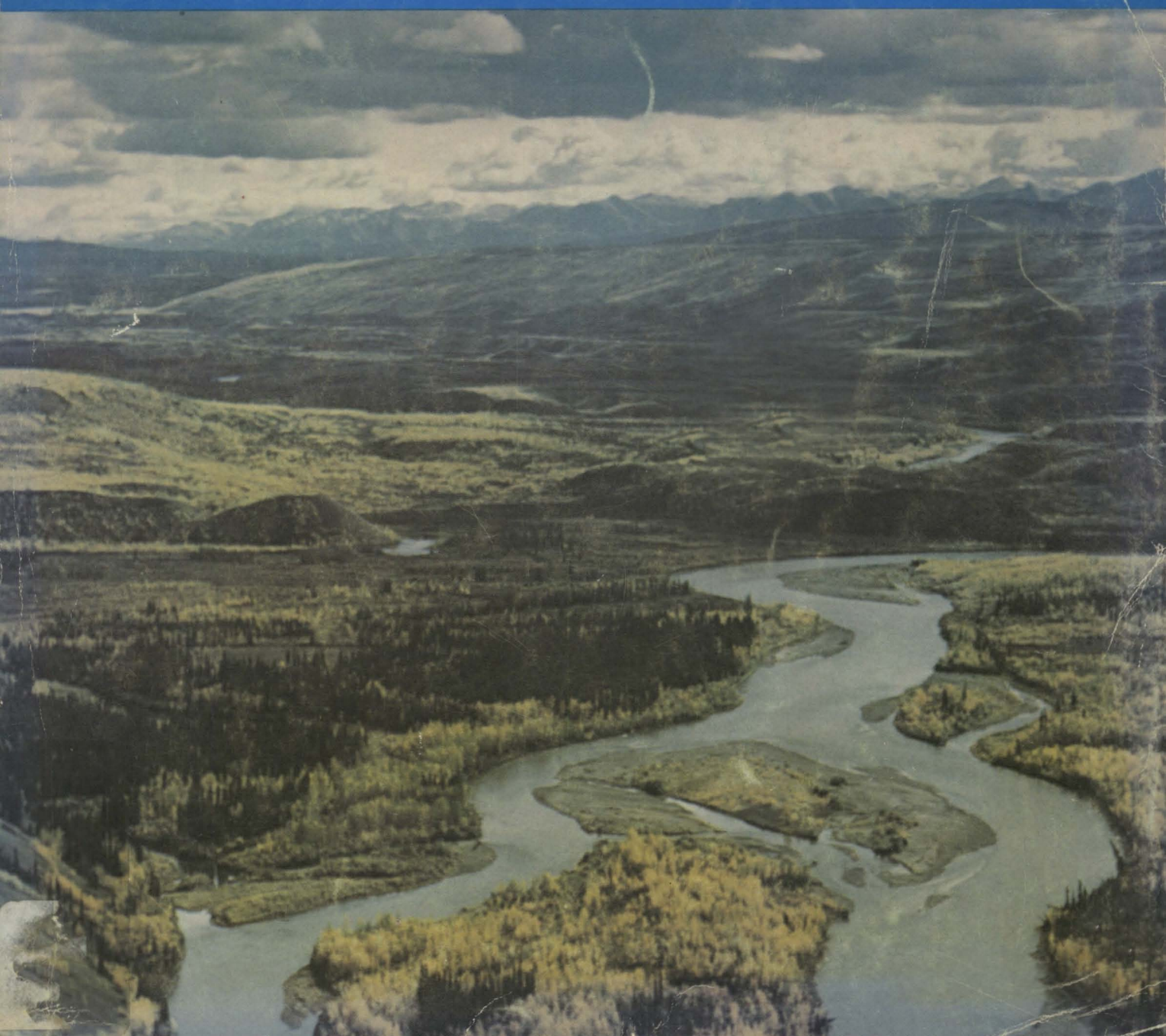
National Energy Board

REASONS FOR DECISION NORTHERN PIPELINES

VOLUME 3



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VOLUME 3

CONTENTS

CONTENTS - VOLUME 3

CHAPTER 5

REGIONAL SOCIO-ECONOMIC IMPACT

CHAPTER 5 - Continued

APPENDICES

CHAPTER 6

ENVIRONMENTAL IMPACT

CHAPTER 6 - Continued

ROUTE MAPS

CHAPTER 5

REGIONAL AND SOCIO-ECONOMIC IMPACT

5.1 INTRODUCTION

5.1.1 General

This section deals with the regional socio-economic impacts of the Mackenzie Valley and Alaska Highway proposed pipeline routes. An extensive amount of material has been adduced for those areas, traversed by the proposed pipelines, lying north of the 60th parallel. Much less information was filed or produced during the hearing on regional socio-economic impacts associated with proposed pipeline developments south of the 60th parallel where fewer problems are anticipated.

The much greater sensitivity of the northern economy and society to large projects, such as those proposed, required that more attention be devoted to those areas north of the 60th parallel. The regional socio-economic impact section is thus structured along the lines described below.

