Federal Environmental Assessment and Review Process

Federal Environmental
Assessment Review Office

Alaska Highway Gas Pipeline

Routing Alternatives
Whitehorse/Ibex Region

Report of
the Environmental
Assessment Panel

Canada

PANEL REPORTS TO THE MINISTER OF THE ENVIRONMENT ON THE PANEL PROJECTS

1. Nuclear Power Station at Point Lepreau, New Brunswick. (May, 1975)

2. Hydro Electric Power Project, Wreck Cove, Cape Breton Island, Nova Scotia. (August, 1976)

3. Alaska Highway Gas Pipeline Project, Yukon Territory. (Interim report, August, 1977)

4. Eldorado Uranium Refinery Proposal, Port Granby, Ontario. (May, 1978)

5. Shakwak Highway Project, Yukon Territory - British Columbia. (June, 1978)

6. Eastern Arctic Offshore Drilling - South Davis Strait Project, N.W.T. (November, 1978)

7. Lancaster Sound Offshore Drilling Project, N.W.T. (February, 1979)

8. Eldorado Uranium Hexafluoride Refinery, Ontario. (February, 1979)

9. Roberts Bank Port Expansion, British Columbia. (March, 1979)

10. Alaska Highway Gas Pipeline, Yukon Hearings. (August, 1979)

11. Banff Highway Project (east gate to km 13). (October, 1979)

12. Boundary Bay Airport Reactivation, British Columbia. (November, 1979)

13. Eldorado Uranium Refinery, R.M. of Corman Park, Saskatchewan. (July, 1980)

14. Arctic Pilot Project (Northern Component) N.W.T. (October, 1980)

15. Lower Churchill Hydroelectric Project. (December, 1980)

16. Norman Wells Oilfield Development and Pipeline Project. (January, 1981)

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Federal Environmental Assessment Review Office
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Environmental Assessment Review | Examen des évaluations environnementales

Hull, Quebec
K1A OH3

The Honourable John Roberts, P.C., M.P.
Minister of the Environment
Ottawa, Ontario
K1A OH3

Dear Minister:

In accordance with the Federal Environmental Assessment and Review Process, the Environmental Assessment Panel on the Alaska Highway Gas Pipeline Project has completed a review of the pipeline routing alternatives in the Whitehorse/Ibex Region.

The review has led to the conclusion that the Ibex Pass route, which is preferred by Foothills Pipe Lines (South Yukon) Limited, should be rejected in favor of the First Whitehorse Route with the West Whitehorse Cut-off. This route is both feasible from an engineering standpoint and environmental problems are minimal. The Panel therefore recommends that the pipeline be routed over this alignment.

Sincerely yours,

Ewan Cotterill
Chairman
Alaska Highway Gas Pipeline Project
Environmental Assessment Panel

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EXECUTIVE SUMMARY

The Alaska Highway Gas Pipeline Environmental Assessment Panel has reviewed the proposal by Foothills Pipe Lines (South Yukon) Limited to route the pipeline along the Ibex River Valley and over Ibex Pass south of Whitehorse, Yukon. The proposal calls for the route to leave the Alaska Highway near the Takhini River crossing west of Whitehorse and to proceed east over Ibex Pass, joining the Alaska Highway again near the Carcross Cut-off. The total length of the section is roughly ninety (90) kilometers and a number of alternative pipeline routes are described. There are a total of 12 route combinations which have been documented for review.

The Proponent submitted pipeline routing documents in March, 1981. These documents and additional information requested by the Panel served as the body of information for the review of the Project.

The Panel sought comments on the proposed project from technical reviewers and from the public. In June, 1981, the Panel held technical hearings at Whitehorse. The Panel considered a number of issues including impacts on fish and wildlife, increased access, public safety, geotechnical matters, present and future land use, connections with the proposed Dempster Lateral Pipeline matters, and project cost.

The Panel's review of the Whitehorse/Ibex pipeline routing question has led to the conclusion that because of the potential for high environmental

impacts through increased access to an area of rich and diversified wildlife and because of the attendant loss of future options on the connection with the proposed Dempster Lateral Pipelines, the Ibex Valley Route Alternative which is preferred by the Proponent, should be rejected. It is the Panel's firm view that the First Whitehorse Route with the West Whitehorse Cut-off should be used because it is feasible from an engineering standpoint, free of significant environmental and land use impacts, and because this route leaves future options open for connections with the Dempster Lateral.

ALASKA HIGHWAY GAS PIPELINE PROJECT

IBEX/WHITEHORSE ROUTING ALTERNATIVES

Report of the Environmental Assessment Panel

July, 1981

1. INTRODUCTION

This report conveys the findings of the Environmental Assessment Panel following the review of a proposal from Foothills Pipe Lines (South Yukon) Limited on pipeline route alternatives in the Ibex/Whitehorse area. This early review of the alternatives was requested by the Northern Pipeline Agency. Other routing alternatives and environmental aspects of the proposed gas pipeline project in Yukon will be reviewed at a later date.

2. THE PROJECT PROPOSAL

The Alaska Highway Gas Pipeline Project is a proposal by Foothills Pipe Lines (South Yukon) Limited. It involves the construction of a large-diameter, gas transmission pipeline and ancillary structures in southern Yukon. The pipeline is part of a larger system intended to carry natural gas from Alaska to the lower 48 States. The Canadian portion of the system would pass through Yukon, British Columbia, Alberta and Saskatchewan.

