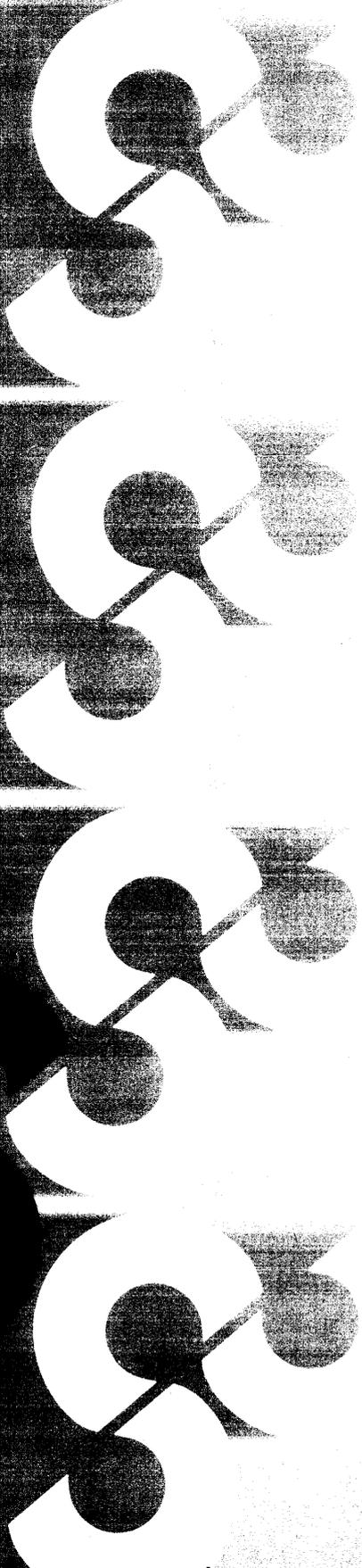


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Northern Development
and Technology
Assessment Systems

A study of petroleum
development potential in the
Northern Territories



Northern Development and Technology Assessment Systems

ANALYZED

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Northern Development and Technology Assessment Systems

A study of petroleum
development programs in the
Mackenzie Delta-Beaufort Sea
Region and the Arctic Islands

by Robert F. Keith, David W. Fischer, Colin E. De'Ath,
Edward J. Farkas, George R. Francis, and Sally C. Lerner

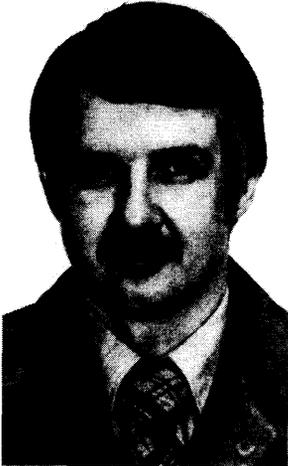
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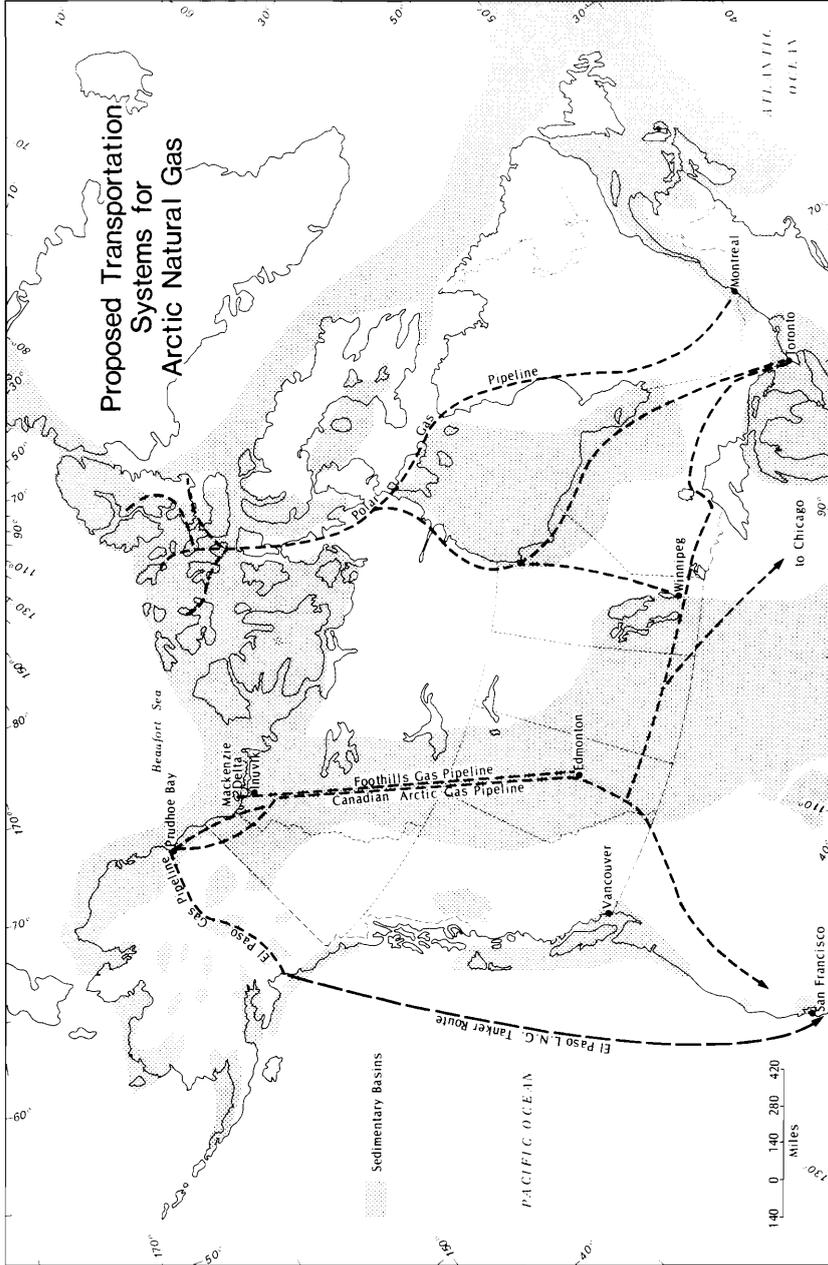
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Foreword

This study was carried out in 1974 for the Science Council by six members of the Department of Man-Environment Studies, University of Waterloo. It is the first of six studies bearing upon the development of the Canadian North:

1) *The Political Economy of Northern Development*, by K. J. Rea (to be published by the Science Council in March 1976).

2) *Decision Making in the North: Oil Sands Case Study*, by Canadian Resourcecon Limited; W.R. Lee, D.K. Strang, G.A. Constable and G.R. Staple. (This will not be published. Mimeographed copies are available from the Science Council).

3) *Le processus décisionnel dans la conception et la réalisation du développement nordique au Canada – La Baie de James, préparé par Eric Gourdeau avec la collaboration de Pierre Dansereau, Louis Edmond Hamelin et Guy Rocher*. (This will not be published. Mimeographed copies are available from author, Eric Gourdeau, 2376 avenue Royale, Québec.)

4) *Arctic Mining: A Case Study of Decision-Making – the Strathcona Sound Mine – Baffin Island*, by R. Gibson. (It is in the process of revision. No decision has been made whether to publish, to distribute in mimeographed form, or to release to the author.)

5) *Offshore Petroleum Exploration on the Labrador Continental Shelf: A Study of Decision Making*, by R.D. Voyer. (This will not be published. Mimeographed copies are available from the Science Council.)

The central purpose of carrying out these studies is to examine the decision-making processes involved and to identify those factors which influence the pace and scale of Northern development.

This review traces the history of oil exploration programs in the Mackenzie Delta-Beaufort Sea areas. It also classifies the social groups impacting and impacted upon by these programs, and analyses the influences on the regulatory, policy, judicial and economic decisions which have been taken.

The substantive issues of Northern petroleum development and the issues inherent in the technology assessment system itself, have been considered distinctly and effectively. There are three matters of general concern which are made evident in this study. The first is the continuing and critical lack of a national energy policy, and effective coordinating mechanisms for energy issues. The second relates to a frequent excess of confidentiality of data. The third, and perhaps most important, is what the authors term an "unresponsiveness to change" in Northern Development based upon the strong and well-established links between industry and the regulatory agencies. Although such linkages are both necessary to progress and often productive in results, there is a vital need for flexibility, accommodation, and effective and genuine communication in our Northern development activities and mechanisms. We would do well to accord a high priority to these needs.

As with all Background Studies published by the Council, the views expressed are those of the authors and are not necessarily those of the Council.

J. J. Shepherd
Executive Director
Science Council of Canada

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This study, which attempts to understand issues of vital concern to so many individuals and organizations in Canadian society, stands indebted mostly to all those who influence and are influenced by petroleum development programs in the Canadian Arctic.

To those individuals in the North, native northerners, territorial government personnel and other northern residents; to federal and provincial government personnel; to members of the petroleum and related industries; to members of the financial community; to research groups across the country; to university personnel; to public interest groups; and to many of Canada's journalists, we owe a deep sense of gratitude. The strengths of this study derive from the cooperation and insights of them all. Its limitations stem from our efforts to portray and interpret what we observed and from the complexity of the issues at hand.

We also wish to thank those members of the Science Council of Canada and its staff who not only made the study possible but who, throughout its conduct, contributed to the endeavour.

Our research assistants Diane Beckett and Frank Doe, contributed significantly and untiringly to the study.

To our secretaries, Margaret Huggins, Lynda Connolly, Mavis Hutter and Karen Atkinson, for their patience and perseverance, our sincere thanks.

RFK
DWF
CED
EJF
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Summary

In recent years the pace and scale of development in northern Canada have reached unprecedented levels. Petroleum in the Mackenzie Delta-Beaufort Sea region and in the Arctic Islands has provided the focus for northern development. The development in both regions is raising issues important to the future of northern Canada and the country as a whole.

This study investigates the ways in which decisions are being made about petroleum programs in the Mackenzie Delta-Beaufort Sea and Arctic Islands regions. By identifying all the social groups (actors) causing or affected by these developments, their objectives, their perceptions of each other, their sources of information, their decisions, and their perceptions of unresolved issues, the authors attempt to summarize and interpret petroleum development processes in northern Canada. They identify factors which influence the pace and scale of development, the emergent issues and policy implications.

In the contexts of natural resource developments in Canada and international events, the study traces petroleum development in the Yukon and the Northwest Territories from its early history to the present. An analysis of the regulation of petroleum exploration and transportation highlights important factors which influence the pace and scale of development.

The social groups involved in both areas are numerous and diverse in kind and purpose and their priorities change. Actors include the petroleum and supporting industries; northern native peoples; the federal, provincial, and territorial governments; environmentalists; research groups; financial organizations; special commissions and regulatory bodies. Some actors are from outside Canada.

We classified actors according to their degree of involvement in and their approval or disapproval of the technological programs. Core actors, those who are continuously and intensively involved in the programs, include, in the Mackenzie Delta-Beaufort Sea area, the "major" petroleum companies, the Department of Indian and Northern Affairs (DINA), Canadian Arctic Gas Study Limited (CAGSL), Alberta Gas Trunk Lines Limited (AGTL).

Core actors in the Arctic Islands include Panarctic Oils Limited, DINA and Polar Gas Limited. Supporting actors include several departments of the federal government, provincial governments and petroleum-related industries. Rivals and adversaries include northern native peoples, environmentalists, and those supporting rival schemes or alternative technologies. "Independent" actors include the Mackenzie Valley Pipeline Inquiry and the National Energy Board (NEB). Important actors outside Canada include the United States (U.S.) government and U.S.-based petroleum interests.

Classifying actors makes it possible to identify more clearly relationships among actors, and the nature of the information base actors draw upon and its relationship to decision making. For the most part information is related to an actor's objectives, except in

those instances where, particularly, regulations require that other kinds of information be gathered. The combined information base of all actors is extensive, but uncoordinated and fragmentary.

Analysis reveals that certain fundamental decisions made by government and industry have set the pace and scale of petroleum development in the Canadian Arctic. While the pattern of decisions is linked to the sequential nature of the petroleum development process, regulatory, policy, judicial and economic decisions have affected the process. Uncertainty, particularly since 1970, is perhaps the overriding concern of all those who make or are affected by decisions in the Mackenzie Delta-Beaufort Sea and Arctic Islands programs.

We analysed two sets of issues surrounding the two Arctic petroleum programs. First, we categorized issues based upon actors' perceptions as 1) technological 2) environmental 3) economic 4) social 5) political. We identified specific issues in each category and discussed their relationship to other issues. Second, we analysed issues inherent in the assessment system itself. Actor issues focussed upon balance of interests, conflicting objectives, and participation capabilities; information issues dealt with secrecy, autonomy, networks, and uncertainty; and decision issues focussed on centralized decision making, the relationship between information and decisions, and consideration of alternative development schemes.

In summary some general issues emerged that may be significant for Canadian policy in the areas of northern development, energy and industrial development. The lack of a mechanism to formulate a Canada-wide (not just federal) energy policy is one such issue. The unresponsiveness to change of many of the actors is also important. The lack of coordinated information systems inhibits the flow of information and generates high levels of uncertainty. The conspicuous absence of any assessment coordinating mechanism raises questions about Canada's ability to conduct comprehensive assessments of large-scale developments, especially before irrevocable commitments are made.

In conclusion, in spite of the large investment of talent, effort and money, there is no overall sense of purpose to northern development. Instead, actors respond to situations as they arise. The absence of an overall policy about which there is some degree of consensus seems clear. The Canadian capability to undertake comprehensive and timely technology assessments, on the basis of what is learned and to innovate socially relevant development programs, is not yet established.

I. Introduction

"The great Canadian pipelines were built just as much as a result of political manoeuvring, horsetrading, bluffing and politicking as they were by solid engineering."¹

"One of the most important questions is whether and how far, technology assessment and a systematic social control and management of technology can help decisionmakers and society at large to shift attention from technology per se to socially relevant innovation."²

Such observations remind us that petroleum development involves much more than technology. Equally a part of development in northern Canada are political, economic, social and environmental concerns: in a sense these, rather than technology, animate and direct development. Therefore, we must look at development as both a cluster of social goals and the processes by which those goals are pursued. We now recognize the importance of considering the social, environmental and other consequences in any assessments of technologies being applied for economic development.

Recently there has been a growing sense of disenchantment with "technological progress" viewed in a narrow analytical sense.³ One response to this has been "technology assessment", an evaluation of the consequences of a technological capability becoming embedded in a society. This has led to concern about how, and by whom, technology is developed and assessments of it are conducted. If we define development, and in this case northern development broadly, we must examine many aspects which transcend limited technological and economic frameworks.

In order to examine all the short- and long-term consequences of technologies, we must recognize two aspects of technology assessment, namely the assessment per se and the processes operating within the social system which conducts the assessment. It is this latter aspect which Gibbons and Voyer refer to as a "technology assessment system".⁴

At the outset of our study we adopted Gibbons' and Voyer's concept of a technology assessment system.⁵ They view such a system as an integral part of a milieu in which certain groups have as a common focus the application of a given technological capability to achieve particular goals. They define a technology assessment system as:

"those social groups which are (or should be) concerned with developing a given technological program. The elements which make up this system may, or may not, be bound together by any formal arrangements: coupling is effected by their mutual interest in the development and diffusion of a given technological capability."⁶

Our analysis of such a system involves identifying the groups or "actors" involved, examining relationships among them, reviewing the

information base for their decision-making, and examining the decisions which result. Next we identify the emergent issues, examine underlying processes of applying technology for development, and raise basic policy questions.

The pace and scale of development in northern Canada is unprecedented. Oil and gas resources are the focus of activity and most actors feel that activity will increase. Two areas, the Mackenzie-Beaufort Sea region and the Arctic Islands, are the sites of rapid and large-scale development. In both regions, numerous actors are involved in the early phases of petroleum development and others are concerned about the implications and consequences. Actors have spent a substantial amount on exploration and on oil and gas transportation development. Each actor sees the issues in the programs differently, but they all agree that the consequences are important not only to the northern regions in which exploration and development are occurring, but also for Canada as a whole.

We investigated the processes of petroleum development in the Mackenzie Delta-Beaufort Sea and Arctic Islands in the context of a technology assessment system. Our specific objectives were:

1. To identify all the individuals and groups (actors) which have been and are presently influencing the direction of development.
2. To state the position of each actor, noting, in particular, perceptions of and relationships with other actors.
3. To describe the information-bases actors draw upon, their judgments of the relevance, sufficiency and accessibility of their information and its relationship to decision making.
4. To identify actors who are not, but should be, involved in influencing development, noting their position, and the consequences for them of a given project.
5. To identify all major decisions of actors, noting patterns and shifts in roles.
6. To identify the major exogenous variables which could affect a given project.
7. To identify actor perceptions of the major technological, environmental, economic, social and political issues surrounding a given project.
8. To gauge the comprehensiveness of assessments by analyzing the assessment system itself, noting particular strengths and limitations.

An analysis of a technology assessment system cannot be reduced to a set of precise measurements or controlled observations. To a considerable degree we depended on our judgments to identify actors, relationships among actors, the use (and misuse) of information and the strategies used in assessment system activities. We required much information only obtainable through personal contacts. We tried to identify the bias in information from each source.

Moreover, the northern petroleum programs are complicated by their large size and the many individuals and groups participating in the assessment system. The experimental methodology and "objectivity"

most appropriate for the natural and some behavioural sciences is not applicable.

The challenge therefore is to produce a balanced review and interpretation of the situation, and to communicate findings to decision makers in a useful manner. The study reflects how we, sometimes rather arbitrarily, coped with the challenge.

Eight persons with varying backgrounds spent from the latter part of May 1974 to the end of September 1974 gathering information. We conducted over 100 interviews with northerners and southerners including native peoples; petroleum company representatives; federal, provincial, and territorial government personnel; pipeline people; financial experts; environmentalists; lawyers; and journalists. The people interviewed resided in Inuvik, Yellowknife, Whitehorse, Vancouver, Calgary, Edmonton, Churchill, Toronto, Hamilton, Montreal, Ottawa, and Washington. We selected them in two ways: 1) on the basis of our knowledge of their involvement in northern oil and gas development, and 2) on the recommendation of other interviewees. We also sought out sources of information.

Following this Introduction, Chapter II reviews historical perspectives of petroleum development in general and in the Mackenzie Delta and Arctic Islands in particular. Chapter III outlines the phases of a petroleum program which affect the pacing of development. Chapter IV is a detailed review of regulatory processes surrounding petroleum exploration and transportation. Again pacing is important. Chapter V classifies and discusses the actors in both the Mackenzie Delta and Arctic Islands programs. Chapter VI assesses actors' perspectives of relevance, sufficiency, access to and comprehensiveness of information. Chapter VII discusses the major decisions in both the Mackenzie and Arctic Islands. Some potential decisions are discussed. Chapter VIII critically analyzes the technological, social, political, economic and environmental issues and the assessment system itself. Chapter IX concludes with some general observations on assessment systems.

II. Background Perspectives

A Canadian Overview

To understand the petroleum programs in the Mackenzie Delta-Beaufort Sea and Arctic Islands regions they must be seen in a historical context of Canadian and global events. Economic, political, social and technological factors have brought frontier petroleum areas around the world, and in northern Canada into prominence.

The "petroleum age", the era in which society has come to depend on oil and gas, is just over 100 years old. Throughout this period there have been predictions that petroleum supplies were in danger of imminent exhaustion. In 1948, predictions of early shortages of petroleum were made which have not been borne out. So far as we know, the soothsayers of 1948 were wrong but the gloomy predictions of today are correct. Why?

Forecasters in the 1940s only considered existing reserves and the then-current rate of consumption, to arrive at a "reserve life index". They overlooked year-by-year fluctuations in the reserve life index which reveal whether or not exploration during the year has uncovered new reserves greater than the year's usage. In the immediate post-war period, the reserve life index was increasing or remaining steady, but in recent years it has been steadily declining. The Canadian Petroleum Association notes that "Canada's liquid hydrocarbon reserves took their biggest drop ever in 1973, declining for the fourth consecutive year. . . ."¹ A similar picture exists in the U.S.

"Proved reserves of liquid hydrocarbons and natural gas dwindled during 1973. . . . Last year's results marked the third year in a row – and the sixth time in seven years – that crude oil proved reserves declined. Natural gas has followed a similar pattern: falling to its lowest level since 1957, these reserves have dropped three years in succession and five of the last six years."²

Furthermore, the Energy Resources Conservation Board (ERCB) of Alberta has noted that Alberta's oil production capability has almost reached its peak level on the basis of discovered pools only.

"In 1975 it will reach a peak at 1.68 million barrels per day and will then start to decline if there are no further discoveries, reaching 0.6 million barrels per day by 1983. Assuming a growth rate of 100 or 200 million barrels a year in initial recoverable reserves, the peak would be slightly higher but the decline would still start in 1976."³

To reverse this trend would require unprecedented exploration; conservation efforts could supplement such efforts but could not alone suffice. Current exploration is certainly unprecedented. Exploration is occurring in areas of the world where even the technological imagination thought it impossible only a few years ago: Canadian examples are "iceberg alley" off Labrador and the Arctic Islands.

By the mid 1960s opinion in the Canadian oil industry was split along the following lines:

1. If new oil reserves were found, they would compete with existing reserves for limited markets.

2. The limited life of existing reserves meant industry had to find more reserves to stay in business.

Then the Middle East War of 1967 led to disruptions in oil supply. It heightened interest in exploration in technologically non-conventional but politically more secure areas and hastened development in the Mackenzie Delta-Beaufort Sea and Arctic Islands regions. As an industry journal noted, "there is an oil crisis, no one has extra oil, and exploration is extending even into the Arctic".⁴ Because of exponential growth of oil and gas consumption, the industry needed giant new fields which were not likely to be found in areas already in production.

By 1967, offshore wells in Cook Inlet, Alaska, and an oil pipeline on the floor of Cook Inlet were operational. Yet a major "Offshore Report" in 1967 did not mention Arctic areas.⁵ Such areas were still not seriously considered by the international oil community.

Also as a result of the 1967 War the U.S. allowed additional oil imports, including some from Alberta. Indirectly this action too spurred interest in the northern frontier. Another factor was the precarious petroleum supply situation of the European countries which forced them, more so than Canada and the U.S., to explore non-conventional areas. The Groningen, North Sea discovery in 1959 sparked a greatly expanded seismic program in the North Sea and encouraged research on and development of new seismic methods. A "quantum jump" in seismic capability was made in 1962 and new equipment became available in 1963, which rendered pre-1962 geophysical data of "dubious" value.⁶ Subsequently, North Sea technology speeded extensive exploration in the Canadian North.

Another factor that had some effect on plans for the Mackenzie Delta-Beaufort Sea and Arctic Islands was work going on in Russia. There were reports that, "Russia was speeding up its timetable for oil and gas exploration beneath its Arctic waters. Growing enthusiasm is spurred by recent onshore discoveries above the Arctic Circle and prospects of improved offshore drilling capability."⁷ There were also reports that the Russians were using new methods to lay pipeline in the far north.⁸ Then Northern Affairs Minister Arthur Laing met with visiting Russian officials during this period and there were hints of cooperative Russo-Canadian Arctic oil hunts.⁹

Despite the increasing interest in the North in both the U.S. and Canada (the Prudhoe Bay announcement was only a few months away) the euphoria was not general. A January 1968 *Oil and Gas Journal* editorial¹⁰ described incentives which had brought exploration to Cook Inlet. It also described pressures to increase the government "take" after oil had been discovered and noted that these new economic pressures could make northern petroleum "look like a marginal operation. Despite its great potential, only one wildcat is drilling. The logistics of developing its reserves, generally believed to be tremendous, are forbidding."

However, only one week later a significant flow of gas was encountered in the "rank wildcat being drilled on Alaska's North Slope

by Atlantic Richfield.” This was the “first encouraging sign in several years of wildcatting on the Arctic Slope, although geologists generally considered the vast basin to hold tremendous potential. Oil and gas had been found before, by the United States Navy in the Umiat area, but reserves have not been considered commercial in view of their remote location.”¹¹

The Canadian government has undertaken several projects in frontier areas which have affected development. The Department of Energy, Mines and Resources (EMR) and the Bedford Institute undertook hydrographic and geophysical studies and did surveys at Resolute Bay, Cornwallis Island, and Baumann Fiord, Ellesmere Island, which they described as “an ideal shipping route if expected oil and gas production comes to the Queen Elizabeth Islands”.¹² The federal government also established the Institute of Sedimentary and Petroleum Geology at Calgary to provide systematic evaluation and storage of core samples.

Industry feels that in addition to providing a technological climate conducive to exploration, the government must provide an appropriate economic climate. In a situation analogous to that surrounding the May 1974 federal budget, Imperial Oil announced in August 1967 that it would suspend a major exploration program involving several million acres in the Mackenzie Delta area of NWT, until the Carter Commission report on tax reform was dealt with by the government.¹³ Several months later Finance Minister Mitchell Sharp hinted that the government “does not accept the Carter Commission report entirely”.¹⁴ There was further reassurance a few weeks later when a mid-fiscal year mini-budget was presented.¹⁵ Mr. Sharp stated there would be no major changes in tax laws, although he did not specifically reject the Carter Commission proposals.

In a further attempt to spark interest in frontier areas, the Canadian government, late in 1967, issued a report showing that more than half of Canada’s onshore potential lay in the North.¹⁶

The government was also researching drilling technology. The National Research Council reported on a new type of drilling platform designed to lower drilling costs.¹⁷ It was predicted that offshore drilling in Canadian waters would start within two years. The government had issued offshore drilling rights totalling four million acres along the Arctic coast.

The energy crisis of 1967 spurred oil and gas exploration in the Canadian North. The energy crisis of 1973 may, paradoxically, slow exploration and hence northern development. Much of the frontier exploration in 1967-73 was funded by U.S. firms who had hoped for oil and gas supplies in return. The energy crisis of 1973 may persuade the Canadian government to retain Canadian supplies for Canadian markets. The resulting realignment may at least temporarily slow work in frontier areas. “About \$1 billion in funds already spent or committed would have to be repaid to United States companies, presumably by Canadian explorers, transporters and utilities that would be taking delivery of frontier gas and oil instead.”¹⁸

The Mackenzie Delta Region

The Norman Wells oil field, "one of the most northerly oil fields in the world", was discovered in 1920, 1 000 miles north of Edmonton, along the Mackenzie River.¹⁹ This field was concrete evidence of oil potential in northern Canada and influenced subsequent oil and gas development in the North.

The impetus for exploration in the Fort Norman area was found in the oil fever which built up in Calgary in 1913 in connection with the Turner Valley field. However, World War I and more accessible drilling prospects intervened and it was not until 1919 that Imperial Oil sent a small party to the Fort Norman area. In 1920 they drilled and capped a well but the transportation problem was overwhelming and they drilled few additional wells. They constructed a small refinery in 1939 to serve local needs.

World War II brought development to the North much earlier than would have occurred otherwise. The supply lines of the strategic Alaskan tip of the North American continent were menaced by Japanese submarines. Thus, in 1942 Canada and the U.S. conceived two land-based projects: the Alaska Highway and the Canol project. The latter was to supply needed fuels "locally", thus making it unnecessary to bring in fuel over thousands of miles from the U.S. The project involved over 1 000 miles of pipelines and roads. As the pipeline progressed in winter temperatures as low as -60°C . Imperial drilled "more than 40 additional oil wells in the Norman Wells field".²⁰ A refinery at Whitehorse began operating in April 1944. By then the strategic situation had changed completely and Imperial shut down the entire operation one year later. It was by then less expensive to bring in petroleum products "from the outside".

In the early 1970s, petroleum products from Norman Wells were still prohibitively expensive. However, drastic changes in the world oil supply make it clear, as of 1974, that large northern oil reserves can be transported to southern markets at competitive costs, and the Canol project has shown that pipeline and other petroleum-based activities are possible in the North.

Activity in the Mackenzie Delta and Yukon areas remained insignificant well into the 1960s. There had been no oil strikes in this area until, in 1959, there was a strike in the Yukon. Oil circles in Calgary and the U.S. became interested. However, there was no increase in exploration, because of the abundant world oil supply and because equally or more attractive prospects were available in more accessible areas.

Mobil went into the Yukon in 1965. Results were disappointing but Mobil's action may have piqued the interest of other companies. Texaco then began drilling in the NWT. British-American Oil filed on 1.3 million permit acres off the Yukon coast between Kugmallit and Mackenzie bays.²¹ Imperial began drilling near the Mackenzie River in the NWT.²² The first wildcat in the Mackenzie Delta area, NWT was planned for summer 1965.²³

Late in 1967 there were encouraging signs from an Atlantic-

Richfield wildcat at Prudhoe Bay on the Alaskan north slope. By mid 1968 the company knew it was a good strike. They drilled additional wells to delineate the field and confirmed that Prudhoe was “the largest oil field ever discovered in North America, with possibly 10 billion barrels of recoverable oil reserves”.²⁴ This encouraged the oil industry to invest heavily in northern exploration. Consequently Imperial and others were active in 1968-69 in areas in the Mackenzie Delta drilled three years earlier by British-American (now Gulf) and others. Imperial which had “10 million acres under permit in the Delta area”²⁵ announced in January 1970 a major oil show at Atkinson Point. Whereas the Prudhoe Bay discovery provided general encouragement for northern exploration, the Atkinson Point discovery was specifically encouraging vis-à-vis the Mackenzie Delta. Activity in the area rapidly intensified.

Gas finds began to occur more rapidly than oil finds, with Imperial, Gulf and Mobil, among others, announcing positive results. Attention shifted to gas and as early as 1972 there were statements that threshold reserves required to support a gas pipeline out of the Mackenzie Delta had been found or soon would be. In March 1972 Imperial contracted with various U.S. firms to sell gas from its Richards Island finds.²⁶

The finds at Prudhoe Bay and in the Mackenzie Delta aroused interest in the use of the Mackenzie Valley as a “corridor” to markets in southern Canada and the 48 contiguous states, a concept which first appeared in the Mid-Canada Development studies of 1967. By 1970, because resources were available to move along such a corridor, the Canadian government laid down basic rules to govern any such transportation concept²⁷ and in March 1971 suggested to the U.S. government that the Mackenzie Valley would be a feasible route for transportation of Prudhoe oil and gas.²⁸ The U.S. government and U.S. oil companies responded negatively. They decided to transport oil from Prudhoe through a pipeline located entirely in Alaska.

However, there was American interest in a Mackenzie Valley route for gas, possibly because Americans hoped to share in Mackenzie Delta gas. In 1969 and 1970 three groups announced plans for gas pipelines following different routes in the Mackenzie Delta. These groups were headed by:²⁹

- 1) TransCanada PipeLine (the Northwest Project Study Group)
- 2) Westcoast Transmission Co. Ltd. (with Bechtel, San Francisco)
- 3) Alberta Gas Trunk Line Co. Ltd. (AGTL) (Gas Arctic Study Group)

By the early 1970s, these groups were spending millions of dollars for design studies and for experimentation at test stations in the Mackenzie Delta. However, compared to the multi-billion dollar construction costs projected and the value of the gas, these study costs were minimal.

The Canadian government told the various groups to pool their efforts because it would allow only one gas pipeline. The study groups

moved slowly in this direction.³⁰ By 1972 the Westcoast Transmission Project appeared to be permanently on a back burner and the other two groups had merged to form Gas Arctic-Northwest Project Study Group. Two legal entities were set up to carry out a feasibility and design study. These organizations were Canadian Arctic Gas Study Ltd. (CAGSL) and Alaskan Arctic Gas Study Corp. (AAGSC)

By the end of 1972, the sponsors of CAGSL were apparently satisfied that a gas pipeline could be built to carry Prudhoe Bay gas up the Mackenzie Valley corridor to southern Canada and on to the lower 48 states.³¹

Finally, in 1974, Canadian Arctic Gas Pipelines Ltd. (formerly CAGSL) and its sister company, Alaskan Arctic Gas Study Ltd., formally applied to regulatory agencies for such a pipeline.

Meanwhile, exploration and research continued. As of 1974, Imperial Oil and Sun Oil had planned additional wells from artificial islands.³² A "Canadian company is being formed to operate a fleet of six deep-sea vessels including two ice-strengthened drillships which will head for the Beaufort Sea in the fall of 1975."³³ Industry was hoping for prompt completion of Beaufort Sea environmental studies so they could begin drilling in water too deep for artificial islands. "Whale hunters and native groups in the NWT have asked the government to ban Beaufort Sea exploration because of possible disturbance of whales' migration habits. The government has taken no action on the requests."³⁴

In the interim Dome Petroleum decided to explore the depth of permafrost in the sea floor and the strength of bottom sediments in connection with anchoring of drillships. Other research projects were to investigate other technical aspects of drilling, such as use of radar to track ice floes.³⁵

Although the Department of Indian and Northern Affairs (DINA) states that millions of dollars of research are still needed,³⁶ groups such as the Committee for Original Peoples' Entitlement (COPE) and the Canadian Arctic Resources Commission (CARC) state that approval in principle for 1976 drilling has already been granted. COPE and CARC also feel that the artificial islands already in use offer more disturbance to the marine environment than drillships, short of an actual oil spill or blowout.

Since the applications of CAGPL and AAGSC for a Mackenzie Valley Pipeline, there had been dissension within the CAGPL ranks and the announcement of a rival project. This was due to the uncertain gas supply picture in Canada which made it unlikely that the National Energy Board (NEB) would allow significant quantities of Mackenzie Delta gas to be exported. When in fall 1974, officials of CAGPL altered their position and stated that Mackenzie Delta gas would be needed for Canadian customers, AGTL interpreted this as ending the interest it had in the CAGPL project.³⁷ On 13 September 1974 AGTL formally withdrew from the CAGPL consortium.

Plans to build an all-Canadian pipeline, as an alternative to the CAGPL project, crystallized. AGTL and Westcoast Transmission Co. Ltd.,

with strong support from the Alberta and British Columbia governments, formed Foothills Pipeline Ltd. to build an all-Canadian pipeline.³⁸ Preliminary design material was filed with the NEB. They intended to send a full application for a right-of-way permit in June 1975 to DINA.³⁹ The consortium proposed that Canadian utilities finance the line, since most if not all Mackenzie Delta and Beaufort Sea gas will be needed in Canada.

Foothills claimed that this "Maple Leaf Line", an alternative to the CAGPL project, would be viable while carrying only Canadian gas to Canadian markets. Thus the project would be more acceptable politically and financially, without carrying Alaskan gas or making "major new exports" of Canadian gas.⁴⁰

Foothills Pipeline Ltd. would use pipe diameter and operating pressure smaller than in the CAGPL proposal.⁴¹ The consortium views these facts as making their proposal less technologically uncertain than that of CAGPL.

Although CAGPL officials criticized the "Maple Leaf" alternative as duplicating their proposal,⁴² the CAGPL line may never be built now. If Canada needs all Mackenzie Delta gas, then the CAGPL project, twice as expensive as the "Maple Leaf" project, and therefore with greater impact in terms of pressure on the dollar, and competition for financial and material resources, may progressively become of less interest to Canada.

Interesting parallels exist between the competition for a Mackenzie Valley pipeline in 1974 and the great pipeline debate in the 1950s, when TransCanada PipeLine was incorporated by Parliament to bring western gas to Ontario and Quebec.⁴³ The 1950s debate revolved around such issues as Canadian control of the transportation process, Canadian consumption versus export of resource, the possibility of a merger of competing pipeline projects, and the problem of a pipeline owned by one country and carrying its gas, crossing portions of another country en route.

Also in 1974, the public learned of serious gas supply problems of some distribution companies.⁴⁴ Reserves were inadequate, and more important, their rate of production was inadequate. The threat of shortage led Ontario, which obtains 25 per cent of its energy from natural gas, to try to invest in developing new gas supplies. Similar factors are behind Quebec's attempted venture into Panarctic Oils Ltd.

In addition to the "Maple Leaf" project, the El Paso Natural Gas Corporation proposal to pipe Prudhoe gas across Alaska and south by Liquefied Natural Gas (LNG) tankers to California now rivals the CAGPL proposal. The El Paso proposal, though as yet incomplete, was filed with the Federal Power Commission (FPC) in Washington, D.C., on 25 September 1974. El Paso is seeking early action by the FPC in order to be "on line" in the early 1980s.

The Arctic Islands

World War II brought the Arctic Islands to the attention of many. Clearly, the Canadian government's interest was kindled. In 1947 the Geological Survey of Canada (GSC) began extensive aerial reconnaissance of the Islands. In 1954 GSC staff wrote about the "petroleum possibilities" of the area. Industry was interested but continued to explore more accessible areas.⁴⁵

The 1958 voyage of U.S. submarines in the area demonstrated the possibility of a new means of transportation and heightened interest in Arctic Island petroleum. The GSC continued issuing encouraging reports about petroleum prospects⁴⁶ and mapping the area.⁴⁷ A land rush developed in late 1958 and early 1959. Petroleum companies, large and small, and even small investors, filed for oil and gas permits which were issued in 1960 after promulgation of the Canada Oil and Gas Lands Regulations.

Dome Petroleum, as operator for a consortium of independent companies, drilled the first well in the Arctic Islands in the winter of 1961–62. They did not find oil or gas, but proved that drilling was possible, and obtained data on the relation between surface indications and subsurface structures. Other operators drilled several additional wells by the end of winter 1963–64. Lack of success, a favourable world oil supply, and attractive prospects in other areas kept the major companies out and the independent firms could not afford to do major work in the area. Only the French government firm, Elf, continued to explore actively in 1964.⁴⁸

In early 1965, British Petroleum, in which controlling interest is held by the British government, picked up two million acres in the Arctic Islands.⁴⁹ BP already held 16.67 per cent interest in another 3.8 million acres, together with Canada Southern Petroleum, Shell, and Clark Oil and Refining. Elf at that time held 19 million acres gross and 15.8 million acres net in the Arctic Islands. The governments of France and England were then the largest holders of exploration rights in the Arctic Islands.

J.C. Sproule had begun geological exploration in the Arctic Islands in 1960. During the lull after the initial drilling, he almost singlehandedly maintained Canadian activity in the area. He used the increasing presence of multinational and foreign-government-controlled oil firms in the Arctic Islands to argue for a cooperative Canadian venture.⁵⁰

By 1967 world events and imminent expiry of permits held by Canadians convinced Sproule to organize a consortium to explore in the Arctic Islands. He soon only needed government support to initiate a \$20 million exploration program.⁵¹ Governmental support came in the form of equity and the then Minister of Indian and Northern Affairs, Arthur Laing, formally announced the formation of Panarctic Oils Ltd. on 12 December 1967, approximately six months before the Prudhoe Bay discovery.

That the government chose to purchase equity rather than provide loans signalled a new wave of development in the North.⁵² It

was suggested that resources besides oil and gas would be among the search objectives. Panarctic would generate jobs and establish a Canadian “presence” in the Arctic Islands. Another factor was the federal policy that resource development was good for the Canadian economy.

Panarctic took over 44 million acres in the Arctic Islands, covered by oil and gas permits issued over the preceding eight years to the various participants in Panarctic Oil Ltd. Dr. Sproule had assembled an extensive body of geological and geophysical information. Panarctic immediately recommenced exploration and was soon drilling. In 1970 they found major gas deposits. As of mid-1974, enough natural gas to support a pipeline had not been found, and there have been no major oil finds.

Some shareholders in Panarctic were uncertain about their investment in Panarctic and wished to sell their holdings. Subject to approval of all participants, Bow Valley Industries proposed to sell its shares to *Société Québécoise d’Initiatives Pétrolières* (SOQUIP), a Crown agency of the Quebec government. The Quebec government considered “natural gas reserves being developed in the Arctic Islands by Panarctic as an important future source of supply for the province”.⁵³ In late October 1974 the federal government blocked the SOQUIP purchase of Panarctic shares claiming a provincial presence would cause conflict and controversy.⁵⁴

In 1971 the Gas Arctic Study Group (the research group associated with AGTL) commissioned a feasibility study of a gas pipeline out of the Arctic Islands. Although not a highly detailed study, it did “demonstrate to Gas Arctic the enormity of the problems to be confronted if pipes are to be laid between the Arctic Islands”.⁵⁵

Panarctic obtained additional financing from a number of companies including Tenneco during 1972. The agreement provided “for Tenneco to be responsible for researching and building the transportation system. . . .”⁵⁶ During 1972 Panarctic did aerial reconnaissance of possible pipeline routes and retained several consulting firms to study these routes.

In early 1973 Polar Gas Study Project was formally announced. The original members were Panarctic, Tenneco, Canadian Pacific Investments Ltd., with TransCanada PipeLine, as project manager.⁵⁷

Activity in the Arctic Islands in mid 1974 was at a somewhat reduced level, due to lack of discoveries and uncertainties over government taxation and land policies. One bright spot was the Drake Point field which Polar Gas Project was considering as the northern terminus for a pipeline. Panarctic was then planning to spend nearly \$60 million for the 1974–75 season and expecting to drill about 20 holes. Dome was continuing to drill and Sun Oil had taken a rig released by Panarctic and was drilling near a Panarctic discovery. “Chevron and Columbia Gas were drilling on Banks Island”⁵⁸ but Elf had ended its operation on Banks Island. Drillarctic was planning to ship its rig out of the Arctic to other world areas where demand for equipment was higher.

Industry is never unanimous about prospects in different areas. Murphy Oil announced ambitious plans for the Arctic Islands area at the same time as other companies were reducing their efforts. Murphy has announced plans to drill on Victoria Island "on a farmout from Alminex Ltd. as part of an agreement in which Murphy will earn a 50 per cent interest in 5.3 million acres of exploration permits from Banks Island in the Western Arctic to Ellesmere Island in the East".⁵⁹

And while there are reports of an exodus of drilling crews and equipment to the U.S. where economic and geological conditions are generally viewed as better, Sun Oil has announced suspension of a three-year drilling program in the lower 48 states because of disappointing results. Emphasis will switch to "offshore regions and to the Canadian Arctic frontier".⁶⁰

Technological Developments

Seismic Equipment

Without steadily improving technology frontier exploration and development would not have been possible. Seismic work is the key to development of vast new areas such as the Arctic or undersea areas. Recent innovations in seismic equipment include lightweight mobile self-contained equipment providing for all needs of a crew for 14 days, including food, bathing, and waste disposal.⁶¹ The crew is more comfortable and seismic work is speeded up. New equipment has reduced costs per kilometer of line and costs of transporting the equipment into the Arctic.

A small submarine of new design, which will operate in the Arctic Islands area in conjunction with an "on-ice support train", will facilitate offshore seismic work.⁶² Explorers expect seismic coverage amounting to 6 000 miles (9 600 km) for the 1975-76 season.

"Heat pipe"

Application of the "heat pipe" will greatly facilitate construction of all types in permafrost areas. Until recently used only in sophisticated aerospace applications, the device has been applied on a large scale in connection with the Alyeska pipeline in Alaska.⁶³ Description of its principle of operation is beyond the scope of this study, but multiple installation of these tubes part way into the ground will result in automatic, unattended, no-moving-parts removal of heat from the soil at a rate equal to or greater than the rate of addition by manufactured structures. Consequently, the permafrost will remain frozen and the approach of permafrost to the surface can even be augmented. The Soviets have developed a modification of this device in the form of a "freezer-pile" filled with kerosene. The ground near a freezer-pile installation remains between -2 and -5 degrees C. in the summer as compared with a natural temperature of 0.5 degrees C. As a result, structures can be safely built and will remain stable.⁶⁴ The significance of the heat pipe or freezer pile principle cannot be over-emphasized as it removes many of the environmental objections to

pipeline construction. The operation depends entirely on natural temperature differences.

Drilling platforms

Use of drill barges and drillships in the Beaufort Sea are apparently not yet feasible in the Arctic Islands. Substantial progress has been made with several alternate concepts:⁶⁵

1. Islands formed with gravel either trucked over ice from the mainland or dredged.

2. Islands formed by dredging fill and placing it inside cofferdams formed of gravel. When the fill freezes in late autumn, drilling can begin. This concept would allow drilling in deeper water than would Concept 1, and is cheaper under similar conditions.

3. In areas where the ice is stationary during the winter, a drilling pad can be prepared by increasing the ice thickness. The latter is accomplished by flooding the area with sea water, allowing it to freeze and repeating the process until adequate thickness is obtained.

Where Concept 3 can be applied, drilling becomes essentially a land-based operation. Application of #3 would greatly advance the starting date of large-scale offshore drilling in the Arctic Islands. As of mid 1974, Panarctic has successfully completed a drilling operation of this type.⁶⁶

Satellite communications

Satellite communications will facilitate control of pipeline systems and presumably detection of leaks before environmental damage of substantial proportions occurs. Canada's communications satellite is being used temporarily to provide communications during construction of the Alyeska pipeline and CAGPL is negotiating for application to the Mackenzie Valley pipeline.⁶⁷

"Seadrill Quest"

Another federal project is the "Seadrill Quest" being operated by the Bedford Institute with assistance from GSC.⁶⁸ This project is the Arctic Islands' analog to the Beaufort Sea study which involves research on environmental and other aspects of offshore drilling.

Transportation alternatives

A major question in the area of technological development is the method of transporting energy. The Polar Gas study group has been reported⁶⁹ to be looking at alternatives, "including LNG tankers, submarine and aircraft systems or the conversion of the gas to methanol, ammonia or high voltage electricity, although the main thrust is toward a pipeline". A railroad is also possible. The Soviet Union is seriously considering both a railroad and a pipeline for transporting products out of its Siberian oil fields.⁷⁰ The Soviets say a rail line could carry other products as well as crude and would prove more economical than a pipeline.

48-inch pipe

A major question with regard to the CAGPL project is the operational feasibility and availability of 48-inch (1.2 m) pipe. Pipe of this diameter in wall thickness needed for Arctic conditions is a new departure in technology. International Portable Pipe Mills Ltd. has been retained to manufacture small diameter support pipes for the Alyeska project and has experimented with the manufacture of 48-inch pipe. "It produced 48-inch pipe on a test basis in 1973 and this year completed 10 miles of production run of 42-inch API specification pipe for high pressure transmission service for AGTL."⁷¹

Coal gasification

Development of coal gasification technology could affect northern development. Coal gasification could possibly outpace discovery of petroleum reserves and development of technology for the Arctic Islands. Preliminary estimates suggest little difference between the investment required to produce gas from coal and from the CAGPL project at the same rate. One likely difficulty with coal gasification would be the environmental impact of the large-scale coal mining involved. TransCanada PipeLine has proposed an \$8 million study of coal gasification as a means of replacing conventional sources of gas, which it believes will be soon exhausted.⁷²

Petrochemical Projects

Large scale additions to petrochemical capacity in Canada will affect the pacing and timing of northern development. Dow Chemical and Dome Petroleum have proposed to governmental authorities that they use ethane extracted from Alberta natural gas to make one billion pounds of ethylene per year. Related petrochemical industries would then develop. Ethane currently being burned as fuel would be made into other products. Thus, the need for gas for use as fuel would increase. These supplies would have to come from frontier areas. Petrochemical industries based on gas would add substantially to total Canadian demand.

A second proposal involves AGTL and Canadian Industries Ltd. (CIL) and the formation of a consortium in Alberta to build a plant similar to that proposed by Dow and Dome. Still a third proposal involves the Sarnia, Ontario, area, and would require up to one-tenth of 1974 Alberta oil production to make a variety of petrochemical products.⁷³

An editorial in the July 1974 issue of *Canadian Petroleum* noted that estimates of Alberta's industrial gas requirements are rapidly escalating. Industrial requirements as of early 1974 were projected to be 0.38 trillion cubic feet per year (Tcf/year) (10.7 km³/year) by the year 2000. Later in the year figures of 1.0 Tcf/year (28 km³) were being discussed. Industrial usage on this scale in Alberta "would virtually dry up" the supply of Alberta natural gas for other regions of Canada.

There are two alternatives. One is to cut back on exports to the

U.S. Some view this course as economically and politically disastrous. From the petroleum industry point of view, "the more constructive and obvious answer, is to encourage development of Canadian frontier gas reserves, for Canadian domestic requirements, and to make additional volumes of gas available for export, if needed."⁷⁴

The oil industry favours continuing and even increasing exports to the U.S. Such factors encourage rapid exploration and development of frontier resources.

In apparent recognition of the implication of their proposal for the overall Canadian gas supply picture,

"Dome Petroleum and Dow Chemical of Canada plan a \$90 million exploration and development program to help supply natural gas feedstock to their proposed ethylene plant in Alberta Drilling in the four-year program will concentrate on gas-prone prospects in Alberta, northwestern British Columbia, and the Mackenzie Valley of NWT. Dome says progress of the drilling campaign hinges to a large degree on energy policies of federal and provincial governments."⁷⁵

The handling of the Dow-Dome application by the NEB was expected to reflect their views of the overall energy situation, and the positions they would take in the fall 1974 supply, demand and deliverability hearings. The issue is complex.

"Observers believe the importance of the case may go beyond Dow's request to export 10 billion pounds of ethylene to the United States over 10 years starting in 1977. At stake may be the power of provincial governments, private groups, and companies to argue their views before the NEB on such major issues as exports of hydroelectricity, natural gas and oil, construction of Arctic pipelines, and exploitation of offshore oil."⁷⁶

Feedstock problems may also be among AGTL reasons for defecting from CAGPL. Its public statements⁷⁷ occurred virtually simultaneously with fast-breaking developments in the ethylene situation. These developments resulted in a setback for Dow, and improved prospects for AGTL's ethylene project, which had "seemed to hesitate until Dow's plans became clear."⁷⁸

AGTL's proposal, an all-Canadian pipeline from the Mackenzie Delta to Canadian markets, using, in part, existing AGTL lines, would give AGTL more control over Canadian gas than it would have if Canadian gas were "piggybacking" on U.S. gas in the CAGPL proposal. Thus, it could more easily steer gas to Alberta Gas Ethylene Co., an AGTL subsidiary.

Petrochemical projects add new dimensions to the northern development picture. If CAGPL appears weakened before regulatory bodies and public opinion, the El Paso, Maple Leaf and Polar Gas (pipeline from the Arctic Islands) projects might go ahead more rapidly. Some observers believe CAGPL had suffered a setback, even before the AGTL announcement, caused by doubt that CAGPL would get Prudhoe Bay gas, and, also by rapid progress of the El Paso

group, which filed an application with the American FPC in September 1974.

The Alberta government may become an actor in the Mackenzie Valley pipeline situation. It is alleged to have encouraged additional parties to contest the Dow ethylene application before the NEB. The Alberta government apparently favours the rival ethylene project of Alberta Gas Trunkline, "frequently considered an instrument of Alberta Government energy and industrial policy".⁷⁹

AGTL would, as already noted, probably find it easier to get its petrochemical feedstock through the "Maple Leaf Line". British Columbia also has petrochemical plans and may be able to gain access to Mackenzie Delta gas more readily via Westcoast Transmission Company's interest in the "Maple Leaf" project.