First, the areas of the Northwest Territories and the Yukon which are likely to be impacted by the proposed projects will be briefly described. Thereafter, the Board presents a summary of evidence with respect to impact on the Mackenzie Valley including the views of CAGPL, of Foothills and of intervenors resident north of the 60th parallel; this part is followed by a summary of evidence for the Yukon including Foothills (Yukon)'s views on regional socio-economic impact as well as views of intervenors resident north of the 60th parallel. The Board has also summarized the views of intervenors resident south of the 60th parallel with respect to both the Mackenzie Valley and Alaska

Highway routes. Finally, the Board presents its own views on impact of the proposed projects in these areas, including views on impact in the Mackenzie Valley, on impact in the Yukon, a comparative assessment of impact in both areas and observations on a Monitoring Authority.

The last part of this section of the Board's report deals with evidence and views of the Board on pipelines south of the 60th parallel.

5.1.2 Socio-Economic Description of Impact Corridors

To provide a sense of perspective of the magnitude of the area of Canada north of the 60th parallel and its low population density, it can be pointed out that while the combined area of the Northwest Territories and the Yukon equals nearly forty per cent of the total area of Canada, their combined population is less than one per cent of the total people in Canada. While the northern regions which will be impacted by the proposed pipelines, the Mackenzie Valley and Delta and the southern Yukon, represent but a portion of the land mass north of the 60th parallel, they encompass a large proportion of the North's total population.

Most of the socio-economic impacts in the North that are likely to result from the construction of a pipeline up the Mackenzie Valley would be expected to take place within a corridor that can be roughly described as encompassing the area within two hundred miles of either side of the Mackenzie River, extending from the Beaufort Sea south to the Alberta-Northwest Territories border.

The socio-economic impacts in the North resulting from the Foothills (Yukon) project would be expected to occur largely in the area adjacent to the Alaska Highway from Beaver Creek, on the Alaska/Yukon border, to Watson Lake on the Yukon/British Columbia boundary.

Comparing the populations within the two corridors, one finds that an estimated 28,000 to 30,000 people, or some 65 to 70 per cent of the Northwest Territories population, live within the Mackenzie Valley corridor (including Yellowknife and Fort Smith), of which approximately 3,000 people are Inuit (located in the Mackenzie Delta region), 12,000 people are Indian and Metis, and the remainder non-natives. Within the Alaska Highway corridor live an estimated 17,300 people or over 80 per cent of the total population of the Yukon, with native people in the corridor numbering about 3,000.

Roughly three-quarters of the people resident in the Alaska Highway corridor, including most of the non-native population, are estimated to live in Whitehorse, while over 70 per cent of the population in the Mackenzie Valley corridor, including the vast majority of the non-native residents, live in the six communities of Fort Smith, Pine Point, Inuvik, Hay River, Fort Simpson and Yellowknife of which the last four will be the most affected if a pipeline is built down the Mackenzie Valley.

The Economy of the Mackenzie Valley

The population of the Mackenzie Valley corridor is scattered throughout some 20-odd communities ranging in size from less than 100 inhabitants in Jean-Marie River to over 8000 in Yellowknife in 1976.

The Mackenzie Valley corridor is not very developed in economic terms, with the bulk of employment falling in the government sector. Non-renewable resource development, mining and oil and gas exploration activity provide most of the non-government wage employment opportunities. Traditional activities, hunting, fishing and trapping, are becoming of lesser importance in terms of the total generation of cash income in the region but are still important to native people in terms of income (both cash and in kind), particularly in the smaller, predominantly native, communities.

Average family incomes of the non-native population in the Mackenzie Valley corridor are generally comparable to average incomes for households in the rest of Canada. However, cash incomes of native families in the region are less than half of those received by non-native inhabitants. This results from the predominance of non-natives in the government sector, mining, oil and gas, exploration and related activities, whereas the incomes of native families are generated from traditional activities, government transfer payments and limited involvement in the government and non-renewable resource development sectors, often on a part-time or seasonal basis.

Accessibility to most of the Mackenzie Valley corridor communities is by water and air only. During the fall freeze-up and spring break-up many communities are completely isolated. A road system exists only in the upper end of the corridor extending to Fort Simpson and Yellowknife; Inuvik at the lower end of the corridor will, in the near future, be linked to southern Canada via the Dempster highway. The mainstay of freight transportation within the region is barge transport down the Mackenzie River. From the rail head at Hay River, on the Great Slave Lake, barges meet the major freight-hauling requirements of the entire Valley. Trucking does offer some competition to the river system in those areas accessible by road.

Most long distance passenger movement within the corridor is by air, with several air carriers offering services ranging from regularly scheduled passenger and freight flights to special purpose charters. For those communities with permanent year-round landing strips, air transportation may be the only means of access during the spring break-up and fall freeze-up periods.

The Economy of the Yukon

Of the approximately 21,400 people living in the Yukon in 1976, it is estimated just over 17,000 live within the Foothills (Yukon) project impact corridor. Of these people about 13,000 live in Whitehorse.

Although relatively more developed in economic terms than the Mackenzie Valley region, the Yukon depends on a very narrow economic base centred primarily on non-renewable resource

development. The government sector employs the largest portion, nearly one-quarter, of the work force, with mining being the most important private employer (employing nearly 1,300 people in 1974). Tourism, generally restricted to the summer months of July and August, adds a dimension to the Yukon ecomomy not found in the less accessible Mackenzie Valley. Traditional activities, hunting, fishing and trapping, are still important in some of the smaller, predominantly native, communities.

Average family incomes in the Yukon are generally higher than average incomes in Canada as a whole. However, as in the Mackenzie Valley region the average family cash income of the native population is substantially less than the income of the average non-native family. Here also, this reflects the lesser involvement of native people in the permanent wage employment sector of the economy.