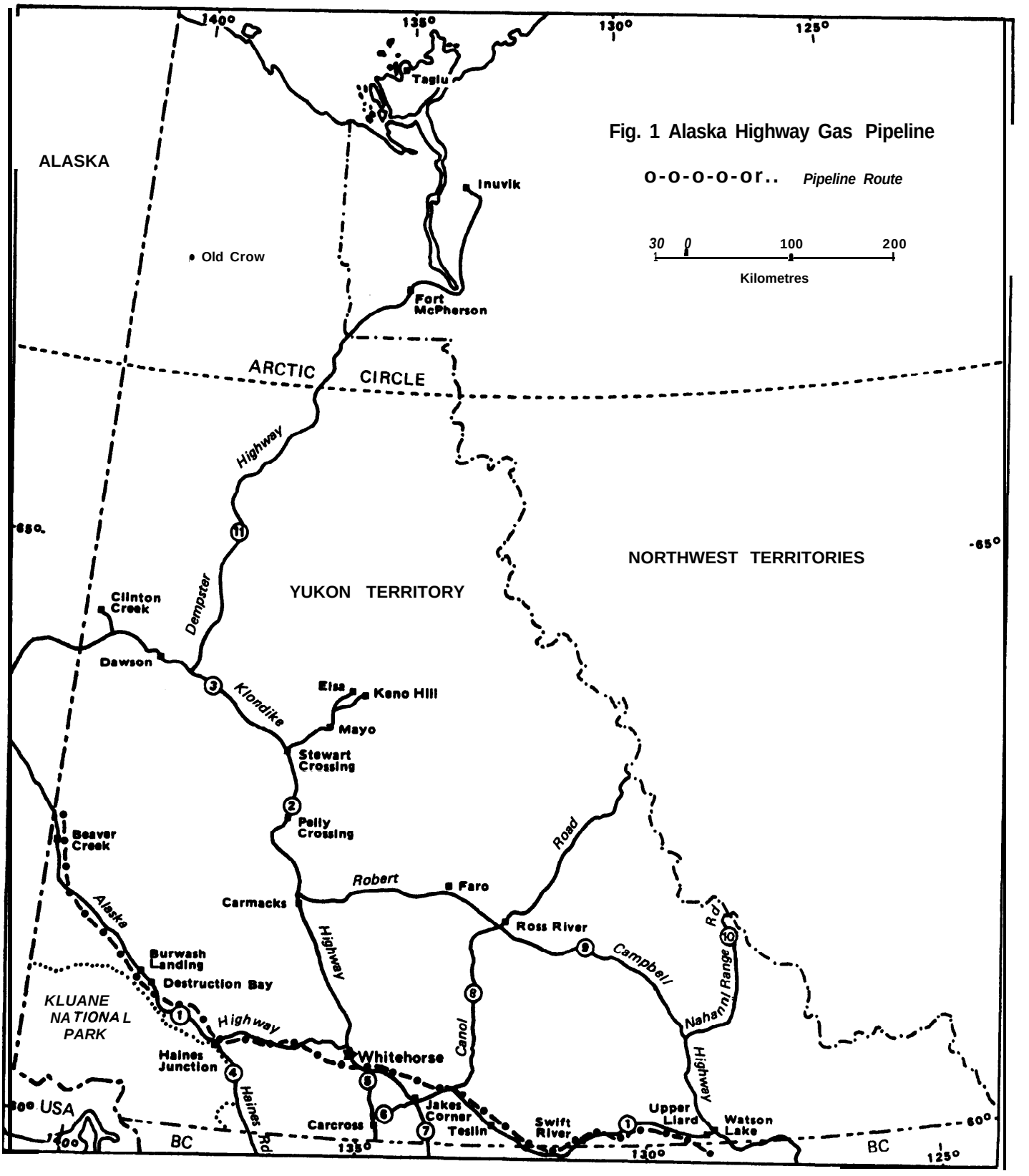
Fig. 1 Alaska Highway Gas Pipeline
o-o-o-o-or.. Pipeline Route
30 0 100 200
Kilometres
ALASKA
Taglu
Inuvik
Old Crow
Fort McPherson
ARCTIC CIRCLE
Highway
NORTHWEST TERRITORIES
YUKON TERRITORY
Clinton Creek
Dempster
Dawson
Klondike
Elsa
Keno Hill
Mayo
Stewart Crossing
Pelly Crossing
Beaver Creek
Alaska
Robert
Faro
Carmacks
Road
Ross River
Campbell
Rd.
Nahanni Range
Highway
Burwash Landing
Destruction Bay
KLUANE NATIONAL PARK
Highway
Haines Junction
Whitehorse
Canol
Highway
Haines Rd
Carcross
Jakes Corner
Teslin
Swift River
Upper Liard
Watson Lake
USA
BC
BC
140°
135°
130°
125°
68°
65°
60°

The proposed route in Yukon is approximately 818 km long and parallels the Alaska Highway from Beaver Creek (Yukon-Alaska border) in the north, to Watson Lake (Yukon-British Columbia border) in the south (Figure 1).

Major departures from the Alaska Highway occur in the Kluane Lake area, at the Ibex Pass near Whitehorse, the Mt. Michie-Squanga area east of Whitehorse, and the Rancheria Valley. From the Alaska border to approximately Whitehorse (375 km), the pipe will have an outside diameter of 1219 mm (48 inches). For the remainder of the route, the pipe will have an outside diameter of 1422 mm (56 inches) to eventually accommodate a planned tie-in with a proposed gas pipeline from the Mackenzie Delta (the "Dempster Lateral").

The proposed pipeline routing in the Whitehorse area is complicated by environmental concerns, land use, zoning, a "tie-in" with the proposed Dempster Lateral, permafrost-related geotechnical problems, potential impacts on wildlife, and other considerations.

The Proponent has investigated alternative routes and combinations of routes in the area (Figure 2). The proposal calls for the pipe to be buried throughout. There is a lack of substantive information in submitted documents for other modes to be used. For the Ibex Pass route which is preferred by the Proponent, right-of-way clearing would take place in the summer and early autumn, and ditching and pipe laying would take place in the summer and autumn of the following year.