In general, Alberta feels "that now is the time to establish its own secondary industry, based on its own resources".⁸⁰ As of mid 1974, it planned for Alberta Gas Ethylene Co. to own and operate ethane extraction facilities. The ethane would be supplied to a petrochemical complex owned by ALPEC, a consortium consisting of AGTL, Canadian Industries, Ltd., Du Pont of Canada, Ltd., and B.F. Goodrich Canada Ltd. With interest shown by Quebec and Ontario in petroleum development and transportation the stage was set for discussions involving federal and provincial bodies.

This survey of both historical and contemporary events identifies many forces affecting the pace and scale of petroleum programs. Though the Mackenzie Delta-Beaufort Sea and Arctic Islands petroleum programs have unique origins the events of recent years have blurred distinctions between them. The very nature of petroleum development processes ensures many similarities. The report will now review these processes with particular emphasis on their implications for the pace and scale of northern development.

III. The Petroleum Development Program

A petroleum development program includes all stages necessary for oil and gas products to reach final markets.¹

1. *Reconnaissance*: the search for potential reserves via aerial photography of sedimentary basins and the examination of their structures and surface geology. Source and cap rocks indicate a possibility of petroleum.

2. *Exploration*: the search for petroleum by geological and geophysical surface and subsurface means, including obtaining land rights to any reservoir discovered.

3. *Development*: the search for the extent and deliverability of a reservoir; this stage is also known as "delineation" whereby the extent of the field is delineated and prepared for efficient production.

4. *Production*: the exploitation of the field to extract the petroleum.

5. *Transportation*: the transporting of petroleum via pipeline, tanker, rail, air or truck to processing and sales centres.

6. *Processing and refining*: the separation and combination of the many compounds in crude petroleum into demanded products.

7. *Sales*: the distribution and final disposition of these petroleum products whether as final or intermediate goods.

8. *Supporting services*: the communications, transportation, and supply requirements for supporting all stages of a petroleum development program; these are especially significant in the Arctic.

With regard to the Mackenzie Delta and the Arctic Islands the situation can be summarized as follows.

Reconnaissance

Industry, the Geological Survey of Canada (GSC), and Energy, Mines and Resources (EMR) have carried out reconnaissance since the 1950s. Since this aspect of petroleum programs is now history, it was discussed in Chapter II.

Exploration

Exploration was the main thrust of oil industry activity in northern Canada in 1974, although some discoveries were already being delineated. The reconnaissance ceases when a company applies for land rights in order to have tenure over any discoveries. Once a company obtains the requisite exploration license, oil and gas permit, and land use permit from the Department of Indian and Northern Affairs (DINA) it can begin detailed surface exploration. The regulations divided exploration into two phases: surface and subsurface (drilling). Each phase required a separate land use permit for environmental considerations and a separate notification for technical and operational considerations. (This regulatory process will be detailed in the next section.)

Surface geological studies are more important in the Arctic Islands than elsewhere, due to the absence of surficial deposits over large areas. Geological and geophysical exploration include visual inspection, and gravity, magnetic and seismic procedures. Seismic

crews search for oil by creating “miniature earthquakes” using dynamite or compressed air and recording the time the sound waves travel through the strata.² The seismic method is the most common type of exploration and is generally done during winter when the ground is frozen. Magnetic crews use a magnetometer to measure magnetic differences in the strata: the gravity meter crews measure gravity differences. Gravity meter surveys are heavily used in the North because the costs are less than seismic efforts. These surveys are generally carried out in the winter. Magnetic and visual surveys operate during the summer when the weather is favourable for flying, ground has no snow and 24-hour light is available.³ “Exploration methods vary little from southern Canadian regions. However seismic and gravity survey parties are generally larger and require camp facilities in the North.”⁴

Costs of exploration in the Canadian Arctic are high because of the hostile climate and terrain, and the extensive support facilities which are required. In 1971 DINA published costs of various exploration methods to inform prospective explorers in the Canadian North.⁵

	Latitude 60-65	Latitude 65-70	Latitude above 70
surface geology	\$70-75 000/month	\$80 000/month	figures
gravity meter	\$30-40 000/month	\$35-50 000/month	not
aeromagnetic	\$3-20/linear mi.	\$5-20/linear mi.	shown
seismic	\$75-115 000/month	\$130-200 000/month	

Explorers combine the results of these four methods along with aerial photographs to create maps showing the strata, their rock characteristics, their orientations and their structures. Geologists, geophysicists and other experienced oil industry personnel interpret these maps and decide whether and where to drill.

Economic and political factors also influence the decision to drill.

“In summary, Canada is estimated to have a relatively large undiscovered conventional crude oil potential, more than five times what has been found to date. Almost all of this lies in the remote frontier areas, many of them in very hostile environments. Finding and developing this potential will be difficult and costly and much of it may never be developed without the incentives of increased price, assurance of markets and a reasonable share of the reward between the public and the investor.”⁶

Exploratory drilling or “wildcatting” is the only method of determining with certainty whether or not hydrocarbons exist below the surface. “It’s the final test in the search for the hiding place of oil. When all the fragments of information have indicated where oil may occur, the drill provides the final answer.”⁷ During the drilling process geologists inspect rock chips or cores to determine the age and type of rock. They take special oriented cores to determine the attitude of the rock layers. Most wildcat wells do not find oil: “in Wes-

tern Canada only about one out of every 35 wells drilled will result in the discovery of an oil field large enough to be worth developing".⁸ In the Canadian Arctic "the present success ratio for wildcats is in the order of one discovery for every five wells drilled".⁹

"The drilling operation in the North is the same as in isolated regions in the south of Canada with camp facilities provided. However, considerably more stockpiling of goods and equipment is required in the northern regions."¹⁰ Permafrost conditions require the construction of the rig and camp on pilings or gravel pads so that ice in the subsurface does not melt. In addition, some drilling rig components require special design against cold and wind; cold avoidance procedures are necessary to stop freezing of fluids and lines, manual activity may be slowed to 30 per cent of that further south. These problems and high transportation costs all combine to make "drilling a northern well about ten times the cost per foot of a southern well".¹¹

Arctic wildcats are thus expensive propositions to an oil company. DINA summarized average drilling costs in 1971 and we compare them with 1974 costs:

	<i>Average drilling cost per foot</i>
DINA prospectus (1971):	
Latitude 60–65°	\$ 46
Latitude 65–70°	\$102
J.C. Sproule & Assoc. (1973):	
Arctic Islands	\$300
T. Kennedy (1974):	
Alberta	\$150
Mackenzie Delta	\$440
Arctic Islands	\$254

With wells ranging "in depth from 4 000 to 15 000 feet, the average cost per well, including geological and geophysical work, is estimated to be \$3 600 000" in 1973.¹² Costs of drilling an Arctic wildcat in 1974 were estimated at \$5 000 000. Should a fire occur at the well an additional \$2 000 000 may be necessary to bring it under control.¹³ Fire is a real danger since several wells in this region have hit subsurface areas of abnormally high pressures. Figures III.2, III.3, and III.4 in Appendix C show the cumulative depths drilled by year, number of wells drilled by year, and total oil and gas exploration expenditures by year.

Development

Development drilling begins after a commercially viable discovery, (large and with good permeability and sufficient pressure in the reservoir) has been ascertained through exploratory drilling. Once a field is discovered additional wells are required to determine its extent. The Canadian Petroleum Association estimates that in the Arctic it will take seven to eight years to delineate a reservoir fully (compared to two to four years in Alberta). The rate of offshore

development will depend largely upon improved drilling technology. "Development wells will be shallower and less expensive than wild-cats. It is estimated that the development drilling cost will be no more than \$200 per foot so that the 5 000 foot wells required for development of Arctic Islands pools will cost \$1 000 000 each, while the 10 000 foot development wells in the Mackenzie Delta will cost \$2 000 000 each."¹⁴ Some development drilling has been completed and some is underway in both the Mackenzie Delta and Arctic Islands. However, the bulk of development is yet to come, as exploration is still in full swing.

Production

Production from a developed pool or field depends upon economic factors such as assured markets, acceptable price and adequate return on exploration and development investment. The rate of production is governed by market requirements and government conservation regulations.¹⁵ Petroleum conservation practices depend greatly on what was learned about the particular pool during the development stage and aim at recovering the maximum amount of petroleum from the reservoir. The pumping or flow rate determines the economic life of the pool. Industry feels Arctic reservoirs will have to produce at the maximum rate possible to be economically viable.¹⁶ Also, northern reservoirs will have to be brought on line one at a time, in order to use efficiently equipment and workers. The Canadian Petroleum Association estimates that each reservoir will be capable of producing for 15 years.

The production process consists of specifying the rate of flow of the oil-gas mixture, separating the oil and gas, measuring their rate of flow, and separating the water from each. The only producing oil field in 1974 in the Canadian North was at Norman Wells, NWT, which was being operated in much the same way as southern fields. Operating costs for gas wells, however, were "extremely high in the Arctic, a large portion being independent of production rates. In our analysis, well operating costs of \$30 000 per well per month were used to define the fixed component of cost and five cents per mcf (million cubic feet) was used for the variable component. These yield total production and processing costs of 7 to 11 cents per mcf, depending on well productivity."¹⁷

Transportation

Both government and industry see transportation as the key to any northern development. Figure III.5, prepared by Canadian Arctic Gas Study Ltd., illustrates the planning and construction necessary before gas can flow through a pipeline. Even this schedule was too optimistic. By mid 1974 CAGPL had completed only the study phase and was negotiating contracts for sales and attempting to obtain the regulatory authorizations. Because of the size of this project, claimed to be the largest private project ever undertaken, little was known about the types of studies necessary to support the application to government. Indeed, the exact nature of the regulatory process itself was unknown.

Transportation of oil and gas is of primary importance in the Arctic, given its remoteness from southern markets. Industry regards pipelines as the most economical and reliable method of transporting oil and gas from both the Mackenzie Delta and the Arctic Islands. As of 1974 gas pipelines were being actively considered for both areas, although liquefied natural gas (LNG) tankers were being considered as an interim method for the Islands should a pipeline not prove feasible.

The hostile environment has posed special problems for transporting oil and gas through the Arctic. Planning for pipelines begins with a commercial discovery or with its development. Research and new technology has been required for pipelines in this region. Polar Gas lists several of its research efforts:¹⁸

1. *Ecological research*: to determine what effect pipeline construction and operation would have on the environment, including socio-economic conditions, vegetation, permafrost, bird life, land mammals, and fresh water and marine biology.

2. *Engineering research*: to establish both a design for the pipeline and a means of laying it, at acceptable rates, on land and across Arctic channels.

3. *Ice research*: to assess the strength and stability of built-up ice as a working surface for construction equipment and crews.

4. *Bathymetric research*: to catalog information on channel depths, currents, tides and bottom and sub-bottom characteristics, including the extent of ice scour.

5. *Aerial photography*: of 6 600 miles (10 560 km) of alternative pipeline routes southward from the gas-producing areas.

6. *Transportation research*: to investigate other modes of gas transportation.

The research began in 1973 and is continuing. The above examples show the kinds of basic knowledge required before a pipeline application can be made.

The proposed CAGPL pipeline from the Mackenzie Delta would be approximately 2 500 miles (6 000 km) long and 48 inches (1.2 m) in diameter, giving it a capacity of 4 bcf (0.11 km³) per day. Based on a 20 year life for the pipeline, gas reserves of 30 tcf (849 km³) would be necessary to support it with 15 tcf (425 km³) coming from the Delta and 15 tcf from the Prudhoe Bay area. The projected cost in 1974 of the pipeline was \$6 billion with a construction time of four to five years. A pipeline from the Arctic Islands would be 48 inches in diameter, about 3 000 miles (4 800 km) long, moving 4 bcf per day. It would require gas reserves of 30 tcf. Its construction cost was estimated to be over \$7 billion.¹⁹

Processing and Refining

During the processing and refining stage the oil mixture is separated into its various components. The mixture is heated and passed through a fractionation tower where the vapours condense at different boiling points in collecting areas at various levels. Some compounds are pro-

cessed further. The only refinery in the North is at Norman Wells “where a small distillation unit refines the crude oil of the nearby oil field to provide most of the fuel needs of the far North.”²⁰ The industry does not intend to do extensive refining in the North. That which is necessary will be highly automated to reduce labour needs.²¹ On-site gathering and processing of gas would be difficult and costly because of “surface conditions and the number of pools to be serviced by each processing facility. On an average basis, capital cost was considered to be \$300 000 per well for gathering, and \$100 000 per mcf per day for gas processing, including compression. Dehydration and liquid recovery is the only processing anticipated.”²²

Sales

The petroleum industry bases itself on demand for its products, interpreting a set of signals as to what products to provide, and ending with sales in the services gained by the customers.²³ Marketing of petroleum covers vast segments of the modern economy—transportation, industry, agriculture and the home. Marketing of fuels in the North is done through Norman Wells although the southernmost region of the North is supplied from the South.²⁴ Most oil and gas found in the Arctic region would be destined for southern markets.

Supporting Services

Government and industry provide supporting services for, in particular, the exploration and development stages of the petroleum program because of the remote and hostile northern environment. Services include monetary incentives to meet the higher cost of exploration, communication networks of radios and navigational beacons, transportation systems for flying and shipping workers and materials, storage and repair facilities for maintenance of equipment and camp facilities for the crew. Even more back-up services are required to support drilling. Two years of planning for essential support services were required in advance of actual on-site use of workers and materials in the Arctic. Delineation of discoveries would require more extensive support in the form of permanent base camps and an all-weather land transportation system.

Phasing of the Petroleum Development Program

These stages of a petroleum program require many years to complete. Figure III.6, prepared by Imperial Oil Ltd., shows the extensive planning period required for operations in the Canadian Arctic and the duration of petroleum programs.

IV. Regulation in the Petroleum Development Process

The Regulation of Exploration

Exploration is currently the major emphasis of the oil industry in the Canadian Arctic. Government as the regulator of exploration and industry as the explorer have together brought most of the Canadian Arctic under some form of exploration.

Figure IV.1 in Appendix C outlines the regulatory process for petroleum exploration in the Arctic. In practice, administration of the process may give rise to exceptions or modifications. First, a potential explorer must apply for an exploration license from the Department of Indian and Northern Affairs (DINA) if the area to be explored falls within its jurisdiction. (The Department of Energy, Mines and Resources (EMR) also has jurisdiction north of 60° but only in the off-shore areas of Hudson Bay and Hudson Strait.) This license is granted to anyone over 21 years of age licensed to do business in Canada, upon payment of the \$25 fee.¹ No land rights are included in this license. The current regulations define the exploration license as permission to “make geological or geophysical examinations, carry out aerial mapping or investigate the subsurface.”²

No company, however, would begin or farm out (authorize another firm’s exploration in return for a percentage of the petroleum discovered) any significant exploration without first gaining the subsurface rights to the site. The competitive nature of exploration precludes exploration without land rights to any finds. In the Arctic, large tracts are seen as necessary to support the search for oil and gas, although they also enhance the likelihood of finding a deposit.

Once the government recognizes a company as an explorer it can apply for an oil and gas permit. This authorizes the company to control access to any oil or gas deposits found by them or any other explorer. It also imposes an obligation to explore for subsurface deposits. In addition, the permittee has the exclusive right to convert the permit into an oil and gas lease.³

A permit is obtained by applying to DINA or EMR, depending on the geographic area, and paying \$250. Also required are a deposit varying in amount by the length of time the permit is held (during the first 18 months of the permit the deposit is five cents per acre), description of the area, and a statement of the anticipated costs and “extent and character” of the work to be done.⁴

For purposes of the permit northern Canada is divided into three zones: between 60° and 65° latitude, between 65° and 70° latitude, and beyond 70° or offshore, whichever comes first (see Figure IV.2). The terms of the permit vary according to zone. The length of tenure increases as distance from 60° increases and the amount of exploratory work required decreases as distance from 60° increases.⁵

These permit terms aim to ensure that exploration occurs rather than just to earn revenues for the federal government.⁶ The permittee can renew the permit, provided it has met all work requirements. For example, a three-year permit in the 60–65° latitude can be renewed twice for a maximum total of nine years. The permit can then be

converted into a lease for a further 21-year period.⁷ If production starts before the end of the lease, it can be renewed for another 21 years. Thus, one company can control an area for 51 years.⁸ Approval of the notice of commencement for exploratory work both permits and compels exploration.⁹ If exploration never commences, then the deposit is forfeited to the government.

As noted in the upper corner of Figure IV.2 the work requirement in the Mackenzie Delta and Arctic Islands is \$2.65 per acre over 12 years. These requirements are met through direct exploration costs, or in certain cases, by carrying out other studies on the impacts of exploration. DINA determines allowable expenses to meet these requirements.

In addition to ensuring exploration DINA viewed these work obligations as a means of reducing land speculation.¹⁰ In practice these intentions have not been borne out since the obligation can be discharged for all permits held by one explorer by drilling on any one.¹¹ The oil industry has criticized these regulations for allowing land speculators to obtain permits for minimal expenditures.¹² On a present worth basis the cost of these work requirements is slightly more than one dollar per acre; therefore, actual holding costs of oil and gas permits are nil.¹³

The holder of an oil and gas permit can convert it into an oil and gas lease. In fact, DINA can *require* that a permittee take out a lease if a well on the permit area contains a commercial deposit.¹⁴ DINA originally intended that the lease provide tenure over the lands during the development of an oil or gas discovery.¹⁵

Figure IV.3 shows the process for disposing of oil and gas rights through the permit and lease stages. The permit is the entrée into the leasing process. After a permit is granted it can be either converted into a lease or allowed to expire; either process creates a Crown reserve. The permittee by converting to a lease is allowed to select 50 per cent of the lands within his or her permit subject to certain pattern limitations. The remaining 50 per cent becomes Crown reserve, called corridor acreage. If a company allows its permit to expire the land reverts to the Crown as reserve. The Crown reserve from either source is then subject to tender or auction as indicated. New permittees or lessees can then begin exploratory work on this 50 per cent.

“The theory is that the permittee will have the opportunity to select what he believes to be the most favourable acreage, but at least one-half of the permit area will return to the Crown so that the Crown may share in the rewards which the permittee’s exploration efforts have produced. This is considered to be a due return for the various exploration incentives, including the free acquisition of the permit in the first place, which the government has afforded to the permittee. This system is to be contrasted with the leasing system in Alaska and in the United States offshore where there are no permits, and all leases must be acquired directly by purchase.”¹⁶

In addition to the 50 per cent of lands retained the new lessee has the option to lease the remaining 50 per cent from the Crown without going through the tendering process. Thus, the lessee could end up with 100 per cent of the former permit lands. The lessee who retained the remaining 50 per cent of the permit lands had to pay a higher royalty rate.¹⁷ Figure IV.4 shows these higher rates, which vary by distance north of 60° and by amount of oil or gas produced.¹⁸

DINA withdrew these regulations in 1970. They have not been re-issued and industry representatives have expressed concern over the resulting uncertainty.¹⁹

Only Canadian citizens or corporations are allowed to obtain oil and gas leases. Canadians must also be able to participate in financing and ownership of the corporation.²⁰ A lease cannot be transferred or assigned to anyone who would not qualify under the Canadian participation provisions.²¹

Royalty rates under oil and gas leases are 5 per cent of production revenues south of 70° for the first three years (north of 70° it is five years), thereafter raised to 10 per cent. In addition, lessees pay a land rental fee of one dollar per acre or less.²² Some deem these rates low compared to other areas in Canada and elsewhere.²³

Figures IV.5 and IV.6 show the increases held under permit and lease. Figure IV.7 shows the effect of the Prudhoe Bay discovery in 1968. After 1968 virtually all of the northern areas including offshore were either permit or lease.

Because the bulk of Arctic lands are already under permit or lease, DINA requires a Notice of Commencement of Exploratory Work to control the way the permittee fulfills work requirements.²⁴ The Notice must show the kinds of exploratory work to be done and include: timing, acreages and locations, equipment, and number of persons involved.²⁵

The filing of the Notice with DINA now also requires a filing for a land use permit. (If a permittee lacks oil and gas permits then the application for an oil and gas permit would require an application for a land use permit.) The land use permit allows the explorer to disrupt the land surface subject to permit regulations. Because oil and gas permits already have been granted, the one basic decision left to DINA is whether to approve a specific drilling location.²⁶

DINA established the land use permit requirement in 1971 in response to increasing awareness of the environmental impacts of exploration and other activities.²⁷ Figure IV.8 shows the process for obtaining a land use permit. While the Land Use Advisory Committees (LUAC) are not mentioned in the Regulations they were established, with representatives from DINA, Environment Canada and the Territorial Governments, to consider the impacts of the proposed exploration on forests, lands and waters, fish and wildlife, and game management respectively. DINA decides when to use the committee and takes the lead role on it.²⁸ The committee decides whether or not to issue a permit. DINA notifies native communities within the pro-

posed exploration area of the pending exploratory work and seeks their agreement, but these communities do not participate on the committee and have no veto power over its decision.²⁹ This process takes about 30 days.³⁰ DINA can approve or reject the land use permit or require the permittee to meet certain environmental constraints.³¹ In addition DINA can require a deposit not exceeding \$1 000 per acre, or a total of \$100 000.³² Inspectors from DINA check on the performance of the explorer.³³ An appeal process is built into the regulations if a company wishes to appeal to the Minister of DINA in Ottawa. The LUACS in the NWT and the Yukon have only been in operation for a short time so that little information was available on their performance.

Figure IV.9 shows the appeal procedure³⁴ used in cases where a native community has objected to a land use permit. Both DINA and company personnel try to persuade the native community to agree. If such persuasion fails then the decision is shifted to the Minister's office in Ottawa via the Land and Water Division.³⁵

Once DINA grants the land use permit and the company gives notice to explore, the exploration can begin. The company may explore the surface using various techniques, including seismic, magnetic, and gravity surveys as well as visual inspection by geologists.

The Oil and Gas Division of DINA ultimately decides what work is allowable against the work requirement. Some surface exploratory work is acceptable but drilling is necessary to meet the work requirement. Environmental research is also recognized.³⁶ If the work is not performed as specified on the Notice of Commencement of Exploratory Work, DINA can disallow it. The Notice also protects the company against arbitrary changes in original specifications by DINA. When a company wishes to drill at a specific location it must then apply for a drilling authorization and another land use permit for drilling disturbances to the land surface.³⁷

The Offshore Regulatory Procedures

DINA has established an approval-in-principle provision for proposed offshore drilling programs. (See Figure IV.10). DINA wishes to give the company some assurance and encourage it to invest in new technology. However, petroleum companies are not pleased with the approval-in-principle. They believe DINA had a long lead time in which to make decisions about offshore drilling. "Many of the offshore oil and gas permits are many years old and thus the government has had years to consider offshore drilling regulations."³⁸ They are hesitant to invest major sums without definite assurance that the technology could be used for drilling. On the other hand, DINA fears adverse public opinion and is reluctant to authorize drilling with untried technology.³⁹ DINA has approved drilling from an ice floe in the Arctic Islands and from an artificial island in the Mackenzie Delta (under the land use permit process). As of mid-1974 only Dome Petroleum was, on the basis of an approval-in-principle, constructing drillships and supply ships capable of working in the Beaufort Sea.⁴⁰

They did this partly to meet their work requirements under their oil and gas permits. The work requirement was counteracting the uncertainty of the approval-in-principle. Other factors influencing Dome's investment include a "pioneer status", large acreages offshore, existing commitments to drill and an opportunity to drill on a farm-out basis.⁴¹

The Environmental Review Committee consisting of representatives from both the Oil and Gas Division and the Land and Water Division reviews the approval-in-principle.⁴² The information required is detailed elsewhere,⁴³ but it covers all facets of a drilling system, including supporting services. The burden of documentation is on the company while the burden of judgment is on the government.⁴⁴ This approval is only required for projects involving new drilling technology. No locations are yet involved. Both technical and environmental feasibility are reviewed.

Two other federal departments are involved in granting the approval-in-principle: the Ministry of Transport (MOT) for shipping aspects and the Department of Environment (DOE) for fisheries impact, pollution control and environmental information (weather, ice, hydrography). The Arctic Waters Pollution Prevention Act proclaimed in 1972 provides the authority for the three departments.⁴⁵ This act is being used to regulate offshore oil and gas exploration until the Canadian Oil and Gas Drilling and Production Regulations are re-written.⁴⁶ Besides MOT and DOE an ad hoc committee reviews the application depending on the particular application.⁴⁷ DINA has taken a leading role in applying the Arctic Water Pollution Prevention Act within its jurisdiction. The Minister of DINA would make the final decision on an approval-in-principle for offshore drilling.⁴⁸

After a company has received approval-in-principle it can then invest in the design and construction of the drilling apparatus, subject to the conditions attached to the approval. The company then applies for a drilling authorization for a specific location offshore and simultaneously, for a land use permit which emphasizes the possible environmental impacts at the chosen site, since the Arctic Waters Oil and Gas Advisory Committee which decides on the drilling authorization comprises the same people as the LUAC, which controls land use permits.⁴⁹ Other federal departments must ascertain that government support services will be ready. The territorial governments are informed via this committee.

Finally, the company receives its drilling authorization, along with any conditions. DINA requires progress reports, which are sent to the Regional Oil and Gas Conservation Engineer of DINA, who is the coordinator of all government support services.⁵⁰

Oil and gas exploration and development in the Arctic require extensive government support services. DINA administers some incentive programs such as the Northern Roads Network Program, Northern Mineral Exploration Assistance Program, Northern Resource Airports Program, northern economic feasibility studies and small business loans.⁵¹ As a DINA prospectus suggests, however, the actual subsidies are quite flexible: "The form and amount of assistance

depends on the actual operation envisaged – in particular, its potential contribution to the objectives of northern development.”⁵² Such aid is over and above the “various tax concessions, benefits and write-offs available to companies under the Income Tax Act”.⁵³

The important Northern Mineral Exploration Assistance Program is designed to “encourage the investment of domestic risk capital in both mineral and oil and gas exploration North of 60°.”⁵⁴ The grants may not exceed 40 per cent of the cost of an approved exploration program, to a maximum of \$9 million.⁵⁵ DINA releases information about an applicant’s grant two years after the exploration program is completed.⁵⁶ If the exploration program is unsuccessful the grant does not have to be repaid; however, should the exploration program result in a producing oil or gas field DINA requires repayment at a rate of not less than 10 per cent per year.⁵⁷ The largest such grant was made to Panarctic Oils Ltd. in 1967 when the government bought a 45 per cent equity in a proposed \$20 million exploration program.⁵⁸

Regulating Development and Production

DINA regulates development drilling much the same way as exploratory drilling. However, the Oil and Gas Production and Conservation Act of 1970 governs production. As there has been no production from the Mackenzie Delta or Arctic Islands, the regulatory process has not yet been used.

The central feature of this Act is the creation within DINA of an Oil and Gas Committee consisting of five members, two of whom must be specialists in oil and gas. Other members can come from within government or outside of it as long as they are not responsible for day-to-day regulation of oil and gas in DINA or have a pecuniary interest, directly or indirectly, in any oil and gas.⁵⁹

Figure IV.11 shows the regulation of the production process as described in the Act. The Oil and Gas Committee is final arbiter of any dispute over production or preservation of oil and gas. Indeed, this “Committee is responsible for shaping the growth of the northern oil and gas industry by inquiring into any matters under its jurisdiction, by providing advice to the Minister, and by providing a body to which industry may appeal”.⁶⁰ Figure IV.11 depicts only this latter role of the committee. The committee oversees all aspects of the petroleum development program including drilling, production, processing, transportation, conservation, safety, storage, distribution, measurement, handling and abandoning of oil and gas operations.⁶¹ The committee has the status of a legal court proceeding.⁶² The Act can also be used to prevent pollution of air, land or water.⁶³

Of course, with actual oil and gas production from the Arctic areas, the government would begin to collect revenues. Figure IV.12 shows the current Crown revenues and sources without Arctic production, except for the existing production at Norman Wells. Figure IV.13 details this latter production and that of a gas field on the southern boundary of the Yukon.

The Regulation of Transportation

When natural gas was discovered in the Mackenzie Delta oil and transportation companies formed three consortia to study ways of transporting gas to southern markets. Government officials in both EMR and DINA expressed interest in transporting gas out of the Arctic as well (see Chapter II), but they suggested that the consortia combine to form one consortium before making an application. Thus, Canadian Arctic Gas Study Ltd. (CAGSL), which subsequently approached the government to initiate the application process, was created. The process shown in Figure IV.14 begins with this approach to the government.

A steering committee consisting of the ministers of EMR and DINA functions as a "point of contact" between government and industry.⁶⁴ This steering committee was designed to give prospective applicants "guidance and direction" prior to contacts with federal agencies.⁶⁵ The National Advisory Committee on Petroleum (NACOP) consisting of petroleum executives, conducts on-going discussions with EMR.⁶⁶ The government coordinates transportation interests through the Advisory Committee on Northern Development (ACND) which consists solely of federal representatives.

The focal point within government for regulating transportation is the Task Force on Northern Oil Development which was formed right after the Prudhoe Bay discovery in December 1968 and is composed of senior officials representing federal agencies including EMR, DINA, National Energy Board (NEB), Department of Environment (DOE), and Ministry of Transport (MOT).⁶⁷ It is chaired by EMR and is principally involved in "coordinating the government's involvement in appraisal and policy studies",⁶⁸ through such committees as the industrial supply committee, pipeline committee, economic impact committee, environmental-social committee, transport committee and marketing committee (See Figure IV.15).⁶⁹ Each of these committees is responsible for its own area of concern, with direct liaison to federal agencies.

The Environmental-Social Committee, chaired by DINA, is responsible for:

1. Maintaining contact between government and industry on social-environmental matters.
2. Recommending guidelines for industry research and study and for the actual planning, construction, maintenance and operation of a pipeline.
3. Coordinating federal research and recommending further research.
4. Identifying environmental and social problems connected with northern pipelines.

The Environmental-Social Committee has representatives from such agencies as DOE, DINA, EMR and from both territories. Figure IV.15 shows the organization of and the relationship between the Task Force on Northern Oil Development and the Environmental-Social Committee. Each agency represented on the committee retained

its separate administrative identity and budget for pursuing its portion of the studies. DINA took the lead in coordinating these study programs. The budget for the work of this committee was \$5 million per year for three years.

This committee had the basic task of providing guidelines for research by government and the applicant.

Once environmental and social implications of the pipeline were being studied, the committee found it necessary to provide more complete guidelines. In particular, they elaborated on the corridor concept (since this was the first application for a trunk pipeline). The expanded guidelines were initially tentative, subject to comments and suggestions from the public. They were tabled in the House of Commons on 28 June 1972.⁷⁰ After the expanded guidelines were made public the studies already underway by the consortium were sanctioned and additional studies were authorized.

The consortium met the study requirements in two ways: direct hiring of consultants, to perform environmental and social research, to support the consortium's application to DINA, and creation of an Environmental Protection Board to carry out independent studies and advise the consortium.

The consortium created the Environmental Protection Board early (September 1970) in the study process. They thought this Board would be sufficient to meet the original August 1970 guidelines. The board was to have three roles:⁷¹

1. Advise the consortium of potential environmental damage and suggest ways of minimizing the damage.

2. Predict the overall environmental impact of the proposed pipeline.

3. Monitor the project to determine the accuracy of the prediction and develop principles for future projects.

The Board is composed of "leading Canadian authorities in the area of conservation and ecology" including persons from consulting firms, universities and institutes.⁷² "All are scientists or engineers and most have many years of experience in Arctic and sub-Arctic research of environmental significance."⁷³ The Board has a research staff. It is autonomous even though the consortium created and funded it. In the words of the Board's chairman:

"We wanted to achieve environmental protection rather than just recommend what should be done. Of course, we could have no corporate or legal powers, so we had to use other methods. The way we chose was to form an autonomous board of people experienced in the North to study the problems and make its findings and its subjective and objective opinions known to the public. Board members need to have an independence of income by virtue of employment outside the project so that they will not only be independent but appear to others to be independent. And, of course, the members need to have an independent turn of mind."⁷⁴

This separation of control of the Board from its funding by

the consortium has not been without conflict. One official in CAGPL noted that there was a divided view of the Board, its usefulness and the continuation of its support by the consortium.⁷⁵ The Board would present their assessment of the consortium's studies to DINA and then to the public.⁷⁶

The other approach by the consortium to meet the government guidelines was to hire consultants as "employees" of the consortium, the results of whose research became the property of the consortium.

The industry designed studies to:⁷⁷

1. Determine the environmental benefits and losses from the pipeline.
2. Determine environmental threats to the pipeline.
3. Apply environmental data to develop better routing and design.
4. Meet government guidelines.

Documentation from these studies would support the application to DINA.

The consortium hired consultants to do the following:⁷⁸

1. Technical pipeline research on metallurgy, pipeline pressures and flows, thermodynamics, corrosion, instrumentation and control systems and test facilities.
2. Gas research to include studies on reserves and phase behaviour.
3. Logistical research including scheduling, transportation, navigation, communications.
4. Soils and landform studies such as soils testing, geological surveys, thermal soils behaviour, soil mechanics, terrain typing and aerial photography.
5. Riverine studies including hydrology and river bottom scour.
6. Environmental studies to include mammalogy, ornithology, ichthyology and botany.
7. Socio-economic studies such as northern employment, training programs, economic impact and cultural impact.

The Environmental-Social Committee commissioned similar studies on environmental and socio-economic aspects. These were done to enable the government to assess the consortium-sponsored studies. Neither set of studies were baseline studies because they were conducted over too short a period (1971–1973).⁷⁹ These government studies "exceeded in magnitude any previous project-related field studies in advance of an application for approval".⁸⁰

Industry and government worked independently because of industry requirements for confidentiality of information. (At the time the studies began there were three consortia competing for a gas pipeline and one for an oil pipeline.) While the industry and government-sponsored studies overlapped, the government concentrated on large areas and the industry studied mainly specific sites.⁸¹ (For the Arctic Islands, however, both government and industry are stressing cooperative environmental studies.)

After industry completes all environmental, social, economic,

routing, engineering and financial studies it applies simultaneously to DINA and the National Energy Board (NEB). CAGSL filed its application in March 1974, under its new name Canadian Arctic Gas Pipeline Limited (CAGPL). It submitted a completed application to DINA in order to obtain interests in lands (a right-of-way permit for a pipeline route) but that portion sent to NEB was still incomplete in mid 1974.⁸²

The CAGPL application was the first of its kind and DINA recognized that its processing of this application would establish a precedent. In response to demands for public observation of its regulatory process DINA organized a special commission under the Territorial Lands Act (Section 19(h)) called the Mackenzie Valley Pipeline Inquiry. They selected Justice T.R. Berger to head the inquiry; he was to report directly to the Minister of DINA.

DINA also created an ad hoc Pipeline Application Assessment Group, staffed by personnel from several federal departments. This group, while officially under the direction of the Commissioner, Justice Berger, still seems to be directly under DINA.⁸³

The Berger Commission is "to conduct an inquiry into the social, environmental and economic impact of the proposed Mackenzie Valley natural gas pipeline".⁸⁴ The inquiry is to be conducted in the North and consider impacts associated with the construction, operation and abandonment of the pipeline. In addition, the commission is to note how companies have responded to the Expanded Guidelines and suggest additional conditions for any right-of-way permits. The Commissioner held preliminary hearings both in Ottawa and in the North to consider the purposes and processes of the inquiry. Following these he will conduct hearings on the North in *all* its aspects. Only then will he begin to hear evidence pro and con the pipeline application. Industry and government researchers will be called for testimony and cross-examination.⁸⁵

The Berger Commission, through DINA, agreed to fund the research of those intervenors whose poverty might have limited their contribution to the Inquiry. Although government funding for intervenors could be interpreted as possible co-optation, the disbursement of such funds through the commission has deflected this criticism. Some groups being funded are the Canadian Arctic Resources Committee, Nature Canada, Pollution Probe, Indian Brotherhood of NWT, and the Council of Yukon Indians.

Justice Berger made preliminary rulings as to the scope of his inquiry.

"The scope of this Inquiry is defined by the Order-in-Council and by the Pipeline Guidelines. Both the Order-in-Council and the Pipeline Guidelines are cast in broadly-worded language. They say I am to conduct a social, economic and environmental impact study. It is a study whose magnitude is without precedent in the history of our country. I take no narrow view of my terms of reference. . . . We have got to do it right. The pipeline, if it is built, will have a great impact on the future of Northern

development and the shape of Northern communities, and the way of life for Northern peoples. Not simply because a pipeline is to be built, but because of all that it will bring in its wake.”⁸⁶

The Minister of DINA authorized Commission staff including legal counsel, and technical, social and environmental advisors.

The Pipeline Assessment Group complements the work of the Commission. This group’s task is to identify deficiencies in the application with regard to the guidelines and make these known to all interested parties. It is also to prepare and submit an assessment of the application, in particular assessing how the applicant proposes to mitigate adverse impacts, for the use of the Commission.

After the assessment group has reported its findings to the Berger Commission its status is not clear. Given the possibility of a pipeline application from the Arctic Islands this group may be maintained.

When the Berger Commission has finished its hearings and submitted its recommendations to DINA its status is also unclear. Such a Commission might remain operable, but with different personnel. After DINA has received the Commission’s recommendations it can then grant or refuse a right-of-way permit. At this point the Minister of DINA might consult the Cabinet.

It is to the credit of DINA that the inquiry process has been public and that the application, the studies which support it, and government studies have been released, in an unedited version.⁸⁷

When DINA has made its right-of-way decision, attention will be focussed on the NEB and its hearing of the pipeline application. We do not know whether the DINA and NEB hearings will be conducted simultaneously or in serial fashion.⁸⁸ Justice Berger noted that the relationship between his inquiry and that of the NEB could “not be comprehensively defined at this stage”.⁸⁹ The Environmental Protection Board had gone on record favouring a single public hearing to cover all aspects of the application.⁹⁰ They believe this would result in rational trade-offs among all elements comprising the application.

CAGPL needs two permits from NEB: a Certificate of Public Convenience and Necessity and an export license. Applications for both are generally heard simultaneously. Figure IV.16 shows the NEB hearing process. It is essentially an adversary process with a formal hearing and cross-examination of the applicant, intervenors and staff of the NEB.

The applicant for a Certificate of Public Convenience and Necessity must provide information on topics listed in the NEB Act (Section 44)⁹¹ as:

1. Availability of oil or gas to the pipeline.
2. Proximity of markets to the pipeline.
3. Economic feasibility of pipeline.
4. Financial responsibility and financial structure of the applicant, methods of financing and the extent of Canadian participation.

5. “All such matters” or “any public interest” that seems relevant to the NEB.

The issuance of a license for export of gas also depends upon complying with the requirements of the NEB Act (Section 83) which states:⁹²

1. Quantity of gas to be exported cannot exceed the surplus remaining after allowance has been made for Canadian requirements.
2. Price of exported gas must be just and reasonable.
3. “All considerations” must be met that seem relevant to the NEB.

Sections 44 and 83 contain subjective tests. The NEB must “satisfy” itself that the pipeline and its exports are required. In addition, the NEB can deliberate any other relevant factor. Blue⁹³ points out the limit to the discretionary powers: it may not give too much weight to any particular factor. Thus, perhaps, if the NEB denied an application on environmental grounds alone, it would risk having its decision set aside by the courts because public convenience and necessity was dominated by environmental reasons.⁹⁴ Grounds for setting aside an NEB decision are as follows:

1. Error of Law,
2. Jurisdiction,
3. Non-observance of natural justice, and
4. Erroneous finding of fact.

The NEB must determine what constitutes the public interest. It must judge the application upon its engineering, economic, financial and environmental-social aspects (the latter being considered at the discretion of the NEB). Anyone capable of putting together a case which the NEB considers relevant to the public interest can intervene in the hearing process. The applicant and the intervenors will be cross-examined by one another and by the NEB and its staff.

The NEB can consider alternative routes and modes of transportation, suggested by NEB staff or intervenors.

Even the abandonment of a gas pipeline comes under the jurisdiction of the NEB. An application for abandonment must be made to the NEB which can accept interventions and establish public hearings on it.

If the NEB’s decision is negative the applicant can only appeal it through the law courts on a point of law. If the decision is affirmative the NEB can place binding conditions on its decision and forward it to Cabinet for a final decision through the Minister of EMR, who cannot alter the conditions. The Minister has stated the NEB decision will be reviewed by the Task Force on Northern Oil Development and the House of Commons Standing Committee on Northern Resources prior to its submission to Cabinet.⁹⁵ While this process is not usual, the CAGPL application could establish precedents and full consideration by other federal agencies (Task Force) and politicians (House Committee) is desirable.

If the NEB grants a Certificate for Public Necessity and Convenience it must still decide about the export license. The NEB grants

export licenses on the basis of the 25a4 rule. NEB makes a four-year forecast of gas consumption and multiplies it by 25 to arrive at Canadian gas requirements. It subtracts this requirement from available gas reserves, less existing exports, to determine if a surplus exists for export. It determines available gas reserves by totalling all proved reserves along with 50 per cent of probable non-economic reserves.⁹⁶

If the NEB makes a negative decision, such a decision is final. If the NEB approves the export of gas, even under stringent conditions, the final responsibility passes to Cabinet. Certainly, the temptation is to avoid the full responsibility for a negative decision.⁹⁷ The NEB has often been criticized as having "a consistent history of underrating Canadian requirements and overrating supply potential."⁹⁸ Given the largest energy project in Canada's history and the first involving the Arctic, the NEB will probably move more cautiously than in the past.

V. Actors

Large and complex technological programs such as those in the Mackenzie and Arctic Islands are subject to influences from diverse social groups or “actors”. Actors are those groups who are involved in the development of a technological program *and* those groups who are affected by such developments. All actors are linked, either formally or informally, by their interest in the technological program.

Actors can be categorized by the nature of their involvement: information-gathering and evaluation, decision making, carrying out regulatory functions, forming groups for collective action, supporting other groups, undertaking independent assessments, developing rival or alternative plans, or taking an adversary position and attempting to persuade others, especially decision makers.

Actors are also categorized by *degree* of involvement and in terms of their *favourability* or value orientation to the technological development program. We can identify cooperative, competitive and adversary relationships among actors, which in turn help us understand their research priorities and decisions.

Gibbons and Voyer, in their study of the Canadian East Coast offshore petroleum assessment system,¹ identified three categories of actors:

1. *Core actors*: groups who were intensively and continuously involved in the technology assessment system.
2. *Supporting actors*: groups who were less intensively and/or intermittently involved in the technological program, but whose decisions and actions could, at least potentially, significantly affect the overall program.
3. *Should-be actors*: groups who will be affected by the development program but for some reason (e.g., unaware, not participating by choice, don't know how to participate or become involved) are not involved.

This classification was based solely upon the concept of involvement. We have, in this study, made finer distinctions between actors by considering attitudes toward the development of petroleum resources. In particular, we are able to differentiate among what Gibbons and Voyer² refer to as “supporting actors”.

By considering both degree of involvement and attitude toward the technological program, we identified nine types of actors:

- | | |
|----------------------------------|--|
| 1. Core | 6. Transitional rivals and adversaries |
| 2. Allied supporting | |
| 3. Independent central | 7. Exogenous rivals and adversaries |
| 4. Middle range | |
| 5. Strong rivals and adversaries | 8. Exogenous independent |
| | 9. Exogenous supporting |

(See Appendix A for a detailed description of actor types.) Figure V.1 (in Appendix C) classifies actors in both the Mackenzie Delta-Beaufort Sea and Arctic Islands programs. The rest of this chapter discusses each actor group, the nature of its involvement in petroleum programs, and its perceptions of other actors, information, decisions and issues.

Mackenzie Delta-Beaufort Sea Actors

Core Actors

Among the many groups involved in the Mackenzie petroleum program, four have been identified as core actors:

1. The "major" petroleum companies.
2. Department of Indian and Northern Affairs (DINA).
3. Canadian Arctic Gas Pipeline Ltd. (CAGPL).
4. Alberta Gas Trunk Line Co. Ltd. (AGTL).

Each has been intensively and continuously involved for several years in the Mackenzie Delta and more recently the Beaufort Sea. The actions of the "majors" and DINA have largely determined the pace of exploration. CAGPL, which includes permit holders at Prudhoe Bay and the Mackenzie Delta, has influenced transportation proposals and has given rise to an estimated \$50 million of technical, environmental and social research. AGTL, the fourth core actor, was formerly a central member of CAGPL, and subsequently joined Westcoast Transmission Co. Ltd. to propose an "all-Canadian" pipeline for natural gas from the Mackenzie and Beaufort Sea. Though in some sense a "strong rival", AGTL because of its early and continuous involvement in the transportation program is classified as a core actor.

The Majors

In the early 1960s Imperial Oil predicted that conventional oil and gas producing areas in Canada would become inadequate. Since Imperial has no subsidiaries in other countries, it focussed its exploration in the Mackenzie Delta. In 1974 Imperial Oil held under permit approximately 10 million acres in the Mackenzie Delta and Beaufort Sea area.

Imperial Oil personnel identified the regulatory and economic climate as their most serious problem.³ They point to the lack of established Oil and Gas Lands Regulations. They are considering cutting down exploration due to the issues of taxation and, in particular, royalties. Industry claims that, although prices and profits are up, the rapidly escalating costs of exploration and development require a taxation policy which allows a substantial "retained share".

Furthermore, Imperial personnel stated that, for petroleum from the Delta to come on line in the early 1980s, government must provide every incentive for expanding the exploration and development programs. According to some industry analysts, personal and government savings and foreign borrowing will not yield sufficient capital. Thus, they see corporate savings as the single most important source of capital for petroleum development in Canada. This would include foreign corporate savings and in the case of U.S. partners, agreements for rights to petroleum supplies should there be exportable surpluses. Thus, uncertainty about exportable surpluses causes the petroleum industry concern. Should income, either from revenues or foreign investment, decline substantially the day production begins may be delayed at considerable cost to the industry.

Imperial Oil identified technical problems: extremely high fluid or gas pressures in the geological structures of the Delta which have caused drillers to abandon some well sites, including a well on one of Imperial's artificial islands, and need for improvements in drill ships before drilling can begin in the deeper waters of the Beaufort Sea.

There are also shortages of engineers, skilled labourers, materials, and housing. Transportation systems, already crowded, will be further strained as pipeline construction, tar sands development and a host of other mammoth projects get underway in Canada. The absence of a coordinated energy policy for Canada is one factor underlying these shortages.

Industry perceives native peoples as pro-development and using the petroleum programs only to force a settlement of their land claims. The industry feels that delays in settling land claims could result in a delay of several years in pipeline construction.

Shell Oil, Gulf Oil, Mobil Oil and Texaco are also majors in the Delta but not so active as Imperial Oil. Like Imperial, they are cautious about further exploration due to uncertainty about regulations, though so far they are meeting all permit obligations.

The majors view their work as having caused minimal environmental damage. They credit this in part to the Canadian policy of permitting work to go ahead under reasonable environmental regulations. Thus environmental protection experience is accumulated. In contrast, the U.S. has declared complete moratoria.

In mid 1974 industry believed that a Mackenzie Valley pipeline was likely to proceed ahead of one from the Arctic Islands. Consequently, while gas discoveries in the Arctic Islands were significant some exploration activity was shifting to the Mackenzie Delta.

Department of Indian and Northern Affairs

Our attempt to analyse the Department of Indian and Northern Affairs as a core actor made us aware of the enormous influence of the department, direct in northern Canada and indirect in the rest of the country. Its roles include that of a "province-like" authority, administrator, developer, regulator, coordinator, conservationist, researcher, and policy planner. The department has foremost responsibility for northern development activities and an important role in national energy and natural resource policy and programs.

Constitutional Responsibility – North of 60 degrees, DINA has control over the natural resources: land, forests, water, petroleum and minerals. This control gives rise to most of the activity in the department.⁴

Another important area of constitutional authority of DINA is that of Indian Affairs. This branch of the department is the focus for northern native groups seeking settlement of land claims.

A third area of responsibility of DINA is government of the Yukon Territory and Northwest Territories (NWT). The Commissioners of the Territories are responsible to the Minister of DINA and the territorial

governments rely, for the most part, on Ottawa for funds. Since DINA controls their natural resources, the territorial governments only administer social programs, such as employment, housing, education, town planning and municipal government.

DINA's fourth area of responsibility is national parks. National park interests in the Territories do conflict with other DINA interests including: preservation and conservation, environmental research, recreation and tourism, mining, petroleum development, and native rights.

Northern Development Program – In March 1972 the Minister of DINA announced a national policy for northern development in the '70s.⁵ Subsequent to this he modified DINA's administrative structure to accent northern development. The northern development program is conducted by four "branches" through a number of special programs, committees, advisors and staff groups (See Figure V.2).

Roles of DINA – The role of DINA as a "*province-like*" authority is recognized both within and without the department. DINA's almost absolute control over natural resource policy, programs and regulations in the North parallels provincial autonomy. The pace and scale of petroleum programs in the North is largely attributable to DINA's assumption, in the early 1960s, that harsh Arctic conditions, technological difficulties, and exploration costs necessitated favourable financial and land tenure conditions. Otherwise, DINA believed, the petroleum industry would explore elsewhere in Canada or the world.⁶

DINA also assumed that the high costs of arctic exploration, development and transportation of petroleum products required large-scale development programs. Large amounts of capital, equipment and labour have therefore been funnelled into Arctic petroleum operations. Moreover, this assumption has caused the petroleum industry to focus their search on potential "elephant-sized" reservoirs,⁷ which in turn reinforce original assumptions about costs and sizes of areas granted under permit.

DINA's province-like authority is evident in its relations with territorial governments. DINA personnel view the two northern Territories as vast sparsely populated areas, containing important natural resources which should benefit all Canada. In contrast, provinces see their resources as first, benefitting their own citizens and second, other Canadians.

As *administrator* of northern programs, DINA is concerned with the evolution of provincial political and administrative systems in the Territories. DINA personnel feel that centralization is the only way to encourage this.⁸ DINA cites the size of the Territories, the small population and the need for all of Canada to benefit from northern resource development as reasons why DINA should maintain its authority. Some officials in DINA feel that the Mackenzie and Yukon Valley area might be considered for provincial status sooner than other parts of the Territories.⁹ Thus, belief in the lack of political and administrative maturity in the Territories and the rapid pace of

natural resource development provide the rationale for gradual evolution of territorial self-government.

In 1967 the Government of Canada joined the search for petroleum in a new and significant way: as the major equity holder in Panarctic Oils Ltd. In January 1973, in the fourth expansion of equity the federal government contributed \$11 250 000 to raise its equity position to \$45 500 000 and thus maintain 45 per cent of the total equity.¹⁰ From that point on DINA assumed the dual role of developer and regulator.¹¹ As of mid 1974, four of 19 directors of Panarctic Oils Ltd. were senior federal civil servants, two of whom were from DINA.