A well-developed transportation infrastructure exists in the Yukon. Apart from Old Crow, all communities are linked by a year-round road system, and extensive air services, regularly scheduled and charters, are available.

5.2 MACKENZIE VALLEY

5.2.1 Views of Applicant - CAGPL

Impact of Pipeline and Related Developments on Population Levels in the Mackenzie Valley

The number of people in the Mackenzie Valley that would be subject to some degree of impact by CAGPL's project was estimated to be, in 1971, in the order of 24,000 people. This population was spread throughout twenty-five communities along the Mackenzie Valley Corridor with about 60 per cent of the population concentrated in four major communities, Inuvik, Fort Simpson, Hay River and Yellowknife. Furthermore, close to 60 per cent of the impact area's population resided within 200 miles of the proposed pipeline right-of-way.

In 1971, the ethnic distribution of the impacted region's population was as follows: seven per cent Inuit, 26 per cent Treaty Indian and 67 per cent "other"; the "other" category included non-status Indians, Métis and non-natives and it was assumed, conservatively in CAGPL's view, that 50 per cent of these "others" were of native descent. However, it was felt that the majority position held by native people might be eroded due to the net increases of the native population failing to match increases in the non-native population which would mainly take place through in-migration. CAGPL found that ethnic distribution was also characterized by the fact that the majority of non-native residents were concentrated in the main urban centres and, as a result, ethnic distribution in those centres was very different from smaller communities which were predominantly native.

CAGPL projected that, in the absence of the pipeline or of an alternative development project with an equivalent impact, the population of the Mackenzie Valley corridor had probably increased by 18 per cent between 1971 and 1975, reaching a total of 28,000 people and would increase by 36 per cent between 1975 and 1985 to reach a total population of 38,400.

With respect to long-term population impacts in the Mackenzie Valley corridor related to pipeline development, CAGPL was of the view that quantitative estimates could only be in the nature of crude approximations and, acccordingly, had not produced a specific estimate. CAGPL felt such population projections would have required estimates of regional residents' participation in long-term pipeline employment opportunities as well as information on whether those Southerners employed on the project would settle permanently in the North. Furthermore CAGPL felt that long-term population increases could be controlled to some extent via a phased community development approach. This approach involved moving gradually from a situation where a substantial number of permanent positions were filled by employees who rotated to the job site, either from other regional communities or from the South, to the desirable long-run situation where most employees were resident with their families in the district office communities. In addition, it was felt population increases related to long-term employment opportunities would be confined to the larger centres, and any impact on smaller communities would be negligible.

During the construction phase, the regional population would increase temporarily as a result of an inflow of southern

transient workers. However, as a result of policies proposed by CAGPL, these people were expected to have very little social or economic impact on the region as a whole or on specific communities.

CAGPL did not believe that the pipeline project would generate large-scale in-migration of persons seeking construction or other work as was experienced, for example, on the Alyeska project. It was felt such a situation would not occur in the Northwest Territories given the basic socio-economic differences between Alaska and the Territories and given the more extensive capabilities for planning and implementing measures to mitigate potential negative effects. CAGPL did not say that the same kinds of impacts would not be present; rather, it felt the magnitude and therefore the seriousness of those impacts that would occur should be greatly reduced. The most important factor in this regard was the potential for controlling the massive in-migration that had been so critical in the case of Alaska.

CAGPL would implement the following policies aimed at reducing in-migration and transient influxes related to the construction period:

all construction camps would exist and operate on a single status basis and CAGPL would actively discourage employees from setting up other arrangements; for such a policy to succeed, it was felt that it might be necessary for the government to formulate and enforce land-use controls in the areas surrounding the camps; and

CAGPL, in co-operation with the contractors and unions involved, would require that all hiring of non-northern

resident employees be done in southern locations, and would give the widest possible publicity to this policy. CAGPL stated it would accept the definition of a northern resident as laid down by governmental authorities.

Under cross-examination CAGPL admitted it was not possible to have complete control over what happens in the Mackenzie Valley Corridor with respect to in-migration or transient influxes. For example, CAGPL acknowledged the fact that the potential for impact in the Hay River area was greater, largely because of the presence of the highway. Further, it was recognized that speculative in-migrants or transients in the order of two to three thousand people could be critical and have a significant impact on the region. However, CAGPL did state the following: "If people came into that area and said, 'I am here looking for a job on a pipeline', I think the Applicant's responsibility would be to move them back out of the region".

Impact on Employment

CAGPL estimated the working age population (individuals aged between 15 and 64 years) of the impact area to be in the order of 13,300 in 1971 of whom some 7,600 were males; of the latter, 73 per cent were classified as "others" and 27 per cent were classified as Indians or Inuit. CAGPL also projected that, by 1985, this working age population would have grown to 24,700 people of whom 13,200 would be males. In terms of labour availability, (those unemployed and willing to work) CAGPL did not produce any figures but stated under cross-examination, that

a figure of 500 to 800 available men would be a 'relevant kind of number'.

In terms of employment in the impact area, CAGPL observed that, in 1972, the level of employment in the area amounted to approximately 45 per cent of the man-years of employment required to fully employ the working age population. CAGPL further observed that while unemployment and underemployment were generally acknowledged as widespread in the impact area, industry frequently had difficulty in attracting a sufficient number of regional residents to fill available jobs.