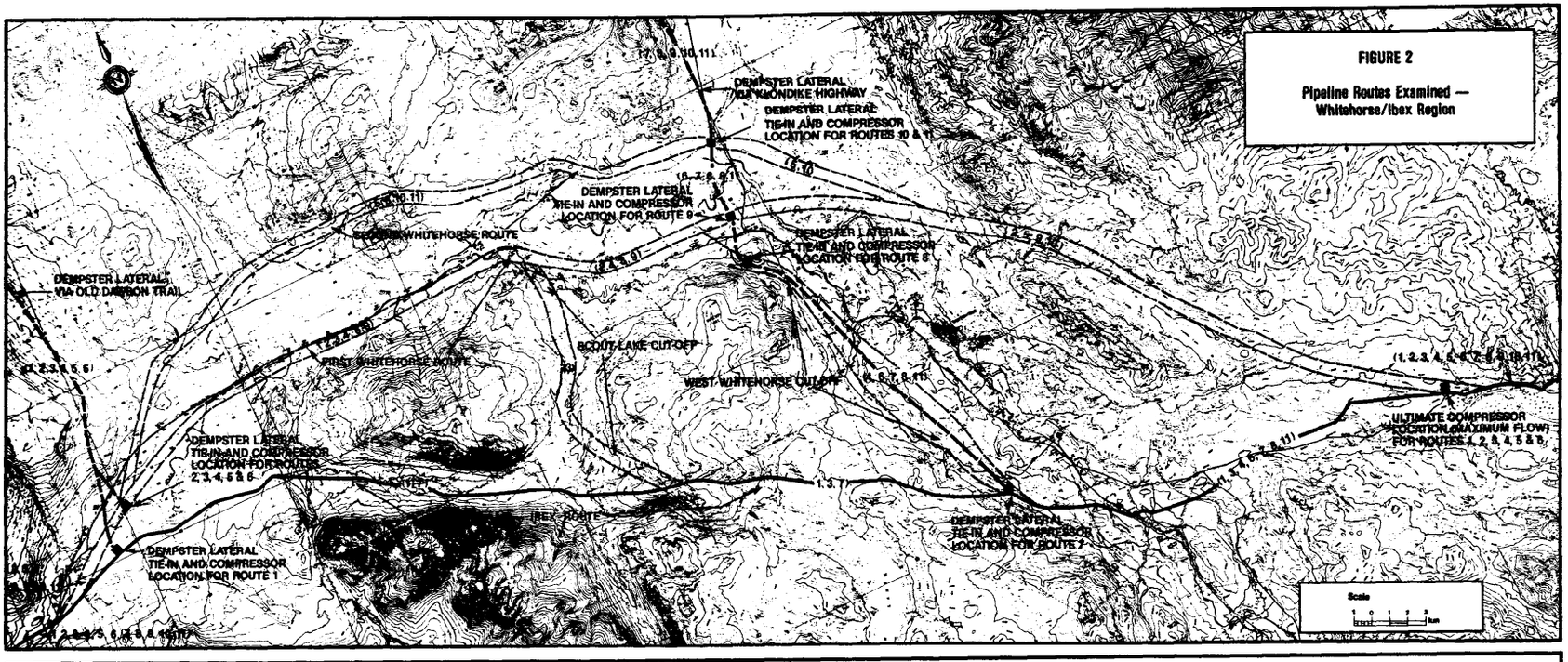

FIGURE 2

Pipeline Routes Examined — Whitehorse/Ibex Region

LEGEND

ROUTES INVOLVING THE DAWSON TRAIL DEMPSTER CONNECTION

1 Ibex Route
2 First Whitehorse Route
3 First Whitehorse Route with the Scout Lake Cut-off
4 First Whitehorse Route with the West Whitehorse Cut-off
5 Second Whitehorse Route
6 Second Whitehorse Route with the West Whitehorse Cut-off

ROUTES INVOLVING KLONDIKE HIGHWAY DEMPSTER CONNECTION

7 Ibex Route with a West Whitehorse Cut-off Route for the Dempster
8 First Whitehorse Route with a West Whitehorse Cut-off
9 First Whitehorse Route
10 Second Whitehorse Route
11 Second Whitehorse Route with a West Whitehorse Cut-off

(#) Numbers in brackets show routes involved with particular segments.

3. THE ENVIRONMENTAL ASSESSMENT AND REVIEW PROCESS

The Yukon portion of the proposed route passes through federal lands which, under the Territorial Lands Act, are administered by the Minister of Indian Affairs and Northern Development. Because the project requires the granting of a right-of-way through federally administered lands, and because there is potential for significant environmental impact, the project was referred to the Minister of the Environment by the Minister of Indian Affairs and Northern Development on March 21, 1977 for review under the Environmental Assessment and Review Process. An Environmental Assessment Panel was then established under the chairmanship of Dr. H.M. Hill.

Because of major decisions facing government on competing pipeline proposals in the fall of 1977, the Panel was not able to undertake a normal review of the environmental implications of the project at that time. Instead, the Panel reviewed existing data, sought public and professional opinion through hearings held in Yukon, and then submitted an Interim Report on July 27, 1977. It was understood that, if the Alaska Highway Gas Pipeline Project was still a contender after decisions on competing proposals were made, the formal environmental assessment and review procedure would apply.

In its Interim Report, the Panel concluded that "the proposed pipeline can be constructed and operated in an environmentally acceptable manner" subject to certain specified conditions related to environmental planning,

routing around sensitive areas and development of mitigative measures to solve environmental problems associated with ice-rich permafrost. It was noted that an elevated mode, which was not addressed at the hearings, might provide an alternative to burying a pipeline in ice-rich permafrost areas. Furthermore, the Panel recommended that an Environmental Impact Statement (EIS) for the proposed Yukon pipeline route be completed based upon guidelines to be issued by the Panel.

In September, 1977, the Governments of Canada and the United States of America decided to proceed with the project. Following this decision by government to authorize construction of the pipeline, the Panel issued to the Proponent in December, 1977, Guidelines for the Preparation of an Environmental Impact Statement. The Guidelines specified that the organization, content and completeness of the EIS are the responsibility of the Proponent. Furthermore, in preparing the EIS, the Proponent was required to take into consideration the information deficiencies identified during the hearings and in the 1977 Interim Report to the Minister of the Environment.

In late 1978, the Initiating Department role for the project was transferred from the Department of Indian Affairs and Northern Development to the Northern Pipeline Agency as a result of the transfer of regulatory responsibilities. In January, 1979, the EIS was submitted by the Proponent to the Environmental Assessment Panel.

Public hearings under the chairmanship of Mr. Fern Hurtubise, were held in Yukon communities, including Whitehorse, in March and April of 1979. The Panel concluded (on April 28, 1979) that the Proponent had not provided sufficient information, on certain aspects of the project, to enable the Panel to complete its environmental review at that time. The Panel prepared a second report requiring that the Proponent complete its assessment of the project. This report was transmitted to the Minister of the Environment and authorized for public release in September, 1979.

In 1980, it was necessary for the Panel to clarify the requirements in the 1979 report and this was done in two meetings attended by the Proponent and the Initiating Department. Following these meetings, the Panel issued a letter of clarification which detailed the explanations of requirements made at the 1980 meetings.

In March 1981, the Proponent submitted the first of several documents for review, the "Addendum to the Environmental Impact Statement for the Yukon Section of the Alaska Highway Gas Pipeline with Respect to Alternate Routes: Submission 3-1. Examination of Routing Alternatives for the Alaska Highway Gas Pipeline in the Whitehorse/Ibex Region" and Submission 3-2, "Mapped Information Requested by the Federal Environmental Assessment Review Office Related to the Whitehorse/Ibex Pass Region". The documents were submitted as one of a series to be submitted to the Panel for review. Addenda within the series are divided into seven sets of submissions dealing with separate subject areas:

1. Introduction to Addenda Submissions

2. Project Description and Update for Addenda Submissions
3. Alternative Routes
4. Geotechnical, Hydrological, Design Mode and Revegetation Issues
5. Fisheries, Wildlife and Scheduling Issues
6. Issues Related to Pipeline Facilities
7. Other Issues.