Officials in DINA are very much aware of their dual role, but they also see the Panarctic venture as a move to maintain Canadian control in the Arctic. The original participants in Panarctic included several small independent Canadian firms. Even collectively these firms were not capable of continuing their exploration activities and in 1966 and 1967 were in a position of having to forfeit their permits. Thus by purchasing equity in Panarctic Oils Ltd., DINA assured a Canadian presence in the high Arctic, expressed additional evidence of territorial sovereignty, and achieved a degree of national control over petroleum resources.

Conflicts of interest do exist, however, and are of expressed concern to officials of DINA¹². Panarctic Oils Ltd. is composed of companies each of whom have other programs and interests. Differences of opinion among directors can reflect the particular interests of the individual members. Thus, DINA finds itself reconciling its interest in the Arctic Islands with those of its partners, which tend to be more diverse.

Crown directors also find matters of budget, taxation and royalties a source of conflict of interest. They have advised the other members of Panarctic to seek ministerial decisions on such matters and on the oil and gas lands regulations and special extensions of permits.

Violations of exploration and particularly land use permit conditions are another source of conflict of interest for Crown directors of Panarctic. Panarctic was recently found to be in violation of a land use permit. Inspection revealed inadequate environmental protection. Normal channels of communication brought the matter to the attention of senior personnel in the Northern Development Program, DINA, where a Crown director recommended that the Minister be notified and appropriate legal action be undertaken.

DINA is also a *coordinator* of federal government interests in the North. Spurred by Prudhoe Bay in 1968 and oil and gas discoveries in the Mackenzie Delta shortly thereafter, several federal departments became active in petroleum development. DINA remained, however, the major force in government. Its statutory and regulatory powers have been augmented by positions on interdepartmental committees and task forces.

The Department of Energy, Mines and Resources (EMR) and DINA together administer the Canada Oil and Gas Lands Act; they each hold directorships of Panarctic Oils Ltd.; they each hold key

positions on the Advisory Committee on Northern Development (ACND) and the Task Force on Northern Oil Development; share common facilities, and share petroleum exploration and development information.

Although DINA has its own environmental inspection staff and review processes and authority to deal with most environmental issues in the Arctic, links with the Department of Environment (DOE) are emerging. Most of these links exist through interdepartmental committees and task forces. Whether in regional committees (e.g., Land Use Advisory Committee (LUAC)) or Ottawa-based committees (e.g., ACND) the role of DOE toward DINA is seen by both as an advisory one. DOE has developed research priorities and procedures for the Beaufort Sea and DINA will ultimately decide on the issuance of oil and gas exploration permits there.

DINA's coordinating role is perhaps best illustrated on the ACND and the Task Force on Northern Oil Development. The Deputy Minister, DINA, chairs the ACND and the Assistant Deputy Minister, DINA is the Secretary. DINA personnel chair three of the committees. The Commissioners of the Yukon and NWT, who are responsible to the Minister of DINA chair two others. The Deputy Minister of DINA is on the Task Force of Northern Oil Development, the group which drafted the pipeline guidelines. DINA chairs the Environmental-Social Committee of the Task Force which has responsibility for the Environmental-Social Program, Northern Pipelines. This latter group has been responsible for the federal environmental-social research program for the Mackenzie Valley gas pipeline. Moreover, this program is revising the pipeline guidelines with respect to a possible pipeline from the Arctic Islands.

Canada's North 1970-1980 sets out Canadian objectives for the North¹³ and indicates that "the heaviest emphasis in current thinking is on the needs and aspirations of the native peoples".¹⁴ The government sees unemployment, low productivity, erosion of traditional values, disease and the impact of technology as contributing to the malaise of native Northerners. Government also sees that because of the incentives it has provided and the demand for northern resources, exploration and development have reached unprecedented levels.¹⁵ Government, in particular DINA, works by a set of underlying assumptions which would solve Northerners' social malaise by encouraging petroleum development:

1. Large quantities of non-renewable natural resources (oil, gas and minerals) exist in the Northern Territories.¹⁶
2. Development of these resources must necessarily be large-scale undertakings.
3. Development of these resources consists of a sequence of inter-related activities and spin-off developments.¹⁷
4. Development will take place over a relatively long period of time.¹⁸
5. Socio-economic benefits will flow to all those involved but especially to Northerners.

6. These benefits will be the basis of a rising standard of living, and better quality of life and opportunity for northern residents.

Maximum benefits to Northerners will only be realized if economic and social development take place at an "optimum pace".¹⁹ DINA also desires a "balance" between people, resources and environment. A.D. Hunt, then Assistant Deputy Minister of DINA, has stated: "We feel that the advancement and the needs of the northern people particularly, are a little out of balance with what has gone on in the past."²⁰ A.D. Hunt went on to add: "but, we still have a long way to go with respect to a consideration for the people of the region."²¹

What is not evident in all of this is what is an acceptable pace of northern development. DINA recognizes that Northerners and particularly native Northerners are becoming concerned enough to resist the pace of development.²² DINA has responded to their resistance by focussing on inadequacies in the flow and timing of information.

A.D. Hunt, in his address to the Northern Canada Offshore Drilling Meeting in 1972, said:

"I don't think anyone wants to ignore their [native Northerners] concerns, but it is a question of how we develop a system that will allow adequate time for them to consider the proposed exploration activities, and quite frankly I think that this means we are going to have to move toward a longer warning period for each exploration activity."²³

Thus, DINA construes the problem as one which can be rectified with a "longer warning period".

DINA has also suggested that the rates at which exploration, development and the construction of petroleum transportation systems proceed will be directly linked to Canadian export policy and National Energy Board (NEB) decisions on export licenses. The importance of exports is evident from the following comment: "We are entitled to know where we stand for our future requirements of energy and more importantly from this meeting's point of view to know what we have and what we might sensibly sell."²⁴

Exports of oil and gas are important to DINA because they assume exploration and development must be large scale to occur at all. As a developer, DINA is conscious of costs. Moreover, Panarctic's involvement in the gas pipeline consortium, Polar Gas Ltd., with its American participants, makes DINA very much aware of, if not favourable toward, the possibility of exporting arctic petroleum to the U.S. American urgency for increased natural gas supplies is clearly a factor in setting the pace for northern development.

One possible reason why DINA has not defined the optimal pace for northern development is that it believes the present pace to be optimal or even sub-optimal. DINA is evidently concerned about possible consequences of a substantial delay in the CAGPL proposal or of an American approval of the rival El Paso proposal. Should the Mackenzie Valley gas pipeline not be built or should it be very much delayed DINA officials expect a slowdown in economic and social de-

velopment in the region with severe consequences. DINA sees the AGTL proposal as only possibly maintaining present levels of activity.

In addition, the formation of Panarctic may be construed partially as a pace-setting decision. The majors, after shunning the Arctic Islands area, were then (1967) looking at it more covetously. DINA feared that if the majors controlled both the Mackenzie Delta-Beaufort Sea region and the Arctic Islands, they might freeze development of the Arctic Islands to suit their schedules. DINA decided to form Panarctic and step-up exploration in the Arctic Islands. As DINA has to some extent set the pace of development, it probably feels the present pace is optimal.

The very structure of responsibilities within DINA creates internal conflicts of interest. On the one hand, the department is devoted to technology-intensive resource development, while on the other, the department has responsibilities toward Northerners and environmental protection. DINA recognizes this apparent conflict of interest but suggests that the same differences would have to be resolved if these responsibilities were dispersed among other federal departments.²⁵ However the momentum in DINA appears to rest with the northern development program, suggesting that decisions are inclined in that direction. Perhaps if resolutions were sought among various departments, perhaps in Cabinet, the array of perspectives and priorities might be greater, resulting possibly in different solutions and decisions.

Canadian Arctic Gas Pipeline Ltd.

Once an exploration program discovers enough petroleum, transportation planning begins. By mid 1970 three separate groups announced their proposals for a gas pipeline from Prudhoe Bay to Mackenzie Delta and south to Canadian and U.S. markets. In August 1970 the federal government notified Gas Arctic Study Group, Northwest Study Group and Westcoast Transmission-Bechtel Group that they should combine since only one pipeline would gain approval. Some members of these groups merged in June 1972 to form Canadian Arctic Gas Study Limited (and its U.S. counterpart, Alaskan Arctic Gas Study Corporation). The consortium changed its name to Canadian Arctic Gas Pipeline Ltd. (CAGPL) when it submitted its pipeline application. By spring 1974 CAGPL consisted of 27 participants.²⁶ Since then changes in the consortium have taken place. Canadian National withdrew in mid 1974 and Sun Oil joined the consortium about the same time. This was followed by the expected but none the less dramatic withdrawal of Alberta Gas Trunk Line Co. Ltd. (AGTL) who have proposed an alternative to the CAGSL proposal.

Both CAGPL and the federal government have conducted extensive research into technical, social and environmental issues. Using the pipeline guidelines developed by the Task Force on Northern Oil Development, both CAGPL and government undertook complementary environmental and social research.²⁷ In spring 1974 CAGPL filed an application with DINA for a right-of-way permit and filed a partial application with

the NEB. Missing were financial, economic and gas contract information.²⁸

CAGPL views the Mackenzie Valley proposal as rational on economic, technical and environmental grounds. It sees the El Paso proposal as ultimately more costly because of the technology involved and because it could not carry Canadian gas to U.S. markets. And therein lies a major uncertainty for CAGPL. Should the NEB decide that new Delta or Beaufort Sea reserves of natural gas are wholly or largely for Canadian users, the anticipated use of the pipeline for Canadian flow through to the U.S. could be indeed questionable. In addition should the export price of gas rise substantially, thus making Canadian gas non-competitive on the export market, the anticipated use of the pipeline would be further suspect.

Clearly, CAGPL sees the El Paso proposal as another major uncertainty. Since reserves in the Delta are as yet insufficient to warrant a 48-inch pipeline, justification rests solely on the availability of Prudhoe gas. CAGPL and most others recognize that the decision on Prudhoe gas will be made in Washington, D.C., either by the Federal Power Commission (FPC) or the U.S. Congress. Neither the application of CAGPL, nor that of El Paso, is complete. Moreover, the complex and time-consuming process of hearings in both countries makes planning difficult at best.

The consortium believes that Canadian markets alone are not capable of meeting capital needs. Little information is available on the financing of the proposed pipelines or their impact on the Canadian economy, except that from some who doubt the wisdom of such ventures. The absence of such information from the pipeline groups indicates their concern about exports and their incomplete contractual arrangements with producers and consumer utilities. CAGPL has revealed, however, that their preliminary analysis shows that flows in capital markets as a percentage of GNP are not likely to change drastically since GNP is continually growing. Much investment in resource development over the past 10 years has been in "smaller projects". CAGPL feels such investment will now shift to fewer but larger projects.

CAGPL is worried about materials and labour. If construction of the pipeline began not long past mid 1974, CAGPL was confident of obtaining pipe from steel mills in Canada, Japan and West Germany. However, during long delays steel mills may undertake other commitments. CAGPL sees lack of skilled labour as contributing to the uncertainty. It sees government training programs as a response to unemployment rather than to the shortages of skilled workers. It suspects government and unions may not see eye to eye regarding employment of Northerners and non-unionized labour.

CAGPL is attempting to use northern businesses but recognizes two special problems: the limited ability of northern businesses to meet the needs of such a large project, and the cyclical nature of project needs which could prove detrimental in the long run to the northern business community.

In response to its many critics, CAGPL suggests they either lack

important facts or do not assign appropriate priorities to the issues. CAGPL indicated, for example, that critics often fail to consider the variable production rate of fields. The phasing of production from individual wells and fields is complex and is often overlooked in discussions of supply estimates.

CAGPL believes the Polar Gas Project is limited by technology and is therefore not a rival. Inter-island pipeline crossings, laying pipe through ice, petroleum liquefaction in the North, and ice-strengthened tanker development are some of the technological obstacles. CAGPL estimates Polar Gas is two or three years away from a formal application.

However, many actors, CAGPL included, see the fundamental uncertainty as the lack of proven reserves of natural gas in the Mackenzie and Arctic Islands. Until threshold volumes are proven CAGPL's proposal hinges on the uncertain availability of Prudhoe gas. Whether a joint U.S.-Canadian route will be acceptable to U.S. regulatory and political decision makers is uncertain. At the same time uncertainty about levels of Canadian exports looms large. Further limitations on exports could seriously delay pipeline development, particularly CAGPL's proposal.

The consortium also feels that government intervention in the resource industries and lack of government planning and policy contribute to a climate of uncertainty. CAGPL sees the fact that new Oil and Gas Land regulations have not been brought in nor taxation and royalty disputes resolved as crucial factors.

CAGPL's approach to native land claims has been to suggest to the native groups that they negotiate between themselves (CAGPL and natives) with funds for compensation to be put in trust pending resolution of the land claim with the government.²⁹ In this way the project could proceed, assuming approval from regulatory bodies is forthcoming.

In summary, CAGPL argues that, on technical, economic, social, and environmental grounds, their proposal is superior to alternatives. However, they recognize that important decisions have yet to be made and issues resolved, the major ones being allowable export levels and price revisions; regulatory issues, taxation, and royalty sharing; native land claims; and the lack of proven reserves in the Mackenzie Delta and Arctic Islands.

Alberta Gas Trunk Line Co. Ltd.

Though one of the initial proponents of a Prudhoe Bay-Mackenzie Valley natural gas pipeline, by September 1974 AGTL had formally withdrawn from CAGPL. It joined Westcoast Transmission Co. Ltd. of British Columbia to form Foothills Pipeline Ltd. and announced they would apply to build a natural gas pipeline from the Mackenzie Delta south to Canadian markets.

AGTL was planning the Mackenzie Valley gas pipeline as early as 1970. As prime mover in the Gas Arctic Study Group, it undertook

technical, environmental, social and economic research. In June 1972 it merged with the Northwest Study Group to form CAGSL.

Throughout spring and summer 1974, Canadians became concerned about the supply and deliverability of natural gas to meet their own needs. Increases in the price of natural gas, particularly for export, and the emergence of the El Paso proposal, combined to emphasize the uncertainty of future exports. Also explorers were finding only limited gas supplies in the Delta. These factors led AGTL to withdraw from CAGPL and develop the "Maple Leaf" proposal, the "all-Canadian" gas pipeline from the Delta.

AGTL maintains Delta gas will be required for Canadians. The "Maple Leaf" pipeline would be a smaller diameter line than that of CAGPL and costs are estimated to be about one-half that of CAGPL.³⁰ AGTL estimates proven gas reserves in the Delta in the order of 7 tcf and anticipates proven reserves of about 18-20 tcf by 1980.³¹ AGTL recognized that the timing of its pipeline construction would be somewhat later than that proposed by CAGPL. In the interim further reserves could be proven, better economic and financial information gathered and materials supply coordinated. Moreover, the impact on the Canadian economy would be less.

A complex web links the governments of Alberta, British Columbia, and Ontario, and major pipeline and utility companies. Central to the web is AGTL. AGTL and the Alberta government each hold 50 per cent of the shares of Pan-Alberta Gas Ltd. AGTL is also linked with Westcoast Transmission Co. Ltd. and through it, the B.C. government. Their joint proposal for the "Maple Leaf" line has already been mentioned. In addition, Pan-Alberta Gas has agreed to supply gas to Westcoast in view of the latter's problems of gas production from its Beaver River and Pointed Mountain Reservoirs.³² Also, the newly-formed Ontario Energy Corporation and Ontario gas utilities are negotiating with AGTL/Pan-Alberta for more Alberta gas.

It might be argued that AGTL, after withdrawing from CAGPL, could no longer be classified as a "core actor" in the assessment system. However, their early central role in CAGSL, the applicability of much of the consortium's research and development to the "Maple Leaf" project, the proposed pipeline application, and the important relationships with provincial energy agencies make AGTL a core actor in the Mackenzie theatre.

Allied Supporting Actors

Allied supporting actors are numerous and include government and industry groups. These actors support some part of the technological program. In the Mackenzie Valley we found some supporting actors in conflict, because there are two distinct proposals for natural gas pipelines. However, all these actors support, facilitate and enhance exploration, development and transportation programs.

Federal government allied supporting actors include the following:

Department of Environment

Department of Energy, Mines and Resources

Treasury Board
Department of Transport
Advisory Committee on Northern Development
Task Force on Northern Oil Development
Cabinet of the federal government and the Department of Finance
Industry allied supporting actors include the following:
Canadian Petroleum Association
Independent Petroleum Association of Canada
The "independent" petroleum companies
Arctic Petroleum Operators' Association
Dome Petroleum Ltd.

Important allied supporting actors which link the industry with the federal government include:

National Advisory Committee on Petroleum
National Advisory Committee on Pipeline Financing

Provincial governments have become increasingly involved, particularly through the investment of capital (or the announced intention to do so), in petroleum development. Those most involved in the Mackenzie are:

Government of Alberta
Government of British Columbia
Government of Ontario
Alberta Energy Resources Conservation Board

Northern petroleum development is very dependent on certain business interests:

The steel industry
The transportation industry (air, rail, boat)
The construction industry
Heavy equipment manufacturers
Investment companies and financial institutions.

Department of Environment

The role of the Department of Environment (DOE) in northern development, while increasing, is very limited when compared with either DINA or EMR. DOE is responsible for fisheries, air, and migratory birds in northern Canada. Two programs of DOE are active in the two northern Territories: 1) the Fisheries and Marine Program, and 2) the Environmental Services Program.

For the most part, DOE reacts to events and provides support to DINA, EMR and the territorial governments which have statutory and regulatory powers. Though DOE is represented on such coordinating bodies as the ACND and the Task Force on Northern Oil Development, control of the environmental aspects of territorial resource development rests mainly with DINA.

DOE was formed in 1971 by amalgamating the Department of Fisheries and Forestry and various branches and services of other ministries. DOE personnel have striven to develop a federal approach to environmental assessment. To date, relationships between DOE and other federal departments have been by invitation, ministerial directive

or DOE mandate and responsibilities. DOE expects the Environmental Assessment Review Process (EARP) will provide a formal procedure for review and analysis of environmental impacts of federal government projects. This procedure is being worked out in the contexts of the Beaufort Sea Study and Polar Gas pipeline research. However, DOE does not have any veto power over other departments and it is doubtful that they will all be required to participate in EARP. For instance, DINA projects will not be subject to the DOE review process.³³ Inasmuch as DINA does its own environmental assessment, and assumes a province-like role in the Yukon and NWT, it has been able to bypass the DOE-controlled assessment process. Under these conditions DOE hopes that information will be exchanged at the Ministerial level and through interdepartmental committees and task forces. To supplement information supplied by cooperating departments, DOE also intends to use the "estimates cycle" as a vehicle for learning, in advance, about projects likely to have significant environmental impacts. This involves digging up information contained in the two-year estimates provided to Treasury Board.

The present status of the EARP shows in part the relationship of DOE to DINA. From the DOE perspective DINA coordinates, even co-opts, other federal departments. For northern projects it is DINA who ultimately interprets, concludes, recommends and takes action.

DOE personnel feel a national policy on northern development is much needed. They feel that, in the absence of comprehensive frameworks, day-to-day operations rather than long term considerations assume priority.³⁴

Department of Energy, Mines and Resources

EMR is involved in developments in the Mackenzie Delta and Arctic Islands in two ways. First, through the joint responsibilities the department shares with DINA for the administration of the Canada Oil and Gas Land Regulations. The regulations have been withdrawn and DINA and EMR cannot revise them until the federal government and the governments of the Atlantic Provinces reach an agreement on rights to offshore petroleum in eastern Canada. Thus, all petroleum exploration and development under federal jurisdictions exists in an uncertain regulatory environment. This makes EMR an important actor.

Second, EMR is involved in formulating national energy policy. With responsibility for the supply and deliverability of energy on a national basis, EMR substantially influences petroleum development in the Arctic. Though undoubtedly the Cabinet was also involved, EMR has made decisions about such questions as the "Ottawa River Line" and Alberta petroleum distribution, the pricing of oil and gas for domestic use and export, the request for detailed information about industry's seismic and drilling activities and farm out agreements between companies³⁵ and the development of a national petroleum company. All these matters affect the pace and scale of northern petroleum development.

Treasury Board

In 1974 the Treasury Board changed its position on funding government-required environmental and social research to support petroleum development proposals. In the case of the Mackenzie Delta and Valley program, government agencies and industry developed, conducted and paid for joint research programs. More recently, Treasury Board has ruled that a large research project for the Beaufort Sea was primarily in the interests of the petroleum companies and therefore they must pay all costs. Most observers expect Treasury Board to follow this precedent in the case of research for oil and gas transportation from the Arctic Islands.

Needless to say, industry did not greet this decision with enthusiasm.³⁶ None the less, industry, through the Arctic Petroleum Operators' Association (APOA) in conjunction with DINA and DOE, developed the Beaufort Sea study program. Both industry and government are conducting research, though industry will pay all the costs. Precisely how the Treasury Board decision has affected the nature and conduct of research is difficult to determine. Industry, it is clear, wishes to influence, more than it has been able to in the past, the kinds of research to be done, to shift the emphasis from "pure" and "baseline" research to pragmatic, design- and development-oriented questions.

Departments of Transport and Public Works

Transport systems linking the North with suppliers in southern Canada are crucial to the pace of northern development. Existing transportation systems have been utilized to their utmost capacity, and the Departments of Transport and Public Works are instrumental in the development of transportation infrastructures including airport facilities, river transport systems, and the Mackenzie and Dempster Highways.

The Advisory Committee on Northern Development (ACND)

Chaired by the Deputy Minister of DINA, the ACND is the means by which DINA fulfils much of its responsibility for coordination of federal activities in the Territories. It was established in 1948 and consists of federal civil servants and the Commissioners of the two Territories. More than half its 10 sub-committees were established since 1968, when Arctic oil and gas exploration intensified. Prior to this the ACND had coordinated federal involvement in the "DEW Line", in the "northern vision" programs of the late 50s, in northwest passage programs, in Arctic weather research and monitoring, and in the Polar Continental Shelf project. However, the committee structure of the ACND now reflects the emphasis on petroleum exploration and development and the consequences which arise (e.g., finance, environment, native peoples, transport, economic planning, government coordination).³⁷

The Task Force on Northern Oil Development

This group was established in 1968 as an interdepartmental advisory

committee on all matters concerning petroleum development in the Territories. Members include the Deputy Ministers of EMR, DINA, DOE, DOT, and the Chairman of the NEB. Emphasis has been placed on petroleum transportation, especially pipelines. This task force produced both the initial and revised guidelines on northern pipelines and is developing another version of the guidelines for potential pipelines from the Arctic Islands. The development of guidelines has involved 11 federal agencies³⁸ and consultation with the oil and gas industry, in particular those groups proposing to build northern pipelines.

The task force is composed of six committees including: 1) pipeline engineering, 2) marketing, 3) transport, 4) industrial supply, 5) economic impact, 6) environmental-social. Each committee undertakes its own research and advises the Ministers of DINA and EMR of research by industry. Also, these committees have responsibility for reviewing relevant sections of pipeline applications.

Reporting to the Environmental-Social Committee (chaired by DINA) is the Director of the Environmental-Social Programs: Northern Pipelines. This group has been primarily responsible for developing the pipeline guidelines, and recommending and coordinating environmental and social impact research in the Mackenzie Delta-Valley region. Also under the direction of the Environmental Social Program is the Pipeline Application Assessment Group, which is discussed in Chapter IV. Though both the ACND and the Task Force are interdepartmental, DINA's role in each is significant.

Federal Cabinet and Department of Finance

Gibson³⁹ describes how key members of Cabinet sought to persuade U.S. government and industry officials to consider a Mackenzie route for oil and gas pipelines. In addition, Prime Minister Trudeau's April 1972 announcement that construction of the Mackenzie Highway would begin immediately, prior to environmental and social impact research, can be taken as evidence of Cabinet support for northern petroleum development.

In the last few years, the Department of Finance has played an increasingly important role in petroleum development. It has sought answers to such questions as: Who "owns" continental shelf areas? Who should receive the potential revenues from petroleum? and What is the federal share of revenues through taxation and royalties on existing production systems, especially in Alberta? The May 1974 budget (which was never enacted because of the election in July 1974) was vehemently attacked by the petroleum industry for its excessive tax implications on oil and gas. While the Minister of Finance attempted to explain and somewhat allay the fears of industry⁴⁰ the issue had not been settled as of October 1974, thus maintaining high levels of uncertainty from the industry viewpoint.

Canadian Petroleum Association

The Canadian Petroleum Association (CPA), which views itself as the collective voice of the petroleum industry, predicts oil and gas pro-

duction from conventional areas will peak around 1976 and then decline. Since frontier supplies are unlikely to be available until the mid 1980s, alternative sources will be required between 1979 and 1985. The CPA thinks the Beaufort Sea area has the best prospects since its geologic structures are uniform and large. Mackenzie Delta structures, while large, are cross-faulted, and those of the Arctic Islands, while large and uniform, appear to date to be without oil.

The CPA sees political and regulatory issues as major problems. The as yet pending oil and gas land regulations, taxation and royalty disputes, and uncertain export levels affect the investment climate adversely. It also sees a lack of skilled labour slowing development. The fact that several large resource development projects are underway at the same time also strains steel supplies and other construction materials and equipment.

Independent Petroleum Association of Canada (IPAC)

The Independent Petroleum Association of Canada (IPAC) represents the interests of the "smaller" independent petroleum companies: those which are not associated with multinational firms. Members are mostly operators and producers; drilling and transportation companies are associate members.

One of IPAC's main concerns has been land regulations. Ever since they were withdrawn in 1970, IPAC has been pressing for their re-issue. They see the delay as a result of an unstable minority government, the native land claim issue, and conflicts between the federal government and the Atlantic Provinces regarding jurisdiction over offshore areas. IPAC is also concerned about taxation and royalties. They prepared a composite model of the petroleum industry based on the May 1974 budget proposals, showing the consequences to 1976 for the industry, and submitted it to the Department of Finance, EMR, DINA and Industry, Trade and Commerce.

IPAC will appear before the NEB during its November 1974 hearings on supply, demand and deliverability of natural gas. IPAC thinks CPA is underestimating reserves in conventional areas, especially Alberta, though they agree frontier supplies will be needed. IPAC's position on conventional area reserves is based at least in part on the fact that 80 per cent of all exploratory drilling in conventional areas is by its own members.

Arctic Petroleum Operators' Association

The petroleum industry recognizes research needs associated with operations in Arctic areas, especially in offshore areas. To coordinate this research it formed the Arctic Petroleum Operators' Association (APOA) early in 1970. Some 35 companies who hold or operate on oil and gas permits in the Arctic are members. APOA is essentially a research arm of the petroleum industry.

The association may recommend or encourage certain projects and members of APOA carry them out. The companies who fund the research make monthly reports to the executive of the APOA, but do not share the results with other members.

APOA has studied offshore drilling problems in the Arctic. To satisfy government requests for detailed drilling plans for the Beaufort Sea, APOA formed the Beaufort Sea Task Force in early 1972. Companies supporting the study included Amoco, Aquitaine, Canadian Superior, Elf, Gulf, Hudson Bay Oil & Gas, Mobil, Texaco, Union Oil and Imperial Oil.⁴¹

In general, APOA strives to improve northern technology research programs. However, groups like APOA feel they may not succeed if government policies on taxation and royalties squeeze research budgets.

Dome Petroleum Ltd.

Dome Petroleum is prominent in both the Mackenzie Delta-Beaufort Sea and Arctic Islands programs. Though Dome thought Arctic Islands production was 50 years away, once other companies began to file on acreage in the Islands, it followed suit in 1959. In winter 1961–62, Dome drilled the first well in the Arctic Islands at Winter Harbour at a cost of \$1 million. Though the well was dry, Dome demonstrated that drilling in the high Arctic was possible.

When Panarctic Oils Ltd. was formed in 1967, Dome had met its permit obligations, unlike many other permittees in the Islands. This fact combined with Canadian Pacific's entry into Panarctic persuaded Dome to join the group and act as its operator.

In 1967, Dome followed the trend to the Mackenzie Delta region. Only offshore parcels remained, but what then looked like second best, now is part of the promising Beaufort Sea.

Dome is a leader in Beaufort Sea drilling technology. After three proposals from other companies for Beaufort Sea drilling were rejected by the federal government, Dome received approval-in-principle to construct two drillships for drilling in the Beaufort Sea. The risks are high and the costs great. "For a whopping investment of about \$100 million and possibly more as inflation progresses, Dome will put two complete Arctic marine drilling systems into the area to begin offshore drilling operations in mid-July 1976."⁴² As the only operator to gain such approval to date, Dome has become a significant actor in the offshore program. Uncertainties in the Beaufort Sea program include the technical feasibility of the drillships, final government approval of the drillships, ice conditions and whether oil and gas will be found.

At the present time Dome believes that Arctic Islands gas will reach markets ahead of Delta gas because the federal government itself has a stake in the Islands and will profit through the sale of gas. Dome also feels that environmental and social problems associated with a pipeline from the Islands are not as great as they would be in the Mackenzie Valley. Much of the pipeline route from the Islands is through the Precambrian Shield.

Dome is concerned about the role of government in petroleum development, especially Panarctic. Dome sees differences among federal departments and the possibility of increased government involvement once production begins, as negative features of Panarctic. In addition they feel that the creation of "Petrocan" might inhibit further explora-

tion, especially if industry is required to furnish even more confidential data to the government.

National Advisory Committees

The National Advisory Committee on Petroleum (NACOP) and the National Advisory Committee on Northern Pipeline Financing have been created to advise the federal government on petroleum development. Both involve high level government and industry representatives whose deliberations are private. Thus, it is difficult to gauge their impact on government policy and programs.

Provincial Governments

As 1974 progressed, the roles of provincial governments in northern petroleum development rapidly evolved. Because the federal-provincial dispute over offshore rights was not settled, revised Oil and Gas Lands Regulations are still pending. The "Maple Leaf" project has rendered the provinces of Alberta and British Columbia important actors in northern pipeline proposals. Alberta, with its links to AGTL,⁴³ and British Columbia, with shares in Westcoast Transmission Co. Ltd., want natural gas for both fuel consumption and potential petrochemical projects.⁴⁴

The Ontario government recently announced the formation of the Ontario Energy Corporation with an initial capital allocation of \$100 million.⁴⁵ Forecasts in Ontario project natural gas shortages by 1976.⁴⁶ Ontario indicated in a brief that it feels the NEB has "failed to protect Canadian requirements".⁴⁷ Former Energy Minister D'Arcy McKeough has indicated possible investment by Ontario in CAGPL, the Alberta oil sands and Polar Gas Ltd.⁴⁸

Part of Ontario's dilemma as to where to invest stems from not knowing which pipeline is likely to proceed first. There is also the question of whether to secure supplies for Ontario by investing in natural gas itself or by participating in a pipeline and perhaps influencing its route.

In addition to securing gas supplies to maintain existing operations, Ontario requires additional energy for industrial growth. It recognizes that one factor influencing supply is Alberta's decision to expand its industrial base. Ontario thinks this expansion can have only limited success since industry locates near markets and the Ontario-Quebec region still constitutes the major Canadian market area.

Alberta Energy Resources Conservation Board

The Energy Resources Conservation Board (ERCB) aims to protect Alberta energy requirements for the foreseeable future, usually interpreted as 30 years. ERCB holds hearings every three years, to estimate these requirements. In the past few years prices have escalated rapidly and this schedule has been stepped up. The ERCB has specific responsibilities:

"The Alberta statutes under which it operates charge the Energy Resources Conservation Board with certain energy resource man-

agement and environment management functions with regard to oil, gas, oil sands, pipelines, hydro and electric energy and coal. The energy resource management functions include appraisal of reserves, regulation of exploration, development, pipelines, and transmission lines, insurance of safety, prevention of waste, appraisal of productive capacity, appraisal of Alberta requirements, appraisal of markets outside Alberta and advising of the Government. Environmental management functions include the regulation of land use, surface water use, subsurface water use, land contamination, surface water pollution, subsurface water pollution, and atmospheric pollution."⁴⁹

The ERCB has no powers to restrict exports of oil, except insofar as they might decrease total amounts of oil produced from Alberta reserves. In addition to its regulatory functions, the ERCB advises the Alberta government. It expects the Alberta government to ask for a statement for the NEB's fall 1974 supply hearings.

The ERCB thinks petroleum from the Arctic might be used in Alberta to supplement its own supplies, as reserves in Alberta are declining and exploration has had little success for the past few years. Also northern development might provide additional pipeline flexibility for transporting Alberta petroleum to other parts of Canada and the U.S. However ERCB does not believe Alberta can support increased gas shipments to eastern Canada. The ERCB opposes the desire of some of the petroleum companies to deplete their reserves of Alberta petroleum and then shift to the Arctic. ERCB believes the prospect of greater earnings from expensive frontier oil and gas is tempting them to use conventional reserves as quickly as possible.

The ERCB is monitoring closely work being done on coal gasification in Alberta and elsewhere. ERCB members are divided on coal gasification versus Arctic petroleum as a long-term prospect though all agree frontier petroleum will likely reach markets ahead of gasified coal.

The ERCB sees liaison with the NEB as good. Some former ERCB staff members are now in senior positions in NEB. The two groups exchange information, in part to avoid duplication of effort. NEB and ERCB geologists meet to sort out differences on reserve figures. Usually discrepancies can be resolved, but when they are not each organization uses its own figures. NEB and ERCB meet at least once a year to discuss reserves and more often when applications are pending.

Supplier Industries

Notable actors in this group include the steel, transportation, construction and heavy equipment manufacturing industries.

Opinions differ on whether adequate supplies of steel will be available when needed for the manufacture of pipe and equipment.⁵⁰ Canadian steel and pipe-making capability is not seen as sufficient for even one of the major pipelines. Thus, pipe will be sought also in the U.S., Japan and West Germany. It is unlikely that orders for pipe will be placed until Cabinet has given final approval to a pipeline. In the

interim there is always the possibility that milling capacity will be booked for other needs, further delaying pipeline construction.

According to several actors, the capacity of air, rail, boat and barge systems has been reached, even exceeded, as more and more supplies and equipment are forwarded to northern communities and petroleum development sites. Compounding the difficulty are a relatively short shipping season and unpredictable ice conditions in the Arctic. In summer 1974 the Western Arctic region was plagued with ice well into the summer, making the shipment of supplies by boat to the Arctic Islands impossible in some cases.⁵¹

Industry fears a shortage of skilled labour for construction of pipelines, compressor stations, production facilities and service facilities,⁵² particularly as several large-scale development projects are now in progress and others may begin soon.

We note two other issues on the construction and equipment side. The first is the question of the availability of new equipment if steel-making and manufacturing facilities are already at or near production limits. The second revolves around the capability of Canadian business to compete successfully for contracts in the North. Some observers believe petroleum projects are so large that Canadian business will not be able to compete with large U.S. or other foreign suppliers.⁵³

Independent Central Actors

Actors of this type are characterized by their autonomy or independence from other actors and their centrality to the decision-making process. They deal with numerous actors and may make crucial decisions. They are as objective as possible, within their terms of reference. Two actor groups fit this particular category, namely the NEB and the Commission of Inquiry (Berger Commission).

National Energy Board

The National Energy Board (NEB) was established in 1959 "to ensure to the people of Canada the best and most effective use of energy resources in this country."⁵⁴ Its regulatory and advisory responsibilities have been discussed in Chapter IV.

The NEB advises the Minister of EMR, who can ask it to provide studies and recommendations. Moreover, the NEB is represented on some federal task forces and interdepartmental committees. "The Board is not set up to collect detailed information but draws heavily on other branches of the federal and provincial governments, from the knowledge and experience of its staff and from the information submitted from the public and energy industry during public hearings."⁵⁵

Potential conflict exists because the NEB is not supposed to be influenced by viewpoints from other agencies or interests, including ministerial statements favouring a particular project. Blue has suggested that "this type of legal consideration is a fact of life accepted by, and to the extent it is within the Board's powers to do so, mitigated by the Board."⁵⁶

The NEB's consideration of environmental and social issues as

aspects of the "national interest" raises certain problems. The NEB Act stipulates that the NEB can look at these aspects of the application should it wish to do so.⁵⁷ However, the Canadian Arctic Resources Committee (CARC) has reported that the federal government decided on 10 January 1973 that the NEB would not deal with native land claims, social impacts on natives, land tenure agreements, nor "even the standards of acceptable environmental degradation",⁵⁸ as this would merely duplicate DINA's role in the regulatory process surrounding the CAGPL application.

Any environmental or social issue arising from the DINA hearings can be reopened in the NEB hearings only at the NEB's discretion. Even should the NEB so decide, it has been criticized as having only limited experience in environmental and social matters. Also the existing hearing process makes it difficult for the NEB to obtain expert testimony on the environment because of the poverty of private environmental groups and the reluctance of government to allow its public servants to testify.⁵⁹

The only time the NEB considers rights-of-way, in practice, is when problems surround the expropriation of private lands.⁶⁰ The CAGPL application, however, only deals with public lands, complicated, of course, by the native land claims issue which also comes under DINA jurisdiction.

One might also question the independence of the NEB inasmuch as its chairman sits as a member on NACOP. This group of senior executives from industry and government advise the Cabinet on petroleum development. Perhaps such an association enables the NEB to anticipate policy and therefore be better equipped to assemble information and advise and regulate. Such an association may also influence its interpretations of national interest and its actions. The NEB's advisory role is not restricted to members. NEB staff serve on a number of governmental task forces and interdepartmental committees both as active participants and observers.

As the present study shows, systematic and in-depth consideration of rival or alternative schemes is lacking.⁶¹ While such interests may be accepted as "intervenor" in public hearings on a specific application, such status is entirely at the NEB's discretion. Thus, there is at least theoretically some question about what constitute legitimate interests, especially in those instances where the NEB has advised the government of the day.

NEB has begun to seriously consider the Canadian demand for petroleum and the export picture. At the time of this writing the NEB is analysing the extent of natural gas reserves in Canada, of projected consumption patterns, of the rates of discovery and development, and of deliverability. It is deciding on the criteria for determining that amount of natural gas which is in excess of foreseeable Canadian needs. Hearings on these matters were scheduled for November 1974.

In part these hearings have arisen from a concern both within and outside the NEB for the sufficiency and accuracy of its information, particularly that related to reserve estimates. A number of critics of

the NEB have suggested that it (and the Cabinet) have relied too extensively on information supplied by industry and on criteria which do not adequately reflect the changing nature of supplies and deliverability.⁶²

The hearings provide industry with yet another element of uncertainty. Not only are revised limits on exports likely (which may affect U.S. participation in both the Mackenzie and Arctic Islands) but the CAGPL application will not be heard until these hearings have been completed. However, the CAGPL application would not likely be finalized until after the hearings, since participants, suppliers and consumer utilities may wish to know their outcome before finalizing contracts.

Another point of contention regarding reserves is that in the past the NEB has considered them only in physical, not economic, terms. Presumably their value would increase as the reserves are depleted.⁶³ One NEB official said that in a "few years" the NEB will consider reserves in an economic sense.⁶⁴

Commission of Inquiry (Berger Commission)

In March 1974 CAGPL applied for a right-of-way to construct a Mackenzie Valley natural gas pipeline. The Minister of DINA, J. Chrétien, appointed a "Mackenzie Valley Pipeline Inquiry" to make recommendations "regarding terms and conditions" which should be attached to any right-of-way which might be granted.⁶⁵ By Order-in-Council (21 March 1974) Mr. Justice Thomas Berger of the B.C. Supreme Court was appointed Commissioner of the Inquiry. Before his appointment to the bench, Mr. Justice Berger was counsel to various B.C. Indian groups and a former leader of the B.C. New Democratic Party. His appointment was looked upon favourably by native rights and environmentalist groups, and we think it likely Mr. Chrétien selected him, in part, to avoid challenges concerning the objectivity of the Inquiry. As Commissioner, Berger was empowered to engage expert advisors and other personnel necessary to assist him in making his recommendations. The federal government also assembled a team of experts to form an assessment group to review the CAGPL application.

The Berger Commission's terms of reference almost immediately became a point of contention. Mr. Justice Berger construed the terms broadly almost from the outset.⁶⁶

In April and May 1974 the Berger Commission held preliminary hearings in Yellowknife, Inuvik, Whitehorse, and Ottawa to take submissions from all parties who wished to be heard during the actual Inquiry. These preliminary sessions considered scope, timing, and procedures of the actual Inquiry. CAGPL representatives argued that the hearings should be expedited so that pipeline work could begin in 1974 and that topics such as alternative transporting methods and the national impact of the project should only be considered by the NEB. Environmental and native groups asked for at least a year to prepare for the hearings and urged that the hearings consider all aspects of pipeline construction in the Mackenzie Valley.⁶⁷

On 12 July 1974, Mr. Justice Berger outlined his rulings on the questions raised during preliminary hearings.⁶⁸

1. Timetable for the Inquiry: The hearings will not be expedited unduly to improve CAGPL's position in relation to the El Paso proposal. "My mandate is to conduct a fair and thorough Inquiry. That must come first."⁶⁹ The hearings should not wait upon the outcome of the Certificate of Public Convenience and Necessity proceedings before the NEB.⁷⁰

2. Hearings: Before the hearings begin, Mr. Justice Berger will personally visit communities in the Mackenzie Valley, the Delta and the Yukon likely to be affected by construction of the pipeline in order "to get to know the people and the way they live".⁷¹ The formal hearing will begin with background data on the history, culture and economy of the northern peoples, geography, climate, geotechnical aspects of construction, terrain types and resources. Then the Inquiry will hear CAGPL, who will be required to call as witnesses the people who prepared material for their application. These witnesses, as well as members of DINA's Pipeline Assessment Group, are to be examined and cross-examined, as will all witnesses at the formal hearings. Native people are to have time to prepare themselves for both the formal and informal hearings, which are to be regarded as "equally important parts of the same process."⁷²

3. Practice and Procedure: All of the persons and organizations which made submissions to the preliminary hearings will have the right to intervene in the Inquiry. Additional intervenors will be solicited through media announcements. The Pipeline Assessment Group will ask CAGPL for information on any matters which were inadequately covered in its application: this material will be available to the Inquiry and the public, as will the Assessment Group's entire report. The Inquiry will take steps to bring to light all relevant reports undertaken by, or in the possession of, the Government of Canada, CAGPL and the intervenors. Subpoenas will be issued at the discretion of the Commissioner.

4. Scope of the Inquiry: "Both the Order-in-Council and the Pipeline Guidelines are cast in broadly worded language. They say I am to conduct a social, economic and environmental impact study. It is a study without precedent in the history of our country. I take no narrow view of my terms of reference."⁷³

The Inquiry intends to consider land claims, since the native groups believe such claims should be settled before any right-of-way is granted. All native groups will have the right to urge this position at the Inquiry.

The Inquiry will have to compare the proposed pipeline route with other possible routes because of the corridor concept. The Inquiry will hear evidence on alternate *modes* of transportation if it assists in determining the conditions which should be imposed if a right-of-way is granted.

Information on purchase and transportation of supplies and equipment, as well as data regarding the gas fields in the Mackenzie Delta

and the gathering pipelines to be built there will be considered relevant to the Inquiry.

The Inquiry will not consider the question of proper royalties and taxes to be placed on gas producers in the Mackenzie Delta, since this is a matter to be decided by Parliament. Nor will the Inquiry consider evidence about the economic impact of a gas pipeline on the economy of Canada, except as it bears on the economy of the North.

The significance of the Berger Commission clearly lies in the view which Mr. Justice Berger takes of his terms of reference. Although the Commission has an advisory rather than decision-making role, Berger clearly hopes the Inquiry will serve as a model for future evaluations of the possible consequences of government and industry decisions.

Middle Range Actors

We classified actors as "middle range" if they were moderately involved in the "assessment system", though, over time, involvement and influence patterns may change. Actors may be classified as "middle range" for other reasons; their own choice (wishing only moderate involvement), expertise not central to the program, or an involvement and attitude toward the technological program that is best described as "moderate". The two territorial governments are not opposed to development but disagree with DINA about the scale of development and northern needs. Because of DINA's control over northern resources they cannot be core actors, however.

Government of the Northwest Territories

The NWT government has evolved from a solitary Commissioner who was also Deputy Minister of the Northern Development Program, with offices in Ottawa. A council of elected and appointed members is now in effect,⁷⁴ offices have been moved to Yellowknife, and the NWT government has jurisdiction over many "provincial" matters. The council is responsible to the Commissioner and Deputy Commissioner, who as federal civil servants are responsible to the Minister of DINA.

DINA retains effective control of the Territories. It is responsible for natural resources, with the exception of game. The future of the Territories for several years will be linked to natural resource development, and the territorial government can only "react" to development. The NWT government is left to oversee social development programs and the "social cost" issues to which they are directed.

The NWT government is dependent on Ottawa in budgetary and fiscal matters. The ability of the NWT government to generate revenues is limited to fuel taxes, liquor tax and certain licenses; these sources accounted for approximately 3 per cent of total federal and territorial expenditures in the North for 1972-73.⁷⁵ Thus, the social development programs in the NWT, though under NWT government jurisdiction, are funded largely by the federal government.

In recent years few new programs have come under the complete jurisdiction of the NWT government.⁷⁶ The territorial governments, like

other federal departments, are subject to the two-year estimates cycle of Treasury Board in Ottawa. In the first year a forecast is made in two parts. Part A concerns budgetary needs for maintenance of existing programs. Part B estimates are for new programs. The fact that few new programs have been established under the NWT government leads to some speculation that DINA effectively takes control of the “B” estimates, presumably because they perceive themselves to be the “provincial” government of the NWT.⁷⁷

NWT government personnel disagree with the assumptions of DINA and industry of the necessity of large-scale developments. Such development tends to be capital and technology intensive and will provide little direct socio-economic benefit to Northerners. Moreover, large-scale projects have not met the needs of Northerners. Two examples given are forest products and cement-manufacturing. NWT government personnel believe that by establishing a number of “small” community-based sawmill operations, lumber products can be provided for northern construction needs, while at the same time providing employment opportunities which can be developed and phased to suit community lifestyles, be they wholly wage-economy oriented, or patterns which still retain traditional native activities such as hunting, fishing and trapping. Similarly, cement-manufacturing facilities could be built and operated. The NWT government has tried to persuade DINA that such modest scale projects meet important needs and ought to be undertaken. So far their attempts have been in vain.

The territorial government is also concerned about the “boom-and-bust” cycle, so often a characteristic of large-scale development projects, such as petroleum development. The pace of development will be affected by industry competition, land regulations, and native land claims and it may be extremely variable. The ups and downs would be felt acutely by small businesses and communities in the North. Territorial government personnel have mixed feelings about the impact of a slow-down in the pipeline development process. While jobs, income and growth may be lost or slowed should a gas pipeline not be constructed in the near future, they also feel that development is occurring too rapidly. Also the lack of a schedule prevents adequate planning. The building of the Mackenzie Highway may provide some economic stimulus but not enough to compensate for a marked slow-down in pipeline development and petroleum exploration. These concerns underlie the NWT government opinion that, at least, in addition to large-scale projects, DINA should consider undertaking road and airport facilities, pipeline access routes, local sawmills, cement-manufacture, a prefab housing industry, and highway services.

NWT government personnel perceive native peoples as isolated from participation in the development process, though not from its impacts. They suggest that this will not change if development is completely halted nor if massive development takes place. Thus, they perceive a need for a moderated process of change which corresponds to native needs and aspirations and which, in all likelihood, would

follow from smaller-scale, locally-based and low technology-intensive activities.

Government of the Yukon Territory

At present, petroleum activities are less important to the Yukon than to the NWT. No substantial amount of gas or oil has been found in the Yukon. The CAGPL proposal involves only a small (though important) coastal area in the Yukon. However, a gas pipeline down the Mackenzie Valley might draw off scarce Yukon labour, divert materials which might otherwise come to the Yukon and forestall Yukon development by absorbing investment capital.

The Yukon government through the Task Force on Northern Oil Development advocated that oil and gas pipelines be built from Prudhoe Bay through the central Yukon and thence to southern markets. Less permafrost area would have been affected, the chance of west coast tanker mishaps would have been avoided and the Yukon would have had the energy it needs for its economic development. The fact that the federal government did not examine this alternative extensively is taken to mean in the Yukon that the federal government had decided very early on the Mackenzie corridor.

The Yukon is a vital link in the route to the Mackenzie Delta and Beaufort Sea. Moreover, upon completion of the Dempster Highway which will likely predate the Mackenzie Highway, the Yukon rail, air and road systems will be even more important.

Yukoners share many of the perceptions of NWT people about "Ottawa". They feel DINA neglects or is unaware of social-cultural differences, especially as they affect native peoples. Some point to the contradiction between the prevailing belief in DINA that "natives are never ready" and the same department's insistence on large-scale development and the leap from traditional customs and lifestyles to full participation in the wage economy. Yukon territorial government personnel, like their counterparts in the NWT, are not able to participate fully in joint federal-territorial committees and task forces. Time and costs are prohibitive. Thus, to a significant degree, there is only waiting and reacting.

Science Council of Canada

The Science Council's evolution has depended, in large part, on the personalities and backgrounds of its chairmen and on rationalistic, positivistic models of society. It could be said that the Council's early experiences in such issues as

1. decentralization of government science research
2. mission-oriented research
3. proposed science/technological projects, e.g., intense neutron generator (ING), telesat
4. national goals against which the activities of the Council might be measured,

have led to a situation in which the Science Council is prepared to examine the social and political context in which large-scale technolo-

gical and research projects such as the northern development projects will be mounted.⁷⁸ The focus of its activities has, in part, shifted from understanding the scientific implications or traditional scientific components of certain projected developments, to understanding the processes which influence decisions and policy implementation. In a sense, the Council has moved into an area not specifically covered by its original 1967 mandate: that of assembling and interpreting how various kinds of scientific information are used in making important national policy decisions.

Thus, the Science Council is placing a greater priority on its role as a policy scanner, watch-dog and creator of public information and ultimately as "assessment analyst". Gibbons and Voyer suggest that one role the Science Council might assume is that of a "technology assessment analyst".⁷⁹ Though the Science Council has taken no official position on the suggestion, it is yet another indication that the Council may be attempting to create a position for itself at the interface of technology and society.

Rivals and Adversaries

Actors classified as rivals and adversaries are "unfavourable" to the petroleum development program at the time of observation and are directly involved with the technological programs in the Mackenzie region. Non-Canadian groups will be considered in the next section. Adversaries may be disenchanted with petroleum development *per se* or in the form proposed. Alternate technologies may or may not be at issue. Rivals propose alternative developments, usually this means alternate technologies.