In terms of employment generated by the project, CAGPL maintained a distinction between employment related to construction and long-term job opportunities related to the operations phase.

In the original application, pipeline construction employment in the impact area was estimated to peak during the third and fourth years of construction at close to 2,500 man-years. This represented peak manpower requirements of over 4,500 during the winter construction periods. Since the original application, CAGPL's estimated construction manpower requirements for total Canada were increased. However, no corresponding increase was made in CAGPL's estimates of northern manpower needs.

In addition to the primary direct employment during the second to fifth years of construction, the project would create indirect employment in the order of over 2,700 man-years in the areas of exploration, production and development activities, water and rail transport, equipment storage and supply. CAGPL also estimated that, from the second to the fifth year of

construction, secondary employment would be in excess of 550 man-years per year. Thus, total pipeline related employment in the impact area during the construction period would be in excess of 4,000 man-years between the second and fifth years of construction peaking at over 6,300 man-years during the fourth year.

During the operations period, CAGPL projected that 1,800 full-time jobs would be available in gas plant operations, exploration and development and that some 1,200 seasonal jobs would be available each year in exploration activities. It also projected some 200 full-time jobs in equipment and materials stockpiling and re-supply which, if added to the previous figure, plus the 206 long-term positions in pipeline operations, yielded a total of 2,200 long-term jobs associated directly and indirectly with the pipeline and related projects. In terms of long-term secondary employment opportunities, CAGPL only provided a range varying from 0 to 3,000 man-years.

Under cross-examination, CAGPL indicated that the majority of the 2,200 long-term jobs as well as the 1,200 yearly seasonal jobs would be in the Mackenzie Delta area.

It was observed that the above long-term employment opportunities offered the potential for a large regional employment impact. In fact, the project would offer long-term jobs in excess of the labour force available to take advantage of them. CAGPL recognized that a critical consideration in terms of the employment impact was the extent to which these employment opportunities were captured by northern residents.

Employment Policies and Practices

CAGPL recognized it had a special obligation to the native peoples of the North and, to this end, had established a continuing dialogue with the various parties who would logically have an interest in the successful development of a northern residents' employment program.

CAGPL felt that its corporate hiring policies should compensate, to the extent possible, for the lack of equality which often existed in situations where native persons had to compete for available jobs with people who had a lifetime of experience in the industrial and wage society. CAGPL indicated its intent to develop employment policies which were realistic and, at the same time, consistent with the policies established in the Expanded Guidelines for Northern Pipelines, 1972.

To date, steps taken by CAGPL to achieve the above had consisted of being prepared to meet formally with native organizations to discuss the training and employment of natives during construction; CAGPL had also joined the NORTRAN program. In addition, CAGPL had held discussions with the Department of Indian and Northern Affairs, the Territorial Governments, petroleum companies, and gas transmission companies on a co-ordinated recruitment procedure for northern residents called the Northern Manpower Delivery System. CAGPL had also held meetings with representatives of four pipeline craft unions and a number of pipeline contractors to exchange views and information and to seek the appropriate commitments that would maximize employment opportunities for northern residents and minimize harmful impacts on northern communities during construction. Some of the

policies sought would require the concurrence of the unions and contractors.

These policies were: flexible rotation schedules for northern residents, preferential hire for northern residents, elimination of the need for northern recruiting to be made through hiring halls, equal wages for northern residents, camps isolated from communities, hiring being done in the South for all but northern residents, rest and recreation for Southerners in the South only, and membership of northern residents in unions.

CAGPL stated that both the contractors and the pipeline craft unions represented at the meetings understood the situation and gave assurances that they accepted the principle of providing maximum employment opportunities to northern residents including reasonable relaxation of terms and conditions leading to such employment. More specifically, CAGPL stated, under cross-examination, that the four major pipeline craft unions had said they were willing to accommodate natives in the union structure and, more generally, to comply with the requirements of the Expanded Guidelines dealing with employment of northern residents. With respect to contractors, CAGPL did not anticipate any difficulties with clauses stipulating they would have to employ employable northern residents and, as the client, it felt it could clearly impose conditions on the contractors with respect to employment, training, counselling and working conditions during construction.

CAGPL indicated it was prepared to assume the responsibility for modifications of practices or the inclusion of clauses in union contracts which would be required to execute its employment

policies for northern residents. CAGPL observed that, at the present time, it had a liaison role with unions and contractors enabling it to bring forward specific questions germane to the project but that the possibility existed that CAGPL could sign what might be an umbrella or master agreement. In addition, CAGPL stated that, from its discussions with unions, the latter fully intended to abide by any guidelines and stipulations the government might set with respect to these matters. Under cross-examination, CAGPL stated that it "would be perfectly happy to see all those items included as terms and conditions for building the pipeline." This would force unions and other parties to abide by them. In a later statement, CAGPL appeared to retract from such a position.

Employment Policies and Practices During the Construction Period

CAGPL said it would give preference to all employable northern residents wishing construction employment, in accordance with the Expanded Guidelines for Northern Pipelines, 1972. Such preference would be realized through the following special measures:

in situations where qualifications of a northern resident and southern resident were equal, the northern resident would be given preference;

in any case where the qualifications of a particular job could be relaxed, that would be done for the northern resident and then they would be given preference over fully qualified Southerners for that job; and

in those cases where a candidate could not meet the relaxed qualifications, special training would be made available to bring skills up to a level satisfactory for employment.