The Panel is comprised of the following:

Mr. Ewan Cotterill, Chairman, Ottawa

Mr. Hiram Beaubier, Whitehorse

Dr. Owen Hughes, Calgary

Mr. William Klassen, Whitehorse

Dr. Douglas Lacate, Vancouver

Mr. Colin Wykes, Whitehorse

4. PANEL PROCEDURES

Review of the Documentation Submitted by Foothills

Following the receipt of Submissions 3-1 and 3-2, Panel staff and technical advisors commenced a detailed review of the documentation. Concurrently, copies of the document were mailed to the public, government agencies, and organized public groups, through the following distribution program:

Public libraries
- Whitehorse and at settlements along the Alaska Highway in Yukon.
- Library of Parliament, Ottawa

University libraries	- Edmonton, Calgary
Offices of the Proponent	- Whitehorse, Calgary, Ottawa
Offices of the Initiating Department	- Whitehorse, Calgary, Ottawa
Technical Intervenors	- Federal Government Departments, Ottawa
	- Yukon Territorial Government, Whitehorse
Public Interest Groups and Individuals	- All groups and individuals which had expressed an interest in previous hearings or responded to a mail out enquiry and advertising by Panel staff.

The technical complexity of the subject material addressed in the documentation required the Panel to retain a number of professional advisors from government and private consulting firms. It was the role of these advisors to review specific aspects of the documentation and supporting information, and to provide advice for the technical hearings.

The Panel transmitted questions to the Proponent on the documentation in Apri 1, 1981. Specific information and clarification was requested. This letter and the response from the Proponent was distributed to the public and at the technical hearings.

5. TECHNICAL HEARINGS

Public hearings were held at Whitehorse in the period June 16, 17 and 18 to receive briefs and comments from technical review agencies, individuals and

organizations. A total of five briefs were reviewed. In addition, there were eight oral statements made by individuals and groups.

In the course of the review of the Whitehorse routing alternatives, the Panel considered all of the available information on the subject from the previous hearings on the pipeline proposal.

6. GENERAL CONCERNS

The documents submitted by the Proponent provided a substantial body of information on the route alternatives in the Whitehorse/Ibex region. In the technical review of the information, the Panel focused on the following general concerns:

1. Evaluation of Alternative Routes: Methodology and Presentation of Information.

The documents submitted by the Proponent constitute a routing report giving justification for the choice of the Ibex route past Whitehorse. The information is not an environmental impact statement and does not detail the predicted impacts and recommended mitigation measures for the preferred route and alternatives. Furthermore the Panel was not informed which negative impacts of the project would go uncorrected if the preferred route through Ibex Pass is to be utilized. These are called residual impacts and it is conventional to describe them and to propose additional measures to remove or minimize their detrimental effects. However, the technical

review did yield sufficient information for the Panel to analyze the routes and to arrive at conclusions and recommendations.

The Proponent compared alternative routes in the Whitehorse area for environmental, socio-economic and safety factors using a numerical rating system for both the degree of concern and the extent of project (Proponent's) response that would likely be required. Factors which affect route location were rated for Importance of Concern on a scale ranging from 0 (factor absent) to 5 (factor present with extreme concern). The Project Response was also noted for each factor on each alternative on a scale from 0 (no response required) to 5 (the response required may not be effective based on previous experience and involves exceptional additional cost or the possibility of delay if necessary innovation is not effective). A final rating of concern for each location factor was obtained by adding the numerical ratings assigned to Importance of Concern and Project Response.

Criticism of the methodology was focused on several points. The Panel was advised that the rating system masked an understanding of the range and levels of potential impacts. Because each rating was applied to an entire route alternative, the location and area1 extent of the potential impacts was obscured. The ratings of Project Response also masked specific information on location and costs of recommended mitigation measures that might be employed. Furthermore, committments were not made to carry out the various mitigation methods on the alternatives.

The Panel concluded that the methodology did not permit a rigorous evaluation of the route alternatives nor did it clearly illustrate the range of environmental impacts for each alternative.

It is recommended that in future submissions, an improved system be used that will identify and describe the kinds, extent and range of potential impacts, the proposed mitigative measures, residual impacts, and the costs associated with them.

2. Corridor Concept

The concept of the establishment of a single energy corridor was discussed. A corridor would restrict oil and gas pipelines and other Jinear transportation facilities and thereby confine environmental and social impacts. Specifically, the Panel learned that there is a question as to the suitability of the Ibex Valley to' accommodate additional facilities such as an oil pipeline. This would call for an evaluation of the effects of cumulative environmental impacts from both projects.

The Proponent advised the Panel that the application for an oil pipeline to transport Alaska oil overland through Yukon to southern markets is presently in abeyance.

The Panel noted this point. However, the panel felt it must take note of the fact that existing government guidelines provide for the planning of linear facilities in the north.

3. costs

The Panel reviewed cost estimates provided by the Proponent. It was learned that the total costs tabled for the different route alternatives do not include the costs of major river crossings, survey, x-ray, revegetation, compression, land communications, project management and contingency. However costs estimates did include special engineering and construction, scheduling, environmental mitigation and public safety.

Given these factors, the Panel was advised that the relative cost of the alternative routing ranged from a low of 171.7 million dollars for the Ibex Route to a high of 210.7 million, associated with the Second Whitehorse Route, using the West Whitehorse Cut-off and connecting with the Dempster Lateral from the Klondike Highway. The range of costs associated with the alternative routings is therefore approximately 39.0 million dollars.

The issue of project-related costs to be assumed by government agencies was not reviewed at the technical hearings. However the Panel notes that potential costs to government are important and therefore bear on the assessment of route alternatives.

7. SPECIFIC ISSUES

1. Access

The question of access focused on the problems associated with the creation of new access into the Ibex Valley and the subsequent effects on wildlife. It is important to note that there were no submissions from the responsible

government agencies on their intentions to develop plans to deal with access during and after pipeline construction.

The Panel learned that the proponent proposes to cut off access roads to reduce impacts from new access if required to do so by government agencies. The Panel was informed that cutting off access could be physically accomplished by the Proponent. However, there is uncertainty as to whether this would be required of the Proponent, and skepticism whether such action would be effective. The Panel was informed that physically blocking access on a road does not usually stop access. Experience has shown that innovative means are used to gain access by motorized vehicles. For this reason the environmental implications of increased access and the detrimental effects on wildlife remained as major concerns.

An assessment of the alternative routes revealed that, in the case of all other alternatives, access presents fewer difficulties than on the Ibex Route. Due to the lack of environmentally sensitive areas and the small amount of access road construction required for Alternative Route #4 (First Whitehorse Route with the West Whitehorse Cut-Off), this route is favored over the Ibex Route.

2. Public Safety

Risk to human life and property arising out of accidental fire or explosion in a gas pipeline or facilities decreases as the distance from occupied land increases. At the technical hearings the Proponent provided information to show that the majority of such accidents are caused by third

party activity and that this generally increases with population density. Although risk in populated areas is statistically higher than for unpopulated areas, the Proponent has stated that risks associated with the proposed route alternatives are comparatively low. The Panel learned that Canadian Standards Association requirements provide that, with increasing population density near a pipeline, the line must be either constructed to a greater factor of safety or operated at lower pressures. It was pointed out at the hearings that the costs to meet CSA standards are already included in the main cost estimates for the project.