The degree of involvement of rival and adversary actors may vary as issues and priorities in the petroleum program change. In the context of the Mackenzie Delta-Beaufort Sea and Arctic Islands programs none of the Canadian rivals or adversaries are particularly "strong". They are not rich enough to effectively challenge the concentration of authority and power in the government-industry complex, which seems predisposed to limited technological perspectives.

Several groups can be considered rivals and adversaries in the context of the Mackenzie petroleum program:

1. Federation of Natives North of Sixty
2. Committee for Original Peoples' Entitlement (COPE)
3. Indian Brotherhood of the Northwest Territories (IBNWT)
4. Council of Yukon Indians (CYI)
5. Canadian Arctic Resources Committee (CARC)
6. Railway Study Groups

Federation of Natives North of Sixty

The Federation of Natives North of Sixty includes the following native groups:

1. Council of Yukon Indians, which represents all native people with ancestral rights to land in the Yukon, who are organized as the

Yukon Indian Association, a non-status Indian and Métis association, and the Yukon Native Brotherhood, a treaty Indian association;

2. Indian Brotherhood of the Northwest Territories, which represents NWT treaty Indians;
3. NWT Métis and Non-Status Indian Association;
4. Inuit Tapirisat of Canada, which represents all Inuit in Canada;
5. Committee for Original Peoples' Entitlement.

In addition an international group, the Circumpolar Native Association, enables all member groups of the Federation of Natives North of Sixty to maintain contact with native groups in Alaska, Greenland, Norway, Sweden, and Finland.

The function of the federation has been to provide a forum for exchange of views and information among all native peoples in the North. It does not represent its members' interests via negotiations.

The Committee for Original Peoples' Entitlement

Usher's account of some native peoples' views on the historical background of current events in the North and the origin and development of COPE reveals what native peoples see as issues in the Mackenzie Delta region. "COPE started in Inuvik, and has grown to include members from the other Mackenzie Delta Settlements of Aklavik, Fort McPherson, and Arctic Red River, as well as the Western Arctic Coast settlements of Tuktoyaktuk, Sachs Harbour and Paulatuk."⁸⁰

According to Usher, the growth of the native movement in Alaska, especially its success in "holding up oil development in order to get a fair land claims settlement"⁸¹ and the discovery of oil at Atkinson Point in January 1970 convinced some native people that "now was the time to speak up or native people would really lose out."⁸²

Initially, COPE had two main objectives:

1. To provide a united voice for all original peoples of the NWT.
2. To work for the rights of the original peoples. Though COPE's written constitution mentions other purposes Usher indicates that these two are always given top priority.⁸³

At the time Usher's report was accepted by the COPE board of directors (April 1973), COPE saw itself as a political pressure group,⁸⁴ whose primary concern was the land question.

COPE originally saw itself as an organization representing all native peoples in Canada. By 1972 other native organizations such as the IBNWT and the Inuit Tapirisat were backed by government funding. COPE, which was operating without government funding, offices, or a full-time staff, saw itself as unnecessary. Feedback from residents of the Mackenzie Delta and Western Arctic settlements, however, convinced COPE workers that the organization had a continuing role as a regional organization to serve the approximately 4 000 native people (Indians and Eskimos) in the Mackenzie Delta and Western Arctic.⁸⁵

Since Usher's report was endorsed by the COPE Board of Directors, we assume it reflects the opinions and perceptions of COPE's

leadership at the time it was written. Their perception of government activities was an extremely negative one. Usher emphasizes long-time failure to consult native people about social, political or economic changes.

“Native people are learning that consultation is often nothing more than government or industry propaganda, where the plans are laid down and native people are just told how to adapt to them. If there were real equality between natives and outsiders, consultation would be replaced by negotiation. That means that the two sides would bargain as equals, with native people having their own information, research and representatives and not depending on just the government’s view.”⁸⁶

Usher discusses oil and gas exploration as the most recent catalyst of too rapid change and, as conducted, an “assault on the land.”⁸⁷ “Boom and bust is the white man’s way of doing things. That’s how it started with the whalers, and that’s how it is today with the oil companies. When the DEW line was built, lots of people got jobs. Then the jobs were gone. Now there is oil exploration and maybe a pipeline. What happens after that? . . . Even with all the development so far, unemployment is still a big problem among native people. Therefore they are skeptical about sacrificing land for jobs that may never come.”⁸⁸

Usher notes that relations between southern whites and northern natives have taken the form of a “bargain”, in that most whites came north because they wanted something, offering in return “trade goods, money, jobs, houses, medical care, even a better life after death”.⁸⁹ Whites made the rules, set the terms of the bargain, and expected the native people to learn the new rules and to become more like the whites. Gradually the bargaining position of the native peoples worsened, since whites imported their own technologies in order to live better and in no way depended on native people (except for their jobs, since most would not have been in the North except to “administer” programs aimed at native people). But . . .

“With oil exploration, something new has happened. The outside world needs the North, or at least its oil and gas resources, but it doesn’t need native people at all If native people have nothing to offer the oil companies, how can they bargain with them?

“The answer is that native people do have something, only they have to fight to show it is theirs, and that others can use or obtain it only at a price. What they have is their land. That is what native people in Alaska learned. They organized and they fought, and they finally got a settlement for their land. Native people in Canada have been hearing that, and wondering if they couldn’t get something like it themselves.”⁹⁰

Reliance on Usher’s 1973 report for information about the organization, objectives and perceptions of COPE appears justified by enclosure of the report as part of COPE’s submission to the Berger Commission’s preliminary hearings.⁹¹ This submission affirms COPE’s pre-

viously stated objectives and includes several specific recommendations about the Berger Commission hearings:

“We consider that the land claims of the native peoples must be settled before any work is done to prepare the right-of-way to build the pipeline or to build treatment facilities of any kind for oil or gas. In this position we agree with the Indian Brotherhood of the Northwest Territories, Inuit Tapirisat of Canada, and the Métis and Non-Status Association of the NWT . . . [this] does not mean that if land claims are settled we will forget about what the pipeline could do to the settlements, to the people and to the animals. It just means that we are ready to talk about them. So to say it in a few words: Our participation in the hearings which you will hold is based on the belief that land claims will be settled before any work of any kind starts. If the government should approve any construction before a settlement is agreed on, I think that members of COPE will want my organization to join forces with the Indian Brotherhood of the NWT and Inuit Tapirisat of Canada in legal action to stop the building of the pipeline. It is our hope that even before you write your beginning report you will tell the government how we think about this matter.”⁹²

Specifically, the COPE submission made the following recommendations regarding the pipeline inquiry: hearings should be held June 1975, to allow adequate time for COPE assessment of data and preparation of submission; hearings should be held in all communities directly or indirectly affected by the building of pipelines and should be informal in the smaller communities; hearings in the smaller communities should take place prior to the more formal sessions in larger communities such as Yellowknife, Hay River or Inuvik; funds should be provided for technical and community resources personnel to assist native groups in the evaluation of data, preparation of submissions and other activities which COPE believes essential to a useful input by the native groups affected by the proposed pipeline. The submission also suggests that the CBC, as the only broadcaster in the North, has a responsibility to give fuller coverage of native affairs⁹³ (and information needs) in native languages.⁹⁴

COPE relies on accurate information as a means of furthering its objectives and protecting the interests of its members. The COPE Newsletter (February – March 1974) notes two recent research efforts. One is the Inuit Land Use and Occupancy Study, conducted by Peter Usher. The other is a report, which COPE asked Dr. Douglas Pimlott (working as a CARC resource person to native communities in the Mackenzie Delta) to write, on plans to drill for oil and gas in the Beaufort Sea.

COPE is taking a research-oriented approach to the land claims and development issues because it places little or no trust in government/industry assurances. It seeks a role as a political pressure group by publicizing what it considers to be important data.

Sam Raddi, President of COPE, believes the greatest obstacle his organization must overcome is *lack* of information. He sees the

government as unwilling to share information, to discuss information needs, or to listen to or receive information from native communities. Raddi also indicated that COPE does not seek confrontation, but would rather negotiate with full knowledge of all interests. Native groups are not opposed to oil and gas development per se, but wish recognition of native lifestyles and needs as these are related to land, water and game.

As an example of what he sees as the crux of the problem native groups face in their relationships with government and industry, Raddi discussed COPE's great concern about Beaufort Sea drilling. There are many unknowns in relation to whale, polar bear and seal migrations; scientists do not pretend to fully understand these matters. It is clear to Raddi that research is needed in such areas before drilling is permitted. He and fellow COPE members are left with the impression that government and industry do not understand (or do not care) that these animals are critical to the Inuit, both as a diet supplement and as an intrinsic part of traditional hunting activities and values.

Raddi insists that COPE seeks an open dialogue on problems and issues, research needed, and how best to proceed, and that the absence of a *mutual* development process forces native groups into the unwanted role of adversaries who must do their own research at considerable cost.

Indian Brotherhood of the Northwest Territories

In 1970, the IBNWT was formed in Yellowknife following attempts to revise the Indian Act.⁹⁵ Funding from the Secretary of State in 1971 provided resources to begin publication of *Native Press*, hire a full-time legal consultant, and initiate research relevant to the land claims of the Indians of the Northwest Territories.⁹⁶

A 1959 Royal Commission recommended against the provisions of the Treaties that would establish reserves and suggested a settlement of \$25 million cash and one-half of 1 per cent of mineral royalties. Depending on which source one reads either the government did not follow up on the Commission's recommendations⁹⁷ or the settlement was rejected by the NWT Indians "since it was computed on the printed treaty's version of land entitlement."⁹⁸ Perhaps both reactions occurred.

In 1973 the IBNWT began a legal suit asking the courts to register a caveat on 450 000 square miles (11.6×10^5 square km) of land including the Mackenzie River drainage basin. This would register its claim to the land and the government would be unable to give clear title to the land (e.g., to a pipeline company) until it had reached a settlement with the Indians. In September 1973 a ruling by Mr. Justice Morrow of the Supreme Court of the Northwest Territories held that the IBNWT had a sufficient interest in the land to file such a land registry warning, but only after all appeals were heard.

In May 1974 IBNWT president, James Wah-shee, spoke to a conference in Ottawa ("Delta Gas: Now or Later?" sponsored by CARC) about IBNWT's current goals. The approach to land settlement currently proposed by the IBNWT includes the following points:

1. "Land not money is the focus of the land settlement."
2. "Instead of having the Native people surrender their Aboriginal land rights forever, those rights must be formalized by creating an Aboriginal Title which clearly recognizes the ownership of traditional lands by the Native people."
3. A "once and for all" solution (i.e., one involving the extinguishment of Indian land rights) "will not work in the NWT for a number of reasons, the most important of which being that there simply isn't the time available without avoiding [sic] conflict and confrontation. Moreover, it would be highly unjust to force such a solution on the Indian people and deny them the time to avoid the countless mistakes that an ill-prepared solution of this sort would impose on all future generations of Native people."
4. The advantage of such a solution is that "time is bought to avoid mistakes and avoid conflict. On-going dialogue and negotiation is made possible in an atmosphere of goodwill and cooperation. The continued participation of Native people is ensured by rights and on terms to be negotiated in each case, rather than as at present on terms dictated to our people."⁹⁹

Throughout this address, Wah-shee expressed distrust of government motives and government promises, in the past and currently, for example, DINA public statements to the effect that a land settlement will cost taxpayers several billion dollars. He saw the federal government as having betrayed its trust as "constitutional guardian" of native rights.¹⁰⁰ Past events give little indication that the IBNWT looks more favourably on territorial government activities. Protesting NWT Indian leaders considered it a victory when a new Regional Director of Indian Affairs for the NWT was appointed in mid 1972 to take over responsibility for Indian and Inuit affairs from the NWT government.¹⁰¹

The IBNWT leadership seems to see industry simply as pursuing its natural goals. Wah-shee believes the government has chosen to encourage, support, and facilitate the activities of those who want to extract resources from the North, usually without effective concern for native peoples' well-being.

The interplay among industry, federal government and native groups such as the IBNWT can take some interesting turns. In Alaska, industry allied itself with native groups pressing land claims.¹⁰² In a 17 April 1972 editorial, *Oilweek* editor G. Barry Kay said,

"the natives of the north are organizing (in many cases organized) to fight any attempt to pipeline oil or gas from the Arctic to the hungry markets of the south until their land claims are dealt with by Ottawa. So, if Ottawa doesn't plan to settle the issue and the natives plan to fight a Mackenzie Valley pipeline all the way to the country's Supreme Court, where does that leave the oil industry? Right in the middle again.

"From a time and dollars standpoint, it might well behoove the industry and/or the companies with northern interest to do a bit of lobbying in Ottawa to get the native claims issue settled one way or the other, before it screws up a pipeline deal."¹⁰³

On 28 May 1974, the *Toronto Globe and Mail* reported, "Canadian Arctic Gas Pipeline Ltd., proponent of the Mackenzie Valley gas pipeline, is prepared to negotiate a land settlement for pipeline right-of-way with the native peoples who claim to own the affected land, even before the land ownership question is legally settled with the federal government, the president of the pipeline consortium Mr. V.L. Horte, says."¹⁰⁴

Horte suggested that if the NEB decides the Mackenzie Valley pipeline is "in the public interest", the builders would have "the right to cross public and private lands no matter who the owner is." He also mentioned that in any case where agreement could not be reached with a landowner after the pipeline has been approved, expropriation was a possibility. The same article expressed Horte's theory that:

"The native peoples could get a better deal from the pipeline consortium if they come to an agreement with the consortium before legal decisions on land ownership questions are reached because once ownership is settled, the pipeline company (if given the go-ahead by Ottawa) could treat the native landowners in the same way that landowners in the south are treated.

"Mr. Horte said the official position of the consortium is that there should be settlement on the land ownership question 'as soon as possible' and that the pipeline should not be held up by ownership problems."¹⁰⁵

The IBNWT strengthened its formal ties with the Métis and Non-Status Indian Association of the NWT in May and June 1974. In May, the boards of the two organizations met at Fort Rae and agreed that one land claim would be sought for all people of Indian descent. On 28 June 1974, 250 delegates attending the first Joint General Assembly of the two organizations at Fort Good Hope unanimously endorsed this position. A press release (2 July 1974) stated,

"The essence of the land claim as endorsed by the delegates is that the Federal Government formally recognize aboriginal title over the 450 000 square miles covered by the caveat, as well as those lands in the Yukon Territory traditionally used by the Loucheaux of Fort McPherson and Aklavik and Slavey of Fort Liard.

"The Joint General Assembly then proceeded to set up a joint land claims committee charged with the task of initiating discussions with the federal government on a negotiated land settlement. The onus is now on the federal government to make good its claim, frequently reiterated, that it is ready to negotiate whenever the Indian people are. The Indian people of the NWT have clearly stated their position, and demonstrated the great support for that position, and have set up a representative body that is ready to open discussion with the government. It is now up to the government to demonstrate its seriousness and good faith."

Recent interviews with representatives of the IBNWT indicate that the IBNWT's current efforts are devoted almost exclusively to preparing the Indian land claims case, in anticipation of negotiation with the

federal government. They are looking at the economic aspects of the land claim. They particularly need data on the economic impact of pipeline (and other oil and gas) activities on both traditional and wage economy opportunities for natives and research on the economic rent of natural resource-based industries. The latter will be critical in the final settlement since any monetary payments will to some degree reflect compensation for these assets. They are also studying the legal basis of the land claim.

They are conducting a land use and occupancy study, which involves discussions with many people in each community to determine present and past areas of traditional activity (hunting, fishing, trapping, settlement). These data are basic to preparing specific land claim terms as well as to future Indian decisions about land use.

The IBNWT emphasize the difficulty of exchanging information with the federal government. A recent story date-lined Edmonton suggests one type of difficulty encountered: "Records vital to researchers digging into Indian treaties have been placed off limits by the federal and provincial governments, a research spokesman said Friday."¹⁰⁶

At the April 1974 preliminary hearings of the Berger Commission Inquiry, George Erasmus, a director of the IBNWT, made known the organization's request that the actual inquiry not begin until spring 1975. He pointed to the need to inform the communities affected by the proposed pipeline so that they could formulate their views. This need to obtain information (by initiating research if necessary), disseminate it to the native communities concerned, and allow time for understanding and discussion of alternatives, has been stressed repeatedly by those native leaders and others who feel that the *timing* of decision making and development is the central issue in their differences with government and industry.

Yukon Native Groups

Native groups in the Yukon have been less well-publicized recently than those based in the NWT.

The Council of Yukon Indians (CYI) is researching and negotiating the land claims of all people with ancestral rights in the Yukon. The CYI represents two groups: the Yukon Native Brotherhood (status Indians – 12 bands) and the Yukon Indian Association (non-status Indians and Métis – 15 locals). As a member of the Federation of Natives North of Sixty, the CYI works cooperatively with the IBNWT and COPE.

The Yukon native groups outlined their views on the land question in "Together Today for Our Children Tomorrow, A Statement of Grievances and an Approach to Settlement by the Yukon Indian People."¹⁰⁷ This document explains the feelings of Yukon Indian people about their land, way of life, and concerns for future generations. After summarizing the changes which occurred in the Indian way of life as whites arrived in the Yukon, it deals with some images that whites have of Indians and some ways Indians sees whites.

Indian perceptions of the white man's influence include a view of

the residential school program (“run by the Church and the Government”) as a destroyer of the Indian family and Indian way of life, and a negative view of the boom-and-bust effects of the American influx in the early 40s.

“And then came Indian Affairs. They made up the Band lists. Then came welfare. Then they invented the Indian Village, where a group of Indians could all be put together. This made it easier for administration.

“Later on came Indian housing which was (and still is today, even more than ever) used as a bribe to get Indian people to move in from the bush. So the final program of changing the Indian way of life from one of economic independence to a welfare hand-out was complete.”¹⁰⁸

The Yukon Indians see the current situation as no more hopeful. Their prior experience with mining operations leads them to believe that “the Oil Companies and the Government give out pay-cheques for meaningless jobs which will all disappear when the pipeline is finished.”¹⁰⁹ The submission points to other sources of Indian dissatisfaction: the creation of the “non-status” category;¹¹⁰ the fact that whites control the economy and jobs in Yukon communities; the change from pre-1948 economic independence among Yukon Indians to the current situation where over half of the families are on welfare; control of education, government and social programs in the hands of whites, with no effective provision for Indian training or advancement to positions of responsibility in these spheres; one-way communication – white to Indian.¹¹¹

The Yukon Indians’ document outlines in some detail the Brotherhood’s specific proposals for a settlement and for future relations with whites. These are prefaced with a succinct statement of the Brotherhood’s position on “development”. “We want to take part in the development of the Yukon and Canada, not stop it. But we can only participate as Indians. We will not sell our heritage for a quick buck or a temporary job.”¹¹² The document calls for the Government of Canada to prove it is sincere about native participation by involving the Yukon Indians *before* it grants oil leases over large tracts of land, and by settling their land claims *before* it grants a pipeline construction permit.¹¹³ They believe that vital research, especially in connection with the Old Crow area, should be funded by DINA, conducted by qualified experts, and controlled by the Indians themselves.¹¹⁴

Yukon natives have the same information problems with government and industry as COPE and the IBNWT.

Government and industry alike are portrayed as agents which push ahead as they wish, whether with experiments in education and social programs which affect native life, or with pipeline construction. “We feel that you are going ahead to build the pipeline anyway, regardless of the harm it will do.”¹¹⁵ Government efforts to involve native people in resource “development” through “job programs” alone are seen as inadequate and perhaps harmful in the long run. Similarly,

government research is seen to place environmental considerations ahead of social impact.

As of July 1974, the CYI indicated that negotiations on a “settlement” were under way, although they do not as yet deal with land. The CYI claims that all of the Yukon plus parts of Alaska, British Columbia and the NWT (207 000 sq. miles or 536 000 sq. km) belong to the Yukon Indian peoples. While the CYI is not conducting a formal land use and occupancy study, it has initiated discussions with chiefs, band members and residents in various communities to ascertain the nature of past and present land use patterns.

The community of Old Crow remains an important concern of the CYI. The residents still pursue traditional occupations of hunting and trapping, and although seismic operations there have been barred for the time being, permits have been issued and there is concern that resumption of this activity, together with the impact of the Dempster Highway, will interfere with caribou migrations, and thus the traditional pursuits that have permitted this community to remain self-sustaining. A major issue is whether the CAGPL pipeline would be routed through the Old Crow flats or along the coast; both routes are seen to have drawbacks in terms of their effects on wildlife.

Opinions vary as to the probable outcome of the CYI – government negotiations. One informed legal source said recently that the CYI is in very poor shape in terms of their negotiations with the government and expressed the belief that the Yukon land claim would arouse too much political opposition in southern Canada to have a chance of being accepted. On the other hand, it is generally conceded that, in Chief Elijah Smith, the Yukon groups have a respected and experienced leader whose skill in dealing with the government may help to achieve an acceptable settlement.

The Canadian Arctic Resources Committee

CARC was formed in March 1971 “to maintain a watching brief over industry and government plans for northern resource development.¹¹⁶ CARC included both scientists and non-scientists who were alarmed about lack of citizen input into government policy making for the North and about foreign control of resource development. While CARC was first conceived as an ad hoc group which hoped to work with DINA and the petroleum industry, and to obtain financial support from them, this arrangement did not develop and CARC became a permanent organization funded by private donations.¹¹⁷

CARC held its initial workshop in May 1972 on the topic, “People, Resources and the Environment North of 60”. Papers from the workshop were published under the title “Arctic Alternatives” and set the tone for CARC’s continued efforts to inform all Canadians about alternatives for northern development. In January 1973 CARC began to publish a newsletter, “Northern Perspectives”.

Recent CARC activities¹¹⁸ include the following:

1. On-going study (funded by the Donner Canadian Foundation) of the legal aspects of resource development in northern Canada;

2. An environmental program with a full-time staff member working on proposed standards for environmental impact statements, evaluating the adequacy of present investigative and reporting procedures; in 1974-1975 this program will assess impact data presented at the Berger Commission, NEB, and DINA hearings on pipeline applications;

3. Establishment of a full-time position in the North, filled in October 1973 by Dr. Douglas Pimlott.

In 1974, CARC has undertaken "a major program on northern resource and land use planning", the objective of which is to "formulate principles and develop procedures to guide decision makers in the fields of resource management and land use regulations."¹¹⁹ CARC has also been (and will in future be) an active and principal intervenor in the Berger Commission, NEB, and DINA hearings on the CAGPL application to construct a Mackenzie Valley gas pipeline. "The intent of CARC's intervention is not to stop the pipeline but to ensure that all the long-term social, economic and environmental consequences of a pipeline are brought to light and carefully considered by regulatory agencies in a manner that will enable Canadians to decide the many important issues that are involved."¹²⁰

A comprehensive statement of CARC's objectives¹²¹ stresses its aim to act as a catalyst of public discussion and a monitor of research and programs relating to the North. CARC supports a settlement of native land claims prior to any major northern development. It also urges the institution of land and resource planning procedures in the North (the Land Use Regulations provide a controlling not a planning apparatus).

In May 1974 CARC sponsored a conference in Ottawa to consider the question, "Delta Gas: Now or Later?" Those attending presented a variety of views as to why it would be in Canada's best interest to delay construction of a gas pipeline up the Mackenzie Valley.¹²² The conference was an affirmation of CARC's own "weigh and consider" approach to all proposals for northern development. The speakers were concerned with questions of timing, scope, adequate prior research, and comprehensive cost-benefit analysis rather than with any blanket opposition to the pipeline.

CARC took a similar approach in its review of the government's approval-in-principle for offshore drilling in the Beaufort Sea. CARC sees the Beaufort Sea situation as typical of the government secrecy, inadequate research, and exclusion of native participation which it deplores, and seems prepared to pursue its investigation in order to prevent similar problems in the Arctic Islands and Hudson Bay.¹²³

Committee for an Independent Canada

Formed in 1970 to lobby for stricter government control over foreign investment in Canada, the CIC is currently planning to intervene as a major adversary in the NEB hearings on the CAGPL gas pipeline proposal.¹²⁴ In four years the CIC has grown from one Chapter in

Toronto to more than 50 across the country, with a membership of 10 000.

The CIC sees its most important task for the next few years as stopping the Mackenzie Valley pipeline project. It believes,

1. That construction of the pipeline is designed to meet American, not Canadian, energy demands, at least initially, and would "seal Canada's fate as a supplier of raw resources to a voracious industrial giant".¹²⁵

2. That the large financial stake of U.S. companies in the pipeline will jeopardize Canada's ability to control future development of her own energy resources.

3. That the large amounts of money which will have to be borrowed will disrupt the Canadian economy, either because of upward pressure on the Canadian dollar (resulting in higher export prices and danger to jobs in the manufacturing industries) if the money comes from the U.S. or, if the money must come from Canadian capital markets, because there would be virtually no funds left to finance other important, or even essential projects.

Railway Study Groups

Transportation alternatives to pipelines and liquefaction for Arctic petroleum have for the most part remained as visionary schemes.¹²⁶ However, the rail alternative has received modest consideration by three groups: CN-CP, who have done a limited feasibility analysis of a rail route in the Mackenzie region; the Canadian Institute of Guided Ground Transport, Queen's University, Ontario; and the British Columbia government, whose proposal "The Way Out" sought to avoid tanker traffic off its coast and develop interior and northern B.C.

Though rail transportation seems technically feasible, economically competitive (depending on assumptions of scale, price and costs), potentially less environmentally harmful and socially beneficial in that it is more labour intensive,¹²⁷ it was not seriously considered by government officials. Arguments against the rail alternative range from "would need products other than oil and gas to make it viable" to "the railroad has already had more attention than it warrants."¹²⁸

In 1972, the B.C. government compared routes/modes of Prudhoe Bay-Mackenzie petroleum transport.¹²⁹

1. Trans-Alaska pipeline/tanker system;
2. Mackenzie Valley railway/pipeline to U.S.; and
3. Yukon-B.C. railway/pipeline to U.S.

They estimated transportation costs at 92¢, 97¢ and 99¢ per barrel respectively.¹³⁰ Though costs for a rail system are higher than the pipeline, rail supporters have pointed out the benefits that come with a railroad; mineral and forest development, higher employment generation, community development and construction in Canada.¹³¹

Exogenous Rivals and Adversaries

El Paso Natural Gas Corporation

On 24 September 1974, El Paso Natural Gas Corporation filed an

application with the Federal Power Commission (FPC) in Washington, D.C., for a Certificate of Public Convenience and Necessity to bring Prudhoe Bay gas to the lower 48 states. El Paso proposes to construct a natural gas pipeline from Prudhoe Bay to Point Gravina near Valdez, 809 miles long (1 394 km) and 42 inches in diameter (1.07 m), capable of delivering 3.5 billion cubic feet (0.98 km³) of gas per day. At Point Gravina they would construct a liquefaction facility and ship liquified gas by LNG tankers to Point Conception, California. They would arrange, through Western LNG Terminal Company storage, re-gasification and transportation in the western U.S. pipeline system.

El Paso thinks its proposal has several advantages over that of Arctic Gas Pipeline Ltd. (AGPL, the U.S. counterpart of CAGPL). The first is U.S. control, which is seen as important to Americans on the basis of the Middle East oil embargo, the efforts of certain foreign countries to exploit the energy shortage and "recent actions by the Canadian government in doubling the price of natural gas flowing across the border to United States customers and in requiring, contrary to existing contracts, that the burden of gas supply shortage be borne exclusively by U.S. customers rather than equitably shared with Canadian customers".¹³²

Such concerns gave rise to "Project Independence," an instrument of the recent Nixon Administration. The El Paso proposal is aligned with U.S. policy. The issue of Canada's export price for natural gas works both ways at once for El Paso. It gives rise to concerns about Canadian nationalism and it pushes up gas prices thus helping the economic base of the El Paso project.

El Paso claims a second advantage in that their project will not affect the U.S. balance of payments whereas the Arctic Gas project would leave \$10 billion in Canada through taxation and profit. Tax revenues to the U.S. from El Paso would be double those of Arctic Gas. Environmental impacts would be negligible since the pipeline would be in the utility corridor with the oil pipeline. Arctic Gas would cross a wildlife range plus many miles of permafrost. El Paso envisions its project being completed more rapidly. The lack of proven Canadian reserves and the doubt about how much gas, if any, will be exportable are also seen by El Paso to be advantages of their project.

The El Paso application, like that of Arctic Gas, is not yet complete. It lacks data on markets, supply contracts and financial capability to undertake the project. El Paso is hoping for approval by early 1976, which would bring Prudhoe Bay gas on line by the early to mid 1980s, earlier than any other proposed project.

Thus we now see in both Canada and the U.S. an "energy independence" oriented proposal rivalling the Arctic Gas project. The decision on Prudhoe Bay gas will be made in Washington, D.C., either by the FPC or Congress. Whatever happens, one country's decision will clearly affect options in the other. The political elements in both countries are likely to be strong forces.

Exogenous Independent Actors

Federal Power Commission and Department of Interior

The FPC issues a Certificate of Public Convenience and Necessity much like the NEB in Canada. The Department of Interior (DOI), like DINA in Canada, issues right-of-way permits.

The statutory powers of the FPC derive from the Natural Gas Act and under this act certificates and authorizations are awarded. The process is activated by an application. Should the request be a regular, non-contentious one the commission will rule without hearings. However, where the application is to be contested or is of considerable significance, formal public hearings are held with adversaries or intervenors, exhibits and witnesses. The hearing is presided over by a law judge, independent of the FPC. Upon conclusion of the hearing the judge will render a decision which, along with evidence and exhibits, is forwarded to the five commissioners. A simple majority decision is all that is required. An applicant may challenge the decision of the commissioners, first in the Court of Appeals, then the Supreme Court.

Since the applications of Arctic Gas and El Paso are mutually exclusive, a competitive hearing is required in which both applicants plus witnesses and intervenors will participate.

The National Environmental Protection Act (NEPA) requires that an environmental impact study (EIS) be done for each application. To coordinate the EIS a joint task force has been formed involving FPC and DOI staff and staff of other agencies as appropriate. FPC personnel will focus upon environmental impacts relating to liquefaction, ocean transport and gasification. DOI members will focus upon land transportation of natural gas through pipelines.

There is some feeling that the issue of El Paso versus Arctic Gas could "go political" given important economic aspects of the projects, conventional reserve analyses in both countries and the "Project Independence" mood. The State Department or Congress could initiate action, though in the case of the latter it might be necessary to amend the Natural Gas Act. The timing of the hearing is uncertain. Though neither application is complete the FPC may proceed on the completed sections if it so chooses.

Arctic Islands Actors

In early 1974 many observers believed that though notable links between the Mackenzie Delta and Arctic Islands programs existed, they constituted two distinct developments, each with its own peculiar mix of issues and operating in a different time frame. By October 1974 this had changed. A growing concern for natural gas supplies in Canada, the NEB fall hearings on supply, demand and deliverability, the emergence of the El Paso and the Maple Leaf projects as rivals to Arctic Gas and the failure as of 1974 to locate threshold volumes of gas especially in the Mackenzie Delta, have united the two projects in time and through actor interests. They are rivals inasmuch as regulatory

approval for one project would mean the other project would be delayed until supplies, labour and capital were available.

Figure V.1 in Appendix C shows that many actors involved in the Mackenzie theatre are also participants in the Arctic Islands development. For purposes of this report we shall discuss under the heading "Arctic Island Actors" only those not already considered under the Mackenzie discussion. In writing about those with dual involvement in the preceding sections, we discussed those aspects related to the Arctic Islands.

Core Actors

Panarctic Oils Ltd.

In Chapter II, we discussed the origins of Panarctic Oils Ltd. From an initial capitalization of \$10 million, Panarctic has grown to a capital worth in excess of \$100 million.¹³³ Of this the federal government's share is slightly more than \$45 million.

To the end of 1973 Panarctic had drilled 48 wells: 40 wildcat wells, 3 relief wells and 5 delineation wells. These accounted for about two-thirds of all wells in the Arctic Islands. Panarctic was the first to drill an offshore well from an ice platform. Drilled in 400 feet of water, this well "confirmed an eight-mile extension of the Hecla gas field."¹³⁴

Panarctic does not view the technological problems associated with transportation of gas as unsolvable. Panarctic feels that the problem of ice scour on the inter-island channel bottoms is well in hand. Their research shows that maximum scour is 18 inches deep (0.46 m) and occurs only in depths of water 100 feet (30.4 m) or less. To overcome this problem, pipe would be laid in 10- to 15-foot ditches (3-4.6 m).

Panarctic believes that during the exploration, development and pipeline construction phases the number of jobs to be created exceeds the number of native Northerners who could be employed. They have developed a training program and transport native workers back and forth from home to worksites. Some difficulties have been encountered where traditional hunting and trapping grounds have become sites for exploration. Ellesmere and Banks Islands are two such examples.¹³⁵ Long-term solutions have yet to be worked out.

Project financing is another area of uncertainty. While Panarctic has successfully raised capital in the past, uncertain reserve and export pictures point to potential difficulties. Taxation and royalty disputes between federal and provincial governments also contribute to uncertainty.

Panarctic recognizes that a pipeline from the Islands could possibly precede one from the Delta. Panarctic professes to have found approximately 15 tcf (425 km³) of natural gas, about one-half of that required for a pipeline. They point out, on the other hand, that optimistic reports from the Delta place reserves there at about 7 tcf (198 km³). Panarctic also sees itself and its partner Polar Gas Ltd. in a better position than CAGPL since the question of Prudhoe Gas is entirely unsettled. Since limits on material, labour and capital mitigate against

two pipelines being constructed at once, Panarctic is attempting to keep a strong exploratory program going while at the same time pressing ahead with research and planning for a pipeline and/or liquefaction facilities in the Islands. Panarctic believes that whatever levels of gas are set by the NEB for Canadian needs, there is ultimately more gas in the Arctic than can be used in Canada alone and therefore exports to the U.S. are likely. Thus, proving-up reserves will influence which transportation system proceeds first, whether one or the other will not go at all.

Polar Gas Ltd.

The Polar Gas group was formed in February 1973 when Panarctic Oils, Tenneco, Canadian Pacific Investments and TransCanada Pipe-Line joined forces to study various methods of transporting Arctic Islands natural gas to southern markets. TransCanada PipeLine was selected as project manager. Since then, the group has been joined by Texas Eastern Transmission Corp. and Pacific Lighting Gas Development Co. Financing has come from the participants in the project. U.S. interests have been guaranteed first right of refusal on exportable supplies of natural gas and have also been required to state that they would not "block" a pipeline in which there would be few if any benefits for them.¹³⁶

Polar Gas recognizes the need for research on:

1. Bottom profiles and sub-bottom conditions in deeper channels between Arctic Islands.
2. Ice formation and conditions from year to year.
3. Ice scours, their age and extent.
4. Liquefaction processes in the high Arctic.
5. Pipelaying techniques under permanent ice cover.

Environmental and social impact issues, while being considered, will hinge to a large degree on the route selected for a pipeline and/or liquefaction and tanker transport system. Polar Gas is actively considering a liquefaction and LNG tanker program in an effort to reduce the time until Islands gas comes to market. This interest is in response to cash-flow difficulties. A liquefaction program could bring natural gas to Ontario, Quebec, the Atlantic provinces, and, if exports are allowed, the eastern seaboard of the U.S. It could be accomplished on reserves which are not adequate for a large diameter pipeline, though if sufficient reserves were found later a pipeline system could complement it.

Among those viewed by Polar Gas to be most interested in Arctic Islands gas are Ontario and Quebec. Ontario, already a large consumer of natural gas, foresees shortages and Quebec, desiring to establish a more diversified industrial base, has attempted to acquire an interest in Panarctic. Whether these two groups will join the Polar Gas group and thus contribute to its capital requirements is not known.

Allied Supporting Actors

In addition to those actors who also support the Mackenzie program

two other groups are seen as important supporting actors in the Arctic Islands program. These are the “majors” and the Quebec government.

The majors, having initially shunned the Arctic Islands region in favour of the Delta, have recently begun to acquire interests in the Islands. Such interests are usually in the form of “farm outs” and to a large extent have been taken out with Panarctic. By the end of 1973, farmee participation with Panarctic involved 1 700 miles of seismic work and 27 exploratory wells. Total farmee expenditures are estimated to be in excess of \$85 million.¹³⁷ Among the majors who have been farmees through Panarctic are: Imperial, Sunoco, British Petroleum, Gulf Oil Canada, Total and Deminex Canada.

In August 1974 Quebec attempted to acquire the interests of Bow Valley Industries Ltd. in Panarctic. Through the provincially-owned petroleum corporation, *Société Québécoise d’Initiatives Pétrolières* (SOQUIP), “The Province of Quebec is taking steps to protect its future energy supplies by acquiring a direct interest in frontier exploration ventures.”¹³⁸ Officials of Panarctic were quick to deny that increased government involvement was an indication of less enthusiasm from the private sector and that the Quebec presence might make present plans to export gas somewhat more tentative.¹³⁹ As was indicated in Chapter II, the prospect that a provincial government might participate in some combination of Panarctic-Polar Gas, was not viewed favourably by the federal government who then blocked the sale of “Bow Valley” shares.¹⁴⁰ Whether the present impasse is peculiar to Ottawa-Quebec relations or whether any provincial participation singly or as a group would still be undesirable in Ottawa’s eyes, is unclear.

Rivals and Adversaries

Through 1974 the Inuit Tapirisat is the most prominent adversary in the Arctic Islands of the manner in which petroleum exploration is being conducted.

Inuit Tapirisat of Canada

While the Inuit of the Mackenzie Delta and Western Arctic Coast regions look to COPE as the organization working most closely with them on regional problems, the Inuit Tapirisat of Canada (ITC), formed three years ago to represent and serve all Inuit groups in Canada, has responsibility for preparing and negotiating the Inuit land claims.¹⁴¹ The ITC is one of the native groups comprising the Federation of Natives North of Sixty. It works most closely with COPE, but also exchanges information on land claims with the IBNWT and Métis and Non-Status groups.

Tagak Curley, outgoing first president of the ITC, believes that the organization has brought unity to the 13 000 Inuit who comprise one-third of the NWT population.¹⁴² Curley, stresses the need for more Inuit involvement in planning their educational programs as well as increased representation on the NWT Council. However, he considers “conflict between oil exploration activities and Inuit concern about the environment” as the most difficult problem the ITC has had to face

and predicts continuing conflict because restrictions on petroleum development have been in the form of temporary halts only.

An ITC press release describes "the dilemma facing the Inuit of Resolute Bay, NWT".¹⁴³ The material released included,

1. A 1 March 1974 message from DINA Minister Jean Chretien to the Resolute Bay Settlement Council announcing his decision to approve a Panarctic application to conduct winter seismic operations on Bathurst Island, NWT. Chretien noted that he had met with representatives of the Council, the Resolute Bay Hunters and Trappers Association, and the ITC on 21 February 1974 to discuss the proposed operations, and that his approval was "in accordance with information provided by the Canadian Wildlife Service and on the available evidence from similar areas in the Arctic." He also offered the assurance that he would keep the Council "informed of activities on the island" and that the government would "continue to enforce strict rules on the oil companies as provided under the Territorial Land Use Regulations".

2. A 26 March 1974 reply from the Council detailing the reasons (primarily relating to concern for caribou survival) why the people of Resolute Bay are against any further seismic operations on Bathurst Island as well as the frustrations the Council had encountered in dealing with the government on this matter.

3. A 25 March 1974 letter from biologist-anthropologist Milton Freeman stating that from his analysis of the Bathurst Island situation he has concluded that "Mr. Chretien has been very badly advised to allow this work to proceed in ignorance of much of the pertinent information available, and with so much of a critical nature still unknown."

4. Freeman's analysis of the DINA environmental assessment of Bathurst Island, which is essentially a refutation of the Minister's claims to have had pertinent advice from the Canadian Wildlife Service or applicable evidence from similar areas.

5. A preliminary investigation by Freeman of the ecological significance of Bathurst Island and the potential impact of proposed seismic work there in the winter of 1974, indicating the risks due to the lack of data on caribou migration, other wildlife, and terrain disturbance.

The ITC position on land claims is being worked out separately from those of the other native groups in the NWT and the Yukon. According to Tagak Curley¹⁴⁴ the ITC is primarily interested in control over certain land areas, with long-term benefits for the Inuit as a group rather than any monetary lump-sum settlement on the Alaskan model.

A recent interim report from the ITC to the federal government states that:

"A settlement of land claims (and any fundamentally different government policy) in respect to Inuit must include four essential elements. First, the people themselves must retain full ownership of considerable tracts of lands and waters. Second, the people must have the right to share meaningfully in the material benefits of Northern development, through compensation paid, and otherwise sharing in material benefits as development proceeds, for the loss

of some interests in those parts of the lands which they have traditionally occupied, but in respect of which they are not allowed to retain all interests.

“Third, people must participate meaningfully in the process of orderly development . . . (this must be considered as an important requirement of any new relationship for native peoples in respect to northern development.

“Fourth, special rights must be assured in respect to hunting and fishing, not only because of their more immediate practical importance, but also because of their continuing cultural significance.”¹⁴⁵

One of the basic tenets of the ITC position on land claims is the fact that to the Inuit “lands and waters are an integral part of their total being. To the extent that relationship is compromised, they lose their identity.”¹⁴⁶

Thus they insist the Inuit as a group retain ownership of some lands. The ITC seeks a settlement which stresses ownership and management by the Inuit and provides for a mix of: 1) complete legal ownership for the Inuit; 2) special hunting rights; 3) “underlying” or residual ownership interests in traditional Inuit lands now under petroleum permits and mining claims; 4) financial compensation for traditional lands where there has been, in effect, expropriation; 5) provision for Inuit participation in the management of development activities.¹⁴⁷

ITC legal counsel, Peter Cumming, who has been centrally involved in shaping the Inuit land claims position, has said that while the Inuit are not opposed to development in principle (nor to such amenities as the snowmobile), they want primarily to preserve the identity and calm of their own communities. Most are appalled at the impact of white incursions on native communities and want to retain control over their own options. Cumming believes between 14 000 and 17 000 people will be eligible in the final Inuit land claims settlement. Eligibility is not considered a serious issue or stumbling block by the ITC because at some stage relatively arbitrary criteria will have to be set and accepted (as in the Alaskan settlement) and, in any case, the Inuit are not looking for a per capita settlement.¹⁴⁸

In 1972, the ITC made a submission to the federal government outlining Inuit concerns about the impacts of the rapid pace of northern development on northern peoples and ecology.¹⁴⁹ The submission stressed the lack of consultation between the government and the Inuit regarding such developments as tanker staging areas and pipeline construction. The thrust of the submission was a request that the Inuit be given the funds to “complete a comprehensive study of their rights and claims and to make proposals for settlement thereof”.¹⁵⁰

Federal funding was forthcoming and most of the specified research had begun by summer 1974. The land use and occupancy study, directed by Connie Hunt, ITC legal counsel, has been completed, and the land claims study, directed by anthropologist Milton Freeman and financed with a \$100 000 federal grant, is scheduled for completion in April 1975. The need for research to generate data relating to northern

resources, ecology, competing land uses and social issues is a cornerstone of ITC policy regarding any future development. Peter Cumming, ITC legal counsel, is forthright in advocating the creation of a new body – a land use planning commission – which could assess the impacts of various northern development proposals *before* they were authorized. Ideally, Cumming says, there should have been a freeze on land use “North of 60” so that such an independent, objective commission could have examined and made decisions about such basic, first-tier questions as energy policy, foreign ownership, native land claims, community development, and the like. He feels that more specific decisions such as are now under consideration in relation to the Mackenzie Valley pipeline cannot be made on any meaningful basis until these policy questions are settled.¹⁵¹ The ITC is giving top priority to research needs in the hope of providing as much meaningful input as possible into decisions which will affect the Inuit, before such decisions are made by others.

Summary

The foregoing discussion identifies several important characteristics of actors in both the Mackenzie Delta-Beaufort Sea and Arctic Islands programs. These programs are first of all characterized by numerous interests and actors. As extensive as the list of actors in Figure V.1 is, the report has highlighted those actors thought to be among the more prominent. Some specific actors have not been considered in detail, but we have discussed most interests, thus setting a framework for analysis of relationships among actors.

The composition of the assessment system is in flux. Not only are new actors emerging, but others are changing roles or priorities. Alliances and coalitions are constantly forming and reforming as groups strive to enhance their positions vis-a-vis the issues and other actors. Whether attempting to acquire information, to influence discussions or offset imbalances in power relationships, the evolutionary realignment processes are important to the overall assessment processes. High levels of regulatory, economic and political uncertainty account for many of the changes.

The classification of actors (See Appendix A) has permitted important distinctions among them. Thus, a framework is established for examining information and decision processes, both central to the analysis of assessment systems.

VI. Information

Information Analysis Framework

This chapter is divided into five general issue categories: technological, environmental, economic, social and political. The specific issues which are discussed under each of these categories were selected on the basis of interviews and discussions with actors and reflect their perceptions of the issues.

We have tried to analyse the quality of the information upon which decisions are being based in the Mackenzie Delta and Arctic Islands petroleum programs. Obviously the kind, quality and amount of information which actors are able to assemble and base their decisions upon are important. However we believe that the following criteria and characteristics are also important to an analysis of a technology assessment system.

1. **Relevance:** judgement of the content of the information in relation to actor needs and goals as perceived by that actor.
2. **Sufficiency:** judgement on the comprehensiveness of the information needed by an actor.
3. **Access:** judgement on the availability of the information as perceived by the actor.
4. **Timeliness:** judgement on the perception of an actor as to the information being available prior to making a decision.

In addition, in order to assess the adequacy of the information base of the technology assessment system, we considered it in terms of certain characteristics identified by Gibbons and Voyer.¹

1. **Actors:** whether the information was available to all interested actors.
2. **Interactions among actors:** whether it links the various actors in the system together.
3. **Anticipatory:** whether the information enables actors to identify potential consequences prior to development.
4. **Long term:** whether the information enables actors to identify possible direct long-term impacts.
5. **External consequences:** whether it enables actors to identify impacts that indirectly affect aspects outside of the development sector.

In addition to the aforementioned assessment criteria, certain key information factors listed by Ingram² were used in the analysis:

1. **Issue context:** affects what information the decision makers are receptive to.
2. **Source of information:** determines consideration granted by decision maker.
3. **Content of information:** affects its reception by decision makers.
4. **Characteristics of actor:** organizational setting and experience influence what information is received.
5. **Rules and regulations:** these legitimize certain information.
6. **Learning capacity:** the amount of uncommitted, staff, time and money affects decision maker's receptivity to information.

7. Timing: affects reception of new information depending on emergence of the issue.

8. Perception of decision: affects what information is generated and transmitted.

9. Expected impact: affects whether information will be transmitted and the content of that which is.

What follows then is a description of the information base within each of the broad issue categories. We used the above three lists of criteria and characteristics as a basis for sorting out the available information and actor perceptions of the information.

Technological Issues and Information

With regard to technological issues in the Canadian Arctic a clear pattern has emerged. The core actors of industry followed by DINA, EMR and NEB have the most information concerning technology and geology, while such supporting actors as DOE, the territorial governments and the provincial governments, as well as such adversaries as environmentalists and native groups have significantly less information. This pattern has evolved partly because the petroleum industry is competitive and thus shrouds its exploration activities in secrecy. It has evolved partly from the nature of the exploration and transportation processes themselves: the industry is leading the search for and implementation of petroleum technology and the research on geologic structures.

Formalized links between industry and government exist to share information concerning petroleum technology. The highest level for this information exchange is the National Advisory Committee on Petroleum (NACOP) which advises the Minister of EMR and includes representatives from industry and government. Membership is restricted to top industry and government executives, who are directly involved with petroleum development. Meetings are conducted in secrecy. Such advisory boards have been heavily criticized both in and out of government circles. For example:

“Because of their quasi-official status, advisory councils are aware of potential policy changes and interagency discussions that may help them oppose government actions. . . . The growth of advisory groups . . . has not benefitted society through increased information and expertise in government. Rather, it has closed off the flow of information and reserved key governmental access points for the leaders of the corporate world.”³

The above claims that advisory boards rarely achieve a two-way flow of information, instead industry takes information from government and gives little – or even misleading – information in return. “Industry advisory committees exist inside most important federal agencies. . . . Industry committees perform the dual function of stopping government from finding out about corporations while at the same time helping corporations get inside information about what government is doing.”⁴

In January 1970 industry created a cost-sharing voluntary organi-

zation called the Arctic Petroleum Operators' Association (APOA) to coordinate technological and environmental studies in the Arctic. The objectives of the APOA include:

1. To cooperatively develop technology for the Arctic.
2. To research ecological, technological and marine aspects of Arctic petroleum development.
3. To act as liaison between industry, government and universities.
4. To promote studies on air, land and water conservation.
5. To collect and disseminate information related to the Arctic.⁵

APOA was created because extensive research was needed prior to successful Arctic petroleum development. Many companies preferred to share the costs of such research. Presently there are over 30 members in APOA who hold over 75 per cent of the permit acreage in the North. Membership has been restricted to companies actually holding or operating permits in the Arctic and funds expended for 40 research projects undertaken since 1970 amounted to \$2.8 million by the end of 1972.⁶

APOA does not itself recommend or conduct research projects and it has no staff. Any member company can recommend a project that interests it for joint funding. The company then carries out the project and the results are distributed only to those who participated in funding.⁷ (Membership in APOA now requires paying a share of each of the early projects. This added cost may result in restricted entry.) Many APOA members serve on government committees but it is not clear how much APOA research is shared with government.

Although DINA and EMR require seismic and drilling information in applications and reports they apparently lack a significant amount of information on industry's geological findings. In late August 1975 DINA requested extensive information from industry about all farm out agreements for oil and gas exploration, and all seismic and other geological findings. The Oil and Gas Division will collect and analyze the additional information from areas under DINA's jurisdiction. This may improve DINA's bargaining position and decision-making ability vis à vis industry, in the key areas of organization and finance.

DINA collects technological information via the application process for an approval-in-principle, which it created in order to have advance warning of the kinds of drilling technology industry is planning to use. This also provides a formal channel for DINA's informing industry on the general thrust of their technological efforts. Thus, DINA's regulatory process determines the nature of contact between industry and government and legitimizes certain kinds of information. Indeed, DINA can be seen as setting up an information process which is evolving in response to politically viable solutions within its jurisdiction and the information requirements of which are partly bolstered and directed by public opinion on northern development, energy, native peoples, environment and the role of industry.

While DINA must rely on departmental regulations for the bulk of its information gathering, the NEB can rely on its statutory require-

ments which explicitly define the appropriate categories of information required for an application. In addition, the NEB can demand any other information it deems to be relevant to the application before it. Also given the small size of the Canadian petroleum industry each industry is well known to the NEB through frequent dealings via the application process. In fact, the NEB knows its clientele so well that it has been accused of being "captured" by the industry.