CAGPL advanced other measures such as ensuring equality of treatment between northern residents and other pipeline workers in terms of benefits and privileges with respect to employment in similar positions. It would also be flexibile in establishing construction work schedules for northern residents in order that community and personal requirements such as traditional pursuits or community services could be taken into account. Such flexibility would consist of having northern residents make up a schedule or choose among various schedules as long as, once selected, the schedule was adhered to. Furthermore, CAGPL declared it would arrange transportation for northern resident employees to their home communities for scheduled rotation leaves, insofar as the cost of transporting a northern resident did not exceed the cost associated with transporting a Southerner on rotational leave. Northern residents working sufficiently close to their home community to make it practical for them to travel to and from their homes on a regular basis if they wished would be able to do so, although CAGPL would not provide transportation.

CAGPL also proposed to ensure that employed northern residents were provided orientation on matters dealing with wage employment (such as camp life, safety, and money handling) and were offered a counselling service on an on-going basis during construction, oriented to their particular needs. The

counsellors would be northern residents with exposure to industry work, to southern workers and southern management.

CAGPL also recognized the importance of on-the-job training to upgrade the skills of those who initially accepted unskilled or semi-skilled positions, and would support and manage programs sponsored by contractors and unions that favoured northern natives in on-the-job training and employment opportunities during construction.

With respect to having northern residents matched with employment opportunities, CAGPL viewed the Manpower Delivery System (MDS) as one which would include a "co-ordinating council", directing the overall activity of the MDS, with representation from government agencies responsible for employment, the unions, interested native organizations and the employers (including CAGPL). The essential elements of the MDS would include recruitment and selection procedures, union enrollment as required, and travel and accommodation arrangements.

CAGPL stated it was not the creator or the sole participant in the MDS but that it wanted to be a party to the discussions leading to its evolution. CAGPL observed that this system could make the use of hiring halls in the North unnecessary as well as promote a labour pool system which CAGPL felt would have been very difficult to develop and operate unilaterally. Finally, CAGPL affirmed it would provide information on all construction jobs on a continuous basis to whatever government agency was designated to co-ordinate northern job placement.

There were also a few CAGPL employment policies and practices dealing with southern workers which were of importance in considering employment policies for northern residents as well as the impact of the project on the impact region.

For one, CAGPL, in co-operation with the contractors and unions involved, would require that all hiring of non-northern resident employees be done in southern locations only and that the widest publicity be given to this policy. CAGPL also said it would carry out indoctrination of non-resident workers in southern Canada and that orientation programs would, among other things, familiarize the non-resident employee with northern life-styles and provide an understanding of northern people. In addition, CAGPL mentioned that all non-resident employees would be required to take their rotational leaves in southern locations and that logistics would be handled to eliminate the need for stop-overs in northern settlements on the way in or out.

Overall, CAGPL felt that, with respect to employment policies and practices, it would be able to reasonably control the situation during the construction of the pipeline.

Employment Policies and Practices During the Operations and Maintenance Phase

During the operations phase of the pipeline, CAGPL affirmed it would seek to preferentially hire all employable northern residents who sought employment. The major differences between the construction and operations phases in this respect concerned the question of relaxation of standards where the safety and proper maintenance of the pipeline would have priority when

considering preferential hiring. It also involved somewhat less flexibility in work schedules because crews of specific sizes had to perform specified maintenance tasks and, more simply, because there were fewer job opportunities during the operations phase than in the construction period.

Nevertheless, CAGPL expected that personnel desirous of pursuing a mixed life-style (traditional pursuits - wage employment), could be accommodated. Furthermore, CAGPL indicated that for seasonal and casual labour required during the operations phase, northern residents would be given first opportunity for employment.

On matters related to transportation of northern residents, equality of treatment with non-resident workers, orientation and counselling, CAGPL's policy would be the same in both the construction and operations phases. CAGPL added that, in the operations phase, it would provide innovative and flexible payroll arrangements to meet the needs of northern residents and their families and CAGPL would encourage and assist in ways to increase savings.

In terms of training, CAGPL offered to co-operate with governments in arranging training, including academic upgrading to prepare local residents for both casual and regular employment opportunities and to encourage relevant vocational and technical trades programs in the Northwest Territories. CAGPL also said it would establish in-house training programs to enable employees to advance to more skilled job categories and that it would arrange special programs to train technicians which would include on-the-job training and theory sessions.

Furthermore, CAGPL stated that training opportunities for northern residents desiring employment would be maintained with the long-term objective of staffing the entire operations and maintenance department in the North with northern residents. During cross-examination, CAGPL said that it could take from 10 to 15 years before perhaps 90 per cent of permanent pipeline positions were filled by northern residents. On this latter matter, CAGPL advanced one of its goals as being to provide regular employment for northern residents equal to at least 40 per cent of the permanent pipeline positions in the Territories within four years after the end of the construction phase. This, in CAGPL's view, was really a minimum number.

CAGPL did not tackle the question of definition of a northern resident. Rather, CAGPL's policy would be to accept the definition laid down by the proper authority which, in this case, it thought would be the Department of Indian and Northern Affairs.

NORTRAN

The Northern Petroleum Industry Training Program (NORTRAN) is sponsored by all three Applicants, CAGPL, Foothills and Foothills (Yukon), in addition to others. The evidence presented to the Board represents the views of all three Applicants, and is summarized here for convenience.