The Panel's assessment of public safety is that it is not a significant issue in this review. Present technology and safety standards will keep risks well within acceptable limits on all of the alternatives. With respect to Alternative #4, topographic and geotechnical conditions would allow placement of the pipeline up to one kilometer or more west of present and planned subdivisions of Whitehorse. In that approximate location, the pipeline would not present a threat to public safety at present or in the forseeable future.

3. Existing and Planned Land-Uses

The subject of the relationships between existing and planned land-uses and route selection was a topic of considerable discussion at the technical hearings. The fact that the Ibex route had, in the opinion of the Proponent, the lowest risk of impacts on existing and planned land-uses was one of the three main reasons for selecting that alternative. Information was presented which described known and planned land-uses along the other

route alternatives. The Proponent noted that consideration should be given to yet unplanned expansion around urban and subdivision populations as the pipeline had a life expectancy beyond most planning studies. However, there were no briefs submitted from government agencies which dealt with land use planning issues.

After careful consideration, the Panel concluded that land-use and land planning could not be considered a major factor in constraining route selection, for the following reasons:

1. The constraints relating to land-use and planning were estimated by the Panel to be roughly equal for most of the routes. The Panel could not find evidence of substantial differences in land-use patterns or planning efforts for those routes passing north and south of Whitehorse.
2. The consideration of future and yet unplanned development was also considered to be important. However, the Panel is of the opinion that this potential for development applies generally within the City of Whitehorse boundaries and within the Block Land Transfer, when the long-term view is taken. The Panel is of the opinion that it is not valid to assume that all areas under current use will simply continue to expand.
3. Finally, the Panel observed that the opportunity is still available for selecting a well-planned route west of the Whitehorse area without impinging on present or planned development. The problems of dealing with land-use conflicts and planning are not as great as those posed by pipeline routing in Southern Canada. Given the large size of the City

of Whitehorse boundaries and the undeveloped nature of the landscape, the opportunity for proper planning is available, given long-term consideration to pipeline needs.

This conclusion that land-use and land planning could not be considered a major factor applies also to Alternative #4 (First Whitehorse Route with the West Whitehorse Cut-Off). Few land-use conflicts are apparent along this route and careful planning that directs the route as far to the west as possible appears to avoid even the aspect of long-term expansion which is yet unplanned. In addition, it is noted that access through this area is provided by the Whitehorse Copper Road.

The Panel recommends that detailed planning be carried out with respect to routing of Alternative #4 through Commissioner's lands and the City. Full involvement of the City and Territorial Governments will be required. Routing should take maximum advantage of the less rigorous terrain requirements for the pipeline and the alignment should be located as far as possible to the west and on the upslopes. The Panel is of the opinion that such a planned route could easily avoid potential conflicts with the McPherson subdivision and meet the long-term requirements of both the City and the Proponent. Such planning should also include the proposed Dempster Lateral connection and routing of service lines to the City.

4. Dempster Lateral Pipeline Connection

In its 1979 report, the Panel requested information on a number of associated projects, one of which was the proposed Dempster Lateral. While

this matter was dealt with by the Proponent at the technical hearings in June, 1981, it was a subject of comment by a number of intervenors. The Panel must consider the implications of the connection of the Dempster Lateral, although it does not have a mandate to assess the environmental impact of that project. This connection is of particular significance because at present there are two alternative routes under consideration for that portion of the Dempster Lateral route from Braeburn (60 kilometers north of Whitehorse) to the point of connection with the Alaska Highway Gas Pipeline project. The western route follows the Old Dawson Trail/Klushu-Thirty-Seven Mile Creek and the eastern alternative is near the present Klondike Highway. The Thirty-Seven Mile Creek portion is an undeveloped area and is not part of a traditionally travelled route.

In the hearings the Proponent stated that the Old Dawson Trail/Klushu-Thirty-Seven Mile Creek is the preferred route thus leading to an interconnection to the west of the Takhini River. The Panel is of the opinion that selecting the Ibex routing forces a decision in favour of the Old Dawson Trail/Klushu-Thirty-Seven Mile Creek route.

The Panel feels this decision should be made only after serious consideration of the environmental impacts on the Old Dawson Trail/Klushu-Thirty-Seven Mile Creek and Klondike Highway routes at the time of the environmental review of the Dempster Lateral Project. To allow such consideration, it is necessary to select a routing in the Whitehorse area which leaves both lower Dempster Lateral options open to consideration. The Ibex routing would not permit this. Thus it presents the most difficulty in this respect. After assessing the alternatives to the Ibex

Route the Panel concluded that Alternative Route #4 would leave open both options on the connection with the Dempster Lateral.

5. Geotechnical Issues

The review of geotechnical issues concentrated on the relative ease (and cost) of pipeline construction on the various routes as conditioned by geotechnical or terrain conditions. The major environmental concern identified was the effect of the berm mode of construction on the movement of large mammals where ice-rich permafrost conditions might require the berm mode to be used. While the relationship between geotechnical conditions and potential for stream siltation was accorded considerable attention in the 1977 and 1979 hearings, the subject was not examined at the 1981 hearings.

The Proponent supplied information in the form of terrain maps (Map 2, Sheets 1 and 2) and descriptions of certain of the terrain types which indicated that the Ibex Pass route was geotechnically the most suitable of the routes available. The soils along the route are mainly granular, well-drained and free of permafrost. The Proponent is of the opinion that where permafrost occurs, it does not contain excess ice and hence is not unstable when thawed. In contrast, all other combinations of routes pass along the Takhini Valley which is floored by fine-grained glacial lacustrine sediments that are locally very ice-rich and highly unstable when thawed.

At the technical hearings, the Proponent indicated that the berm mode of construction would be required over intervals with ice-rich sediment on alternative routes in the Takhini River Valley. The intervals may be up to one kilometre or so in length, separated by intervals where the pipe is buried. The bermed intervals would be similar in appearance to the existing Alaska Highway. A closer analogy would be the Alaska Highway with one lane occupied by a pipe buried beneath a 2.5 meter high mound. The degree to which bermed sections would inhibit large mammal movement is uncertain. However, the sections would be required in an area where there are no known seasonal migrations of animals such as sheep or caribou.

The ice-rich lacustrine sediments of Takhini Valley lie mostly below an elevation of 2500 ft. and could be avoided by location on the south slope of the valley. In this location, there are several intervals of bare bedrock which would necessitate extensive blasting. Estimates of construction costs as supplied did not permit a comparison of the cost of berming and the cost of blasting. Both are known to be significantly more costly than conventional ditching and burial. In this review berming is a new concept for the construction of the gas pipeline. However it involves relatively simple construction procedures. Granular material necessary for berming occurs in large widely separated deposits on the south side of Takhini Valley and supplies are adequate. However, it may be necessary to haul material some distance depending on where the berm mode would be required.