DOE, on the other hand, as a supporting actor primarily science-oriented and concerned with environmental research and management, has little access to technological information. DOE however has started to request an advance look at DINA's development plans in order to begin environmental assessment. DINA opposes this process. DINA points to its "provincial status" in the North with its control over the northern environment as well as the rate of northern development. At present the Ministers of DINA and DOE are cautiously negotiating. Meanwhile the amount of such information DOE has is woefully insufficient. Indeed, during the Mackenzie Valley environmental studies a major complaint by government scientists (and even the industry's Environmental Protection Board) was the lack of technical information from industry. There is also an inherent reason for insufficiency of information in DOE; namely, the research nature of science which sees the search process as never-ending.

The territorial and provincial governments which also take a supporting role in northern petroleum development also suffer from lack of technological information. The territorial governments simply do not share the regulatory power of DINA over the petroleum industry north of 60°. The territorial governments only have jurisdiction over social services, which in development terms means the social costs created by such development. Planning by the Territories is impeded by the lack of technological information.

The provincial governments have been playing their potential supporting roles with vigour. As these governments, such as Ontario through its new Crown energy corporation, offer to buy into the consortia for pipelining gas from the Arctic they shift into a more central information role. Ontario and Quebec as major consumers of energy have been uncertain where to invest. Their capital resources are being relied upon to gain access to petroleum information. Should these two provinces buy into one of the pipeline consortia and into a petroleum reservoir they will take on the dual roles of producers and transporters in addition to their roles as consumers and regulators.

Alberta and British Columbia, as major natural gas producers, are also trying to secure a place in Arctic petroleum development via the "Maple Leaf" pipeline project. Their decisions have rested on their belief that the U.S. will send its Alaskan gas over an all-U.S. route, thus they want Mackenzie Delta gas and possibly even Arctic Islands gas linked with their existing gas pipeline systems. These producer provinces, who have long worked with the Canadian petroleum industry within their borders, have established access patterns to the necessary information, but information about Arctic petroleum would

be insufficient and perhaps inaccessible too. Both provinces have already bought an equity position in their petroleum transportation systems and should their perception of U.S. gas going over an all-U.S. route be correct, their part ownership of an Arctic transportation system will make them core actors with most information needs met. In this sense they could also be joined by Ontario and Quebec as owners of an Arctic pipeline system.

Both independent environmental groups and native groups have the least technological information and are least able to acquire it. Their main strategy for gaining access to such information is through public forums on Arctic energy development. They provide the means for disaffected experts and university critics to suggest alternatives and to ask penetrating questions. These groups also have their own experts to check and counter the information presented by the industry and government. For example, the Canadian Arctic Resources Committee (CARC) hired a well-known university biologist to do research in the Arctic. The native groups have also hired economists and sociologists to help them garner information to bolster their land claims. These hired researchers are critical of government and have evolved a detailed research process which compels the government to provide itself with additional information. This strategy is one of widening the context of the issue so that additional technological information becomes important and existing information is shared.

Seismic Information

Information about such technological and geologic issues as seismic, drilling, pipelines and alternatives thereto has varying impacts on each of the above-named actors. Seismic operations to garner both geologic information and meet DINA-imposed work requirements have been an issue in the Arctic. Even industry has not succeeded in extracting sufficient geologic information by this means. Many seismic runs may have to be re-done because of new technology for obtaining and processing seismic information.⁸

Geologic information has been the most sought after and has proven difficult to interpret. In general, core actors have been optimistic about the potential of the Arctic. Other actors, including the public, have shared their enthusiasm as revealed (couched in conservative terms) in their public statements.

“The discoveries by Panarctic and Imperial have been termed ‘large’ by the press. However, both companies have been guarded in their announcements to the public so as not to create inflated expectations. No disclosures have been made on the exact size of any of the finds. Unfortunately, the public and some of the press have responded by mistaking what is really discretion for evidence that extreme size of the Imperial and Panarctic discoveries must necessitate secretiveness. It is a short step from here to the false conclusion that many Arctic exploration groups are on the verge of great success.”⁹

Given such misperceptions of actor strategies it is not surprising to find

divided opinion and even mistrust among the public, rival actors, supporting actors, and even among core actors. Certainly, the DINA request for additional information from industry on their exploration activities is a partial response to the conflicting views found among the various actor groups. But one thing is certain: "Prudhoe Bay gas reserves have already been verified while Canadian Arctic reserves are still considered a question mark."¹⁰ This same question mark still exists today, nearly three years after this statement was published.

Reserve figures vary depending upon who produces them. The same information can be interpreted differently depending upon training, experience, affiliation and outlook. Even the definition of *reserves* varies widely depending on whether it is from the Canadian Petroleum Association, the Canadian Association of Petroleum Geologists or the Geological Survey of Canada. Therefore, the same geologic information can be used for a variety of purposes.

DINA has not had sufficient access to seismic information and has begun to demand more information from the industry. In turn, adequate information about seismic operations has not been given by DINA to native groups and village councils. Thus, conflict has resulted from seismic operations in traditional hunting areas. The native groups have been concerned over the lack of seismic information from the companies and DINA, and the short notice when information has been given.¹¹

Drilling Information

Drilling information, if favourable, sparks the transportation planning phase of the petroleum development program. In 1974 insufficient reserves of gas had been found in both the Mackenzie Delta-Beaufort Sea and the Arctic Islands. Thus, transportation applications were tentative until adequate reserves were not only found but consigned to the transportation consortia.

Industry sends drilling cores to DINA for geological evaluation, but DINA has trouble obtaining sufficient samples.

DINA obtains early information on offshore drilling technology by encouraging companies to submit their plans for an approval-in-principle even before final construction designs are created. The government sees early submission as important so the coordination of the approval process and the government supporting services for such drilling can begin. This approval-in-principle has reduced drilling applications for offshore because the government does not guarantee that early approval will assure final drilling authorization.

Environmental and native groups have criticized DINA's secrecy about offshore drilling. Even though substantive information was available on such drilling and meetings between government and industry were held, all was done without public disclosure. DINA believes this allows an unimpeded dialogue between industry and government on technological and regulatory concerns. DINA wants timely information in order to arrange for public relations, employment liaison, govern-

ment support services, contingency plans, equipment and supplies, and guidelines and regulations.¹²

Industry is unhappy about the drilling delay because DINA has had years to prepare to approve immediate drilling in the Beaufort Sea.¹³ Concerning offshore drilling regulations, industry wants more involvement in the formation of policies and regulations, improved communication between government and industry, and additional environmental information.¹⁴

On the other hand, industry secrecy is an issue to government. Both industry and government recognize that unreleased scientific and technologic information is shared between professionals through peer and personal relationships. However, DINA officials prefer to see co-operative research by industry and early public release of results.¹⁵ At present cost-sharing drilling programs have a two-year secrecy stipulation. One official in DINA has noted: "It is my Department's view that the competitive and secretive practices which have generally characterized oil and gas operations in provincial and state jurisdictions are unreasonable with respect to Canada's North and are largely obviated because of the concessionary elements of Federal Government's land disposal policies."¹⁶ Of primary concern to DINA is the long lead time they require to provide supporting information and supporting services and to appraise their priorities and budgetary allocations. In addition, they need time to consult with northern governments and native communities and conduct environmental assessment.

Transportation Information

The technological information associated with transporting gas and oil in the Arctic has been amassed recently. While the industry now appears to have enough information to construct and operate a pipeline, it has not been informed how long the approval process may take. This lack of information is creating much uncertainty for the industry. Competing projects – a pipeline from the Arctic Islands, the American El Paso alternative, or even development on the east coast – all threaten the Canadian Arctic Gas Pipeline Limited (CAGPL) application. The longer the application process takes, the greater the threat to CAGPL that a large discovery will be made elsewhere. However, once a pipeline is approved, exploration activity will greatly increase in the area serviced. The consortium also lacks knowledge about reserves and consignments for existing reserves.

The consortium has gathered enough pipeline information to actually construct the line and fulfill the guidelines. Thus, industry feels excessive information has been gathered, while government feels the information has been barely sufficient, or even deficient in those cases identified by the DINA pipeline assessment group.

The NEB has a unique information problem. The NEB Act requires it to regulate pipelines in the public interest, yet the agency is not allowed to employ staff whose work duplicates that of existing agencies. Thus, the NEB cannot accumulate its own data but must seek senior experienced permanent staff capable of assaying informa-

tion submitted by a potential applicant. Such staff must come from the industry itself, other regulatory bodies or other federal agencies, which could influence their interpretation of information. In addition to permanent staff, the NEB seconded staff from other agencies. The NEB sees the hiring and the secondment of staff as offsetting the influence of past employment. The interpretation of information is crucial to the NEB decision because the information presented by the applicant and the intervenors often conflicts. For example, export licensing depends upon the existence of reserves beyond Canadian requirements and commitments. Reserve figures may be arrived at differently by those promoting early development, than by those opposing it. The NEB staff must interpret the figures of all actors and reach their own conclusion about reserves.

Isolation can also be an information problem for the NEB. Information on which to base decisions about pipelines must be formally presented at hearings which means the intervenors *must* present the negative aspects.

Critics charge that the NEB clings to time-honoured policies based on obsolete information when it encourages sales to the U.S., emphasizes economies of scale, and encourages development of reserves.¹⁷ McDougall has charged that the NEB has erred on three counts:¹⁸

1. By underrating domestic demand.
2. By exaggerating extent of supply.
3. By miscalculating accessibility of new supplies.

Each of these three NEB estimates was based on facts, so to deal with the charges, both the research process and the method of interpretation of facts should be questioned. The hearings on Canadian reserves in the fall of 1974 were the NEB response to such criticism.

Ontario and Quebec have had both insufficient and inaccessible information until recently. With the advent of the well-endowed Crown energy corporations searching for investment opportunities to secure future gas and oil, consortia representatives have visited these provinces to persuade them to invest in their respective projects. This information exchange between the governments and the industry has been privately conducted.

Information on Alternatives

Technological information on alternatives to a pipeline is sparse. Such alternatives as a railroad, submersibles, ice-breaker tankers and resource aircraft have remained as concepts. Only pipeline research has been vigorously pursued. This research was aimed at solving particular challenges posed by an Arctic pipeline including the selection of materials suitable in cold, and methods of chilling the gas and laying the pipe in permafrost and through ice on the seabed. The oil companies based their early selection of pipelines over other methods of transportation on past experience.

Because the "permafrost" is the principal barrier to conventional buried pipeline technology¹⁹ the Canadian Institute of Guided Ground

Transport at Queen's University developed an Arctic railroad alternative to the Mackenzie Valley pipeline. Their feasibility study was met with less than enthusiasm by Canadian National and Canadian Pacific who were both members of CAGPL, the pipeline consortium. Nevertheless, the railway companies took up the idea and approached the government about funding extensive technical, economic and environmental-social studies. The government, however, and in particular DINA, refused to fund the entire study, choosing to fund only a "narrow technical study",²⁰ which began in spring 1971 and ended in June 1972.

Critics have charged that DINA and the oil industry were opposed to the only serious transportation alternative to the pipeline and that DINA relegated it to a secondary position by funding only part of the research necessary to fully support its application. Thus, "the northern bureaucracy would protect itself from charges that it had not encouraged further study on the rail alternative, but the study itself would be narrow enough to prevent a truly comprehensive assessment of the railway concept."²¹ Also, the government will have "sole access to the information in the study group's report and sole right to release the information to the public. . . . The CN-CP group . . . realize that the government will carefully filter out any information that might challenge assumptions" already made by the government.²²

This government suppression of new information is a direct result of an early technological decision about transportation, a good example of how the context "affects what information the decision makers are receptive to".²³ Certainly, DINA was unreceptive to information on other modes of transportation from an early stage, perhaps because of established ties (via NACOP) with oil industry initiatives on behalf of pipelines and from the way of perceiving what was at stake in the North. Interviews with DINA officials reveal that they feel the rail alternative actually received far more attention than it deserved.

The disagreement over transportation alternatives in the Arctic Islands is not between opposing actor groups as in the Mackenzie but rather is within the transportation consortium itself. Polar Gas simply has insufficient information to choose between a pipeline and a liquefaction plant in the eastern islands and LNG tankers. Ultimately, both modes may be used, beginning with the tankers and phasing in a pipeline later. Much depends on further research and what happens in the Mackenzie Delta.

Industry is divided in its opinion of whether the Mackenzie Delta or the Arctic Islands will come on line first. (See Appendix B). Interviews with industry officials seemed to suggest that there was competition between the actors in each location. Information on locational alternatives to the two Arctic areas, including the eastern offshore, is clearly insufficient and was inaccessible to us because the reserve information is incomplete. The industry actors interact in secret.

Government interest in alternative locations is unclear. Certainly, if the eastern offshore or the Hudson Bay offshore were to be developed

first EMR would be the lead agency in petroleum development policy. On the other hand, if either the Beaufort Sea, Mackenzie Delta or Arctic Islands was to come into play first then DINA would occupy this senior position in the Ottawa milieu. There even appears some element of competition between the federal and Alberta governments over location of petroleum development. Interviews suggested that information on petroleum technology alternatives is not a priority in the federal government; rather, the emphasis is on finding out the other agencies' strategies for enhancing their respective positions in the petroleum development hierarchy.

The provincial governments are keenly aware of petroleum technology alternatives, albeit with varying motives. Both Alberta and British Columbia are attempting to lengthen their tenure of dominance in petroleum development by seeking alternative sources and technological improvements. Ontario and Quebec, the major consuming provinces, are searching for information on a wide variety of energy sources and transmission possibilities. Thus, Alberta wants all Arctic gas pipelined through its territory before being sent east, whereas the consuming provinces seem willing to consider any source from anywhere shipped by any means. The territorial governments are also interested in pipelining or perhaps some other mode as long as their development is enhanced. However, they have no capability to search for and discuss either transportation or location alternatives.

Environmental and native groups demonstrate significant interest in alternatives to petroleum development but for different reasons. Environmental groups wish to delay all petroleum development until sufficient long-term environmental baseline studies have been completed and policies have been set. Native groups also want petroleum development delayed but only while they gather information to support their land claims. They do not appear to want to postpone such development altogether.

Environmental Issues and Information

The same basic information pattern emerges with environmental issues that was revealed with technological issues. The core actors of industry and government (DINA and NEB) have the most information, whereas other actors representing the environment such as DOE, environmentalists and native groups seem to lack information. Industry and DINA have spearheaded the search for environmental information and together control the access to it, although DINA dominates the determining of sufficiency.

Another part of the environmental information problem is inherent in the nature of natural scientists, who rarely feel sufficient study has been undertaken by the core actors and who have often been proven right.

A major weakness in the information system designed to support Arctic petroleum development is that it is brought into play only at the end of the planning phase for transportation. If environmental factors were to have equal emphasis with development then "environ-

mental considerations should have been a part of the assumptions and decisions at the time of acreage dispositions".²⁵ In other words, government should not have allowed the northern sedimentary basins to have been totally blanketed with permits if there were possibilities that these basins could not be developed for environmental reasons. However, environmental information played no part in the granting of these permits by DINA, although a procedure now exists for land use permits (see Chapter IV).

Industry has been concerned with the environment in the narrow technical sense of whether or not pipeline can be laid and efficiently operated in it. Any information which required a wider view of the environment, the industry gathered mainly to build a case to meet a legal requirement. Therefore, information deemed useful was selected for detailed study while the remainder was glossed over or used as "filler". Industry publicity of its environmental information stressed the overall size of the report and its costs. No major findings were extensively publicized out of this massive study effort. Little industry interest existed in environmental impact assessment until the pipeline guidelines necessitated some interest. Even now the industry does not see environment as an issue.

Industry did create an autonomous, independent advisory body, the Environmental Protection Board, which is staffed by experienced Arctic scientists. This Board helped to give the industry effort credibility although the industry view of the Board is mixed. If the Board's independent assessment is considered to aid the pipeline's approval then the Board is to be continued. If not, the industry will stop supporting it.²⁶ Although the autonomy of the consortium-supported Board has been unique, one person noted that few project details were released to the Board from the consortium during its studies, so that the Board was unable to completely assess the environmental impact of the pipeline. Thus, the industry is willing to support any information that will influence approval of their project. This position is, of course, thought quite legitimate given the goals of this actor group.

The industry then has sponsored two major environmental research efforts. They directly submitted the results of the research by hired consultants to support their pipeline application, while the other research was submitted separately by the Environmental Protection Board as an assessment of industry's application. This procedure appears to have considerable potential for future resource development projects since the independent appraisal provides another focus using both an independent and a wider view.²⁷

DINA has responded to the quest for environmental information by reorganizing its Land and Water Division to emphasize environmental impact studies. DINA has also taken the lead in coordinating the Environmental-Social Committee. This committee with representatives from interested federal departments and the territorial governments has directed a host of government-sponsored studies of the same environmental factors that the industry studied but from a somewhat wider view, and based on a more regional perspective than that of

the applicant. The government's main purpose besides achieving some northern research experience was to assess the industry studies. The short time period over which government gathered this information did not allow it to establish baseline parameters of environmental factors.²⁸ It is striking that with industry interest in northern petroleum development known to government for over 10 years the government had not undertaken any appropriate environmental studies of the Arctic.

The paucity of any information on the Arctic was proven when the government also had to commission studies. All in all, industry spent \$50 million on environmental-social studies, while the government spent \$15 million on such studies, an expensive information search, particularly if we consider the general nature of the government guidelines. Government did not encourage or integrate public response to the guidelines, even though that was the stated intent. Little public discussion occurred. Therefore, if an item is overlooked in the guidelines or not accomplished in detail is the applicant released from studying it further? This question is apparently being considered in the guidelines which the Environmental-Social Committee is currently writing for the Arctic Islands pipeline.

Several officials readily admitted to the haste with which the 1972 expanded pipeline guidelines were put together. Perhaps a \$65 million information search and an expensive assessment of such information should have rested on a more carefully thought-out publicly derived set of guidelines.

Independent environmental groups such as CARC have also undertaken environmental studies. They seek an information base to judge the validity of both industry and government studies. The studies provide a basis for "second-guessing" both industry and government and arriving at their own "deficiency statement" and assessment. They have taken the widest possible view of the environment and its associated issues.

In all, four separate sets of environmental studies were conducted. One set was sponsored directly by industry to support its pipeline application. Another set, also sponsored by industry but independent of the actual application, was done by the Environmental Protection Board. Government sponsored its own studies to judge the application. Finally, independent environmental groups sponsored other studies to both goad the government and judge the validity of the other studies. Whether all the studies were necessary is not clear, but the lack of an environmental information policy created problems in deciding which actor should sponsor what studies for what purposes. Both industry and government (except DOE) have viewed this environmental information as of little importance in the final pipeline decision, whereas the Environmental Protection Board, DOE scientists and independent environmental groups have viewed such information as basic to the decision. Again, a lack of national policy has made a tenuous link between the information and the final decision inevitable.

DOE has been keenly interested in evolving an environmental im-

pact assessment policy which would apply to all federal agencies. This effort, while successful in obtaining a cabinet order, has been blunted in its application to DINA.²⁹ Even though the cabinet declared all departments were to be subject to the order DINA has opted out on the basis of its “provincial” status. Conflict over gathering environmental information has evolved between DOE and DINA because DINA prefers to do its own environmental impact assessments as any province would. Even though DINA depended on DOE for scientific staff for the pipeline study, DINA reserved the right to interpret the data. This “jurisdictional” split on environmental impact assessment has resulted, for example, in DOE looking at caribou as animals while DINA views caribou in terms of their function as food supply to the native peoples.³⁰

However, even if DOE with its environmental orientation and expertise was allowed to make all such assessments in the North this policy would still be insufficient, for DOE sees the entire assessment process as an in-house one which is publicly invisible.³¹

Jurisdiction is the key to understanding the information roles of the government actors – DINA, NEB, DOE and the territorial and provincial governments. Briefly, DINA has jurisdiction over petroleum development, native peoples, lands, waters and forests; NEB has jurisdiction over pipelines; DOE has jurisdiction over fisheries; territorial governments have jurisdiction over wildlife as game animals; and provincial governments control all resources including air and water within their boundaries. Each entity has evolved an information program designed to suit its jurisdictional position. Some of these actor groups attempt to expand their information collection systems vis-à-vis other actors groups, such as DOE trying to expand its environmental impact assessment authority into the North where DINA’s presence has been paramount.

DINA, however, has apparently been successful in limiting the power of DOE north of 60 degrees. For example, DOE “was not named as an administrative or a cooperating agency for the enforcement of either the Arctic Waters Pollution Prevention Act or the Northern Inland Waters Act. . . . It even has unwritten orders to clear all of its actions to enforce Section 33 of the Fisheries Act with DINA.”³²

With reference to secrecy of environmental information Pimlott has noted that DINA “allows the petroleum industry to ‘shelter’ potentially important reports on environmental topics, such as meteorological and ice conditions, under proprietary interests arrangements so that they are not even reasonably available to members of government”.³³ He cites the case of DINA approving the construction of artificial islands for drilling platforms in the Beaufort Sea on the basis of their being “normal extensions of land use operations rather than identify[ing] them as the first stage of offshore drilling operations”.³⁴

DINA’s Land and Water Division requires a “mini-impact assessment” to support a land use permit application. The Division has created a checklist of environmental elements they believe significant in terms of possible environmental impacts.³⁵ Sufficiency of and access to information are not problems for this Division since it is part of the regu-

latory process and can require the requisite information to support a permit application.

The NEB can also require environmental information to support a pipeline application but its environmental capability is quite limited. Its small environmental staff can only provide a liaison service and must depend on outside agencies, principally DOE, for environmental information. The NEB concern for environment is limited, however, to ensuring the pipeline's safe operation and minimal disturbance to environmental conditions in its vicinity.

DOE, on the other hand, has major interests in environmental information and is the only federal actor with a significant research capability. DOE sees environmental information on arctic petroleum development as both inaccessible and insufficient. Because of DINA's biological work in the North it has successfully excluded a major role for DOE north of 60. DOE has only been involved in gathering such information through its position on the Environmental-Social Committee headed by DINA.

One central problem arises when the major actors either view environmental studies as peripheral to the decision or regard good engineering and environmental protection as synonymous. Peterson suggests that environmental information is important in at least four contexts:³⁶

1. For studies of renewable resources which support native peoples.
2. For managing renewable resources.
3. For managing environmental impacts from disturbances.
4. For fulfilment of international treaty commitments.

Environmental information on aquatic, climatic, terrestrial and animal resources is important in the Arctic even without a development project, but no long-term, on-going, system for gathering data about the North appears to exist in DINA. Only project-oriented studies are conducted at present.

Peterson, the former coordinator for DOE studies on the Environmental-Social Committee, has listed some of the advantages and disadvantages of the project-oriented Mackenzie environmental studies:³⁷

Advantages:

1. Sets priorities for location of on-going government data collection programmes.
2. Provides an alternative to obtaining general knowledge.
3. Increases the integration of environmental information into engineering design.

Disadvantages:

1. Allows secondary and tertiary effects which are obscure and subtle to escape detection because of short duration.
2. Experimentation is disregarded because of short duration.
3. Focusses on the likely results of the project rather than on long-term management.

4. Totally dependent on knowledge already gained through past experience.

The Mackenzie environmental studies were done within a short period because it was generally assumed that the consortia would be getting an early construction starting date. There is never enough time for adequate project-oriented environmental studies. The Beaufort Sea environmental studies are to be conducted over two years from 1974 to 1975; "DINA announced . . . the delay in drilling would provide 'over two years' for environmental studies. DOE officials have said that plans still call for all the studies to be completed by July 1975 (16 months)."³⁸ Even though environmental research in the Beaufort area was planned for the summer of 1974, the weather and ice conditions only allowed a small fraction of the study time originally planned. To offset the short duration of environmental studies DINA places the burden of proof on the industry to show that its development will not adversely affect the environment.³⁹

Another critical disadvantage of project-oriented studies is the lack of communication between engineers and environmental scientists and between those studying the environment and the public. Industry denied project details not only to the government during the environmental studies but also to its own Environmental Protection Board. Thus, integration of environmental data into engineering design was not completely possible. The studies were only released to the public after they were completed.

Another problem with the government studies was the limited nature of some of the efforts. Given the structure of the Environmental-Social Committee (which was headed by DINA) only DINA interpreted the data. Thus, DOE personnel who were used by DINA for these studies could not look at the validity of the project but only to assess its routing and design implications.

Information systems for supporting the Polar Gas pipeline proposal and the Beaufort Sea offshore drilling proposals are currently being designed and carried out. DINA rewrote the 1972 expanded pipeline guidelines for the Mackenzie studies for use in the Arctic Islands studies. Loken's special study reviewed what information was needed, what information was known and what process was required to get what was needed.⁴⁰ He suggested some information guidelines for the Arctic Islands pipeline study:

1. The Environmental-Social Committee should oversee the entire research process and integrate the results.
2. The federal agencies with the jurisdictional responsibilities should do the research and the territorial government should have a visible presence in the effort.
3. Federal employees who are participating in the study should identify with the task and not with their employing agency.
4. Project teams should include representatives of all federal agencies with jurisdiction over the area of study.
5. Industry and government joint projects to reduce costs are

desirable but each group must retain the capacity to make independent judgements and assessments.

6. The committee should coordinate support services.

7. Liaison with both territorial government officials and native peoples will be important throughout the study.

The Environmental-Social Committee has not yet finalized the guidelines for the Arctic Islands. Certainly, there will be some changes due to the Mackenzie experience, but whether the committee will adopt Loken's suggestions is unknown.

Environmentalists have been generally critical of the timing, accessibility and sufficiency of the information they believe should have been (and should be) generated and evaluated prior to large-scale development in the arctic environment. The Canadian Arctic Resources Committee (CARC), in its chosen role of monitor, has increasingly become the major mouthpiece for environmental groups on the information and other arctic issues.

K. Vincent, CARC Executive Secretary, suggests that DINA makes issues appear as complex and technical as possible to avoid public participation and converts "all political and social questions into pseudo-technical ones".⁴¹ Finally, Vincent maintains that DINA and DOE both hoard information, primarily to hide the inadequacy of the information on which decisions are based and to avoid informed challenges to those decisions.⁴² As an example of the inaccessibility of information, Vincent mentions that when Douglas Pimlott went to Inuvik for CARC in 1973, he was thwarted by government officials in his efforts to inspect the supposedly public applications for seismic operations filed during the preceding three years.

Vincent does not purport to speak for all CARC members. However, CARC's own publication has consistently hammered at the information issue and a recent issue of *Northern Perspectives* (Vol. 2, No. 2, 1974) was devoted entirely to a critical appraisal of the government's handling of the issues surrounding offshore drilling in the Beaufort Sea. The introduction posed a number of questions, including, "Why was this new phase of exploration cloaked in secrecy?"⁴³ Clearly, CARC is attempting, through its critical stance, to forge a role for itself in the decision-making process.

In May 1974 DINA announced that no drilling would begin in the Beaufort Sea before summer 1976 "so that at least two full years of environmental studies can be completed by industry and government".⁴⁴ Since the story reporting this announcement also says, "In recent weeks some environmentalists had complained that Ottawa would allow drilling to start before the minimum environmental studies had been completed"⁴⁵ the story implies that groups such as CARC had successfully influenced an important government decision relating to northern resource development. But the story also notes that Chretien's announcement only "underlined" a previous federal cabinet ruling and further, that federal authorities said that "drilling could not have started before mid-1976 for technical reasons".⁴⁶

Economic Issues and Information

Economic issues loom large in any petroleum program in the Canadian Arctic. Information about regional economic development in the North and in the West, about the impact on the national economy of a period of intensive energy development, about Canada's ability to finance such development and about the location and extent of markets is both scarce and highly subjective. Interviews revealed that for many of the core actors listed, economic issues are beyond the ken of any single actor group, even though any one or all of the above issues may be highly relevant to them.

The petroleum industry has one overriding concern: to remain a growth industry by finding new resources and exploiting them as rapidly as possible.

The oil industry has done just enough economic research to answer its critics. Independent economists from universities have criticized arctic petroleum development because of its overall impact on the national economy. The industry has defended its case for early and rapid development. It has defended itself against charges of excessive profits by shifting from standard accounting practices to "inflation accounting" – expressing profits in present value terms.⁴⁷

The government required no economic appraisals except studies of northern economic impact and financial feasibility of the project.

DINA and NEB, the core actors in the federal government, both seem to favour rapid development although for different reasons. DINA is maintaining its "presence" in the North by development efforts. The NEB must maintain sufficient reserves to meet Canadian requirements.

No government agency has taken an overall look at petroleum and the economy to determine the regional and national impacts of different rates of development, modes of transportation and locations. The Economic Council of Canada and the Bank of Canada have developed economic impact models for testing changes in economic policies, but these models were not designed for testing changes in petroleum development patterns.⁴⁸ EMR has done a major study on energy policy, but the part on petroleum does not contain information on alternative development strategies and their economic impacts.⁴⁹ The NEB, despite restrictions inherent in the hearing process, can and does, however, research economic and financial impacts, but has not dealt extensively with different patterns of petroleum development such as pacing and scale.

The Department of Finance has an overall responsibility for Canada's economy. It can change incentives which affect the petroleum industry such as export prices, tax and royalty rates. As an example of lack of coordination this department did not communicate with EMR or DINA prior to the May 1974 budget despite its major impact on the petroleum industry.⁵⁰

The federal government has created a Northern Advisory Committee on Northern Pipeline Financing, headed by EMR, to determine adequate financing arrangements. It has no mandate to determine economic impacts of alternative development proposals.

The territorial governments, of course, are interested in northern economic development only. Even in this area they have no capability to encourage economic development; they even lack the capacity to do research. In fact, the usual practice of the federal government when awarding contracts for northern services on the basis of sealed bids is to ignore the higher cost base in the North and award contracts to southern companies, even when such northern companies cut their profits to minimum levels.⁵¹ The territorial governments do not seem able to intervene at the political level to have this imbalance corrected.

DINA, which has complete control over economic activity in the North, downplays the potential role of the Territories in their own development. DINA sees itself as the acting provincial government. Even though part of the DINA bureaucracy was moved to Whitehorse and Yellowknife, the major informational tasks have remained in Ottawa. Thus, the information process for the Territories is completely dependent upon DINA in Ottawa with little input from the territorial governments. Even the Petroleum Resource Development Committee in the NWT is limited to advance information on social impacts with no regard for the economic and resource policy aspects.⁵²

The provinces, while only interested in economic development of the northern Territories if it might displace industry from their jurisdictions, show major concern for economic issues surrounding petroleum development. They want secure petroleum supplies to maintain their economies and minimal economic dislocation stemming from northern petroleum development. Expert opinion is divided as to where to invest to gain security of supply, what the economic dislocations, if any, would be and what industries, engineering and financing will be included and to what extent.

The environmental groups have provided a forum for economic experts and university economists to speak out against petroleum development in the North and, in turn, they have used these experts to bolster their position of no or delayed development. This strategy is sound since it allows two divergent groups to appear as a unity. In addition, it provides a central forum for collating economic information and giving it public impact in a way that would not be possible if each economist made her or his points individually.

The independent economists so gathered have uniformly opposed immediate development of arctic gas resources.⁵³ Their information sources are outside the information base generated by the core actors. Their analyses are based on the public statements of the industry actors including their past economic performance matched with economic theories and models.

Maxwell has reported that the three available national models of the economy are each deficient for fully assessing the economic impact of arctic petroleum development.⁵⁴ Economists with government and with the consortium have used these models and their results are classified or confidential.⁵⁵ Even within government, however, economists' assessments differ: one government economist published a negative assessment of the economic impact from the proposed gas pipe-

line.⁵⁶ Given the immense rewards at stake for the consortium and the assumed benefits for the country by the government it is not unusual to see them clothe the project in secrecy.

Native groups are interested in the economic impact of petroleum programs on the North and they need to know the value of their land in terms of petroleum. Employment of native people is of vital interest to both DINA and the people themselves. Information concerning the impact of petroleum development on the native peoples was gathered by the consortium, government and the native groups. Indeed, the latter have hired their own economic experts to determine the economic impact on their traditional activities and to determine the economic rent of the natural resource base.⁵⁷ The information gathered will be used to support the land claims issue. The native groups feel it is important to gather separate information because they see no differentiation between DINA and the oil industry. Not only does DINA not share information with the native peoples, DINA is seen by them as a developer and not as a "protector" of their rights before industry.⁵⁸

Northern employment information is also sparse. The uncertainty surrounding the approval and eventual timing of pipeline construction has prevented any native training program for pipeline construction.⁵⁹

Information about socio-economic impacts as well as about the behaviour and attitudes of the native peoples themselves has not been readily available. Most baseline studies including those by the consortium and by the government, were contracted with the same northern consulting firm, Gemini North. This firm, even given its northern location, had severe data problems such as:⁶⁰

1. Lack of historical information.
2. Most information available is *ad hoc* and unrelated.
3. Community and regional information non-existent.
4. DBS statistics not relevant.
5. Surveys are not favourably viewed in the North.

Thus Gemini North's studies are tenuous and consultation with native people is of prime importance.

Turning to such substantive economic issues as regional economic impact, national economic impact, financial market capability and exports, information problems are acute. However, these problems are in the sparseness and the conflicting nature of the available information. The economic impact of Arctic petroleum will be considerable. Government regulation and management will determine the direction and the magnitude of the impact. Surprisingly, however, little information has come from core actors about economic impacts. If studies have been done they are secret.

The economic impacts or side effects of massive petroleum development in the Arctic are reasonably well understood in theory, but the role of each actor in reinforcing or retarding them is unknown. Two important side effects are an increase in foreign exchange earnings from petroleum exports and a rise in domestic prices because Arctic petroleum would be more expensive. Both of these impacts could affect existing manufacturing and petroleum consumption patterns. Cer-

tainly, the federal government will act to control these results but no information as to who, how and when was obtained.⁶¹

Social Issues and Information

Most actors in the proposed Mackenzie Valley gas pipeline agree that industry and government have invested more money and effort in researching and preparing against possible damage to the Arctic environment than in similar efforts vis-à-vis impacts on Northerners.⁶²

The industry actors in both Mackenzie Delta-Beaufort Sea and Arctic Islands resource developments have expressed concern over the difficulty of planning their operations because of unsettled native land claims. However, these actors agree that native groups have provided information regarding their claims. The industry does appear to blame the federal government for delay in effecting land settlements and for failing to indicate its timetable.⁶³

One response to this uncertainty was the Canadian Arctic Gas Pipeline Ltd. (CAGPL) offer to "negotiate a land settlement for pipeline right-of-way with the native peoples who claim to own the affected land, even before the land ownership question is legally settled with the federal government".⁶⁴

Both industry and government have stressed native employment in northern development projects. Industry has undertaken and publicized studies and pilot programs to determine the most effective ways of utilizing native Northerners in pipeline construction and maintenance and other aspects of petroleum operations.⁶⁵ Industry has also cooperated with government in operating training programs and evaluating results. All these programs result from keen awareness that major criticisms of previous northern development projects centred on the failure to hire native workers at all, or the failure to hire them in any but unskilled jobs, or the failure to train them for better and more permanent employment. In response, government issued strongly-worded guidelines stating that the welfare of native Northerners must be the first concern in any northern development and that Northerners must be given priority in hiring. Industry responded with training programs which guarantee, for example, that those natives involved will have permanent employment with the sponsoring companies whether the Mackenzie Valley pipeline is given the go-ahead or not.⁶⁶

Additional guarantees by industry towards native labour will be required because of the poor showing in this regard in the Pointed Mountain project.⁶⁷ Apparently industry had offered assurances that the Pointed Mountain pipeline project would provide full-time employment for native workers in that area but in March 1974 Jean Chretien pointed out that this had not materialized. He noted that "perhaps one mistake, a small one in Pointed Mountain, is a good thing because it will alert everyone that relying on the goodwill of these people (industry actors) is not enough because they had told us that they were to do their best but apparently their best was not very good".⁶⁸

Currently, industry seems to have responded to the government's pressures and offers of cooperation, and is generating enough informa-

tion via studies and various training and employment-option experiments to satisfy themselves that they can meet government and public relations requirements as well as deal effectively with the actual employment situations as they arise. One area of uncertainty for industry in its employment planning must be the extent to which unions, under government pressure and/or regulation, will allow "equality" for native labour to be interpreted as compensatory preferential treatment for native workers when hiring begins.⁶⁹

The federal government is, of course, centrally involved in the native land claims question. It was a long-time complaint of DINA officials that the government was willing to negotiate with native groups if only they would articulate what they wanted. Former DINA Minister Jean Chretien was instrumental in providing government funding so that Indian and Inuit groups could conduct the research necessary for them to present negotiable claims to the government. "Funding in the amount of \$440 000 is being provided towards the Inuit Land Use Study and the Indian Brotherhood of the Northwest Territories will receive up to \$500 000 from the Indian and Northern Affairs programmes to research and prepare their land claims."⁷⁰

This could be a useful model for the future as long as native groups (or other actors) are free to determine their own research needs and priorities.

The federal government, through DINA, is committed to employment for Northerners, especially native workers, in any large-scale development project such as a Mackenzie Valley pipeline. The government insists that some permanent jobs for northern residents must be created. The federal government is also investigating the possible effect of wage employment on native Northerners. Peter Usher reported to DINA in July 1972 that: "Short-term employment on the (Mackenzie Valley) pipeline will most likely be of direct benefit, in terms of experience and income, to a fairly limited number of native people. The social impact of the pipeline on most native Northerners will tend to be an adverse one, though of degree rather than kind."⁷¹ Usher's report, one of many government efforts, attempted to deal realistically with the fact that the pipeline would undoubtedly be built, for reasons having little or nothing to do with benefits to native people. He suggested that least harm would result if industry offered native workers first refusal on jobs rather than actively encouraging them to leave the smaller communities for temporary wage employment. "Employment guidelines should emphasize maximizing . . . benefits to those most able to realize them, rather than pushing as many people as possible into such employment with no long term goal."⁷²

Usher also strongly recommended that the government not rely on short-term wage employment generated by massive resource development projects to solve northern social problems. Instead, he urged that activities based on local renewable resource harvesting and processing should be strengthened; greater consideration be given to secondary industries which would provide long-term employment; and that both these alternatives should be pursued via cooperatives and local

development corporations to permit maximum local control and participation. With access to such studies the federal government has had at least a minimal information base from which to develop policy and procedures regarding native employment. While DINA has utilized some of the ideas stemming from such research (e.g. the "first refusal" approach to hiring), some observers criticize the government's narrowing of its interest in the welfare of native peoples to "the zealous pursuit of employment opportunities" for them and neglect of larger issues of native land rights and land use.⁷³

In general, however, DINA officials are satisfied that their studies of the economic and employment needs of native groups in the towns and smaller settlements have been adequate, and they point to such projects as Hire North as proof that better understanding of the needs of native workers leads to successful employment experiences for them.⁷⁴ The federal government has also studied the employment and training of the Inuit in the Arctic Islands and Loken reported in May 1973 that the government felt it had a good information base and sound experimental evidence of the ability of the Inuit "to adapt" to the employment needs of petroleum companies.⁷⁵

Loken's study indicates the government's approach to researching the probable effects of pipeline construction and operation on the socio-economic structure of the Arctic Islands area. The researchers identified 40 areas of socio-economic concern⁷⁶ on which information was needed. They described why the information was needed, investigated the state of present knowledge (e.g., some data available needs collating), and listed priority and magnitude of research required (e.g., high priority/small amount needed) and special considerations (e.g., need for an early start on data collection; general value of the data for DINA).

Loken's study indicated 12 areas of socio-economic concern in which data were urgently required.⁷⁷ This general paradigm would have been equally useful in assessing research needs in the Mackenzie Delta area.

Overall, DINA (together with the territorial governments) has undertaken or commissioned dozens of studies of the possible impacts of pipeline construction and other resource development activities on the social life of native peoples north of 60°. Of necessity, these studies considered the possible effects of interaction between natives and whites. While much of the concern over possible "social disruption" centres on such problems as alcoholism, prostitution, demoralization, and increasing dependence, Usher pointed out that a correlation between ethnic status and class structure appeared to be emerging (despite government efforts to train native people for better jobs) and that one danger of rapidly-paced massive development projects such as a pipeline would be increased polarization and hostility between white and native in the North.⁷⁸

While DINA now has access to a lot of information regarding possible social impacts of pipeline construction and knows what additional information is needed, government officials realize that research on

social questions has been less adequate than that on environmental impacts. Officials are less certain about social policy. DINA is relying heavily on the Berger Commission hearings to provide a well-rounded picture of probable social impact in the Mackenzie Delta area. DINA has also mounted its own study of the social impacts of gas production in the Delta.⁷⁹

The territorial governments are less knowledgeable than the federal government about land claims and certain socio-economic issues. But since the territorial governments have responsibility for such “people functions” as education, welfare, employment, town planning and the like, territorial officials have been in a good position to monitor developments in employment. They feel they have adequate information on native employment needs but they cannot design training programs because they lack information on what skills will be needed and when by industry.

One of the major problems for territorial government officials is coordinating their activities with DINA. Travel time and costs limit their participation in Ottawa-based meetings and work groups and, inevitably, limit their knowledge of federal plans for the North.⁸⁰

The NWT government’s Petroleum Development Group Coordinating Committee was set up to exchange information with the federal government about both the Mackenzie Delta and Arctic Islands and thus permit the NWT government to anticipate and deal with social impacts. The committee suffers from the above-mentioned lack of coordination. The committee also coordinates the Mackenzie Highway program and is responsible for Hire North. It conducts and commissions studies but it must get DINA’s approval for staff and money. The committee is centrally concerned with the impact of pipeline and exploration work crews on communities, since the arrival of 50 or 60 workers can significantly affect a community. They try to encourage the location of such crews well away from communities. This effort is hampered by the fact that the territorial government has had little contact with CAGPL and is therefore unable to anticipate work crew movements.

NWT officials have the impression that the Treasury Board believes that Mackenzie Valley social and environmental research should be applied to pipeline proposals for Arctic Islands activity. NWT government people believe this policy would ignore important environmental, cultural and social differences between the two areas.

In general, the NWT government would like to encourage industrial and other development on a scale geared to community, territory and native cultural needs, such as local sawmills, concrete plants, the prefabricated housing industry and highway services. It does not entirely share the federal belief (or position) that a pipeline will assure the NWT a continuous boom period, but is apprehensive about the problems – historically documented – of large scale projects and the accompanying boom-and-bust cycle.⁸¹

The Yukon (YTG) territorial government shares the same time and cost constraints as the NWT government. There appears to be a useful

flow of information through the Commissioner's office, which serves as a link between the federal and territorial governments. This link provides some advance notice as to what the YTG will have to deal with. In general, the YTG undertakes its own research about socio-economic impacts of such federal programs as those which promote employment of native people in mineral and petroleum development programs. YTG feels, for instance, that the federal people insist on native employment clauses before granting development permits, without sufficient attention to the social and cultural context within which native employment has to occur.⁸² For example, Usher mentions the need for better understanding of the impact on individuals, families and communities (especially in terms of loss of leadership) if and when men leave for extended periods of temporary wage employment.

Bruce Cox has analysed major effects of highways and energy pipelines on animals and fish,⁸³ and, in the same report, emphasized long-term implications of environmental disruption for native peoples' lifestyles. He concluded that although a great deal of research has been done on the effect of pipeline construction on northern environments, other, more socially relevant, research is needed to obtain a full picture. He describes this research as pertaining to impact of highways on northern environments, especially animal habitats, and the social effects of highway construction on nearby communities. Cox's emphasis on the interrelatedness of "environmental" and "social" concerns is typical of the stance taken by CARC and COPE, two organizations which currently, at least, see the usefulness of linking native and environmentalist efforts to slow down development until adequate information and comprehensive planning have some chance to guide future large scale projects.

Environmentalists have increasingly attempted to relate the environmental consequences of northern development to the social consequences of such environmental disruption. In Pearse's volume, for example, Everett Peterson's chapter on "Environmental Considerations in Northern Resource Development", although separate from the chapter on native peoples, notes at several points that environmental (particularly biologically-oriented) studies are important to native groups developing land claims based on traditional land use and related to management and regulation of the area.⁸⁴

As previously noted generation of and access to information has always been a top priority for the major native groups. The ITC, for example, recognized that without funds to develop their land claims case, negotiations with the federal government would not be on an equal basis. Chretien acknowledged this by funding their research. COPE has worked closely with CARC to evaluate the government's procedures and information base in its handling of Beaufort Sea drilling. The Indian Brotherhood of the NWT (IBNWT) also received government funds to conduct land claims research. A May 1974 newspaper story reported that access to records needed to research Treaty 8 was denied to investigators for the Indian Association of Alberta. A spokesman for DINA said he wasn't aware of the problem and would like to

straighten it out.⁸⁵ The IBNWT still need studies which assess the economic value to native communities of hunting, trapping and fishing.⁸⁶ The Council of Yukon Indians (CYI), while not conducting a formal land use study, is holding discussions with communities, bands and chiefs about traditional and present land use patterns. CYI is concerned over their lack of information on possible effects of seismic operations and the Dempster Highway on hunting, trapping and caribou migration.⁸⁷

The major native groups indicate that dialogue with government and industry is difficult regarding such possible effects of resource development as employment options, social disruption and general problems of community development. The pace of northern development has become a central issue (particularly in relation to Mackenzie Valley operations) partly because native groups, backed by environmentalists, have insisted that land claims should be settled before development proceeds. They also insist that they do not yet have the necessary information to evaluate options (e.g., commitment to wage employment and town settlement versus limited participation in wage employment and maintenance of smaller communities) and prepare for impacts either because it has not been generated or it has not been relayed meaningfully to the communities affected.

One observer of Inuit lifestyles points to change in "developed" areas of the Arctic and notes that the time for research is almost past. If viable land-based employment alternatives to wage-employment do not appear soon, the Inuit may lose interest in *any* alternatives.⁸⁸ Thus a sense of urgency animates the demands of native leaders for research funds and for access to existing information on the possible socio-economic impacts of alternate types of "development".⁸⁹

In conclusion, the actors most concerned with the social consequences of northern development do not feel that sufficient information about social issues has been generated or made available. Regarding native land claims, all actors believe themselves hampered by lack of information regarding the basis and nature of the land claims, settlement timetable, government intentions, and industry strategy. Although actors are now less frustrated than prior to the federal government's 8 August 1973 clarification of its intentions, the land claims question remains an area of major uncertainty, particularly for industry. Funding of native groups' research on claims is the most positive development in terms of information about social issues.

A basic conflict exists between those who seek to involve native peoples in development primarily through wage employment and improved social services and those who believe that this path will lead to increased social disruption via increasing native dependence on welfare. This latter group advocates instead strong government support for native people who may wish to combine types of employment. Mr. Justice Berger appears determined to give Mackenzie Delta native groups ample time and opportunity to offer their own informed ideas and preferences in this matter. How much weight these data will carry with government and industry decision makers remain to be seen.

A major problem in the Arctic Islands (in addition to perceived gaps in the information base) is the necessity of determining what experience and research findings from other settings (e.g., Mackenzie Delta) are applicable to Inuit groups in the Arctic Islands.

Political Issues and Information

Some fundamental political issues currently affect the North:

1. Canadian territorial sovereignty and foreign ownership of resources.
2. Levies, taxes and costs imposed on resource industries.
3. Pacing, magnitude and secrecy surrounding energy developments.

We shall discuss information in terms of these issues.

Canadian Territorial Sovereignty and Foreign Ownership

The petroleum industry, which is largely U.S. owned, is interested in the terms and conditions of its tenure in the North at two levels: a global level, in terms of which nation controls Arctic waters for example, and, a second level, in how this nation allocates tenure to specific groups and individuals. Since the voyage of the Manhattan and the introduction in April 1970 of the Arctic Waters Pollution Prevention Act and amendments to the Territorial Sea and Fishing Act of 1964, the Canadian government seems to have established a national and respected, but not absolute, claim to a large portion of the Arctic.⁹⁰

However, interest in the disposition and ownership of resources is high. The crucial questions now relate to how much of each resource there is and how soon it can be extracted.

Until recently certain politicians have assumed that large surpluses to Canada's needs of oil and gas existed in the North. They have encouraged U.S. companies to invest in exploration and transportation even if this meant partially compromising Canada's sovereignty in the North through the granting of rights-of-way or a treaty with the U.S. government. Gibson has documented assumptions about the North and about the need for a Mackenzie Valley oil and gas pipeline about which the Liberal Cabinet may have been misled. He suggests that industry may have indirectly or directly supplied incorrect information to the Cabinet in the following areas:⁹¹

1. The North has ample reserves of oil and gas which can be easily discovered if industry is given adequate incentive for exploration and development.
2. Oil and gas are single use commodities valuable only for the production of conventional forms of energy and therefore in danger of obsolescence.

He also infers that information generated within Canada from economic, financial and environmental impact studies has not really influenced the construction of an oil pipeline. He contends that the oil pipeline has not been built because of "the refusal of the project by the U.S. government and by the American multinational oil industry,

parent companies of the Canadian oil and gas industry members whose development the Canadian government was trying to encourage and facilitate.”⁹² Similar arguments might be applied to the non-construction of the gas pipeline and they might shed light on the willingness of the Canadian government to make concessions to the U.S. and the multinational firms.

Since Gibson wrote his article two new points have entered the picture.

1. To satisfy immediate U.S. energy requirements more oil will have to flow from the northern slopes of Alaska (both Prudhoe Bay and U.S. Naval Reserve No. 4) than the Alyeska pipeline can handle. This could mean that a U.S. controlled oil pipeline might still pass through Canada’s North.

2. There has been more discussion on the role of treaties to cover American/Canadian oil and gas pipeline networks.⁹³

As yet information on these developments is not generally accessible to most actors. It seems, however, that the Pentagon and the U.S. State Department would have a key role in shaping any oil and gas transportation treaties.