The program developed by the Applicants (CAGPL, Foothills and Foothills (Yukon)) originated with the work of Trunk Line in 1971. Starting with 16 trainees, Trunk Line developed the training philosophy, program structure and staff which formed the basis of the expanded training program when it was established by

the consortium members (including Trunk Line) in 1973. In that year, 73 training positions were made avaiable. In October, 1974, the program was renamed NORTRAN. As of March 1977, the program had expanded to 130 positions.

A key to the program was the policy of all sponsoring companies to provide continuing employment to trainees, regardless of whether gas plants and pipelines are built in the North. In this way, trainees would be provided the opportunity for a career in the petroleum industry, as long as they continue to carry out their responsibilities in a satisfactory manner. This policy also acted as a brake on the expansion of the program, as companies would not provide a large number of positions with such a long term guarantee. Once a certificate had been granted, the capacity of the program would be expanded to accommodate as many suitable trainees as wish to join.

Regarding the impact of the program on the trainees, particularly the impact of the southern training environment, the Applicants outlined the various components dealing with these impacts. The Applicants emphasized that the program was career-oriented and, as such, might not be compatible with a continued traditional lifestyle. They stated that many of the training positions were very technically oriented, and that these positions required a minimum of grade 10 education. The program provided academic up-grading to bring trainees to this level, but even so, it would take six or seven years to train a good senior technician as a controls technician.

In response to questioning by the Board, the Applicants stated that with the exception of those trainees employed in the

Mackenzie Delta, all those currently in the program would be eligible for jobs in gas plants or pipeline operations and maintenance, and that their optimistic estimate of NORTRAN employees placed in pipeline jobs at the start of operations and maintenance would be 40 of 98 technical positions and a majority of the non-technical positions.

Concerning the question of the impact of the southern location of the technical training, the Applicants stated that the trainees would remain in the South, until there was suitable employment on a pipeline or gas plant in the North. More specifically, the Applicants stated that many of the trainees had identified several pre-conditions to their return North. In addition to work relevant to their training, they wanted good housing, schools and medical services. The Applicants agreed to a certain degree with Dr. Hobart's assessment of the program as a re-socializing influence on the trainees, re-moulding them in the southern image, but felt that for most of the trainees, this process had begun long before they joined the program.

In response to questions about NORTRAN's capacity to provide expanded, construction oriented training, the Applicant stated that NORTRAN could provide more construction oriented training if required, but that its current priority was still training for long term operations and maintenance positions.

Concerning the future of the program, the Applicants stated that should the pipeline project proceed as planned, the program would continue at least to the end of the pipeline and gas plant construction phase. Should the pipeline project be delayed for a long period of time, for example ten years, the current trainees

would be absorbed by the companies as regular employees and the NORTRAN administrative organization would be dissolved.

Participation of Local Business in Pipeline Development

CAGPL stated that its policy with respect to local business participation in the pipeline project was to utilize local contractors and suppliers of goods and services to the maximum extent consistent with the welfare of the communities. Such purchases must also, however, be consistent with the full range of its responsibilities. CAGPL would have to balance the objective of maximizing regional economic impacts with its responsibility to ensure the timely delivery of materials and supplies and the maintenance of a strict logistics schedule.

CAGPL realized however, that too aggressive a policy could entail adverse consequences and that careful planning was required. CAGPL felt that there must be some upper limit on the utilization of local business and that it could not determine unilaterally what this limit was. CAGPL stated that care must be exercised to avoid encouraging the formation of new businesses, or the expansion of supply capacity in existing firms, on the basis of unjustified expectations covering the volumes of materials that would be required. CAGPL believed it should not encourage the establishment of those types of local businesses for which demand would be minimal when construction was completed. CAGPL also stated it would endeavour not to monopolize contractors to the extent that other unrelated work could not be done and to avoid creation of demands for goods to the extent that local supplies were depleted and prices inflated.

While CAGPL did not have any policy with respect to providing cost preferences to local businesses, it did propose, where possible, to break large contracts into smaller packages on which local businesses might readily bid. CAGPL also proposed to encourage the formation of consortiums of local businesses which could, as a group, bid on larger contracts.

If an affirmative decision were taken on the project, CAGPL would provide detailed information to businessmen in the impact region as to the sorts of goods and services that could be required, the duration of construction in a particular area, and give advance notice of bids. This flow of information would be channeled through a forum, or Economic Liaison Group involving the pipeline company, local businessmen, government representatives and possibly native organizations. Such a forum would air the kinds of problems that might be associated with local procurement and facilitate the development of an orderly planning process.

During cross-examination, CAGPL observed that the approach developed for local business participation would apply both during the construction and operations phase.

Personal Income Effects of Pipeline and Related Developments

CAGPL observed that communities in the impact area with a concentration of non-native residents, ranked relatively high in terms of per capita income levels while per capita incomes in the predominantly native communities were so low as to be appropriately defined as being at the level of poverty. For

example, in 1970, average per capita income of the Indian population was only one fifth of that of non-native residents.

CAGPL also observed that, overall, government wages and government transfer payments amounted, in 1973, to over 50 per cent of the area's total income. While income in kind was not included in the total income figure, CAGPL recognized its importance particularly in the smaller native communities.

CAGPL had not detailed what the income effect of the project could be on the region but stated rather that the estimate of employment impact could be taken as a proxy for income and other economic impacts. Indeed, CAGPL felt a detailed estimate of the income effects of the project would have required assumptions with respect to the degree to which northern residents would take advantage of the employment opportunities generated by the project; such a projection was not made as the degree to which northern residents would be available or interested in employment.

