha right-of-way. However, potential disturbance would be approximately half this, as vegetation clearing, in the form of shrub clearing, would mainly occur south of Douglas Creek. Shrubs are generally absent from the right-of-way north of Douglas Creek. Even the cleared right-of-way in the south would be used by various species and would not prevent movement by species across it. The lack of other developments or planned developments in the region means that no cumulative effects would occur.

- Wildlife may be disturbed during construction because of noise and the presence of people. However, during operation, no significant adverse impact is predicted and no cumulative effects would occur.

- Both people and wildlife are expected to use the right-of-way between Inuvik and Douglas Creek for winter travel. As described above, winter access to the Caribou Hills is already quite easy, especially in winter. The Inuvialuit Settlement Region is well organized with a community HTC, a regional ICC and a joint government/Inuvialuit Wildlife Management Advisory Council ("WMAC"). Through these structures, information flows and wildlife management decisions are made. The information reviewed results in the conclusion that no significant residual effects would occur because of the right-of-way. No other residual access related effects have been identified and so, no cumulative effects would occur either.

5.0 THE BOARD'S CONCLUSION

The Board is satisfied with the environmental and socio-economic information provided by IPC with regard to the potential adverse environmental effects of the proposed Development Plan and facilities operation and is satisfied with IPC's proposed mitigation measures.

The Board is satisfied with the cumulative effects information provided by IPC and is of the view that the environmental effects of the proposed Development Plan, in combination with past, existing, and future projects and activities, are not likely to cause significant adverse cumulative environmental effects.

The Board is satisfied that IPC has notified and discussed the proposed application in a timely and satisfactory fashion with government agencies, public interest groups and affected persons, and that there are no known outstanding issues.

The Board is of the view that if IPC's proposed environmental mitigative measures are implemented, the Project is not likely to cause significant adverse environmental effects. Should IPC's application be approved, the Board would condition the order so as to ensure adherence to mitigative measures.

5.1 Order Condition

Unless the Board otherwise directs

1. IPC shall implement or cause to be implemented all the policies, practices, recommendations and procedures for the protection of the environment included in or referred to in its application.

6.0 CEAA DETERMINATION

The Board is of the view that, taking into account the implementation of the proposed mitigative measures, the Project is not likely to cause significant adverse environmental effects. This represents a decision pursuant to paragraph 20 (1)(a) of the CEAA.

7.0 DECISION

The Environmental Screening and the CEAA determination were approved by the Board on 23 December 1997.

8.0 DEPARTMENTAL / AGENCY CONTACT

M. L. Mantha
Secretary
National Energy Board
311 - 6th Avenue SW
Calgary, AB T2P 3H2