We have not yet discussed one of the core issues in the ownership question: precisely what the stakes are in the race for northern energy supplies. This issue is complicated by:

1. The secrecy and/or uncertainty of the oil companies regarding reserves.

2. The probable optimism of suppliers, when they report to such agencies as the NEB.

3. The lack of emphasis on deliverability in forecasts of the availability of Canadian gas and oil reserves.

These factors which influence forecasting have provoked some fairly acrimonious discussions between industry representatives, Canadian nationalists and others. For example, W.P. Wilder, Chairman of CAGPL has stated:

“Eric Kierans and others. . . . have argued that the – “Industry” – deceived the National Energy Board in 1970 with exaggerated claims of natural gas reserves. We are told that the Board was so deceived that it approved a large volume of gas export sales with the result that we now face a shortage of supplies for our own needs. . . . Our potential reserves. . . . as estimated by the Geological Survey of Canada, are more than enough to meet our projected needs to the year 2050. . . . We have adequate reserves of natural gas to satisfy both our own domestic needs and to honor the export commitments, authorized by the Government of Canada, which have been made to the United States consumers.”⁹⁴

The confidence implicit in this comment contrasts strongly with the uncertainty in statements made by Robert Macaulay, who has represented the Ontario Government before the NEB and served as a counsel to the Ontario Energy Board. He said, “. . . it is a “national disgrace” there is no reliable inventory of Canadian fossil fuel re-

sources and "statistics have been industry-fed and there's been no way of testing them."⁹⁵

Given the relationship between the NEB and Cabinet and supposedly between the Cabinet and industry, it is questionable whether the NEB will be receptive to information on the environment, and native peoples' rights. Gibson has suggested that the NEB and the Cabinet are still basically motivated by the same "Roads to Resources" policies as were the Cabinets of the 1950s and 1960s. The Chairman of the NEB, Marshall Crowe, was, for example, in October 1973, president and chairman of the Canada Development Corporation, which was and still is a member of CAGPL. Additionally, he spent from 1967 to 1971 working for the federal Cabinet, where his work included negotiating with the U.S. government on energy disposal strategies. He has also been a member of the Interdepartmental Committee on Oil.⁹⁶ Similar links exist elsewhere in government. Membership of Panarctic's board of directors, for example, has been discussed elsewhere. The pervasiveness of such industry-government recruitment and links help explain the similarities in information-gathering priorities of the federal government and the oil and gas industry.

As previously mentioned, current information about U.S. energy intentions in the North is sparse. However, another issue about which there is information and which could potentially affect the ownership question, is the bid by Foothills Pipeline Co. (Alberta Gas Trunk Line and Westcoast Transmission) for a smaller all-Canadian pipeline, the "Maple Leaf" project. This means that the CAGPL consortium no longer has the same backing that it originally had, and that there has been a revaluation of some of the information available to its members. This revaluation could be based on information on:

1. New delivery technologies.
2. Reserve reappraisals.
3. The expanded potential of Canadian markets since the advent of increased oil prices.
4. The increased availability of investment capital and/or the possibility of securing more favourable rate structures.

Which of these factors influenced the Foothills Pipeline Co. decision will be made public at the NEB hearings.

Levies, Taxes and Costs Imposed on Resource Industries

The federal government, apparently chastened by criticism that Canadian resources are being exploited for the benefit of non-Canadians, is seen by some oil and gas industry personnel as:

1. Trying to redress past inequities in resource development at their expense.
2. Attempting to exert some leverage vis-à-vis the provinces in the control of resource development, particularly in the area of fossil fuels.
3. Causing uncertainties regarding investment in exploration through unfavourable tax and royalty rates.

Although the oil and gas industry is well aware of the Cabinet's policy to have:

1. Domestic wellhead prices below international market prices;
2. Price parity throughout Canada; and
3. Export prices at international market prices;

it nevertheless feels excluded from federal/provincial strategy discussions. The industry feels that oil and gas are the stakes in a federal-provincial poker game in which the outcome is very uncertain. John Turner, then federal Minister of Finance, has consistently insisted on the right of the federal government to tax the profits on resources and states very succinctly:

“There can be no question that petroleum is a resource in which the provinces have a particular interest”. . . . (however) “ownership of or jurisdiction over a resource does not mean the exclusive right of taxation. There is a national interest as well which must be served. . . . If I understand this point correctly, the industry is saying that it would be unable, contrary to its expectations, to reach the point of financing its capital expenditure programs entirely out of current revenues. But this is not unusual for industry generally. Exploration and development costs relate to generation of future production income. It is no more reasonable for a resource producer to expect to cover these capital expenditures entirely out of current production income, than it is for a manufacturer or any other producer to expect to finance the entire cost of a new plant out of his current sales. The critical test for new investment is whether it will produce a reasonable rate of return. From this point of view, I find it difficult to understand why the federal proposals would lead to a cutback in exploration programs for new oil. . . .”⁹⁷

In the light of the latter part of this statement it is not difficult to see why the federal government is anxious to find out more about the finances of oil companies.

V.L. Horte, President of CAGPL, sees the problems of the industry as including taxes and levies, and a number of other important problems:

1. The energy industry is caught in a federal-provincial fight for control of energy resources.
2. At least seven state-owned or controlled enterprises are now either engaged in, or planning, oil and gas development and related activities. Will these enterprises be extended special privileges and advantages?
3. Provincial marketing boards have been established to displace private sector marketing of crude oil and natural gas.
4. Freehold petroleum and natural gas rights in Saskatchewan have been expropriated by the Crown.
5. The number, size and location of proposed giant petrochemical plants appears to have become a matter for determination by governments in pursuit of political objectives, rather than by economics as determined by the competitive market-place.

6. Government share of revenues from sales of oil and natural gas has sky-rocketed.⁹⁸

The federal-provincial squabble over taxes and royalties continues and it would seem as though Mr. Turner and Premier Lougheed of Alberta have been unable to reach any informal agreement over what portion each government should have of oil and gas revenues. Mr. Turner's November 1974 budget contained the controversial measures which appeared in the ill-fated May 1974 budget (royalties paid by crude oil producers to the Alberta government will not qualify for deduction from federal corporate income tax calculations). Representatives from the oil industry have been excluded from these discussions so that considerable concern over future operations in Canada remains.⁹⁹

The federal government is also contemplating the passage of a Petroleum Administration Act which will control gas prices nationally, outside of the producer provinces. Similar provisions exist for the pricing of oil. Donald Macdonald, then Energy Minister, suggests that this legislation is necessary in case supplier-consumer agreements fail in 1975. The legislation also allows the federal government to determine how increased revenues should be distributed among producers, transmission companies and government. The NEB would be given responsibility for enacting the legislation."¹⁰⁰

Information such as that contained in the budget reaching the oil industry has prompted its representatives to make such statements as: "Oilmen doubt that politicians understand the working of the industry well enough to recognize disaster situations, therefore their absolute gloom at the moment."¹⁰¹

Adelman, an internationally renowned observer of the petroleum situation has recently written that "Governments have taken nearly all the oil production profits (over and above the incompressible minimum return on investment): henceforth it (the price) will fluctuate irregularly. This return is subject to considerable margin for error, and will lead to disagreeable confrontations and perhaps some expulsions. Price reductions will come from governments' share, not from the companies'."¹⁰² Thus, the oil industry cannot be entirely blamed for the shifts in price and the policy impasse.

The oil industry lacks information on the cost of new regulations to replace the Canada Oil and Gas Land Regulations. Under traditional conditions critics suggest that costs associated with regulated exploration can quickly be passed on to the consumer. Eric Kierans, a former Liberal Cabinet Minister says, for example,

"I'm very much aware of the investment in exploration and development that all of these companies did in the Delta but I don't like it when they call it investment because it's not investment because you and I pay for it every time we pull up to a gas station — exploration and development charges. . . . So it's all written off. And even today. . . . we go further than that and lean over Imperial Oil's shoulder and Shell's shoulder and say, 'How much have you spent in exploration'? And the guy says \$30 mil-

lion. We'll put down \$40 million for tax purposes – and that's the government that says it."¹⁰³

It would seem that the firms operating in the North, although not overly concerned with economics per se if exploration costs can be rapidly recovered, have some interest in how the new regulations will relate to:

1. Costs of mandatory work requirements.
2. Costs of permits and leases.
3. Costs of complying with environmental/technological sanctions.

As previously mentioned, there does seem to be sufficient government-industry contact and probably the regulations will, to a great degree, reflect the interests of industry despite the delay in their promulgation. The industry, despite views to the contrary, does have an interest in regulations which will make costly accidents less likely to occur. However, their inputs into the new regulations will probably not be as pervasive as they were in the old days when it was alleged that: "the Canada Oil and Gas Land Regulations (SOF/61 – 253) were debated only in the board-rooms of government departments and oil corporations. . . . The government of that day gave the oil industry carte blanche telling them to write the kind of regulations that would create incentives for northern development."¹⁰⁴

Pacing, Magnitude and Secrecy of Energy Developments

Neither governments, the oil and gas industry nor the critics of both have definite opinions about these issues. For example, W.P. Wilder, Chairman of the CAGPL, argues that simultaneous investment in a number of large energy projects is possible and desirable. He states:

"Recently there have been a number of forecasts of total capital investments, some based on relatively sophisticated methods. For example, the University of Toronto Trace Econometric model produced an investment forecast of approximately \$248 billion for the period 1974-80. The Chairman of the Economic Council of Canada has estimated a cumulative total of about \$267 billion In the October issue of its publication, *Business and Economics*, the Toronto Dominion Bank estimated capital investment in the order of \$288 billion. . . . While our approach to resource investment is relatively unsophisticated, it happily yields an investment forecast consistent with the range of estimates I have mentioned. Basically, we made the assumption that the pattern of investment-spending during the 1970s will be similar to that observed in the preceding decade. To this estimate of 'normal' capital requirements we added the estimated requirements for the three much-talked about energy projects that we believe can be undertaken during this decade: The James Bay Project, Development of the Tar Sands, and the Mackenzie Valley Natural Gas Pipeline.

"From data for the period 1963-73, we calculated the following compound annual growth rates for capital spending: Energy

12.82%, Other Utilities 15.49%, Mining 12.65%, Forestry, Fishing and Agriculture 5.80%, other Public and Private Investment 9.94%. Using these growth rates, the investment series then were projected through to the year 1980. This yielded the following estimate of normal capital spending for each of the resource categories during the period 1974-80 inclusive: Energy \$37 billion, Other Utilities \$9 billion, Mining \$10 billion, Forestry, Fishing and Agriculture \$13 billion. To this resource sector total of \$69 billion we then added an estimate of \$15 billion for the three special energy projects noted earlier. This estimate allows for the construction of one new tar sands plant per year after 1974 The forecasted total of investment spending for resource development that results from the addition of the special energy project is \$84 billion. To check the reasonableness of this forecast we used the same approach to derive an estimate of total non-resource investments during the 1974-80 period. The result was \$193 billion. This yields an estimate of total capital spending of \$277 billion, which, as I mentioned previously falls within the range of estimates that have been presented by others. It is interesting to note that our forecast shows resource investment accounting for 30% of total capital investment during the 1974-80 period, as compared to 25% during the historical period. The 5% increase is, of course, accounted for by special energy projects."¹⁰⁵

Opponents of the pipeline, particularly the Committee for an Independent Canada, have requested government funds to generate their own econometric models and to show among other things the projected economic effects or large-scale energy projects, particularly of foreign investment, of excessive demands on limited labour supply and materials, of effects on prices of frontier oil and gas. To date they have not been able to successfully challenge information such as that contained in the above forecast because of a lack of funds sought on a number of occasions from the federal government.

Superimposed on national forecasts are the energy plans of each of the provinces and the NWT. The unfolding of these plans through the development of energy projects, new regulatory procedures and incentive plans can and do increase the complexity of federal planning.

1. *Ontario*: This province wants clean, cheap and abundant supplies of energy to supply its large urban populations and heavy and light industries. It has opted for coal-burning and nuclear electricity generating stations. However, it is on the terminal end of an oil pipeline from Alberta and is fearful for various reasons that there will be a cessation of fuel supplies, especially gas, from that source. Premier Davis and then Energy Minister McKeough flew to the Arctic Islands to check on energy developments there. The Ontario government is skeptical of the NEB being able to act to protect the interests of Ontario (and Canada). It will have problems in guaranteeing oil supplies to such industries as Petrosar (170 000 barrels of oil per day). Already

Union Gas and two other Ontario distributing companies are warning their customers of projected gas shortages.

2. *Alberta, Manitoba and Saskatchewan*: Alberta and Saskatchewan want to get the maximum returns they can from declining energy supplies. Both have experienced a slowdown in oil exploration and discoveries. Both provinces feel that they have historically been discriminated against by the wealthy east. They are not against a one-price system for oil and gas providing such a system "is extended – inclusive of transportation cost – to other major consumer commodities which are largely manufactured in central Canada – or a share of the export tax is allocated to Alberta and Saskatchewan to be placed in a fund to minimize the extra shipping costs paid by the citizens of our land-locked provinces."¹⁰⁶ These provinces want to establish their own industries rather than depend on the munificence of central Canada. Ultimately, these provinces will be forced to find alternative sources of fuel unless further conventional supplies of oil and gas are found.

Manitoba as a consuming province is in somewhat of a position of limbo in terms of its dependence on the other two provinces and in terms of its dislike for Ontario.

3. *Quebec*: Quebec wishes to become an energy generator and broker. Power from the James Bay and other projects may be sold to neighbouring provinces and the U.S. Imported crude oil will be refined and sold to Ontario. However, the days of access to plentiful supplies of cheap imported crude may have ceased. In the meantime Quebec is faced with many of the same problems as Ontario. The federal government sees Quebec as being vulnerable to oil shortages but is having severe problems in persuading Interprovincial Pipe Line Limited to build the Sarnia to Montreal pipeline.

4. *Atlantic Provinces*: These "poorer" provinces are anxious to find oil and gas and to some extent have been successful. They are probably more willing to generate and sell energy to the rest of Canada than are the Prairie Provinces. However, there might be problems in retrieving the more northern offshore oil and gas.

5. *British Columbia*: This province would like to maintain self-sufficiency in gas and electricity and have access to oil from Alberta, Alaska or the NWT at reasonable rates. It would also like to protect its coastline against U.S. oil pollution. B.C. industry is based on relatively abundant supplies of raw materials and will need more energy in the future. Plentiful supplies of coal could meet more of B.C.'s energy needs.

6. *Northwest Territories*: DINA, as mentioned elsewhere, tends to assume for many purposes that it has a "provincial government" role. However, unlike the provinces, and their somewhat isolated premiers, DINA, through its own cabinet minister, has a direct line to the influential Finance and Energy ministers, both of whom have tended to play crucial roles in determining energy development and regulation priorities. The NWT legislature tends to be starved of information about and influence on high level policy decisions. Some NWT informants feel that DINA's large scale approach to energy de-

velopment and plans to integrate Canada's energy systems, are not in the best interests of northern residents.

Even if the CAGPL pipeline is completed, Northerners may not have access to the gas in it. "Arctic Gas would not own the natural gas in its pipeline system . . . (it) will be available for purchase and distribution to northern communities by whomever may be authorized to perform this distribution task, and *wherever it is economic to do so.*"¹⁰⁷

The threat to secrecy of information possessed by both government and industry is well illustrated in the current controversy surrounding the Mackenzie Valley Pipeline Inquiry. This inquiry has instructed all participants to "provide a list of all studies and reports in their possession or power relating to this Inquiry. All of the participants, except Arctic Gas, expressed their willingness to provide a list of all studies and reports in their possession or power relating to the Inquiry, including those for which privilege might be claimed."¹⁰⁸

The Minister of EMR also resisted the comprehensiveness of the information net Mr. Justice Berger is attempting to cast. Reacting to a press report that Mr. Macdonald was contemplating changing the inquiry's terms of reference, the Leader of the Opposition, Mr. Stanfield, stated in the House of Commons,

"For the Minister to suggest that if Mr. Justice Berger, in his search to have a full inquiry and to do the task that has been assigned to him, asks for certain documents to which the Minister does not think he is entitled, he will change the judge's terms of reference, this is one of the most shocking things that has taken place in this country for a long time."¹⁰⁹

Both the oil and gas industry and the federal government appear to fear a premature disclosure of information relating to oil and gas finds in the Arctic about which the government has only tentative but privileged information. By statute such information remains confidential and privileged for two years. Prior to or at the inquiry hearings there may be some conflict about who can declare information privileged. Canadian jurists have not in the past confronted the federal government with demands for privileged information or even questioned who has the right to define what is privileged information.

VII. Decisions

The Assessment System and Decision Making

Following the approaches of others¹ who have analyzed complex decision making systems, this chapter will identify those decisions which have had a marked influence on the Mackenzie Delta and Arctic Islands programs and actors.

Fundamental decisions are major shifts in policy or major investments which result in substantially increased activity. Fundamental decisions can also be characterized as general decisions with broad and long-lasting consequences.

*Incremental decisions*² are specific and limited and both precede and follow fundamental decisions. Taken together, several incremental decisions by one or more actors may change both the information base of an assessment system and the relationships among actors. Thus, in addition to fundamental decisions, we will discuss important incremental decision "clusters".

Shifts in exploration activity, the emergence of several transportation proposals, and the prospect of revised policy for petroleum exports have increased the interdependence between the Mackenzie Delta-Beaufort Sea and Arctic Islands developments, especially in 1974. Thus, although each program is unique, this analysis of decision making will show how various decisions have increased their interdependence.

Fundamental Decisions

1. *Federal Government Regulations in 1960* – Canadian arctic petroleum programs have evolved rapidly from the late 1950s when there was little activity into active programs, involving many technical, informational, financial and managerial resources by many actors in 1974. This has happened because during the early and mid 1950s, the federal government identified the Arctic frontier as an area of major initiatives. In spring 1960 the federal government issued regulations for petroleum exploration north of 60 degrees and set the stage for the Mackenzie Delta and Arctic Islands developments. As Maxwell points out:

"Within weeks the industry had snapped up permits for 60 million acres. The new regulations were different from those in most other producing countries, in that the government decided to forego revenues during the exploration stage and to give the companies long-term rights to the land. . . . In other words, the first priority was to get the exploration going."³

This was clearly a fundamental decision. It induced immediate action on the part of the petroleum industry. Permits were quickly taken out on virtually all sedimentary areas in the Northwest and Yukon territories, both on land and under water. The government had to regulate and survey exploration activity. Through annual work obligations and the length of time the permits could be held⁴ the government established the pace of petroleum development. This single decision spawned the petroleum programs of the Mackenzie Delta-Beaufort Sea and Arctic Islands regions.

2. *Imperial Oil's Decision to Remain in the Mackenzie Delta* – Though permits were taken up quickly, exploration was slow and arduous. Explorers had little experience in harsh arctic conditions and so by the early '60s some had relinquished their permits in favour of more promising areas of the world. However, not all explorers chose to do so, nor could they necessarily. Imperial Oil substantially increased their permit acreage in the Mackenzie Delta area and by 1964 had accumulated approximately 10 million permit acres, making them the largest operator in the region. Imperial is not an international explorer: its exploration choices were limited to searching for oil and gas in Canada or to searching here for uranium⁵. Ostensibly, Imperial had little choice, but the east coast shelf area and Hudson Bay did represent alternatives to the Mackenzie Delta. Retrospectively, we see Imperial's decision to acquire a vast permit area in the Delta as a fundamental decision. They have set the pace for exploration in the Delta, reported the first finds of oil and gas there, and have pioneered drilling from artificial islands in the shallow offshore area. Moreover, other actors have followed Imperial to the Delta, spurred on also by the Prudhoe Bay discoveries.

3. *Decision to form Panarctic* – At the same time exploration in the Arctic Islands was progressing. This region was initially shunned by the "majors" so the permits in the Arctic Islands were mostly held by the smaller "independents" and a few foreign firms, two of which, Elf and British Petroleum, were controlled by the French and British governments, respectively. As outlined in Chapter II, the efforts of J.C. Sproule and growing government concern about Canadian sovereignty in the Arctic led the federal government in 1967 to form Panarctic Oils Limited, in which the government took a 45 per cent equity position. This allowed the "independents" to continue as cooperative explorers in the Arctic Islands, assured a Canadian presence there and made government both a developer and regulator. As a result of the formation of Panarctic, Arctic Islands operations may now be viewed as rivalling in many respects those in the Delta region for first production and transportation.

Thus, the decision in 1967 by the federal government to form and underwrite Panarctic Oils is a fundamental decision, in terms of intent as well as consequences. Although discoveries and production were uncertain, the government chose to become a developer instead of providing loans and more favourable taxation conditions to the consortium emerging in 1966-67. It chose an equity position by which it could directly influence northern resource development. Panarctic, in addition to its exploration activities, has sought, through its participation in Polar Gas Ltd., ways to get natural gas out of the Islands to markets in the south. By farming out exploration work Panarctic has increased both the number of actors and the level of activity in the Arctic Islands.

4. *Discovery at Prudhoe Bay* – Then in mid-summer 1968 came the announcement that vast quantities of oil and gas had been found at Prudhoe Bay on the Alaska North Slope. Though not a decision,

the discovery had many of the consequences that characterize a fundamental decision. Seismic and drilling activities in the Canadian Arctic increased rapidly. Petroleum transportation planning began in earnest. Technical, social and environmental research programs were launched. Federal government task forces and committees were formed and existing committees shifted their emphasis to northern petroleum programs. In Alaska, environmental interests began to pressure authorities to undertake comprehensive environmental impact studies. Native groups in Alaska intensified their efforts to settle their land claims and grievances. The emergence of environmental and native land claim issues in Alaska as significant concerns is thought by some to account for their importance in the Canadian Arctic and the level of activity and investment made in research on these issues.

Decision Clusters

Since 1968 and the Prudhoe Bay announcement a variety of actors have made numerous decisions, affecting every aspect of petroleum development in the North, none of which have had as much significance as the fundamental decisions. However, by grouping these decisions in "clusters" we can identify important trends, whose ultimate importance it is perhaps too early to know.

First cluster. The federal government made a number of important decisions during the years immediately after Prudhoe Bay, particularly in 1970-71. In June 1970 Parliament passed both the Arctic Water Pollution Prevention Act and the Northern Inland Waters Act. The former was in response to the issues raised by the voyage of the Manhattan, an American ice-breaking oil tanker, namely: oil pollution in arctic waters and a threat to Canadian sovereignty in the Arctic. The latter was intended to protect inland waters, particularly the Mackenzie River.⁶ Also in 1970, the Canada Oil and Gas Land Regulations were withdrawn so the government could revise them to be more similar to regulations in the provinces and Alaska, especially concerning "royalty rates and primary terms."⁷ Also in 1970, the government introduced its Preliminary Pipeline Guidelines for Oil and Gas Pipelines in the Mackenzie Valley. These guidelines served notice of the government's intention to give the Mackenzie Valley corridor concept priority, in order to interest the U.S. in a Canadian route for Prudhoe petroleum, and indicated to the three groups who were developing proposals that only one gas pipeline would receive approval. Though it took nearly two years to do so, the "Northwest" and "Gas Arctic" groups merged to form Canadian Arctic Gas Study Ltd.⁸ The year 1970 also saw the National Energy Board (NEB) decide that there should be no new contracts for the export of Canadian natural gas⁹ though the NEB continues to approve exports under existing agreements.¹⁰ In 1971 the government brought in the Territorial Land Use Regulations to complement the Arctic Waters Pollution Prevention Act and the Northern Inland Waters Acts, and to protect the environment through control of resource industries.¹¹ The Land Use Regulations were not intended to discourage development.¹²

These decisions of 1970-71 mark the beginning of a changed federal role in the Arctic – from an unobtrusive facilitator of development to an initiator of programs designed to increase its own control, over exploration and the anticipated production and transportation processes. In addition, the NEB's decision not to allow new natural gas export contracts signalled yet another potential area of government initiative.

This cluster of government decisions in the early '70s caused uncertainty among many groups. Industry, faced with new and untried legislation, the withdrawal and pending revision of existing legislation, the high costs of exploration and transportation, the prospect of limitations on natural gas exports and uncertainty as to taxation and royalty arrangements felt (and still feel in 1974) that they had little more to go on than the hope that government would be "reasonable".

Environmentalists and native groups also saw the future as uncertain: although Parliament passed environmental legislation, the promulgation of regulations was slow and inordinately favouring the development process.¹³

Thus, government decision making in the early 1970s had two important results. First, government created a basis for increased control over northern development. Second, it created much uncertainty among those involved or affected by northern natural resource development.

Second cluster. A second cluster of decisions concerns the evolution of northern native groups and the growing importance of the land claim issue. Chapter V discusses the origins and some of the preceptions of the Committee for Original Peoples' Entitlement (COPE), the Inuit Tapirisat of Canada (ITC), the Council of Yukon Indians (CYI), and the Indian Brotherhood of the Northwest Territories (IBNWT). Three decisions are notable. The first is Mr. Justice Morrow's ruling in favour of a caveat on use of the lands to be claimed by the IBNWT. This has shown that the land claim is to be taken seriously and provided an incentive to the IBNWT for renewed efforts to develop the basis for negotiating a land claim.

The second important decision was that of the three major native groups (the CYI, ITC and IBNWT) to identify "land, not money" as the basis of negotiation. While clearly there are important economic aspects of the land claims, all three groups had made the land issue their first priority.

The third important decision is that of DINA to establish a Commission of Inquiry into the terms and conditions under which a natural gas pipeline may be built in the Mackenzie Valley. More specifically the importance of the inquiry to native groups stems from the statement of Mr. Justice T.R. Berger, Commissioner of the Inquiry, that he does not interpret his terms of reference narrowly and that at the root of the issue will be the question of native land claims.¹⁴

Because of these three decisions, all since 1968, the land claim issue has emerged as an important factor in northern development. The scope and pace of the Commission of Inquiry and land claim negotia-

tions may affect petroleum development. The agreement among northern natives over land claims has made northern native groups active and strong adversaries in the petroleum development process. They are not against all development, but they wish their land claim settled before development proceeds so they can exercise some control over how the North changes.

Third cluster. As the roles of government and native groups changed, industry activity increased, despite high costs and uncertainty about regulations and land claims. Industry made important decisions between 1972 and 1974. In 1972 Imperial Oil built the first of its artificial islands in the shallow offshore areas of the Mackenzie Delta and the Northwest and Gas Arctic groups merged to form Canadian Arctic Gas Study Ltd. (and their sister organization Alaskan Arctic Gas Study). The number of participants in CAGSL increased to 27. The formation of CAGSL led to intensive research on technical, environmental, social and economic issues, estimated to have cost in the order of \$50 million.¹⁵ By February 1973, when Polar Gas Ltd. was formed to study all possible means of transporting natural gas from the Arctic Islands to southern markets, transportation studies were underway for both of the arctic petroleum programs. Industry views on which program is likely to proceed first differ.¹⁶ (See Appendix B for a summary of industry views on this question.)

In 1974, industry made more important decisions. CAGPL (formerly CAGSL) filed its pipeline application which, though incomplete, caused the federal government to set up the Commission of Inquiry and to form a "pipeline application assessment group".

Then in summer 1974, following weeks of rumoured disenchantment within the CAGPL consortium, Alberta Gas Trunk Line, one of the founding participants, formally withdrew from the group. Soon AGTL and West Coast Transmission formed Foothills Pipeline Ltd. to build an "all Canadian" natural gas pipeline from the Delta to Alberta. Now CAGPL had a formal rival in Canada.

In late September the picture became even more tangled as El Paso Natural Gas Corporation filed its application with the Federal Power Commission and Department of Interior to bring Prudhoe gas to the lower 48 states via an Alaskan pipeline and LNG tankers. Like the Foothills Pipeline Ltd. proposal in Canada, El Paso appealed to (American) nationalists and proponents of energy independence.

Thus, although threshold volumes of gas in the Delta and Islands have not yet been discovered, four serious proposals for natural gas transport have been made.

In August 1974 Dome Petroleum decided to have *two* (as required by federal government) drillships built to explore in the Beaufort Sea, the cost of which no company had been prepared to risk thus far. Dome's decision is important for several reasons. First, industry regards the Beaufort Sea as the most likely source of threshold levels of oil and gas at the soonest possible date. Second, the decision has environmental implications. Through requiring *two* drillships allows a measure of safety, native groups and environmentalists feel a blowout

under severe ice and weather conditions could be disastrous and they are seeking a delay in Beaufort Sea drilling beyond 1976. Third, the decision gives Dome a decided edge. Until drilling results are known it is unlikely other firms will invest \$100 million to construct drillships.

In conclusion, these decisions taken by industry actors represent significant developments in both the Mackenzie Delta-Beaufort Sea and Arctic Islands programs. Transportation planning for the Mackenzie Delta-Prudhoe Bay area has gone full circle from three competitive study groups in 1970, to one major consortium in 1972 and now back to three serious proposals in 1974. Arctic Islands transportation planning is well underway though much uncertainty remains; for example, some actors still feel that the Islands could be linked to the Mackenzie corridor. Despite uncertainty, adversarial action and competition, the level of exploration activities, though down somewhat from winter 1973-74, is still high.

Fourth cluster. The fourth major cluster of decisions focusses on the activities of governments from 1972 through summer 1974. The governments of Alberta, British Columbia, Ontario and Quebec all became involved in one or another aspect of Arctic petroleum development. Alberta and British Columbia, through AGTL and Westcoast Transmission respectively, back the "Maple Leaf" project. Both provinces want to expand their industrial bases by developing petrochemical industries. British Columbia is presently experiencing a short fall in natural gas due to production difficulties in its northern fields. In summer 1974 Ontario announced the formation of the Ontario Energy Corporation and indicated that Ontario was considering investing either in the Mackenzie Delta-Beaufort Sea or Arctic Islands programs. As the industrial centre of the country Ontario needs additional fuel to maintain and expand its industrial base. Thus, both Alberta and Ontario are vying for Arctic gas and petrochemical development projects. Also in summer 1974, Quebec attempted to buy shares in Panarctic, a move which the federal government blocked.¹⁸

The federal government has made several important decisions. In April 1972 Prime Minister Trudeau announced that construction of the Mackenzie Highway would begin shortly, an attempt, perhaps, to secure U.S. commitment to a Mackenzie Valley pipeline route.¹⁹ Then came three decisions designed to secure the federal position as an initiator and controller of the petroleum development process. First, through EMR the government served notice of its intention to form a national petroleum company. Legislation was introduced in 1974 although it was not passed before Parliament dissolved. Second, the 1974 spring budget statement which contained higher taxation and royalty conditions for petroleum companies evoked immediate displeasure from the industry. Third, in a move which further strained government-industry relations, the federal government announced in August 1974²⁰ that it would require detailed information on all farmout agreements in exploration programs and more complete seismic and drilling records from industry. Industry is displeased by these changes in the "rules of

the game” but government feels it warned industry in 1970 of intentions to revise the Oil and Gas Land Regulations.

As a result of recent decisions the federal government has moved into a position in which it initiates rather than reacts to Arctic petroleum programs. Industry views changes in taxation and royalty rates along with requests for extensive and detailed exploration data as the prerequisites for the successful establishment of a national petroleum company.

At the same time the provincial governments of British Columbia, Alberta, Ontario and Quebec seek to assure themselves of adequate oil and gas. Interprovincial and federal-provincial relations have never lacked for strong differences of opinion on resource development. The two western provinces jockey with Ontario and Quebec for access to Arctic petroleum for their industry. And sitting in the wings, so to speak, are the Atlantic Provinces, where exploration on the offshore shelf regions continues and the dispute over ownership, and therefore access to revenues, remains unsettled.

National concern for energy needs and supplies has increased. A mood of energy independence has emerged. The NEB constantly reviews exports of oil and gas and has increased export prices. Only a few years ago Canada sought to develop petroleum markets in the U.S.; now the concern has shifted to Canadian self-sufficiency.

A review of both the Mackenzie Delta-Beaufort Sea and Arctic Islands petroleum programs since the late 1950s reveals a rapidly evolving assessment system characterized by a few fundamental decisions and decision clusters. These decisions have animated the system and determined the momentum, direction and uncertainties that have emerged. Of particular note is the change in the role of the federal government, from unobtrusive facilitation to active initiation. Changes in the competitive framework are important too. Initially the industry actors saw each other as competitors; however, strong federal government initiatives have led to industry’s recognition of the government as a competitor. Provincial governments have also emerged as competitors in both Mackenzie Delta-Beaufort Sea and Arctic Islands petroleum programs.

Some Future Decisions?

The foregoing analysis of decision making suggests the possibility of certain important future actions.

One of these concerns the NEB and the question of Canadian needs and exports of oil and gas. At present (1974) the NEB is preparing for hearings on the supply, demand and deliverability of natural gas. In addition, there is growing concern over levels of oil exports to the U.S. The task of the NEB is to discern what reserves Canada has that can be expected to become productive, the manner in which Canadian needs will be assessed and measured and whether such reserves justify additional or even continued export of oil and gas to the U.S.

Many actors²¹ believe that the NEB will reduce exports of oil and gas. Such a decision could have fundamental implications for the Mac-

kenzie Delta-Beaufort Sea and Arctic Islands. Less foreign investment might hamper further exploration, possibly influencing discovery rates and hence the pace of development. On the other hand, the federal and provincial governments might invest heavily in exploration and transportation to ensure an active development program. However, foreign investment already made in anticipation of export approvals, might require repayment. Predictions about such repayments are difficult. The question also arises as to how the NEB and the federal government would allocate oil and gas within Canada.

A second potential fundamental decision is settlement of the native peoples' land claims. The land claimed by native peoples envelops practically all of the Yukon and Northwest Territories. All actors have acknowledged the importance of the land claims.

When and under what circumstances negotiations will begin is uncertain, as is the outcome. As far as petroleum programs in the Mackenzie Delta and Arctic Islands are concerned the key element in a negotiated settlement will be title to or control of lands where exploration has demonstrated the presence or strong likelihood of oil and gas. Possible results range from native groups' control and a halt to development, native groups' control and continued development, to little or no native group control and continued development. In any event decisions on the land claims could substantially affect the location, scale and pace of exploratory work, production facilities and transportation systems. Conversely petroleum development has increased the value of the land being bargained for. The time frame of the negotiations themselves and the extent to which petroleum programs proceed during that time will also be important. Lengthy negotiations and vigorous exploration and transportation programs could all but leave the native groups with a "fait accompli".

The third fundamental decision likely in the future is approval for transportation of Prudhoe and/or Delta gas. Should the U.S. Federal Power Commission or Congress authorize the application of El Paso Natural Gas Corp., the CAGPL proposal will terminate. Immediately the "Maple Leaf" project of Foothills Pipeline Ltd., would be the only contender for Mackenzie Delta and Beaufort Sea gas transportation. The approval of an El Paso application is likely to delay the transportation of Delta gas, depending on when the decision favouring El Paso were taken, on the success of further exploration in the Delta, and on the acceptability of the "Maple Leaf" application to Canadian authorities. The possibility also exists that CAGPL may reformulate its proposal and compete with the "Maple Leaf" project for the same sources of supply. In this event the federal government might urge the two projects to merge as they did in 1970, or it might allow the two applications to proceed. This might take more time than either the applicants or the government wish and the strategies at this point could be many. However, since industry seeks returns on investments as soon as possible, and since government revenues are linked to industry returns, we feel they would both favour strategies designed to find more oil and gas and commence pipeline construction quickly.

The Arctic Islands transportation program must also be decided. Already concerned about cash flows, Polar Gas Ltd. is considering both pipelines and liquefaction-LNG tanker systems. The east coasts of both Canada and the U.S. (should exports be allowed) are possible locations for the terminus of a liquefaction system, as is James Bay. In an address to the Association of Professional Engineers of Ontario, Richard Rohmer indicated that thought was being given to a deep sea port near Moosonee.²² Jamesport would have re-gasification facilities and natural gas pipelines to Ontario and Quebec markets and would greatly affect economic development in northern Ontario and industrial strategy in the whole of Ontario. However, if transportation development in the Mackenzie is long delayed and if threshold volumes of natural gas are found soon in the Arctic Islands, Polar Gas might decide on a pipeline to southern markets instead of a liquefaction system in the Islands. Technological, environmental and social problems facing a pipeline among and out of the Islands would require much research and capital, as in the Mackenzie program.

Another possible decision could involve a potential Canadian rival to Arctic development. Still in its early stages of exploration and with only a few commercial finds, the east coast offshore area, under the right combination of events, could profoundly affect the pace and scale of Arctic petroleum development. The ice problems off Labrador notwithstanding exploration, production and transportation development appear less problematical than in the Arctic, and markets are much closer. For the east coast program to rival the two Arctic programs would require first of all significant finds of oil or gas, then settlement of the dispute between the federal and Atlantic provincial governments over offshore rights. Questionable too would be the ability of the petroleum industry to shift some operations from the Arctic to the east coast without jeopardizing their northern permits; nonetheless, such a development is not impossible.

What emerges from the decisions to date is a complex pattern influenced by the sequential nature of the petroleum development program but subjected to numerous other forces which deflect, redirect, quicken or slow the process. Uncertainty, particularly since 1970, is the overriding concern of all those who make or are affected by decisions in the Mackenzie Delta-Beaufort Sea and Arctic Islands programs. The intended or unintended absence of information, whether about petroleum development activities themselves, taxation and royalty policies, land claims and rights of way, environmental, social and economic impacts, industrial strategies or a national energy policy has led to the climate of uncertainty. As a result decision making has been disjointed and reactive. Most actors express concern that such a pattern may continue even though fundamental decisions are required. Ultimately, an integrated and comprehensive policy for northern development is required.

VIII. Issues

To say that the petroleum development programs in the Mackenzie Delta-Beaufort Sea and Arctic Islands regions raise numerous issues and policy concerns is to understate the case. The magnitude of these projects; the pace of development; the diverse interests that are involved; and the regional, national and international significance of petroleum development are unprecedented. In this chapter we examine “issues” from two perspectives: first, as they are perceived by actors in the technology assessment system; and second, as they are inherent to the technology assessment system itself.

From discussion with many of the actors we identified five broad issue categories:

1. Technological
2. Environmental
3. Economic
4. Social
5. Political

Each actor, despite their different objectives, quite readily identified these categories, which form a common basis for the organization of perceptions and concerns, though a given concern may involve more than one of the categories. However, the dynamic character of the petroleum process complicates any analysis of issues. As the program proceeds through the various phases (see Chapter III) it gives rise to different mixes of actors and new information and decision processes. This means that the issues change.

The first part of this chapter portrays the most salient issues as they are perceived by the actors. “Issues” in this sense are a mixed set of unresolved questions raised by the petroleum projects in the North and deemed significant by one or more actors. The questions vary considerably in scope.

The second and more important part of the chapter is a discussion of the assessment systems and processes themselves: the balance (or lack) of participating interests, the quality and accessibility of information, the nature of decision-making processes, the relationships among actors. These are critical for northern development and may be more important than the issues identified by the actors, for the nature of the assessment system may influence to a considerable degree the actors’ perceptions and understandings of issues.

Substantive Issues in Petroleum Development

The substantive issues are listed by major categories, as they are perceived and reported by actors in the technology assessment system. There did not appear to be a significant difference between the Mackenzie Delta-Beaufort Sea and Arctic Islands issues, although their relative importance would presumably differ. The issues are not listed in order of importance, nor could we so list them. They are recurring unresolved questions important in the view of different actors.

Technological Issues

1. Performance of newer seismic technology.

2. Drilling in high geopressure formations.
3. Drillship performance.
4. Drilling performance from ice platforms.
5. Relief well procedures.
6. Dealing with oil spills under ice and among ice floes.
7. Icebreaker technology for pack ice and floes.
8. Design of supporting infrastructures for Arctic conditions.
9. Sea bottom scour or underwater pipeline routes.
10. Pipelaying (large diameter) through ice.
11. Pipelines in the continuous, and discontinuous zones of permafrost with rapidly changing temperature micro gradients.
12. Pipelines at river crossings, and under water.
13. Petroleum extraction and production from offshore areas.
14. Liquefaction technologies under Arctic conditions.

Most actors agree that these issues are important. Differences among actors relate to the degrees of risk which they see as acceptable, and differing judgements about the consequences of “something going wrong” versus the costs in time and money of lowering the risks by more thorough testing. It is a difference between those who wish to get on with the job with some acknowledged degree of risk, and those who want first to be absolutely certain. The latter have in some instances allied themselves with actors who oppose the whole undertaking.

Environmental Issues

1. Lack of basic and long-term data on biophysical environments.
2. Lack of detailed knowledge about environmentally sensitive areas.
3. Lack of sufficient data on ecology of particular species.
4. Effects of sea drilling and artificial islands on marine ecosystems.
5. Effects of roads, airstrips, supply depots, pipeline gathering systems, on surrounding environments.
6. Effects of pipelines in permafrost, at river crossings and on other sensitive areas.
7. Waste disposal problems.
8. Impacts of undersea oil spills, blow-outs.
9. Impacts on particular mammals such as caribou, seals and whales which are hunted by native communities.

The arctic ecology is easily disturbed and/or takes a very long time to recover. With the lack of adequate biophysical data, assessments of the possible long-run environmental consequences of petroleum development are at best tentative and incomplete. This adds to the considerable apprehension of some actors about what these consequences may be.

Economic Issues

1. Export decisions and their effects on availability of foreign capital.

2. Price levels of natural gas and oil, in Canada and the U.S.
3. Taxation and royalty policies and retained earnings.
4. High costs of exploration, production, and transportation in Arctic.
5. Interest rates and debt-equity ratios.
6. Inflation.
7. Location and demand of markets.
8. Economic competition among provinces on energy projects.
9. Petroleum revenues and equalization payments among governments.
10. Alternative investment opportunities.
11. Time needed to get revenue flowing from investments.
12. Phasing of projects in view of need for investment capital.
13. Impact of exploration on regional or local economies.
14. Impact of pipeline financing on investment in other development schemes.
15. Scale of expenditures in relation to regional or local economic needs.
16. Associated business investment in the North.
17. Canadian ownership.

These 17 issues centre around three larger subject areas: first, the tasks of raising the capital needed for massive development projects and managing their finances under changing economic conditions; second, the economic impacts on the Canadian economy in general and the northern economy in particular, usually as a factor in decisions, particularly on the scale and timing of development; third, the appropriate role of governments in absorbing risks and the social costs of developments and in sharing revenues derived from them.

Social Issues

1. Native land claims.
2. Sufficiency and appropriateness of job opportunities for natives.
3. Insufficient and inadequate housing in the North.
4. Insufficient accessible health care in northern communities.
5. Lack of understanding of traditional lifestyles of natives.
6. Incompatibility of “wage-economy” jobs with traditions of native groups.
7. Disruption from “boom-and-bust” development activities.
8. Transience of many white northerners.
9. Social disruptions of northern communities.
10. Effects of school programs on native peoples.
11. Alcoholism and family breakdowns.

The common theme among the social issues as they are variously perceived by actor groups is the cross-cultural impact from “southern white” society on northern native groups. While this has been a long-standing situation, the awareness of problems has been heightened among both northern whites and natives by the emergence of native spokespersons and organizations, particularly on the land claims issue.

Political Issues

1. Export of Canadian petroleum to the U.S.
2. Canadian ownership of resource industries.
3. National energy policy.
4. National industrial development strategy.
5. Government petroleum corporation.
6. Industry secrecy concerning exploration data.
7. Taxation and royalty policies of different governments.
8. Federal-provincial disputes relating to energy resources.
9. Inter-provincial disputes over energy and industry.
10. Conflicting objectives among federal agencies.
11. Conflicting objectives within DINA.
12. Uncertainty of the regulatory process.
13. Lack of involvement of northerners in major decisions affecting them.
14. Fully responsible government for the Territories.

To a considerable extent the issues in all categories are “political” in that they are matters around which groups organize, take positions and try to influence decisions. The above list focusses more directly on governmental behaviour. In general, it includes Canadian-American relations regarding energy policies, intergovernmental relations in Canada as they relate to coordinated and shared responsibilities for developing energy resources, problems of inter-agency coordination within governments, and industry-government relations as they relate to “steering” the development of arctic petroleum.

Technology Assessment System Issues

A well functioning technology assessment system will provide the actors with a balanced view of all the consequences of applying the technology. To the extent that any assessment is incomplete, it may be due to inadequacies in the assessment processes and/or the assessors. An analysis of an assessment system should focus upon the following: actors and their interrelationships, information, and decisions.

Actor Issues

A technology assessment system must be comprehensive. “All” interests will be considered only if all interested or affected actors are involved in the assessment system. Otherwise legitimate interests may be overlooked or ignored.

In the Mackenzie Delta-Beaufort Sea and Arctic Islands programs, there are no actors who have not become involved in at least some manner.

In the Mackenzie Delta-Beaufort Sea region, the Mackenzie Valley Pipeline Inquiry has assured numerous groups of an input to deliberations about terms and conditions of a right-of-way for a natural gas pipeline. Moreover, funding, provided by the federal government for land claim negotiations, has encouraged participation by native groups. However the native groups still feel they lack sufficient funds. Their resources are not proportionate to those which government or industry

have already expended or plan to spend on petroleum development impact research. Also, native groups do not have nearly the same access to professional expertise as do industry and governments.

The situation in the Arctic Islands is more difficult to gauge; some actors who should be involved are not. Exploration is proceeding at near record levels, but transportation planning and research is just beginning. Though ideally it is now that all interests should be involved, the uncertainty about technological options and timing means not much information is available. Some actors, including provincial governments, will await further developments before seeking more extensive involvement.

Perhaps more important than the involvement of all affected actors to the proper functioning of an assessment system is the balance of power among actors. In both the Mackenzie Delta-Beaufort Sea and Arctic Islands programs the system seems disproportionately weighted in favour of federal government and industry participation. Historically this has always been the case, but ideally it should not be so. The development initiatives come from government or industry. However, as Jantsch points out, effective societal involvement in assessment and forecasting requires instead decentralized initiatives.¹ Jantsch goes on to point out: "Today most institutions hesitate to acknowledge any responsibility for integrating their own patterns of actions into the wider concepts of the 'joint systems' constituted by society and technology."²

This is evident in both petroleum programs. While government and industry have consulted with northern groups in the course of their programs, the consultation has been after the fact. This does not qualify as "decentralized initiatives". Rather than encouraging involvement, the strategies of industry and government have generated hesitancy, uncertainty, and even mistrust.

The ability of some actors to participate in technology assessment is related to this balance of power. The federal government and industry effectively control development processes, and it is difficult for other interests, however legitimate, to become involved. For example, many northern interest groups including native groups and territorial government personnel find travel costs to be a significant barrier.

Thus, for example, territorial government representation on a number of federal committees is largely nominal.

Another important aspect of the proper functioning of an assessment system is whether an actor has internal conflicts in objectives. Foremost among those actors with conflicting objectives is DINA. Several writers have elaborated on this.³ "Where conflict occurs between the needs of the people, environmental maintenance and resource development, the government's tendency is to either deny the existence or possibility of such conflict, or to dismiss those who oppose resource development as uninformed, emotional or reactionary."⁴

DINA does not completely dismiss the existence of such conflicts.⁵ DINA suggests that the normal machinery within the department is capable of resolving the conflicts and is the appropriate forum. How-

ever, the pre-eminent role of the “Northern Development Program” of DINA is such that the economic development interests within the department carry more weight. If “development-people” decisions could be made outside the department where a wider array of interests and values could be brought into perspective – such as one might expect from Cabinet – different decisions might result.

We hope that the above examples illustrate how the actors themselves can limit the effectiveness of a technology assessment system.

Information Issues

Throughout our interviews, nearly every actor expressed concern about research methods and uses of information, specifically:

1. Secrecy of information
2. Independence of sources
3. View taken of information
4. Information networks
5. Uncertainty of information
6. Uses of information

Each of these issues affects each of the substantive issues discussed earlier.

1. *Secrecy* is the most important of these issues. How much secrecy is justifiable and from whose point of view? Are customers helped by corporate secrecy? Are taxpayers served by government secrecy? How much secrecy is mere force of habit? Does secrecy serve only to maintain an image of pseudo-competition among corporations or an image of pseudo-importance among government departments? Secrecy is expensive: actors require more extensive information and must duplicate research. Secrecy also fosters mistrust.

Secrecy is rife throughout the petroleum technology assessment system. NACOP members are formally sworn to secrecy. The petroleum companies do not share seismic data: each company rechecks the same area. DINA has stated that they consider existing industry secrecy to be “unreasonable with respect to Canada’s North” because of concessionary land disposal policies.⁶ On the other hand, both the environmentalists and native peoples accuse DINA of secrecy. Indeed, DINA kept the offshore drilling proceedings held in December 1972 secret while complaining of industry secrecy at the same proceedings.⁷ Native groups have complained that DINA has deliberately denied them information.⁸ The overriding concern of natives and environmentalists is their need for information. Even industry and DINA see information as their basic problem, but all actors seem caught up in a system of secrecy, which is not questioned.

2. *Independence of sources* is another major information issue. Every actor group interviewed saw the need to maintain separate information-gathering systems, even at a high cost. They wish to be seen as independent by other actors in the assessment system. The major issue in choosing researchers is their independence and not the extent of their expertise. For example, industry representatives have complained that government is no longer using available industry expertise,

while government representatives have stressed the need for separate sources.

Independence of source is related also to secrecy and to actor goals. Native groups hire their own social and economic experts to gather information on land claims. Environmentalists hire staff to study environmental impacts. Government undertakes a \$15 million program of environmental-social studies to enable it to independently assess industry studies. The CAGPL consortium sponsored the Environmental Protection Board to independently assess its own studies. Each company within the industry does its separate studies and analyses of exploration. In each case the research is designed to support actor goals, and as yet the actors have been unable to establish a coordinated approach.

3. *The view taken of information* is also important. Actor goals determine the kinds and amounts of information the actor feels to be necessary for decision making. One actor's information base does not coincide with another actor's information base because they perceive the issues differently. For example, industry seeks mainly geologic data, technical feasibility studies and financial rates of return. The government, on the other hand, is being pressured to obtain information on social and environmental impacts before making any decisions, and is no longer making decisions on the same basis as in the past. This disagreement about requisite information is a constant source of conflict between industry and government.

Government and industry are pushing the Mackenzie pipeline by stressing two aspects: resource development in northern Canada and the availability of that resource in the South. The large-scale program is said to be the appropriate vehicle for all northern development, but actually the project is narrowly conceived. The pipeline is *not* for the benefit of the North, either in objective or in design. It will generate many of the wrong jobs at the wrong scale at the wrong time. Industry responds to the desire of the native peoples for participation in resource development with "pick and shovel" jobs rather than a voice in decision making. Industry measures socio-economic impact solely by the numbers of job and native workers employed. Such impacts as retained income in the North, social and political development in the North, industrial dislocation in the South, financial and industrial overload, and delayed social infrastructure all should be included as project-induced. No government studies of these impacts have been released, if made at all.

4. *The information network* also appears to be a major issue. Industry uses an informal network to circumvent the publicly visible network and is constantly seeking out key government people to tap.⁹ Informal meetings with public servants also occur through professional associations. The emphasis is on gaining information about pending changes in policy. They also sound out attitudes toward various initiatives. These informal liaisons give industry a "competitive" edge on other actors. Many actors who should have access to the same information at the same time are excluded. Industry and DINA have "regularized" informal contacts and share information which is unavailable to environmentalists, native groups, or other actors.

Public accountability is lacking in the reporting process of the government directors of Panarctic Oils Ltd. There are no formalized channels for reports from the government board members to the public or even to the Department of Finance which pays the government share.¹⁰

5. *Uncertainty* of both industry and government over Arctic petroleum development has increased. Contributing to industry uncertainty have been the withdrawal of land use regulations, changes in oil and gas regulations, changes in provincial royalty rates, changes in federal tax rates, creation of an export tax, controlled prices, fluid nature of ownership of northern lands and creation of a national petroleum company. Government uncertainty is due to the possibility of native title to northern lands, gas and oil discoveries (or lack of), energy shortages, lack of precedent, lack of information, heightened interest in environment, heightened expressions of nationalism and, in general, the Arctic shifting from a liability to an asset. Industry's shifting exploratory activity elsewhere and government's lengthening the application process, are both reactions to the untoward uncertainty surrounding petroleum development in the Arctic. The core actors are not actively working to dispell these uncertainties.