Impact of a Pipeline on Prices in the Mackenzie Valley

CAGPL recognized that the cost of living in Northern Canada was significantly higher than in the South. CAGPL expected its project to influence prices in the impact area. However, in its view, such an influence would bear a direct relationship to the success of various measures designed to increase resident employment as well as to the success of measures to promote local procurement.

For example, one consequence of local participation in pipeline employment opportunities would be the inflationary

effect of local spending of incomes earned on the project. Nonetheless, if an adequate supply of goods and services (which are in demand) is maintained, this should limit inflationary pressures similar to the ones described above or stemming from local procurement by CAGPL. Another consequence would be the creation of inflationary effects as a result of potentially higher earnings from pipeline employment since regional employers might have to offer higher wages to counteract the lure of pipeline earnings.

CAGPL stated that a mitigative measure to reduce any tendency toward demand-pull inflation would be the encouragement of savings programs. To this end, it proposed to assist its employees by making them aware of the opportunities available for money management and by instituting pay mechanisms suitable to their situation. CAGPL also stated that, as higher pipeline earnings could be the result of longer hours of work, these types of pressures could be reduced by certain regional employers competing with the pipeline lure by offering employees the opportunity to work longer hours.

CAGPL testified that, in general, building in anticipation of the pipeline project, pre-planning, the absence of massive in-migration and the rather limited potential for local procurement of goods and services should all operate to reduce the overall inflationary tendency. In addition, the amount of spending in northern communities by the non-resident pipeline workforce should not put additional pressures on prices as CAGPL's policy of self-contained camps, absence of casual transportation to communities, and other similar measures, would limit such occurrences.

CAGPL also stated that in its planning it had been careful to attempt to not over-expand transportation services north of the 60th parallel and to ensure that any inflationary pressures from this sector did not continue beyond the construction term. Similarly, CAGPL had derived a housing policy for its employees which should avoid inflationary pressures in the housing market.

CAGPL felt that inflationary pressures resulting from the project would not be uniform throughout the impact area but would vary depending on the community considered. CAGPL could not supply any quantitative information on the extent of the inflationary pressures that could be created, nor did it supply information as to whether these inflationary pressures would be carried over from the construction phase into the operations phase.

Impact on the Public Sector

While CAGPL did not provide the Board with any estimate of costs which might be imposed upon the public sector in the Northwest Territories, CAGPL felt that the project would generate a considerable surplus of governmental revenues relative to public services supplied to the project and costs of new government programs related to increased development activity.

Under existing legislation and revenue sharing arrangements, revenues would flow to the Territorial Government through fuel taxes during the construction phase and from property taxes during the operations phase. The Federal Government, on the other hand, would collect sales tax on materials, corporate and personal income taxes, from those firms and persons in pipeline

related activities, and royalties from producers during the operations phase.

To give some idea of the magnitude of the revenue flows, CAGPL stated that property taxes in the Northwest Territories could yield $7 million in the third year of operation declining to $3 million per year after 20 years. In the Yukon, such property taxes would be in the order of $650,000 to $850,000 per year. CAGPL also stated that corporate income taxes for that portion of the system north of the 60th parallel could amount to $230 million per year during peak years of flow and that royalties would also be significant.

CAGPL felt that the pipeline project and related developments could be a significant factor in Northern Canada achieving its goal of economic self-sufficiency.

CAGPL also observed that much of the infrastructure of its project (such as transportation and medical facilities), normally considered to be a cost to the public, had been internalized to the project because of its nature and the remote location of the area.

In evidence presented by CAGPL on the impact of the Alyeska project in Alaska, revenue lags were identified as a serious problem for the Alaska government. This lag was identified as a gap between the rapid increase in population due to the project and the increase in revenue from the various types of taxes. It was felt that, had there been better planning on the part of the state, many of the problems related to this lag could have been avoided. CAGPL observed that, unlike the situation in Alaska, the federal and territorial governments had been studying, for a

number of years, the potential impact of a Mackenzie Valley gas pipeline with the objective of planning for and ameliorating its impact.

Impact on the Traditional Sector

CAGPL observed that while the value of fur, fish and game harvested was a small proportion of the total income in the impact area, its importance as a source of income varied widely by settlement. In the smaller settlements, in which native people predominated, fish and game provided a major proportion of real income. For example, fish and game were the source of 53 per cent of the estimated total income of the people of Old Crow and 50 per cent of the income of the people of Fort Good Hope. On the other hand, in larger settlements such as Inuvik, with greater wage employment opportunities and a more mixed population, fish and game were relatively unimportant as a source of cash income.

CAGPL also observed that the pursuit of traditional activities was not only related to the achievement of income. Some native people, it felt, hunted for purely recreational reasons. Furthermore, CAGPL recognized a continuing dependency of native people on country foods.

CAGPL revealed that, based on a survey conducted in 1972, only 96 persons, out of close to 24,000 people in the impact area, were engaged in full-time or regular part-time trapping; CAGPL recognized, however, that this figure did not encompass all native people engaged in traditional pursuits as many more could

be engaged in these activities on other than on a full-time or a regular part-time basis.