In summary, the Ibex Pass route is rated as the best of the available routes from a geotechnical point of view. The Panel agrees with this assessment. It should be noted that no geotechnical assessment was provided for the Old Dawson Trail/Klushu-Thirty-Seven Mile Creek alternative of the proposed Dempster Lateral. The choice of the Ibex Pass route would necessitate adoption of that alternative.

After an assessment of the proposed alternatives to the Ibex Pass Route the Panel has concluded that although Alternative #4 presents some local difficulty with geotechnical conditions, engineering solutions to those conditions are apparently available, and no significant environmental problems are predicted from the application of the engineering solutions.

6. Fisheries

The Panel assessed the adequacy of the Proponent's mitigative measures to reduce impacts of pipeline activity on fish or fish habitat. Seasonal movements of fish, downstream water quality, and fish habitat were of particular interest. The Proponent's response to these concerns for the Ibex Pass Route primarily involved the scheduling of activities within time windows when there would be minimum impact on fish or fish habitat.

The Panel was informed by intervenors that other mitigative measures in addition to scheduling would be required to reduce impacts. The use of flumes and culvert crossings in stream areas where spawning and rearing occur in close proximity to pipeline crossing sites was recommended as one such special construction technique. This has been used on pipeline

projects in Southern Canada and seemed to have some merits there. However there were some differences of opinion as to the criteria for the application of these special construction techniques.

The Department of Fisheries and Oceans provided a priority list of the alternative routes rated according to the impact on fisheries. It was estimated that, if additional mitigative measures such as fluming and culvert crossings were used, impacts on fisheries for any of the alternatives would be almost negligible.

The Panel's assessment of the fisheries issue is that the Ibex Route carries with it the greatest potential for fisheries impact compared to other routes. Some mitigative measures in addition to scheduling (such as fluming and culvert crossings) should be utilized wherever stream flows permit and spawning and rearing areas are in close proximity to the pipeline crossings. In terms of comparing the various route alternatives near Whitehorse, the impacts of the pipeline on fisheries are probably mitigatable and are not therefore seen to be significant.

7. Wildlife

Since the commencement of the Alaska Highway Gas Pipeline review, the Ibex Valley has been singled out as a unique area because of the variety and abundance of the wildlife occurring there. It is one of four sensitive areas along the Yukon portion of the proposed pipeline where alternative routes were to be considered. This uniqueness is enhanced and complicated by its proximity to Whitehorse which is the largest centre in Yukon. At

the technical hearings the Proponent and others presented information on the Dall's sheep population in the area and the location of mineral licks, lambing areas and winter range adjacent to the pipeline route. There is evidence of a viable grizzly population in the Ibex Valley and denning sites and spring and summer range have been identified. Because of its sensitive nature, information on exact raptor nest site locations has not been presented to the Panel. However the evidence received indicates that the highest concentration of raptor eyries occurs along the Ibex route. Additionally, although little direct evidence was received, moose and furbearing mammals also occur along this route. Waterfowl habitat of significance does not occur in the Ibex Valley.

Although the level of information on the wildlife resources along the alternate routes, which was presented at the hearings, is not comparable to that along the Ibex, the Panel concurs that the Ibex Valley deserves the high environmental rating assigned to it by the Proponent.

Because of the sensitivity of the wildlife of the Ibex area to disturbance, the Proponent was asked to address the mitigation of impacts. The Proponent responded that disturbance during construction can be satisfactorily mitigated by scheduling construction during the least critical periods of the year for the wildlife in the Ibex Valley. The time-windows for this activity are quite constrained but there is some time for contingency. Furthermore, it is the Proponent's position that mitigation of impacts arising from post-construction use of the pipeline corridor is the responsibility of the government agencies having

jurisdiction over the resources affected. However the Proponent is prepared to assist in mitigating impacts, if required to do so by government agencies.

The Panel received no information on a comprehensive environmental plan for the area affected by the Ibex routing. Apparently the plan does not yet exist and no significant progress over the last two years has been made in the preparation of the plan.

The Panel's assessment of the Ibex Pass Route is that there are too many disadvantages to the wildlife resource there. In view of the unique nature of the variety and abundance of wildlife occurring in the Ibex Valley and Ibex Pass area, the proximity of this area to the City of Whitehorse, the conflicting evidence concerning the effect of pipeline construction activity on the wildlife resources, and the fact that plans do not exist for the careful management of this area if and when a pipeline becomes operational, the Panel cannot recommend the use of this route. To do so at this time would foreclose a wide range of options for the long term enjoyment of the resources of the area by the residents of the Yukon in general, and Whitehorse residents in particular.

In consideration of the other route alternatives the Proponent noted that the berm mode of construction may be necessary along Takhini Valley portions of Alternative #4. On the basis of available information, it is the Proponent's assessment that the length, height, and slope of the intermittent bermed sections will not be a barrier to large mammals known

to occur along that portion of the route. In the area, there are no known seasonal migrations of large animals such as sheep or caribou.

It is the Panel's position that the potential long-term implications for wildlife are considerably less along Alternative #4 than those which may be expected from an Ibex routing. Therefore with respect to wildlife, Alternative #4 is preferred.

8. Trapping and Outfitting

In its 1979 report the Panel requested information concerning land use relevant to the preferred and alternate routes in the Ibex/Whitehorse area. The Proponent evaluated route alternatives but did not include trapping and outfitting as important land uses. However during the hearings the Proponent did provide fur harvest value figures for trapping areas which are crossed by the proposed pipeline alternatives. Information was also received at previous hearings and at the 1981 hearings from representatives of the Yukon Trappers Association and the Yukon Outfitters Association. These intervenors expressed concern over the potential impact on these two forms of land use. The major concerns dealt with disturbance resulting from the project during construction and from trespassing along the right-of-way during operation, particularly in the Ibex Valley. No information was received on conflicts with outfitting operations along other alternative routes.

The Panel was informed that trapping areas will be affected regardless of which route is chosen. There will be a range of impacts which cannot be

measured simply in terms of reduced gross returns from affected traplines. This was noted by the Proponent.

The Panel's assessment of these issues is that while these two forms of land use are important, they are not major factors in this review. However if Alternative #4 is used, impacts on trapping and outfitting will be reduced or removed because, according to the Proponent, trapping areas along Alternative #4 have the lowest average annual income, and outfitting is not an important activity at the present time.

9, Environmental Planning

The issue of environmental planning and impact mitigation was brought before the Panel. Detailed environmental planning during the construction phase of the pipeline, and mitigation strategies were mainly directed by the Proponent to selection of route alternatives and the scheduling of pipeline construction work.