6. *Actual use of information* in the decision-making process is the last major information issue, as often information gathered bears little relationship to the decisions to be made. For example, some people see the social and environmental studies undertaken by industry and government as "add-on" information to decisions already made.

Far more studies were suggested and carried out than were necessary for deciding on environmental feasibility of the pipeline of its routing and design. Scientists collected information with little or no clear idea about its role in planning, designing or deciding about a pipeline. Although the stacked environmental publications were over six feet high and cost over \$50 million, many will be of questionable usefulness to decision makers.

A monumental information search has accompanied petroleum development in the Canadian Arctic. Nearly every actor group has been involved. Actor perceptions of this research vary considerably. As one critic has noted:

"The Mackenzie Valley gas pipeline has provoked a sheaf of engineering and environmental studies, economic analyses and public policy reviews on a scale that is claimed to surpass anything in our history. . . . For the most part their purpose is not public education. Rather they are sponsored by investors, environmentalists and tax collectors attempting to overcome our ignorance of the complex technical, ecological, sociological and economic consequences peculiar to Northern resource development. As a result, they are fragmentary both in their coverage and in their point of view."¹¹

Our research centred on actor perception of this massive information base. Basically, we examined how accessible each actor felt the relevant information was, whether it was sufficient for decision mak-

ing and available at the right time. We could not always determine such perceptions accurately because of the number of other issues.

These six information issues affect each of the substantive issue areas, but we will not go into details here.

Decision Issues

How decisions are made in a technology assessment system is important. Authority can be centralized or decentralized. Responsibilities can overlap. The timing of decisions can create problems for other actors. Each decision maker wishes to be seen as autonomous. Of importance too is secrecy and access to decision-making processes.

The same issues as we discussed under information also characterize decision making. Some actors see secret decision making in the Mackenzie Delta-Beaufort Sea and Arctic Islands programs as an issue. In his analysis of decision making in the Mackenzie Valley pipeline development, Gibson¹² indicates the federal government sometimes made decisions without any advance discussions except with industry. Also, some federal government departments proceed with plans which significantly affect other departments but with no prior discussions. For example, the Department of Finance did not report the proposed May 1974 budget to other departments with extensive responsibilities for petroleum development.¹³ The Prime Minister's April 1972 announcement that existing sections of the Mackenzie Highway would be linked immediately to the Delta was not preceded by discussions with many Northerners affected.

Government views industry as secretive in both its information and decision-making processes. Industry cites competition among companies to justify the secrecy. Extensive cooperation among industry groups (e.g., pipeline consortia, such as CAGPL and Polar Gas Ltd., Arctic research groups such as APOA, and overlapping memberships in exploration and transportation ventures) casts some doubt on that excuse.

Centralized decision making is also an issue in northern petroleum development. Other federal departments, the territorial governments, and northern residents see DINA as an agency exercising extensive, preemptive powers in the North. The basis of this power is both statutory and managed; managed in the sense that DINA occupies central coordinating (in some views co-opting)¹⁴ roles in the federal government. DINA's underlying assumptions about northern development (See Chapter V: DINA) reflect a limited view of development possibilities and the means to achieve them. During our studies we found that DINA sees the fate of the North as inextricably linked to the present petroleum exploration and transportation programs. DINA views its "Hire North" program as responding to and being compatible with northern native needs. However, other actors in the Territories feel that native groups are being offered only temporary and low-skill jobs. Moreover, these other actors believe the federal government, and DINA in particular, is not in favour of small-scale local projects related to both renewable and nonrenewable resources (See Chapter V: Territorial Governments),

even when these represent an "intermediate" position on the scale of labour intensive to capital intensive economic activities.

These actors are apprehensive about large and quickly completed development projects in part because of past experiences. Wood commented upon the impacts of the DEW-Line project:

"When DEW-Line radar site construction was begun after the War, a lot of relatively short-term employment opportunities were created for Indians and Eskimos. This resulted in a significant number of people being moved around, temporarily high incomes being paid and occupational expectations being raised to unrealizable levels. Almost no consideration was given to the economic and social consequences of establishing the DEW-Line; as a result the basic pattern of unemployment, social dislocation and increased welfare dependence that was already a feature of northern life was significantly accelerated. Moreover, the need for immediate program responses to the increasingly complex set of problems encouraged by the DEW-Line construction created a new wave of short-term solutions with an unanalysed potential for generating unforeseen, long-run consequences."¹⁵

In spite of such examples, the federal government remains optimistic about large-scale petroleum developments in northern Canada. Such optimism combined with highly centralized control over northern development makes DINA a primary concern of many actors involved in or concerned about northern development.

The centralization of decision making about petroleum development and the links between industry and government have limited the consideration of alternatives, especially transportation alternatives. Precedent has prevailed. Pipelining may well be the most viable alternative; however, in the absence of thorough and systematic analyses of alternatives, the technology assessment is incomplete.

Non-decisions, such as absence of revised Canada Oil and Land Regulations are a vital issue, which result in uncertainty. The federal government's inability to decide on these regulations is linked to its dispute with the Atlantic Provinces over offshore rights. This example highlights one of Canada's important current dilemmas: the respective roles of the federal and provincial governments in resource development and benefit-sharing. Though some form of compromise is likely in the east coast offshore dispute and the dispute between Ottawa and Alberta over taxation and royalties, the strong indications of moves by several provincial governments into the Arctic energy scene do not conjure up images of federal-provincial cordiality.

Autonomy of decision making has been an issue particularly in the case of the National Energy Board. Gibson¹⁶ has suggested that ministerial policy pronouncements have essentially circumscribed the deliberations of the NEB. Even if this is true, however, the NEB is still acting within its mandate, i.e., with the frame of the national interest as defined by policy. Though the NEB may be criticized in terms of its information base,¹⁷ it is not the primary energy policy formulator even

though it is an important advisor to the Minister of Energy, Mines and Resources.

Some Overview Issues

In summary, a number of more general issues about the technology assessment systems in the Arctic petroleum development programs emerge. These issues have also been identified in a study of energy regulation in the U.S.¹⁸ Close energy linkages exist between Canada and the U.S. and the energy assessment systems suffer from similar shortcomings.

Lack of an Overall Policy Mechanism

Petroleum development is but one aspect of an overall energy program, and no agency has responsibility for overall energy policy. While formally, an overall energy policy is the responsibility of the federal cabinet, no institution has a clear responsibility to develop, guide or apply national energy policies, taking into account divided jurisdictions among governments, and the many non-governmental actors involved.

While the technology assessment system for the northern petroleum projects demonstrates the complexity of energy resource issues, it also demonstrates the need for a national (Canada-wide, not just federal) energy policy. An organization to develop a national policy might usefully address itself to issues such as:

1. The relative priorities of all uses of energy.
2. The efficiency of energy use and energy conservation.
3. The relationship of energy supply to national objectives such as regional economic development, environmental protection, land use, international financial stability, national energy independence, and security of supply.
4. The development of new energy technologies.
5. The distribution of energy responsibilities among such groups as the federal, provincial, and territorial governments, and the private sector.

Unresponsiveness to Change

The assessment systems associated with Arctic petroleum development respond inadequately to alternative technologies and economic development opportunities. Strong links between a pipeline-oriented industry and the regulatory agencies of the federal government virtually assure unimpeded pipeline development. In speaking of regulatory agencies the aforementioned organizational study states:¹⁹

“Regulatory agencies typically proceed on a case-by-case basis considering individual requests for licenses, leases, rates or other specific actions relying heavily on precedent. This approach tends to focus attention on the proven rather than the novel and on the specific rather than the general. The result is often institutional inflexibility and short-sightedness that restrict timely regulatory responses to changing national energy objectives and new energy problems or opportunities.”

The rapid pace of petroleum and energy development in the Arctic and the rest of Canada means our regulators need flexibility to meet changing conditions. While there are some indications of adaptation (e.g., federal support of land claim research) the unwavering commitment of the government to large-scale development projects suggests an inherent unresponsiveness to alternatives.

Lack of Coordinated Data Systems

We have discussed the problems of multiple and overlapping information systems and information autonomy. A slightly different information problem is the wide variations among reserve estimates. Here lack of coordinated information has resulted in high levels of perceived uncertainty and problems of decision making. Uncoordinated information systems also restrict access to information, especially for those who are not primary information-gatherers (i.e., government and industry).

Unsatisfactory Inter-Actor Coordinating Mechanisms

The actors in the assessment systems under discussion are not coordinated. Gibbons and Voyer²⁰ suggest the need for a “technology assessment analyst” to ensure comprehensiveness, a regular flow of information, and a balanced overview of issues and consequences. No such mechanism exists in the Mackenzie Delta-Beaufort Sea and Arctic Islands assessment systems. Also, despite DINA’s prominent role, federal government interests in the North are poorly coordinated. That the Ministry of Finance could announce budgetary measures affecting petroleum without advising other federal departments involved in petroleum activities is evidence of serious lack of coordination.

Federal-Provincial Conflicts

An effective continuing mechanism to coordinate the energy activities of various levels of government is needed. Ministerial forays and “First Ministers” conferences, the principal mechanisms employed, are scarcely sufficient now, let alone in the future.

IX. Concluding Note

“... Planning must be concerned with the structural design of the system itself and involved in the formation of policy. Mere modification of policies already proved to be inadequate will not result in what is right. Science in planning today is too often used to make situations which are inherently bad, more efficiently bad.”¹

The technology assessment system of the Mackenzie Delta-Beaufort Sea and Arctic Islands petroleum projects has not been perfected, despite the impressive amount of talent, dedication, expenditures, and work committed by the various actors involved. While there is a sense of purpose, organization and controlled performance to particular activities there is a sense of “drifting”, of being constantly caught up in an unfolding dynamic that is always calling upon actors to react and respond to emergent situations but offering no clear basis for their doing so.

In part, this may be attributed to the lack of coordinating mechanisms among actors and the lack of a common information system. Over and above this, however, is the absence of an institution which deals with “the process of rational creative action”² or “societal policy”,³ by creating a policy-making process which would be explicitly normative and “futures-creative” in its anticipation of fundamental choices involving social values and goals, in its careful selection of purposes. Without such a process, technology demands the adaptation of society to it and gives rise to ad hoc struggles against its effects. This latter situation characterizes the petroleum program in the Canadian Arctic.

Technology assessment systems are neither intended nor able to fulfill a “futures-creative” policy planning process. Rather, by focussing on particular technologies and their effects on social groups, they point clearly to the need for this larger guiding perspective.

Petroleum development in the Canadian Arctic demonstrates this need in a compelling way. The following are conspicuously absent from the main thrust of technology assessment in the Canadian Arctic: any relation of the pace and scale of northern development to the needs of Northerners and the interests of all Canadians, national and regional industrial strategies, the careful review of alternative technologies, recognition of preferred lifestyles and opportunities to pursue them, and restraint in harsh yet sensitive environments.

This points to the most fundamental issue, namely, how Canada can best use the expertise and experience in all actors to thoroughly assess technological development in a multi-sector, inter-institutional setting and within an avowedly normative planning process.

Appendices

Appendix A – Actor Classification Framework

Figure A.1 outlines the two dimensional framework for classifying actors in a technology assessment system.

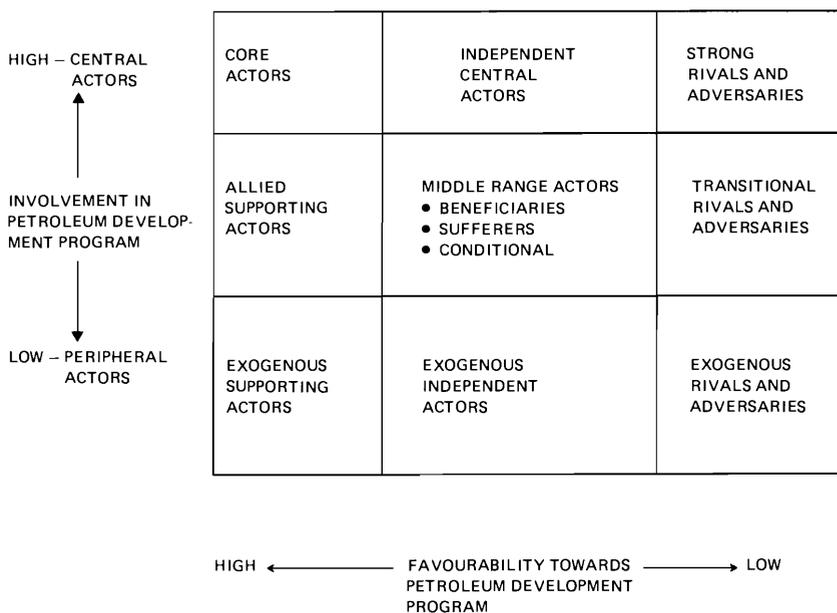
The left-hand column represents actors with varying levels of involvement who are all favourably disposed to the development program. As the degree of involvement decreases the specificity of the supportive relationship will likely change from intimate knowledge of the development activities on the part of core actors to more generalized supportive value orientations on the part of “supporting exogenous actors.”

The middle column represents a “mixed” attitude or value orientation. Actor types would include:

1. Neutral actors.
2. Should-be actors.

3. Independent actors – who theoretically are without *a priori* value positions. Such actors may conduct “objective” analyses. Regulatory agencies whose concern is the “national interest” would be classified as independent actors.

Figure A.1 – Actor Classification Framework



4. Conditional actors – depending on decisions of other actors (as well as own decisions) these actors may be either favourably or unfavourably disposed to a development program.

The right-hand column of the framework consists of those actors opposed to the development program: the adversaries and rivals. Reasons for opposition will vary among such actors and be related to:

1. their own particular objectives.
2. the situation or context in which they are located.

Rivals and adversaries demonstrate varying degrees of involvement. Even those peripheral to the technology assessment system may significantly affect the system and the petroleum program. Clearly, decisions in the international sphere such as the OPEC oil price increases have had an impact on petroleum development in the Canadian Arctic.

In order to clarify the actor classification framework a description of each actor-type follows.

Core Actors

This group has continuous and intensive involvement in the technological development program. Though other actor-types may make fundamental decisions it is usually the core actors who initiate a program via one or more fundamental decisions. Core actors are usually fewer in number than other actor-types though core actors may change as the development program evolves through major phases (e.g., exploration, production, transportation, etc.).

Allied Supporting Actors

These actors are characterized by a positive or favourable orientation to the development program. Their activities enhance the development program. Supplying of goods and services, provision of infrastructures, enabling decisions, passage of legislation, and so on, are examples.

Independent Central Actors

Actors of this type have a degree of independence or autonomy from both the proponents and adversaries of a given development program. Their autonomy may be either constitutionally or legally-based or a function of an “objective” information position, i.e., performing their own research, information-gathering and interpretation.

Middle Range Actors

This actor type has moderate involvement in the development program and may have favourable, unfavourable or neutral attitudes to the development. An actor is classified middle range for several reasons:

1. chooses only moderate involvement.
2. has expertise peripheral to program.
3. has limited legal basis for involvement.
4. lacks information especially from other key actors, thus position not sufficiently well developed to qualify as another actor-type.
5. is waiting for decisions by others to determine or declare position.

Transitional Rivals and Adversaries

This group of actors consists of those who, for reasons of expertise, power, resources and information, have only moderate involvement and are declared rivals or adversaries of the technological development program. Not only may actors be emerging as rivals and adversaries

but also, given a fundamental decision against the prevailing program, former “core” or “allied supporting actors” may shift to rival or adversary status, while those who were formerly rivals and adversaries assume “core” or “allied supporting actor” status.

Strong Rivals and Adversaries

Such actors are characterized for the most part by having developed viable alternate technological programs. To the extent that two or more development programs are recognized (one of which is that of the core actors) and are similarly feasible, then strong rivals will exist. Strong adversaries might include political organizations who may be central to the development program in terms of power but ideologically opposed to the particular technological-economic program mix.

Exogenous Rivals and Adversaries

This group of actors is outside the technology assessment system, certainly in its day-to-day, week-to-week functioning. Exclusion may be on a geopolitical basis (e.g., another country). They are opposed to the prevailing development program, and they may support an alternative program which may or may not differ technologically.

Exogenous Independent Actors

These actors are seen as exogenous to the assessment system, usually for geopolitical reasons. Like “independent central actors” they have an independent or autonomous role due to constitutional or legal factors.

Exogenous Supporting Actors

1. Those actors who have definite links to “allied supporting” and “core” actors and who though geopolitically distinct from members of the technology assessment system may indirectly and significantly control their actions (e.g., multinational corporations).

2. Those actors who are characterized both as marginal to the development program and supporting it. Usually they can only be identified through solicitation or indirect representation of their views (e.g., other countries with similar development programs).

Appendix B – Industry Actor Perceptions of Factors Affecting the Pacing of Petroleum Development

The following outlines petroleum industry perceptions of relationships between the Mackenzie Delta-Beaufort Sea and the Arctic Islands. Representatives from each industry actor or petroleum company discussed the potential timing of these two projects. The issues they raised can be summarized as follows:

Industry views of why the Mackenzie Delta-Beaufort Sea may be first:

1. The geologic potential of the offshore basin appears richer: the structures are sealed, uniform and large.
2. The area is under more intensive exploration.
3. Petroleum products from the Arctic are necessary for Canadian energy viability.
4. This project is the most nearly ready to come into play: technology is available, studies are completed and the application is made.
5. The pipeline process is easier than in the Arctic Islands.
6. A large pipeline can be economically supported with a smaller Delta reservoir because it can also transport Prudhoe Bay gas.
7. Economic studies show the project to be completely feasible.
8. Environmental studies show that environment will not affect the feasibility of a gas pipeline.
9. Native peoples are generally pro-development.
10. Industry is willing to work with any land owners, native or federal.
11. The presence of a U.S. affiliate demonstrates a degree of political feasibility.
12. The dominance of the majors in the area provides a good cash flow position for waiting until actual production commences.

Industry views of why the Mackenzie Delta-Beaufort Sea may be last:

1. Sufficient reserves of gas have yet to be discovered in the Delta.
2. The area will have to meet the new large NEB reserve requirements which could prohibit exports.
3. Image of the first large Arctic gas reserves going to the U.S. is against CAGPL.
4. Failure of B.C.'s ultimatum to the U.S.: pay the higher price or lose the gas is against CAGPL.
5. A treaty will not prohibit a province from taxing any gas crossing its borders.
6. Total pipeline system is too long and too costly when the U.S. portion is considered.
7. East-west pipelines in the U.S. will have excess capacity by 1980 so that no new pipelines would be necessary.
8. The El Paso all-American pipeline is an alternative for Prudhoe Bay oil and gas.
9. Ice problems in Beaufort Sea will retard exploratory drilling.
10. Contracts for Prudhoe Bay gas do not exist.
11. Native land claims issue is not settled.
12. Imposition of export tax reduces market share so exploratory interest is lagging and being shifted elsewhere.
13. The potential provincial status of the Mackenzie area is uncertain.

14. The government's policies on foreign investment, foreign affairs, provincial relations and energy are uncertain.
15. The sudden shifts in government policy reduce investor confidence.
16. Canadian government has lost credibility with U.S. government.
17. Deliberations over the pipeline application are taking too long.
18. The rules governing the regulation of arctic petroleum development are uncertain.
19. Government has not approved engineering designs for offshore drilling.
20. Government is not directly involved in the Mackenzie via an equity position.

Industry views of why the Arctic Islands may be first:

1. The geologic structures are larger and so have the greater potential for discoveries.
2. The proven reserves of gas are larger.
3. The ice conditions are more stable: less movement, less scour.
4. Shorter pipeline to southern market is required.
5. Use of LNG tankers is possible.
6. Economies of scale in exploration have been achieved.
7. There are fewer environmental and native problems, as the area is far less inhabited.
8. Government participates directly in the area via Panarctic: the government would get royalties, profits, an image of opening the North, an image of government success in enterprise, and an all-Canadian image.

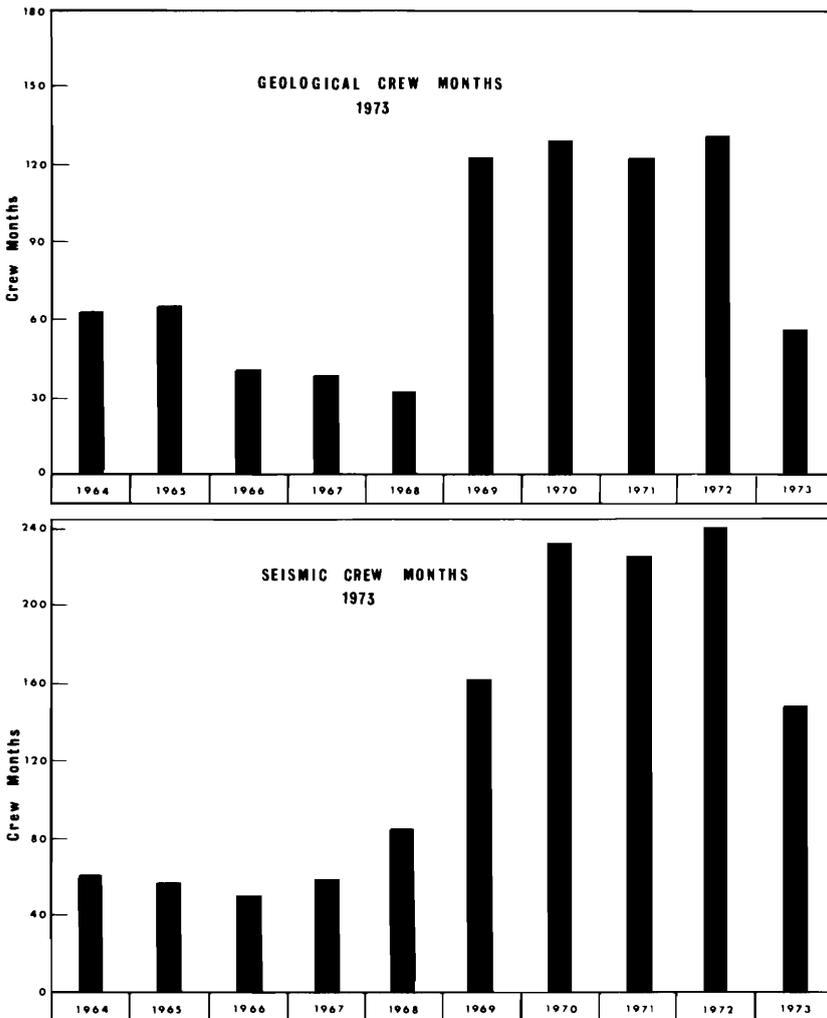
Industry views of why the Arctic Islands may be last:

1. The large geologic structure syndrome is passing since the large structures are turning out to be dry.
2. The area was originally oversold so that any failures in exploration are magnified among investors.
3. All Island finds are offshore, which creates problems of undersea field delineation where offshore technology is non-existent.
4. Cost of exploration and development too high to support only a gas field, i.e., a crude oil reservoir is required.
5. Really giant gas fields with good deliverability are necessary to bring down costs per mcf.
6. Major finds are too scattered which makes transportation too costly to link together and bring gas out in one large pipeline.
7. Transportation technology is still non-existent.
8. An export license is required because the Canadian market is too small to meet the necessary economies of scale for Island gas.
9. Panarctic prefers to wait and let the Mackenzie gas bear the full burden of meeting the new NEB reserve requirements.
10. Joint owners of lands are just waiting and are not willing to participate in exploration until government uncertainty has been resolved.
11. A cash flow problem exists because new investors are holding back until government uncertainty is removed.
12. Only small firms with a poor cash flow position are involved. The lead time before the first cash flow is too long and so majors can buy in at any time.

13. Public is not interested in the Islands.
14. Role of Panarctic and Petrocan is unclear.
15. Government has discouraged outside investors with the export tax, 1974 pre-election budget, land regulations, which make it impossible to make a really big profit.

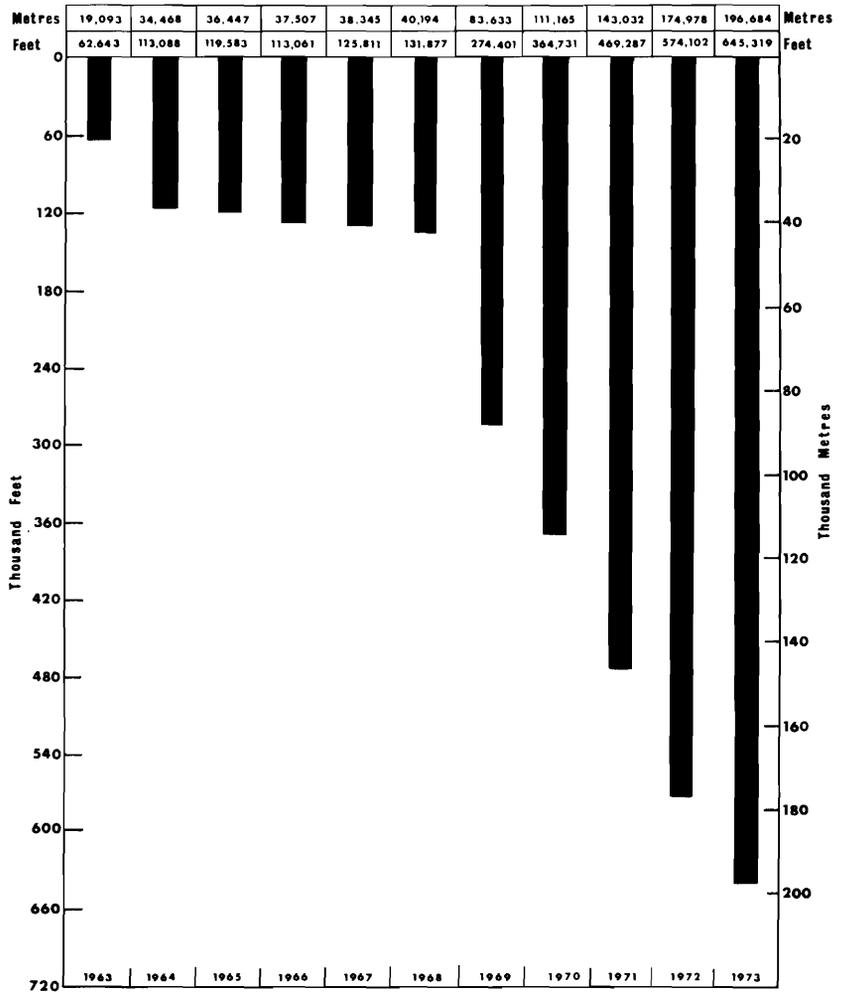
Appendix C—Figures

Figure III.1 – Exploration Activity in the Yukon and Northwest Territories



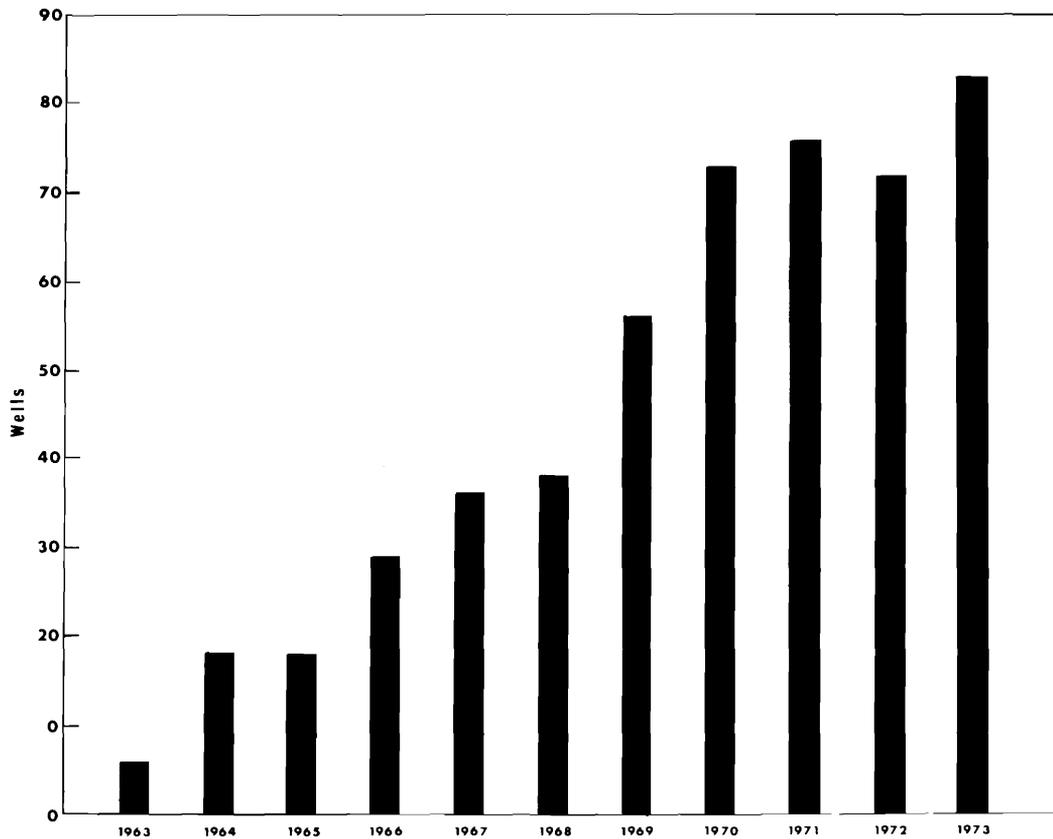
Source: DINA, *North of 60: Oil and Gas Activities 1973*, Ottawa, 1974, p. 23.

Figure III.2 – Depth Drilled in the Yukon and Northwest Territories



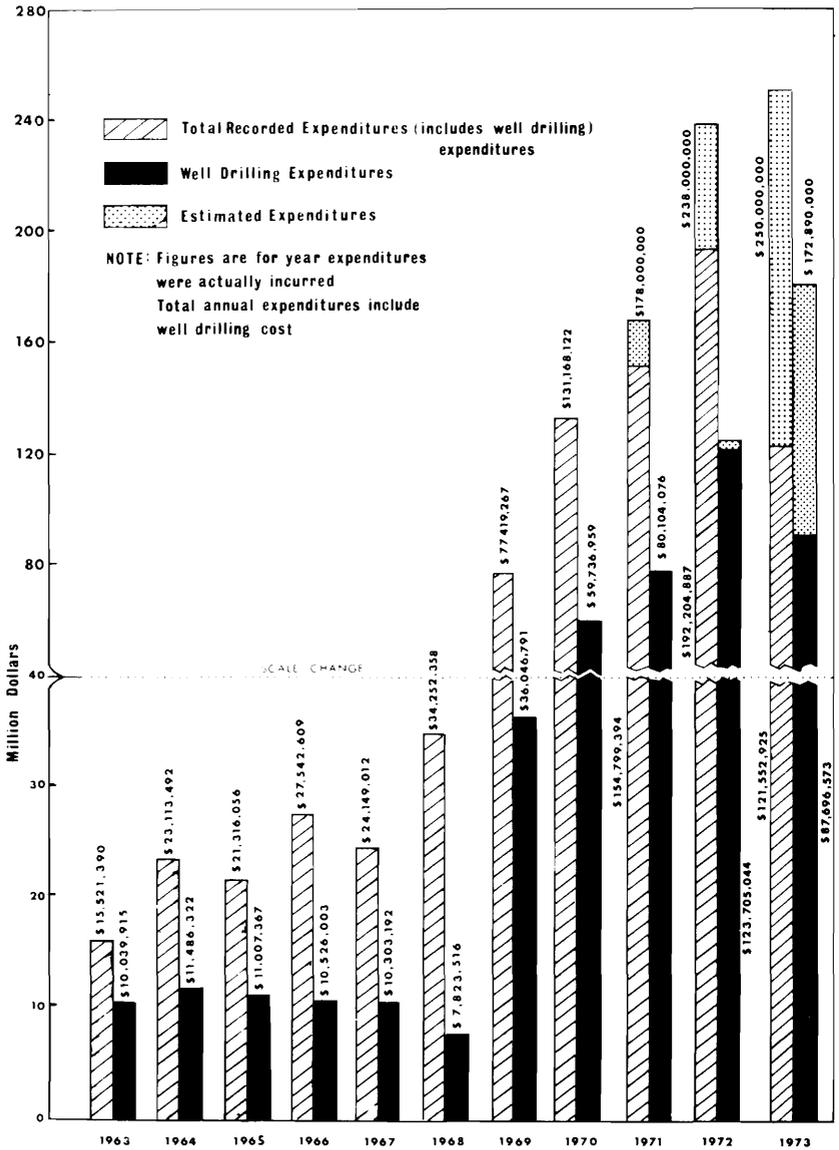
Source: DINA, *North of 60: Oil and Gas Activities 1973*, Ottawa, 1974, p. 23.

Figure III.3 – Wells Drilled in the Yukon and Northwest Territories (Number of wells drilled to end 1973 is 734)



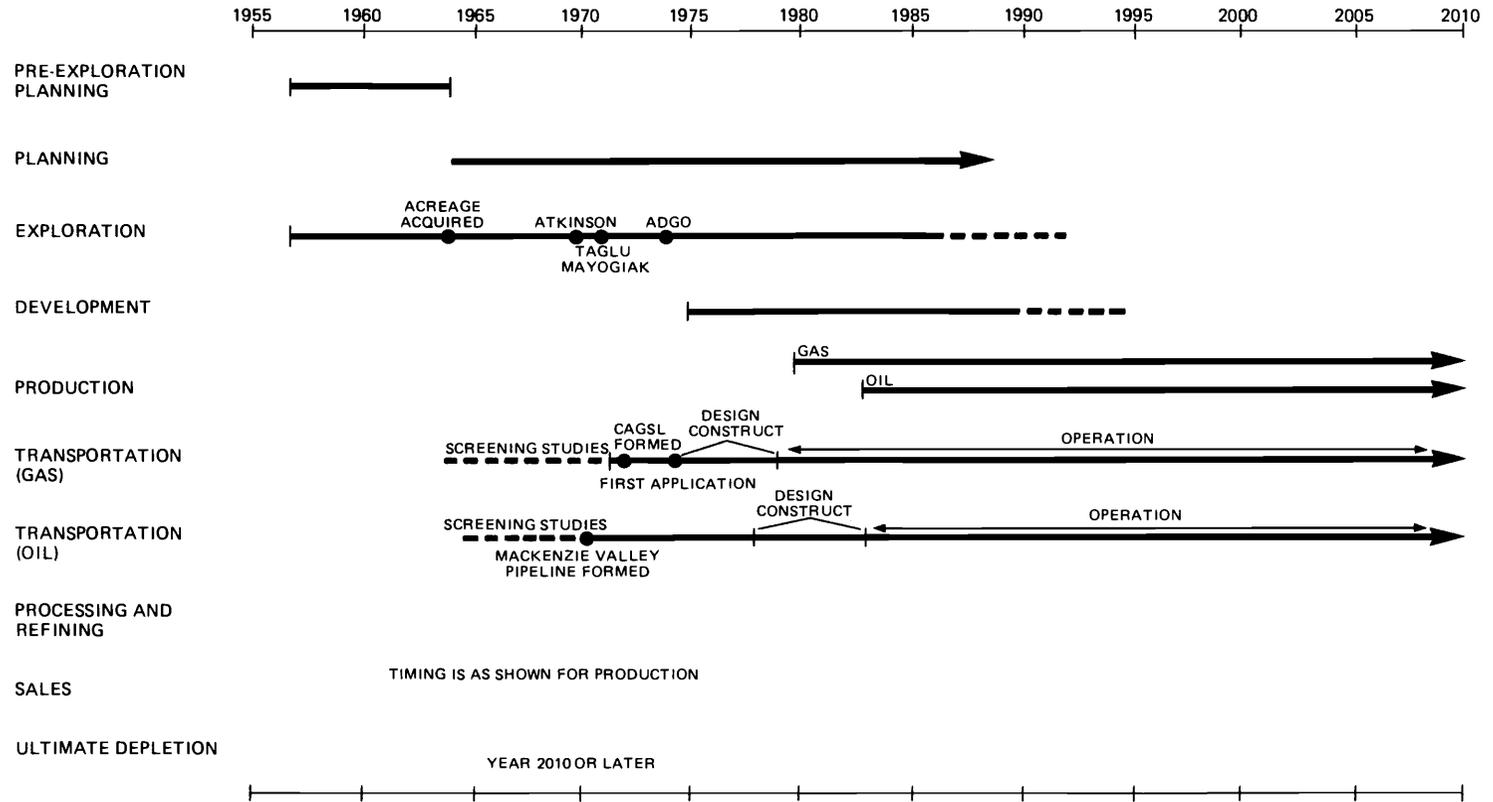
Source: DINA, *North of 60: Oil and Gas Activities 1973*, Ottawa, 1974, p. 22.

Figure III.4 – Oil and Gas Exploration Expenditures



Source: DINA, *North of 60: Oil and Gas Activities 1973*, Ottawa, 1974, p. 24.

Figure III.6 – Lead Times in Petroleum Development (Mackenzie Delta Area)



Source: Imperial Oil Ltd., Toronto, 1974.

Figure IV.1 – The Exploration Regulation Process

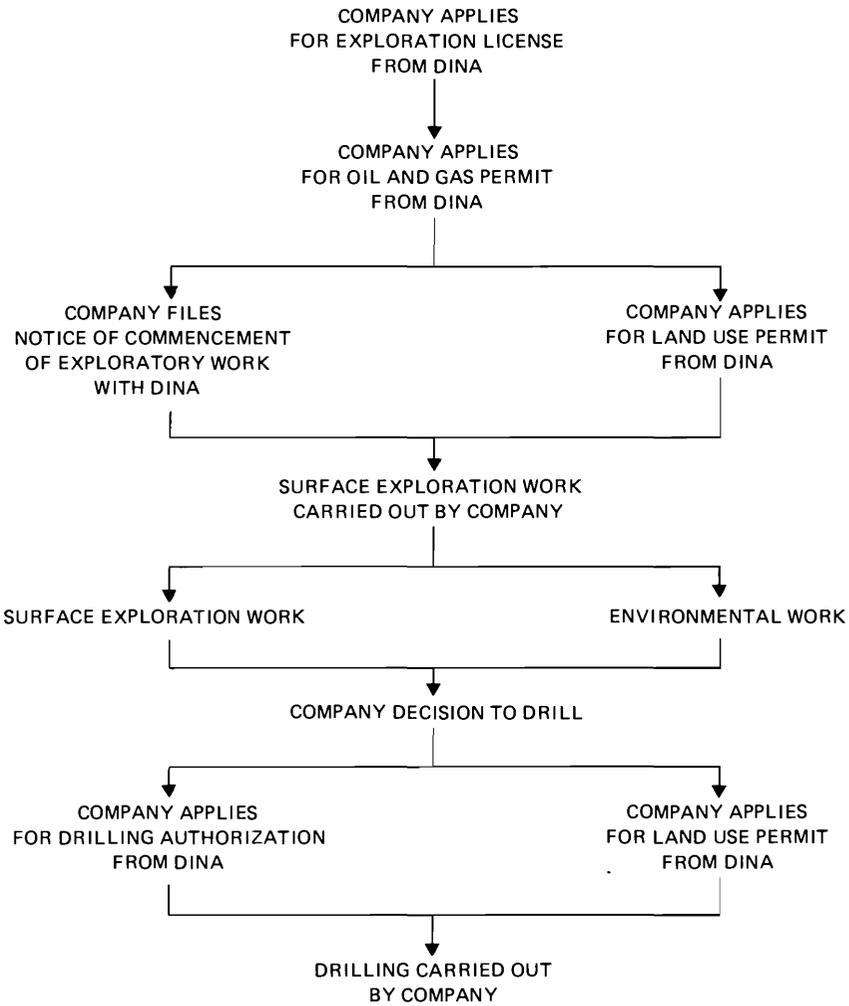
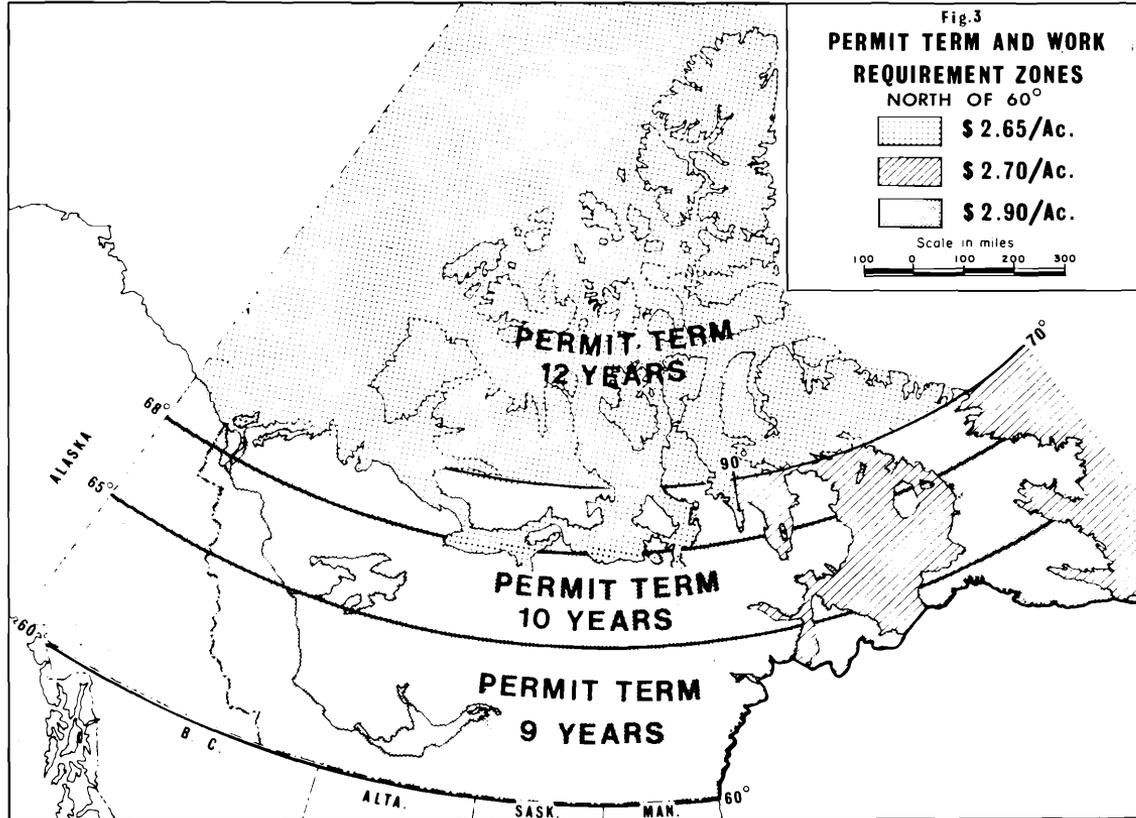
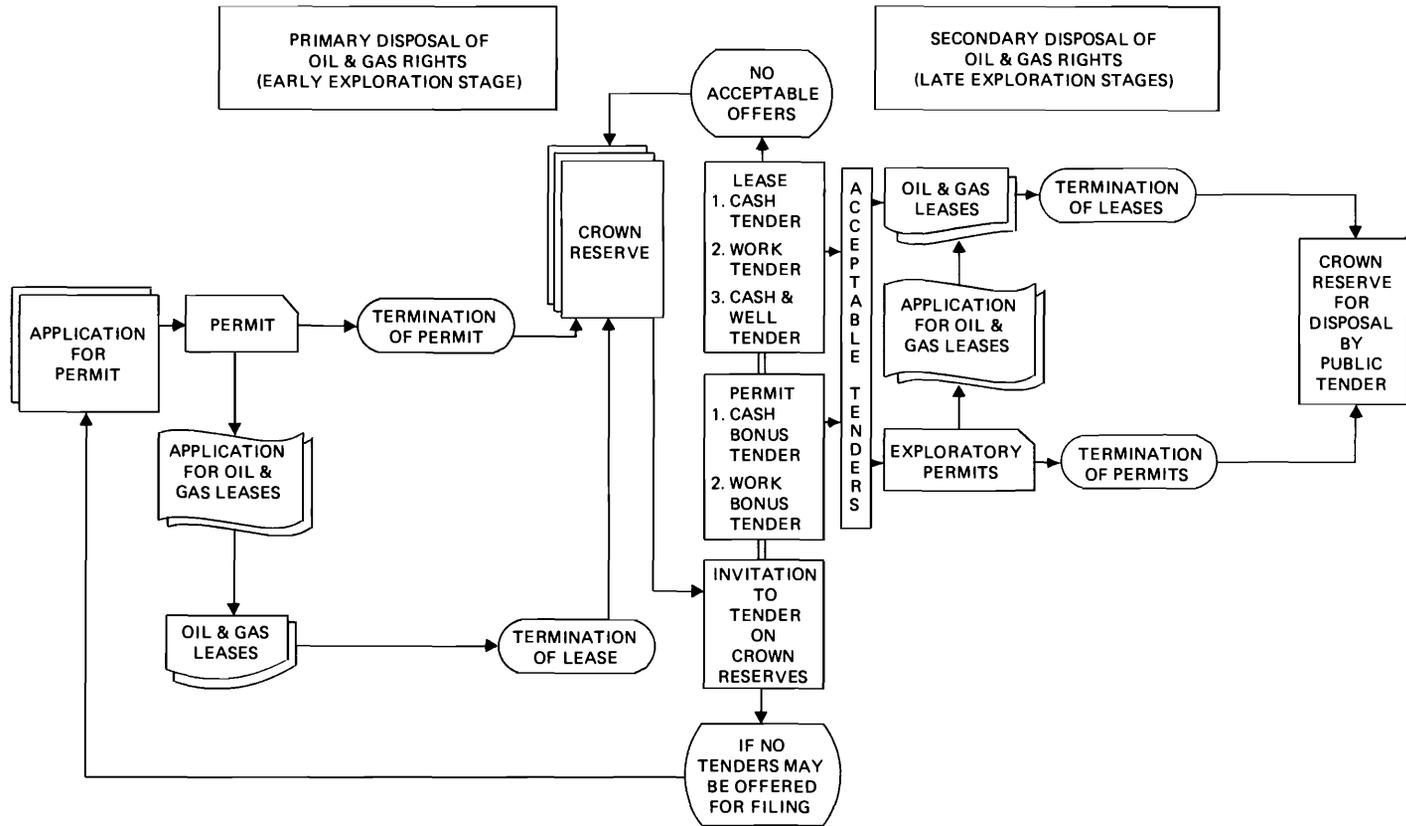


Figure IV.2 – Permit Term and Work Requirement Zones



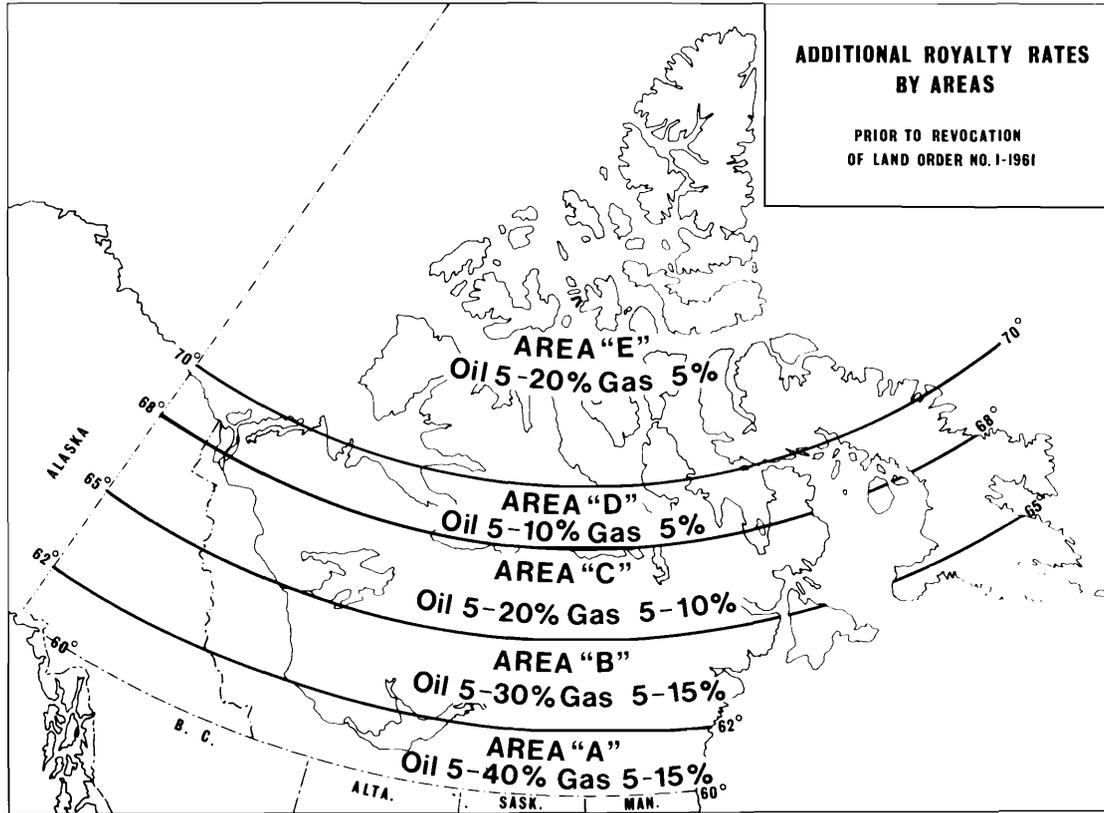
Source: DINA, *North of 60: Oil and Gas Activities 1973*, Ottawa, 1974, p. 14.