Several intervenors reported that it was difficult to evaluate route alternatives because specific mitigative measures were not described. The Proponent maintained that the proposed scheduling programs gave full recognition to sensitive timing during fish and animal life cycles. The Department of Fisheries and Oceans stressed that scheduling alone may not be sufficient in all cases to mitigate potential fish-related impacts.

The requirement of the Proponent to meet the Environmental Terms and Conditions established by the Northern Pipeline Agency was discussed. It

was understood that detailed environmental plans are to be developed to guide the construction of the pipeline through Yukon. Furthermore, the Proponent stated a willingness to undertake specific measures for environmental protection beyond scheduling, should this be required by the Northern Pipeline Agency.

For the purposes of this review, the Panel assumes that the proposed scheduling plans of the Proponent and the committment to meet the Environmental Terms and Conditions established by the Northern Pipeline Agency will provide adequate environmental control during the construction of the project. The Panel regards these as adequate responses during the examination and selection of routing alternatives for the pipeline in the Ibex/Whitehorse region.

8. CONCLUSIONS

1. If the Alaska Highway Gas Pipeline is constructed in a corridor near the Alaska Highway, environmental and social disturbance could be minimized, benefits to residents and communities could be maximized and resource development can be channelled effectively.

   The Panel has concluded, therefore, that in the absence of other significant constraints, a general bias should be displayed in favour of those routes which would be placed within the existing Alaska Highway corridor.

2. As a result of its review of written material and its consideration of evidence provided at public hearings, the Panel concluded that there were five principal factors relevant to an assessment of the routing alternatives presented. These were:
   - environmental impacts and implications
   - links to the proposed Dempster Lateral Pipeline
   - present and potential land use conflicts including constraints upon future townsite development
   - public safety.
   - costs of construction

3. After a thorough consideration of these factors, as they related to the routing alternatives presented, the Panel concluded that the major significant variables were environmental impacts and implications and costs of construction. In this regard the matter of eventual linkages to a Dempster Lateral was concluded to be an important feature of each of these two variables.

4. The Panel concluded that from the standpoint of public safety and present and potential land use conflicts, the differences between the proposed routes were of minimal significance.

5. The Panel concluded that in terms of the two variables identified, only two of the proposed routes offered reasonable alternatives. These are the Ibex route (#1) and the First Whitehorse Route with the West Whitehorse Cut-off (#4). Most of the other proposed routes entailed

major cost penalties, while only marginally improving environmental impacts or implications, including those associated with an eventual link with a Dempster Lateral.

6. The Panel concluded that the major environmental considerations associated with an evaluation of proposed pipeline routes may not arise from the actual construction of the pipeline but rather will occur during the operation of the project. The Panel was satisfied that, even in the most environmentally sensitive route, the Ibex Pass, the Proponent has the intention to minimize environmental impacts and to carry out the construction in an environmentally acceptable way. The principal environmental concerns, in the view of the Panel, will relate to the degree of new access provided to significant wildlife areas close to a major population centre, and the extent to which proposed routes will maintain or restrict options on a link to a Dempster Lateral. The latter concern is significant because of the general lack of environmental knowledge currently available on the Dempster Lateral routing alternatives in the Whitehorse area.

7. The Panel considered at length the difficult problem of weighing the money value of potentially lost environmental values should the Ibex route be selected, against the higher cost of utilizing an alternate route.

On balance, the Panel concluded the cost advantages associated with the proposed Ibex Pass route are outweighed by its potential for negative

long-term environmental impacts and by the current uncertainties associated with the Old Dawson Trail/Klushu-Thirty-Seven Mile Creek linkage to the Dempster Lateral. The selection of the Ibex Route would render the choice of the linkage virtually unavoidable. Therefore the Panel concluded that the proposed Ibex Pass route should be rejected.

8. The Panel concluded that, despite the projected extra cost associated with the First Whitehorse Route with the West Whitehorse Cut-Off, this route offers significant environmental advantages, preserves acceptable options for the eventual link with a Dempster Lateral, and adheres to the existing Alaska Highway corridor.

9. While peripheral to its terms of reference, the Panel concluded that it would be remiss if it did not comment on the opportunity now presented to Governments to take positive action to preserve the current environmental values of the Ibex Pass and to preserve future options for this unique area. For example, controls with respect to surface and sub-surface rights should be continued until governments can conclude an environmental plan for the area. Without action of this nature, the Panel recognizes that it is only a matter of time before the Ibex Pass will face further encroachments, either as a result of other major development proposals, or through a gradually increasing utilization and exploration that is both unplanned and uncontrolled.

10. Finally, the Panel appreciates the fact that the Proponent has chosen the Ibex Valley Route with the conviction that the Proponent can do its

part to mitigate successfully those impacts which will affect fish, wildlife and other environmental elements. However the Panel has an obligation to advise the Minister of the Environment on long-term and broad implications of the routing choice in the Ibex/Whitehorse area.

Because of the proximity of the Ibex Valley to Whitehorse, it would be very difficult for government to moderate access to that area following pipeline construction. To utilize this route would certainly remove future options to dedicate the Ibex area to other uses. Therefore, the Panel has concluded that, notwithstanding the planning and intentions of the Proponent, the Ibex Route should be rejected.

9. RECOMMENDATIONS

1. It is recommended that the Ibex Pass Route be rejected and that the Alaska Highway Gas Pipeline be routed through the Whitehorse Area by using the First Whitehorse Route with the West Whitehorse Cut-Off.

2. It is recommended that Government agencies take early and positive action to preserve the present wildlife and environmental values in the Ibex Valley area and to preserve future options for this unique area.

Environmental Assessment Panel

Alaska Highway Gas Pipeline Project

E.R. Cotterill

D.S. Lacate

W.L. Klassen

P.H. Beaubier

O.L. Hughes

C.E. Wykes

10. APPENDICES

APPENDIX I - PANEL MEMBER BIOGRAPHIES

EWAN COTTERILL - CHAIRMAN

Mr. Cotterill has had a twenty-one year association with the Canadian North.

He was appointed Assistant Commissioner of the Northwest Territories in 1973, with executive responsibilities for the Departments of Public Works, Local Government, Natural and Cultural Affairs and Public Services as well as for the Territorial Government's offices in the four administrative regions of the Northwest Territories.

Appointed in 1975 as Assistant Deputy Minister, Northern Affairs Program, Department of Indian Affairs and Northern Development, he was responsible for all departmental programs in Yukon and Northwest Territories which are concerned with the management of natural resources together with the protection of northern environment and support of the Territorial Governments in providing social and other local services.

He was appointed Executive Chairman of the Federal Environmental Assessment Review Office in 1980.