Figure IV.3 – Flow Diagram of Disposal of Oil and Gas Rights



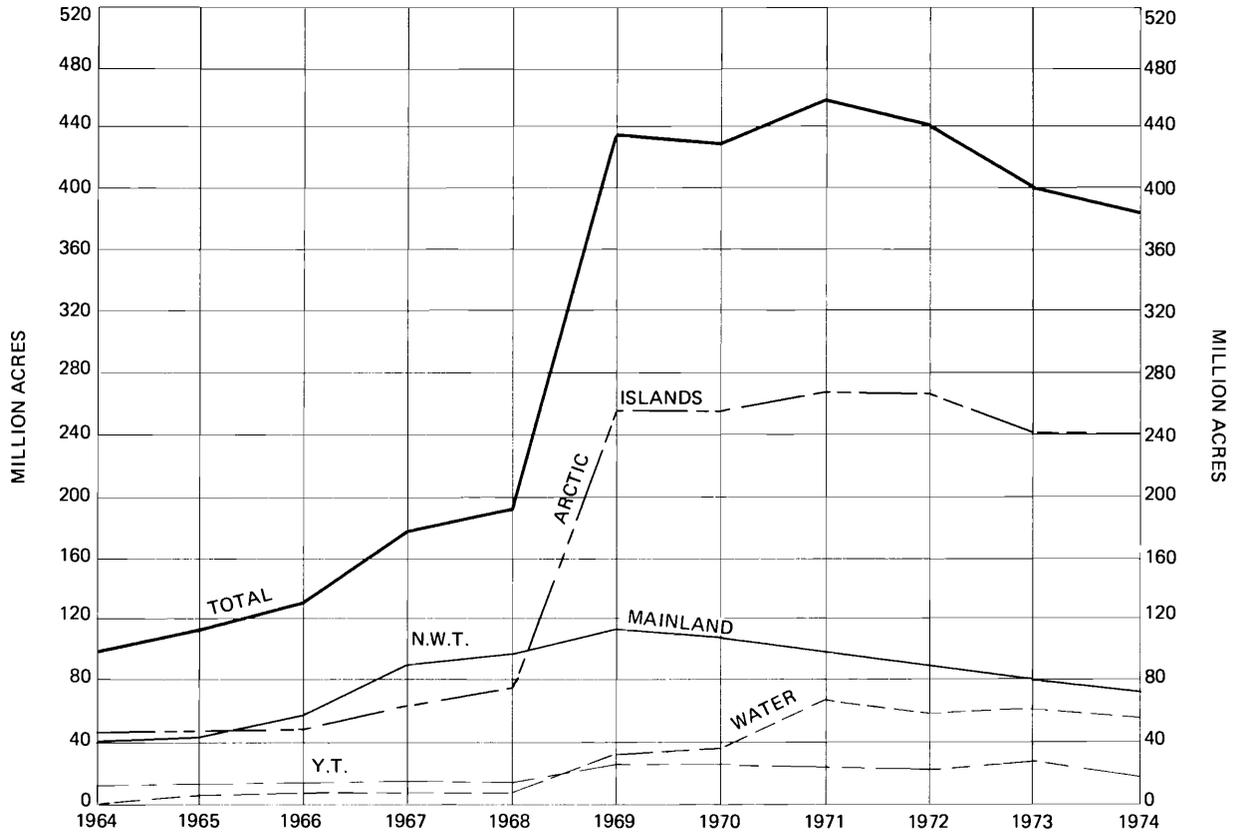
Source: DINA, North of 60: Oil and Gas Activities 1973, Ottawa, 1974, p. 19.

Figure IV.4 – Additional Royalty Rates by Area



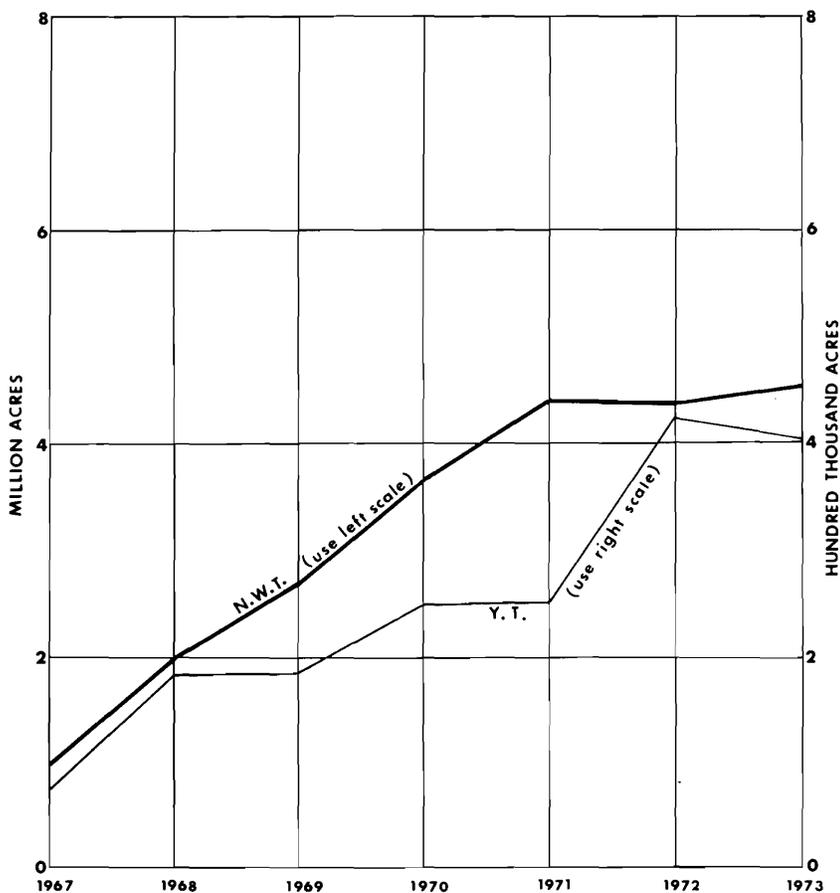
Source: DINA, *North of 60: Oil and Gas Activities 1973*, Ottawa, 1974, p. 18.

Figure IV.5 – Acreage Held Under Oil and Gas Permit in the Yukon and Northwest Territories



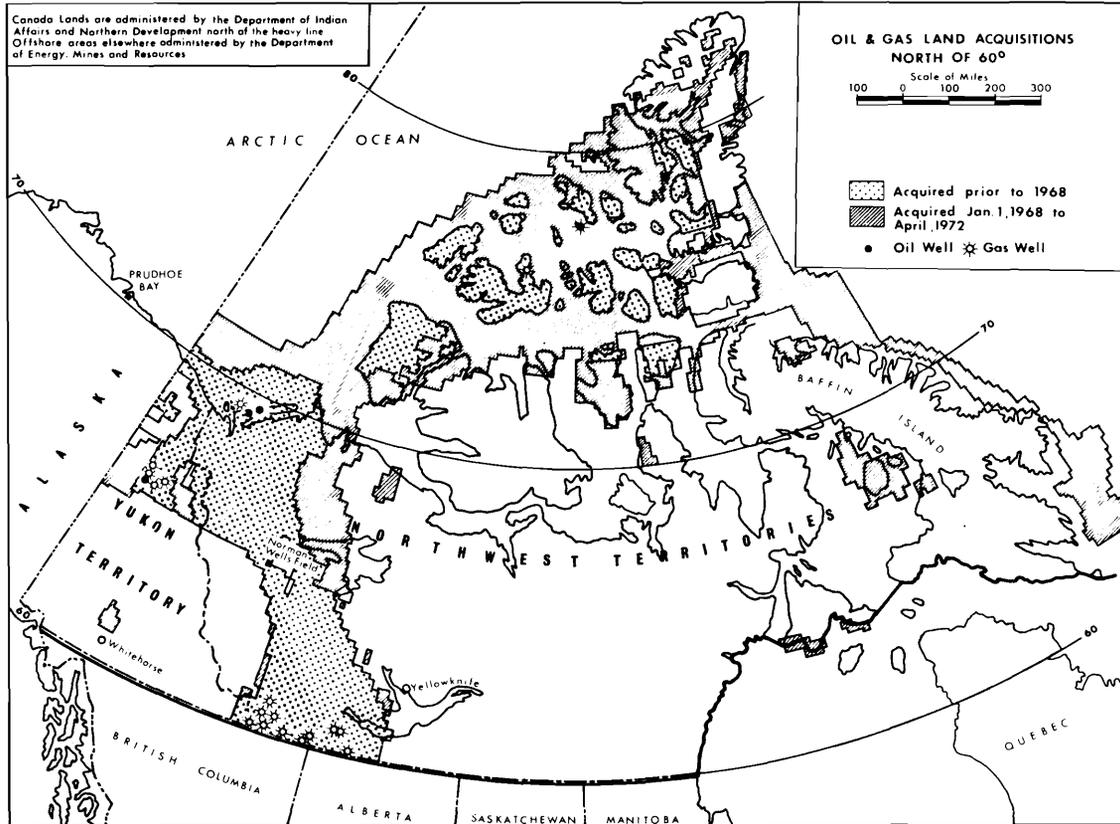
Source: DINA, *North of 60: Oil and Gas Activities 1973*, Ottawa, 1974, p. 12.

Figure IV.6 – Acreage under Lease by Year in the Yukon and Northwest Territories



Source: DINA, *North of 60: Oil and Gas Activities 1973*, Ottawa, 1974, p. 13.

Figure IV.7 – Oil and Gas Land Acquisitions North of 60



Source: DINA, *North of 60: Oil and Gas Activities 1973*, Ottawa, 1974, p. 11.

Figure IV.8 – The Land Use Permit Process

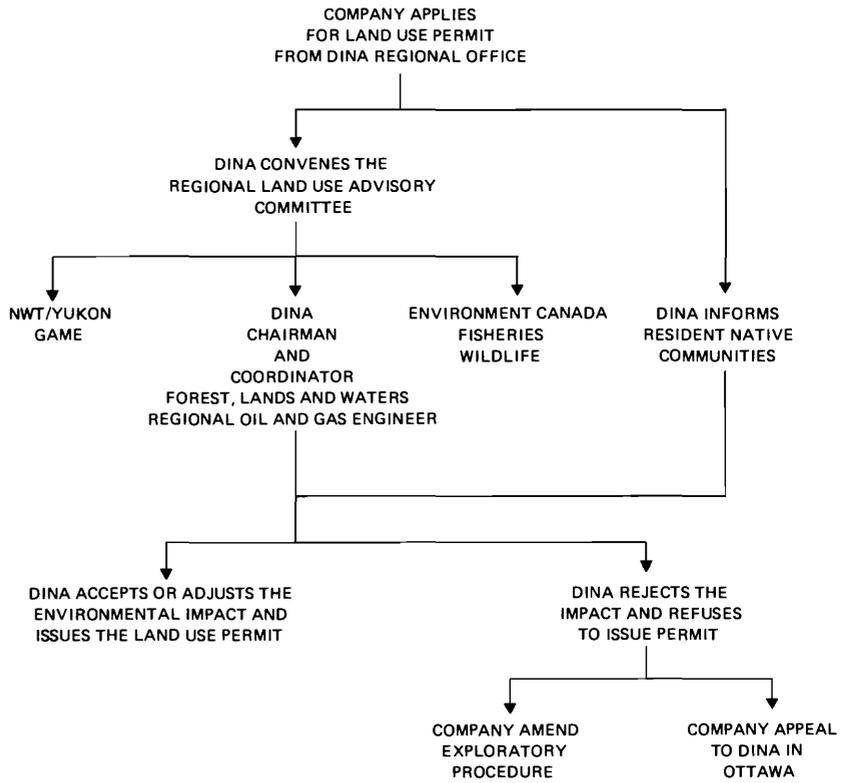


Figure IV.9 – Process for an Objection from a Native Community

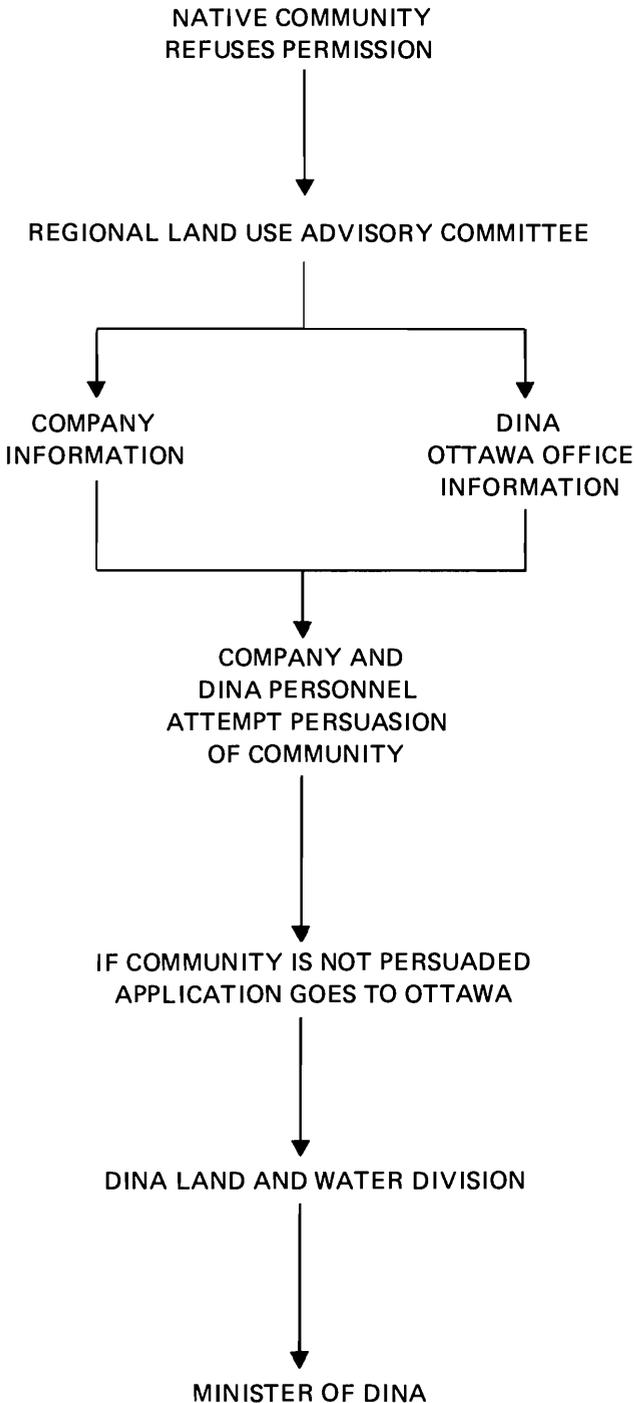


Figure IV.10 – Offshore Exploration Regulation Process

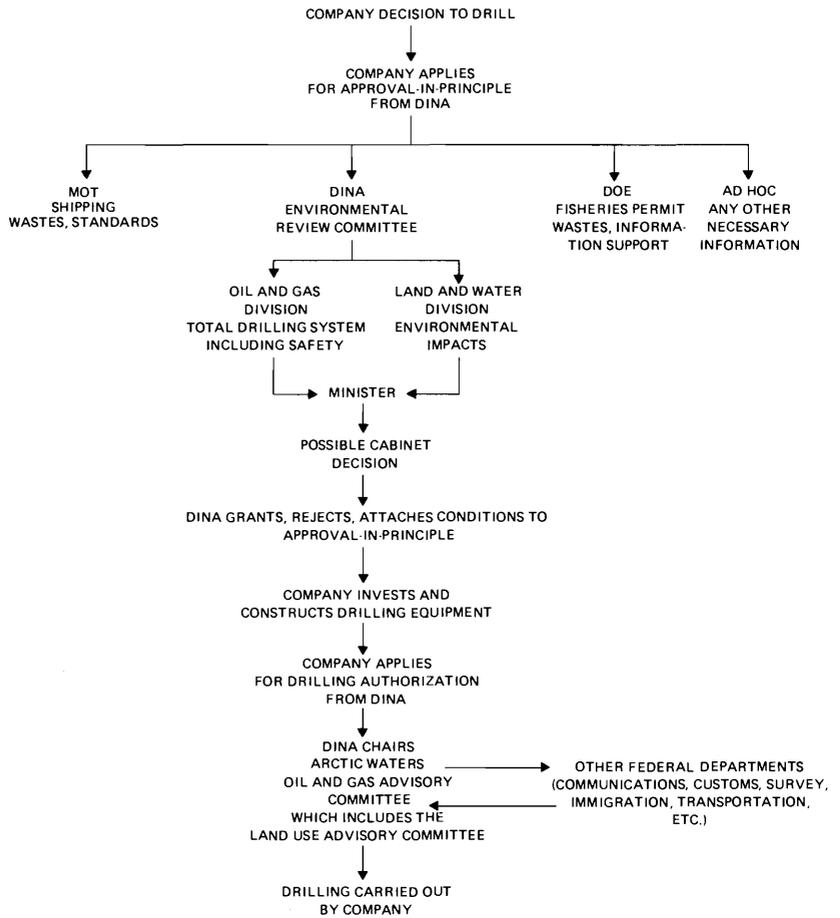


Figure IV.11 – The Production Regulation Process

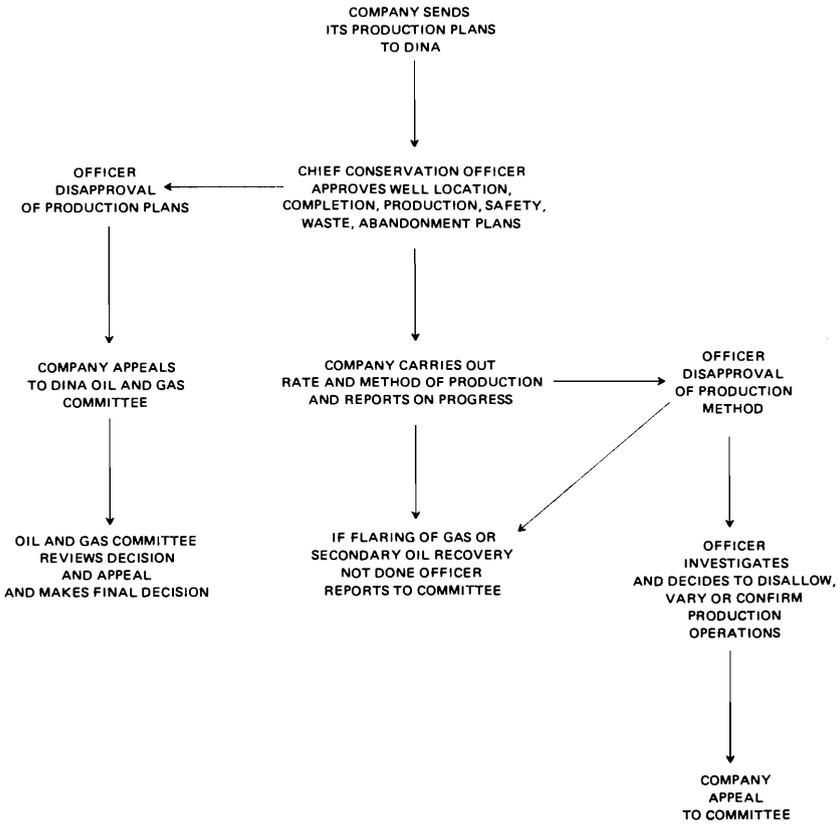
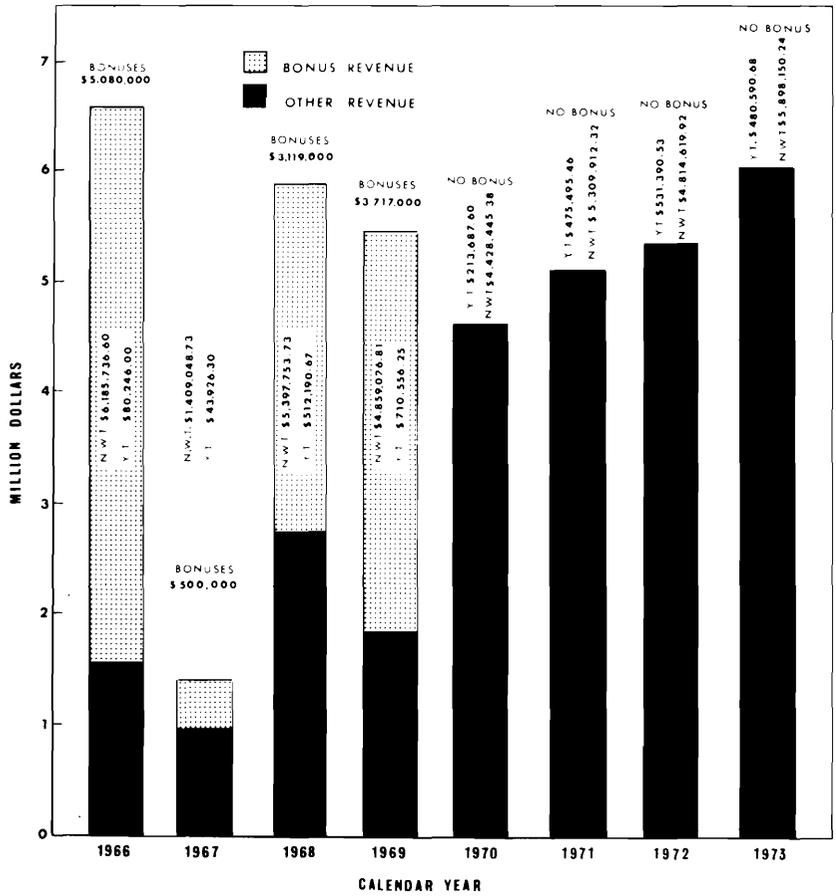


Figure IV.12 – Gross Revenue from Oil and Gas from Cash Bonus Bids, Fees, Forfeitures, Royalties, Rentals and Sale of Maps



Source: DINA, *North of 60: Oil and Gas Activities 1973*, Ottawa, 1974, p. 41.

Figure IV.13 – Production of Crude Oil and Natural Gas by Volume and Value, 1950 – 1973

Year	Northwest Territories				Yukon Territory		Total Value (\$000's)
	Crude Oil		Natural Gas		Natural Gas		
	Volume (Bbls)	Value (\$000's)	Volume (mcf)	Value (\$000's)	Volume (mcf)	Value (\$000's)	
1950	183 591	325	33 335	13	—	—	338
1951	217 818	316	19 333	8	—	—	324
1952	259 418	312	24 847	10	—	—	322
1953	316 689	256	26 109	10	—	—	266
1954	369 887	384	29 085	10	—	—	394
1955	404 219	1 040	18 670	6	—	—	1 046
1956	449 409	940	21 210	7	—	—	947
1957	382 701	253	19 243	6	—	—	259
1958	457 086	839	24 100	8	—	—	847
1959	430 319	765	67 189	23	—	—	788
1960	468 545	644	39 785	12	—	—	656
1961	516 979	714	41 678	17	—	—	731
1962	566 168	624	56 707	24	—	—	648
1963	630 465	768	51 478	21	—	—	789
1964	574 125	564	34 341	14	—	—	578
1965	660 770	742	43 068	18	—	—	760
1966	741 476	853	46 238	20	—	—	873
1967	684 179	533	40 589	17	—	—	550
1968	753 592	909	42 602	18	—	—	927
1969	801 341	556	43 723	18	—	—	574
1970	846 003	1 142	81 939	35	—	—	1 177
1971	939 151	1 202	299 204	117	869 102*	90*	1 409
1972	890 067	1 058	12 033 308	1 326	3 458 000*	338*	2 722
1973	962 733	2 240	37 359 567	3 387	3 402 449*	381*	6 008
Total	13 506 731	17 979	50 497 348	5 145	7 729 551	809	23 933

*7 per cent of total field production.

Source: DINA, *North of 60, Oil and Gas Activities, 1973*, Ottawa, 1974.

Figure IV.14 – The Transportation Regulation Process

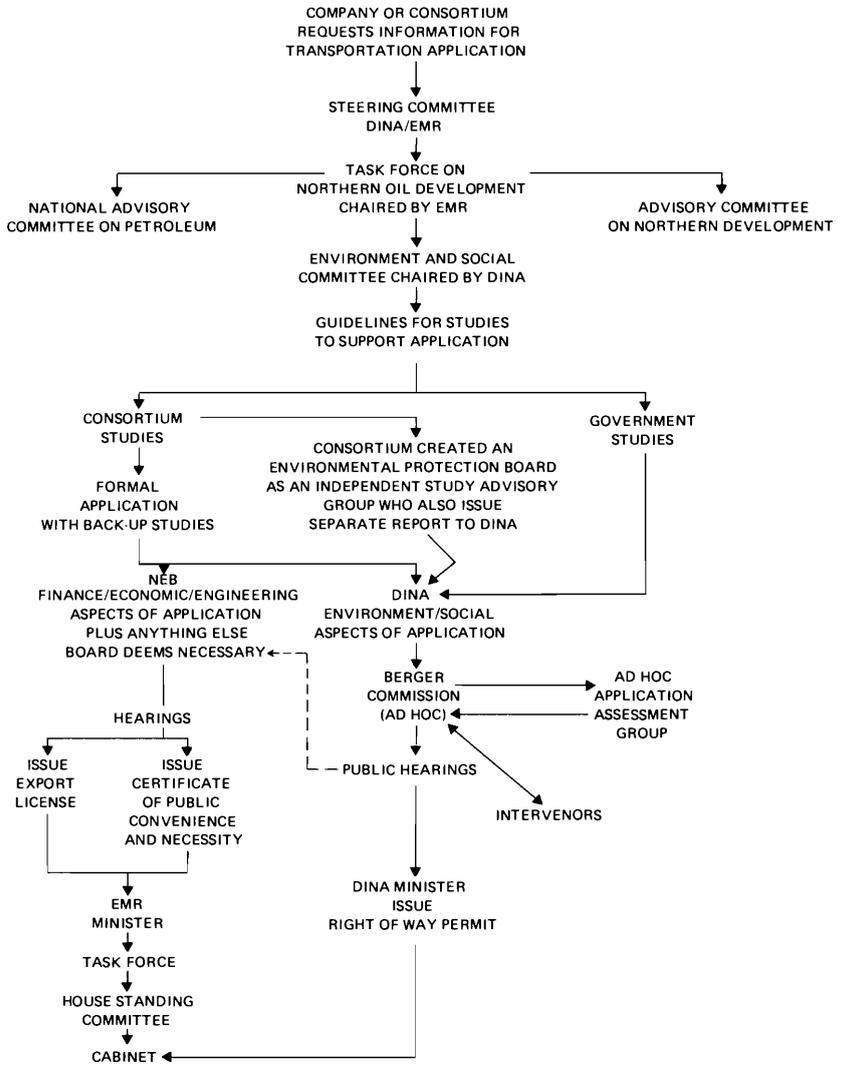
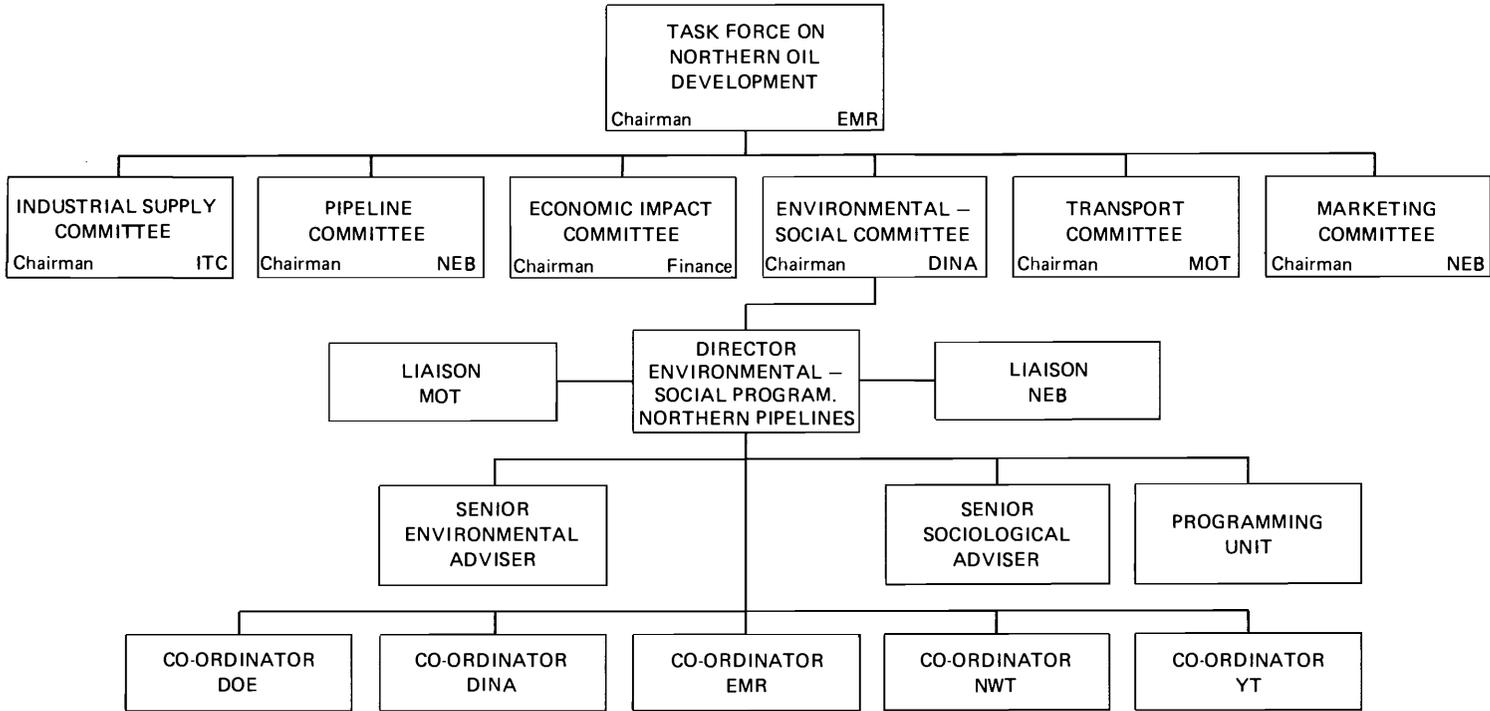


Figure IV.15 – Task Force on Northern Oil Development and Environmental -Social Committee



Source: DINA, *Pipeline North: The Challenge of Arctic Oil and Gas*, Report No. 72 – 1, Ottawa, 1972.

Figure IV.16 – National Energy Board Application Process

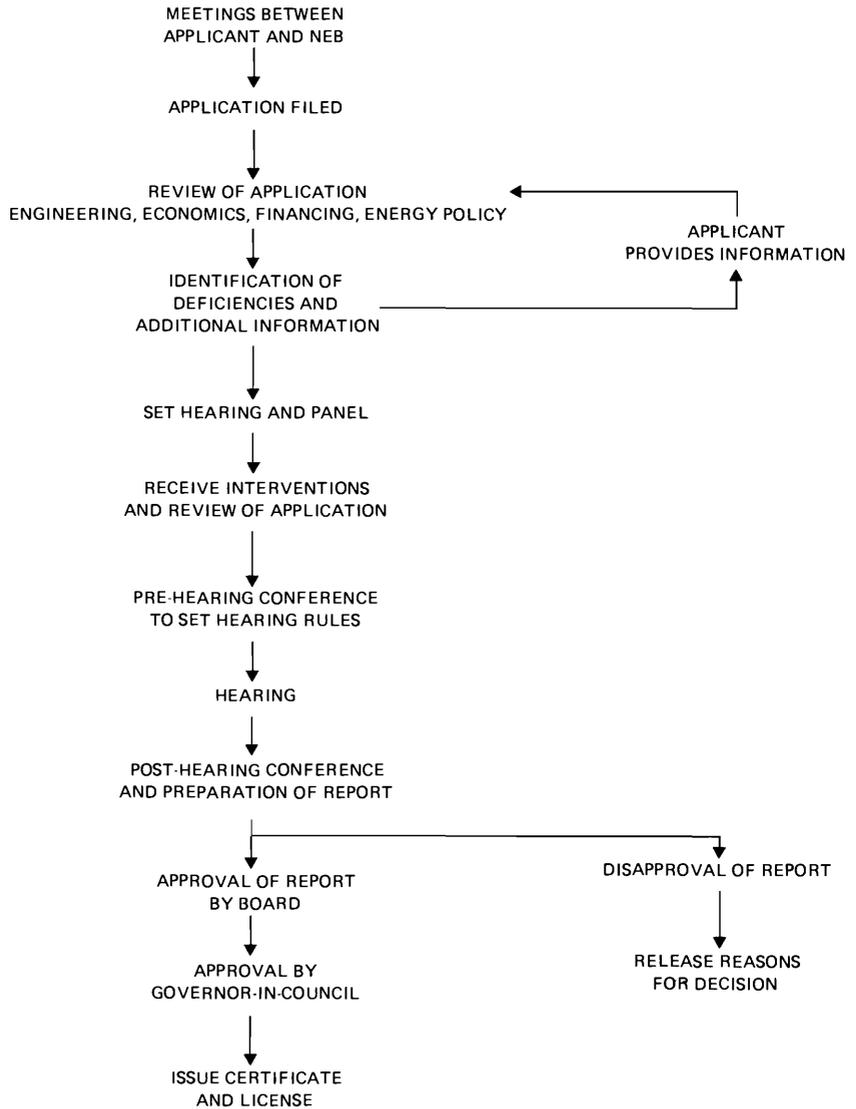
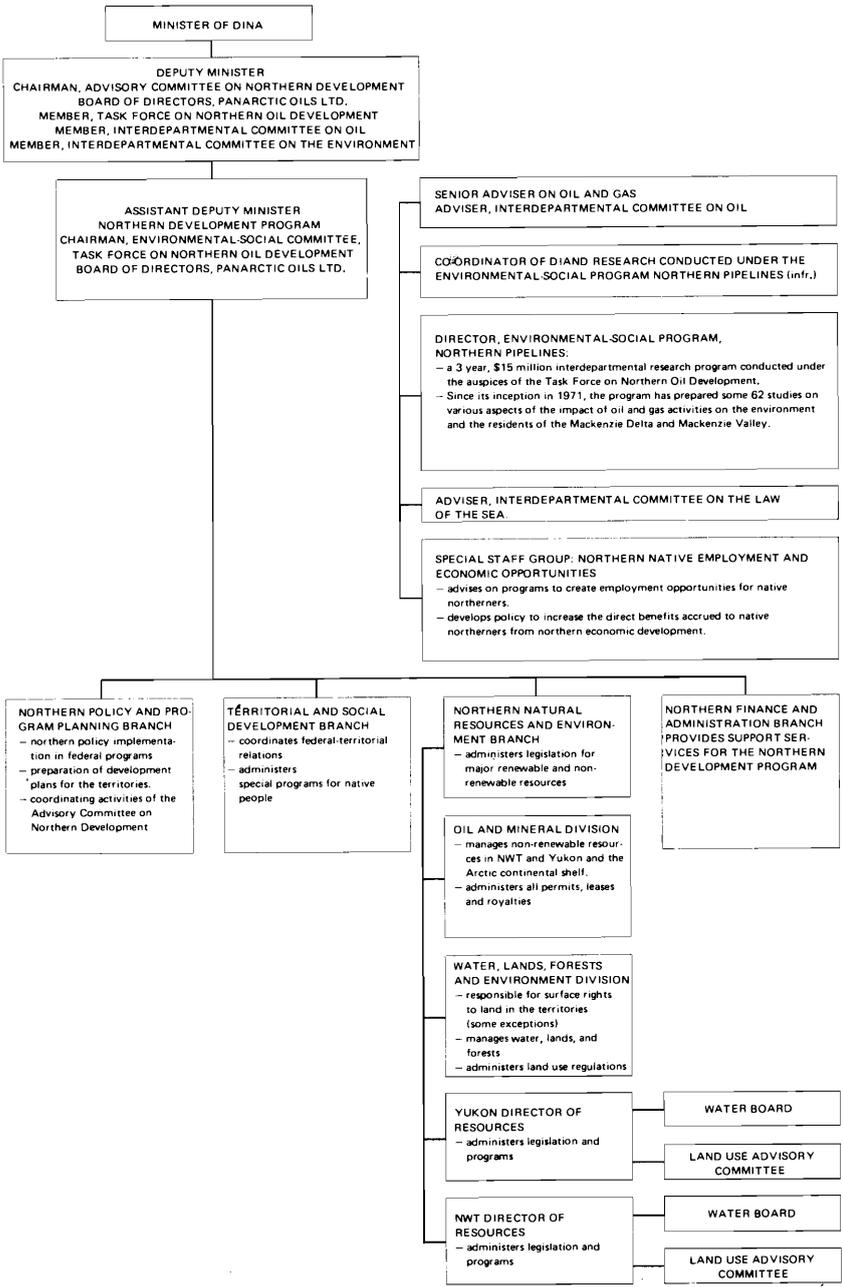


Figure V.1 – Classification of Actors for Mackenzie Delta and Arctic Islands Programs

Actor Type	Mackenzie	Arctic Islands
Core Actors	Petroleum Majors Indian and Northern Affairs (DINA) Arctic Gas (CAGPL) Alberta Gas Trunk (AGTL)	Panarctic Oils Ltd. Indian and Northern Affairs (DINA) Polar Gas
Allied Supporting Actors	Dept. of Environment (DOE) Dept. of Energy, Mines and Resources Treasury Board Departments of Transport and Public Works Advisory Committee on Northern Development Task Force on Northern Oil Development Federal Cabinet Dept. of Finance Pipeline Application Assessment Group Canadian Petroleum Association Independent Petroleum Assoc. of Canada Arctic Petroleum Operators' Assoc. Dome Petroleum National Advisory Committee on Petroleum National Advisory Committee on Pipeline Financing Government of Alberta Government of British Columbia Government of Ontario Steel industry Transportation industry (air, rail boat/barge) Construction industry Heavy equipment manufacturers Investment companies and Financial Institutions Alberta Energy Resources Conservation Board	Dept. of Environment (DOE) Dept. of Energy, Mines and Resources Treasury Board Departments of Transport and Public Works Advisory Committee on Northern Development Task Force on Northern Oil Development Federal Cabinet Dept. of Finance Canadian Petroleum Association Independent Petroleum Assoc. of Canada Dome Petroleum Petroleum Majors National Advisory Committee on Petroleum National Advisory Committee on Pipeline Financing Government of Alberta Government of Ontario Government of Quebec Steel industry Transportation industry (air, rail, boat/barge) Construction industry Heavy equipment manufacturers Investment companies and Financial Institutions

Actor Type	Mackenzie	Arctic Islands
Independent Central Actors	National Energy Board Mackenzie Valley Pipeline Inquiry	National Energy Board
Middle Range Actors	Government of the NWT Government of the Yukon Science Council of Canada	Government of the NWT Science Council of Canada
Rivals and Adversaries	Committee for Original Peoples' Entitlement (COPE) Indian Brotherhood of the NWT Council of Yukon Indians Federation of Natives North of 60° Canadian Arctic Resources Committee Railway Study Groups Committee for an Independent Canada	Inuit Tapirisat of Canada Federation of Natives North of 60° Canadian Arctic Resources Committee Committee for an Independent Canada Arctic Gas (CAGPL) Alberta Gas Trunk (AGTL)
Exogenous Rivals and Adversaries	El Paso Natural Gas Corp.	
Exogenous Independents	Federal Power Commission (US) Department of Interior (US)	
Supporting Exogenous Actors	Multinational Oil Corporations	Multinational Oil Corporations

Figure V.2 – The Department of Indian and Northern Affairs: Northern Development Program



Source: Science Council of Canada, Study on Northern Development, "Federal and Territorial Government Activities in the NWT and the Yukon", 1973.

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7. Judith Maxwell, *Energy from the Arctic: Facts and Issues*, C.D. Howe Research Institute, Montreal, 1973.
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10. Department of Indian and Northern Affairs, *Press Release*, Ottawa, 6 January 1973.
11. The same can be said for the Department of Energy, Mines and Resources, (EMR). They too have representation on the Board of Directors of Panarctic Oil Ltd., and the department shares with DINA the administration of the Canada Oil and Gas Land Regulations. EMR has jurisdiction in Hudson Bay, the Labrador - East Coast offshore areas and the West Coast offshore area.
12. Private communication served to provide much of the information on the dual role of DINA and the conflicts of interest it creates.
13. *Canada's North, op. cit.*, p. 10.
14. *Canada's North, op. cit.*, p. 11; and A.D. Hunt, "Welcoming Address and Opening Remarks", Northern Canada Offshore Drilling Meeting Proceedings, Department of Indian and Northern Affairs, Ottawa, December 1972.
15. A.D. Hunt, *op. cit.*, p. 1; and *Canada's North, op. cit.*, p. 9.
16. A.D. Hunt, *op. cit.*, p. 3.
17. Private communication.
18. Private communication.
19. Private communication.
20. A.D. Hunt, *op. cit.*, p. 3.
21. *Ibid.*
22. *Ibid.*, p. 8. This concern was expressed frequently in discussions with northern residents, particularly representatives from native groups.
23. A.D. Hunt, *op. cit.*, p. 8.
24. *Ibid.*, p. 4.
25. Private communication.

26. William W. Brackett, "Arctic Gas: An Optimum Step in Energy Use and Conservation", Remarks for Energy Resources Committee, Interstate Oil Compact Commission Mid-Year Meeting, Vail, Col., 30 June - 3 July 1974, pp. 8-9.
27. The Environmental-Social Program of the task force established in 1971 coordinated the federal government research program for the Mackenzie Valley pipeline. Annual budgets were approximately \$5 million for the three-year program (discussion with DINA personnel). Industry claims to have spent approximately \$60 million on pipeline research. W.P. Wilder, "Letter to the Editor", *Globe and Mail*, 27 September 1974, p. 7.
28. Discussions with both CAGPL and NEB personnel.
29. J. Carruthers, "Native Land Deal Possible Before Rights Settled", *Globe and Mail*, Toronto, 28 May 1974.
30. T. Kennedy, "AGTL pulling out of consortium it helped set up for Arctic Gas", *Globe and Mail*, Toronto, 17 September 1974, p. B2.
31. Private communication.
32. *Ibid.*
33. Private communication.
34. Private communication.
35. T. Kennedy. "Ottawa Directs Oil Firms to Open Confidential Files", *Globe and Mail*, Toronto, 31 August 1971, p. B1.
36. Discussion with several industry representatives.
37. Information on the structure and function of the ACND was obtained for the most part from discussions with DINA, DOE and EMR officials.
38. The eleven federal agencies are: Indian and Northern Affairs, Energy, Mines and Resources, Environment, Transport, Finance, National Energy Board, Defence Research Board, National Research Council, External Affairs, Industry, Trade and Commerce, Northern Transportation Co. Ltd.
39. Robert Gibson, The Decision-Making Process in Francois Bregha, et. al., A case for delaying the Mackenzie Valley Natural Gas Pipeline, Faculty of Environmental Studies, York University, Toronto, June 1974, p. 88.
40. The Hon. John N. Turner, Notes for Remarks by Finance Minister John N. Turner to a Public Luncheon Meeting Sponsored by the Calgary Chamber of Commerce, Calgary, 21 June 1974.
41. *Canadian Petroleum*, August 1974, p. 31.
42. Horst Heise, "Dome Wagering \$100 Million on Success in Beaufort Sea Drilling", *Financial Post*, 14 September 1974.
43. See previous discussions in Chapter V on AGTL.
44. See discussion in Chapter II, "Petrochemical Projects".
45. John Picton, "Ontario Plans Agency to meet Energy Needs", *Globe and Mail*, Toronto, 5 September 1974.
46. Discussions with natural gas utility companies.
47. John Picton, "Ontario Criticizes NEB Gas Policies", *Globe and Mail*, Toronto, 15 September 1974.
48. John Picton, "Ontario Plans Agency to Meet Energy Needs", *Globe and Mail*, 5 September 1974.
49. *Conservation in Alberta - 1972*, Energy Resources Conservation Board, Calgary, March 1973, p. 5.
50. The question of supplies of steel and related material and equipment was of expressed concern to several of the industry actors with whom discussions were held. Also, Judith Maxwell, *op cit.*, discusses this issue.
51. Discussion with residents and officials of northern communities.
52. Discussions with industry representatives.
53. This position was taken by T. Godsall in his address entitled "Canadian Small Business vs. The Mackenzie Valley Pipeline", to the Canadian Arctic Resources Committee, Ottawa, May 1974. The same sentiments were expressed by Robert Page, President, Committee for an Independent Canada, in his remarks to the Energy Conference, York University, Toronto, 25 October 1974.
54. National Energy Board, *Functions and Responsibilities of the National Energy Board*, Ottawa, 28 January 1974, p. 1.
55. *Ibid.*, p. 5.
56. I.A. Blue, The National Energy Board, Energy Seminar, University of Ottawa, 1-2 March, 1974.
57. National Energy Board Act, C.46, S.1, 1959, Section 44e.

58. Canadian Arctic Resources Committee, *Northern Perspectives*, vol. 1, no. 6, June 1973.
59. Judith Maxwell, *op. cit.*, p. 76.
60. Discussion with NEB officials.
61. In discussions, some actors have suggested that while DINA may have conflicts of interest, (e.g., developer and regulator, or development and native peoples' interest), the NEB in consideration of the "national interest" is the forum for examination of rival or alternative technological proposals.
62. Eric Kierans, "The Day the Cabinet was Misled", *Canadian Forum*, Toronto, March 1974, pp. 4-8.
63. P.G. Bradley, "Energy, Profits and the National Interest: Three Perspectives on Arctic Natural Gas", in *The Mackenzie Valley Pipeline: Arctic Gas and Canadian Energy Policy*, edited by P.H. Pearse, McClelland and Stewart, Toronto, 1974.
64. Discussion with NEB officials.
65. Information Sheet on the Mackenzie Valley Pipeline, Research Bureau, National Liberal Caucus, mimeo., n.d.
66. The Hon. Mr. Justice T.R. Berger, "Preliminary Rulings", Mackenzie Valley Pipeline Inquiry, Yellowknife, 12 July 1974, IV, Scope of Inquiry, p. 8.
67. *Globe and Mail*, Toronto, 9 May 1974.
68. "Preliminary Rulings", Mackenzie Valley Pipeline Inquiry, *op. cit.*
69. *Ibid.*, p. 2.
70. *Ibid.*, pp. 3-4.
71. *Ibid.*, p. 4.
72. *Ibid.*, p. 6.
73. *Ibid.*, p.8.
74. NWT government personnel pointed out that in the next election (likely in early 1975) the council, with the exception of the Commissioner and Deputy Commissioner, would become a fully-elected council.
75. *Government Activities in the North*, 1972, Information Canada, Ottawa, 1972.
76. Private communication.
77. Private communication.
78. These observations are based in part on information from G.B. Doern, "The Role of Central Advisory Councils: The Science Council of Canada", in *The Structures of Policy-Making in Canada*, edited by G.B. Doern and P. Aucoin, MacMillan, Toronto, 1971.
79. M. Gibbons and R. Voyer, *op. cit.*, pp. 92-93.
80. Peter J. Usher, The Committee for Original Peoples' Entitlement, Ottawa, 25 April 1973, mimeograph, p. 1.
81. *Ibid.*, p. 20.
82. *Ibid.*, p. 21.
83. *Ibid.*, p. 22.
84. *Ibid.*, p. 23.
85. *Ibid.*, pp. 41-42.
86. *Ibid.*, p. 10.
87. *Ibid.*, p. 11.
88. *Ibid.*, pp. 13-14.
89. *Ibid.*, p. 18.
90. *Ibid.*, p. 95.
91. Sam Raddi, President of COPE, "Submission of the Committee for Original Peoples' Entitlement to the Hon. T.R. Berger, at the preliminary hearings of the Mackenzie Valley Pipeline Inquiry Regarding Practices and Procedures to be Followed in the Inquiry", 24 April 1974.
92. *Ibid.*, pp. 2-3.
93. *Ibid.*, p. 8.
94. This effort to increase discussion and dissemination of information among native groups appears to have been a continuing interest of COPE. There are now some opportunities for native peoples to broadcast in their own languages, an innovation not always viewed favourably by white northern residents. (Discussions with COPE personnel and Nellie Cournoyea, Station Manager, CHAK, Inuvik, NWT.
95. Philip Sykes, "Canada's Arctic Natives on Big Alaska-Style Payout", *Toronto Star*, 3 October 1972.
96. "The ancestors of the Indians in the Northwest Territories negotiated

treaties with the federal government in 1899 and 1921 (Treaties 8 and 11) that have never been fulfilled. In those treaties, the government took title to the land and in return promised to pay the Indians a monthly allowance and give them land. The deal was that they would get one square mile for each family that decided to live on a reserve, or 160 acres for each Indian who wanted to live apart. The money is being paid, but the land has never been granted, partly because the Indians hesitated to select the land and adopt the reserve way of life There are several thousand Indians in Alberta, just south of the 60th parallel, who are also covered by Treaty 8 and who have acquired all the lands promised by it. Obviously the government does not want to negotiate a settlement with the territorial Indians that seems to be unfair to those in Alberta The Yukon Brotherhood has a claim against the Yukon territory lands outside the treaty area, while the Inuit are claiming lands in the far North. Treaty 11 actually covers the land as far North as the Arctic Ocean, but the Indians have carefully refrained from registering claims to land used by the Inuit. The government has tried to solve the problem created by the treaties by promising to settle the treaty claims and then to negotiate any other claims the Northwest Territory Indians wish to make.

The Indians, on the other hand, claim that their grandfathers did not understand the meaning of the treaties and would like to reopen the negotiations." Judith Maxwell, *op. cit.*, p. 49. In Philip Sykes' 1972 series on native land claims in the *Toronto Star*, the INWT legal consultant, Gerald Sutton, is quoted as maintaining that confinement to reserves was never even considered by the Indian negotiators of Treaty 11 in 1921. "The Indians did not think the 1921 treaty negotiations were about the surrender of land but rather 'a peace treaty whereby the rights of Indian people to their traditional hunting and trapping would be guaranteed.'" Philip Sykes, "Indians Want Land Settlement Before Pipeline Started", *Toronto Star*, 13 October 1972. Among the first INWT research efforts was the taping of reminiscences of old people who witnessed the 1921 negotiations. The treaty which Ottawa published after the 1921 negotiations indicated that the Indians surrendered "forever" all rights, titles and privileges to their lands.

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102. Philip Sykes, "Billion Dollar U.S. Settlement Raises Canadian Native Hopes", *Toronto Star*, 30 September 1972.

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104. J. Carruthers, "Native Land Deal Possible Before Rights Settled", *Globe and Mail*, Toronto, 17 September 1974, p. B2.

105. *Ibid.*

106. *Kitchener-Waterloo Record*, 25 May 1974, p. 64.

107. Yukon Native Brotherhood, "Together Today for Our Children Tomorrow", A Statement of Grievances and an Approach to Settlement by the Yukon Indian People, Whitehorse, January 1973.

108. *Ibid.*, p. 11.

109. *Ibid.*, p. 13.

110. *Ibid.*, p. 21.

111. *Ibid.*, p. 25.

112. *Ibid.*, p. 29.

113. *Ibid.*, p. 42.

114. *Ibid.*, pp. 44-46.

115. *Ibid.*, p. 19.

116. K. Vincent, "Cornelius Vanderbilt is Alive and Well: DIAND (DINA) and the Public Interest", Address to the Canadian Political Science Association Convention (draft), 5 June 1974, p. 2.

117. *Ibid.*, pp. 4-5. Vincent faults DINA for its rejection of initial CARC of-

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13. D.D. Lougheed, "Wrap-up Remarks - Industry", Northern Canada Offshore Drilling Meeting, DINA, Ottawa, 5-6 December 1972, p. 323.
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VII. Decisions

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IX. Concluding Note

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