P. HIRAM BEAUBIER

Mr. Beaubier completed a B.A. degree from the University of British Columbia in 1967 and an M.A. in Geography from McGill University in 1970.

Mr. Beaubier is presently Assistant Director, Renewable Resources, Department of Indian Affairs and Northern Development, Yukon Region. He is responsible for programs relating to the Region's waters, lands and forests.

Before moving to Yukon, Mr. Beaubier worked on general research programs in various locations of the Canadian North, including mapping of present land and resource use of Yukon.

Mr. Beaubier was a Panel member on the Shakwak Highway Project Environmental Assessment Panel and he has participated in other environmental reviews of major projects in both northern and southern Canada.

OWEN HUGHES

Dr. Hughes holds a Bachelor of Applied Science degree from the University of British Columbia (1950) and a Doctor of Philosophy degree from the University of Kansas (1959).

From 1950-52 Dr. Hughes was Technical Officer and from 1953 to the present, Geologist and Research Scientist with the Geological Survey of Canada. Up to 1960 he worked on problems of Pleistocene and engineering geology in Nova Scotia, northern Ontario and northern Quebec. From 1960 to the present has carried out similar studies in Yukon and the Northwest Territories.

In 1974 Dr. Hughes was a member of the Mackenzie Valley Pipeline Assessment Group. During the Berger Inquiry on that project he served as advisor to the Inquiry Counsel.

Since 1977 Dr. Hughes has been a member of the Alaska Highway Gas Pipeline Environmental Assessment Panel.

WILLIAM 3. KLASSEN

A native of Manitoba, Mr. Klassen arrived in the Yukon in 1966 as a constable in the Royal Canadian Mounted Police. In 1970, he began employment as a Game Guardian with the Yukon Game Branch. He graduated from the University of Alaska (Fairbanks) with a B.Sc. in Wildlife Management in 1976.

Since 1976 he has been employed by the Yukon Wildlife Branch and the Yukon Pipeline Branch, working on environmental impact assessment, particularly concerning effects of development on wildlife. He recently received a

Master of Forestry degree from the Yale School of Forestry and Environmental Studies.

DOUGLAS S. LACATE

Dr. Lacate received a B.Sc.F. from University of New Brunswick in 1956 and an M.Sc. from Cornell University in 1959.

He was employed as research scientist with federal Forestry Branch, 19564960, working on forest land classification throughout eastern Canada. He transferred to British Columbia in 1960 and continued forest land classification research until 1964 at which time he was seconded to the Canada Land Inventory Program (ARDA) and served as provincial Co-ordinator of the Forestry and Agriculture Capability program.

Dr. Lacate completed his Ph.D. in 1970 at Cornell University in the fields of natural resource management and environmental impact assessment of highway developments. He was associate professor at the University of British Columbia from 19704973, teaching airphoto interpretation and land classification and evaluation.

He worked on the evaluation of terrain in the Mackenzie Valley 1971-72 and in 1974 he returned to federal public service as Regional Director of the Lands Directorate, Environment Canada, in the Pacific and Yukon region where he has been stationed up to the present.

Dr. Lacate has been a member of the Alaska Highway Gas Pipeline Environmental Assessment Panel since 1977. In addition he served as panel member on the Shakwak Highway Project Environmental Assessment Panel.

COLIN E. WYKES

Mr. Wykes has a B.Sc.A. (1965) from University of Guelph, majoring in Fisheries and Wildlife Biology, and an M.Sc. in Limnology (1967) from University of Guelph.

From 1967 to 1973, Mr. Wykes was a Biologist with the Resource Development Branch, Federal Department of Fisheries, Halifax, N.S. These six years were spent in fisheries management and development work throughout the Maritime Provinces.

From 1973 to the present he has been Director, Environmental Protection Service, Environment Canada, Yukon Branch, at Whitehorse, with responsibilities for directing the Environmental Protection Service in Yukon, serving as a member of the Yukon Territory Water Board, and as a member of four Environmental Assessment Panels for Yukon projects.

APPENDIX 2 - BRIEFS SUBMITTED TO THE ENVIRONMENTAL ASSESSMENT PANEL

1. Panel letter to Northern Pipeline Agency, April, 1981.

2. Department of Indian and Northern Affairs.
   Comments on the Addendum to the EIS. Alternative Routes.

3. Department of Fisheries and Oceans. Department Brief on Addendum to the EIS for the Yukon section of the Alaska Highway Gas Pipeline with Respect to Alternative Routes, Submission 3-1.

4. Foothills Pipe Lines (South Yukon) Limited. Responses to Panel Questions Regarding Addendum to the EIS for the Yukon Section of the Alaska Highway Gas Pipeline with Respect to Alternative Routes - Submission 3-1.

5. Environment Canada. Department Brief on "Addendum to the Environmental Impact Statement for the Yukon Section of the Alaska Highway Gas Pipeline with Respect to Alternative Routes. Submission 3-1."

6. Department of Energy, Mines and Resources. Environmental Assessment of Routing Alternatives for the Alaska Highway Gas Pipeline in the Whitehorse/Ibex Region.

7. Yukon Historical and Museums Association. The Identification and Protection of Historic Sites Subject to Alteration by Development.

APPENDIX 3 - APPEARANCES BEFORE THE PANEL

Mr. W.J. Deyell	Foothills Pipe Lines (South Yukon) Ltd.
Mr. G. Lipsett	Foothills Pipe Lines (South Yukon) Ltd.
Mr. P. Dixon	Foothills Pipe Lines (South Yukon) Ltd.
Mr. R. Owens	Foothills Pipe Lines (South Yukon) Ltd.
Mr. D. Fielder	Foothills Pipe Lines (South Yukon) Ltd.
Mr. J. Burrell	Foothills Pipe Lines (South Yukon) Ltd.
Mr. 3. Elwood	Foothills Pipe Lines (South Yukon) Ltd.
Dr. V. Schilder	Department of Indian Affairs and Northern Development
Mr. J. Payne	Department of Fisheries and Oceans
Mr. J. Mathers	Department of Fisheries and Oceans
Mr. M. Romaine	Department of Environment
Mr. Derek Wolff	Department of Environment
Mr. G. Privett*	Whitehorse Chamber of Commerce
Mr. K. Heynen*	
Mr. G. Umbrich*	
Mr. H. Mackenzie (for Mr. C.	Templeton)*
Ms. Sylvia Williams*	
Ms. N. MacPherson*	Yukon Conservation Society
Mr. Tony Hodge*	Yukon Conservation Society

* See transcripts for text of briefs.

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Robert Van Everdingen	Technical Advisor
Brent Lister	Technical Advisor
Ronald Jakimchuk	Technical Advisor
Daniel Carruthers	Technical Advisor
J.G. Moore and Associates	Responsible for recording proceedings and production of transcripts.