CAGPL further observed that most younger native people were not as interested in attempting to earn a living through practising the traditional pursuits; they appeared to be more interested in education and training that would enable them to enter the wage economy. It was felt that for the larger number of native people who had made the transition to the wage economy or who would now choose to do so, assistance in achieving or improving an alternative means of earning a living and, presumably, an alternative lifestyle, must be provided. To provide the needed jobs and income, economic development would be required.

Furthermore, CAGPL observed that it was becoming increasingly difficult for native people to pursue traditional activities primarily because outfitting costs made it necessary to enter the wage economy to earn the required money. This, of course, in addition to the disinterest of younger native people in traditional pursuits, contributed to the erosion of the traditional sector.

In view of the above, CAGPL felt that the policies it set forth should be shaped in an effort to ensure that those persons wishing to continue to follow the more traditional style of life and means of earning a living must not be precluded from doing so. Their freedom of choice must not be interfered with.

CAGPL's position with respect to the impact of the project on the traditional sector was stated as being that the construction and operation of the pipeline could be expected to be essentially neutral in terms of its impact on game, fur and fish, and the

ability of Northerners to harvest these resources. In terms of impact on the participation of native people in traditional activities, this, of course, would very much depend on the extent to which native peoples elected to take wage employment as opposed to pursuing traditional activities.

CAGPL felt that the potential for negative impacts on the traditional sector during the construction phase would be minimized as a consequence of some of its policies. These policies included the fact that areas used for hunting and trapping would be avoided to the extent possible, unnecessary environmental damage would be scrupulously avoided, and damage that was unavoidable would be repaired and restored; furthermore, it was felt that any impacts on the environment would be of short duration and only a very small proportion of the impact region would be affected by the project. Policies would also be implemented to prevent the staff and employees of CAGPL and its contractors from contributing to any increase in the pressure on the game and fish resources of the impact area. In addition, CAGPL would have a policy of paying equitable compensation to trap-line operators for any damage caused by the project.

Overall, CAGPL felt that, in as much as traditional pursuits were relatively more important in the smaller communities and that the longer term impacts of the project would be concentrated in the larger communities, the total impact of the pipeline on the traditional pursuits of the native people of the impact area would be negligible.

Impact on the Petroleum Industry in the North

CAGPL testified that a decision on the pipeline project would have a profound effect on the future of the petroleum industry in the Northwest Territories and particularly in the Mackenzie Delta. Approval, delay or indefinite delay would all have an influence on oil and gas exploration and development activities.

Similarly, CAGPL felt that at a time when the desires of younger people in the impact area required economic development capable of providing jobs and income, CAGPL was unaware of any indigenous natural resource, with the exception of natural gas, that was susceptible to early development and which would have a timely and adequate impact in terms of the provision of needed jobs and economic opportunities.

CAGPL contended there was a limit to the degree of economic development that could be generated by trapping and making use of renewable resources, this limit falling short of sustaining the population of the impact area.

CAGPL felt that, while it was difficult to predict with any degree of certainty, it was probable that, in the absence of the pipeline, exploration for oil and gas would decline. CAGPL thought it was certainly realistic to assume that, without the pipeline, petroleum exploration activity would not provide increased employment and income, and a likely result would be a massive increase in unemployment throughout the Mackenzie Valley.

Impact on Transportation and Communications

CAGPL noted that, in recent years, a significant increase had taken place in the amount of goods and people entering the impact area. They also noted there had been a significant increase in investment and activity in highway construction and improvement, in the barging system and in air services and facilities. CAGPL further remarked that a significant proportion of the transportation activity in the impact area in recent years had been directly related to petroleum industry activities and that any sharp decline in exploration activity would be reflected in a significant reduction in barge traffic.

In terms of total transportation activity in the absence of a pipeline, CAGPL felt the net change was more difficult to evaluate since population increases would be an offsetting factor to some extent; nonetheless, it thought it was probable that there would be some decline in traffic at least for a period of time.

In terms of impact on the transportation sector of the impact area, if the project were approved, CAGPL did not anticipate over-extending any of the transportation systems it might use.

CAGPL's general policy position on transportation and communications services and facilities was that the project would meet its own requirements using local capacity where it existed, but without over-extending the demand on that capacity to a point where regular community service was disrupted. CAGPL was of the opinion that community needs should take priority over pipeline needs in circumstances where CAGPL's efforts might have failed to provide for the increased volume of traffic.

To the extent possible, CAGPL proposed transporting personnel between the South and its work sites using its own airstrips in order to minimize air traffic at the community airports. Furthermore, in communities where CAGPL would make use of public airports (such as Inuvik, Norman Wells, Fort Simpson and Hay River), it would co-ordinate its activities with Transport Canada, the airlines and communities to insure that normal ground crew operations, cargo handling facilities, and other airport services were not disrupted. On the question of freight rates, CAGPL stated it expected to negotiate arrangements with the carriers that would minimize the exposure of other traffic to rates greater than those that would have prevailed in the absence of the project. The intent of CAGPL would be to attempt to negotiate in such a way that costs reflected in the acquisition of equipment and facilities would not be passed through to the general rate structure. For example, CAGPL pointed out that for barging on the Mackenzie River, it would be responsible for financial consequences after construction, if the equipment initially bought to serve pipeline construction requirements did not require full utilization.

Impact on Other Primary, Secondary and Service Industries (Excluding the Petroleum Industry and Traditional Activities)

CAGPL testified that primary industries in the impact area, other than the petroleum industry and traditional pursuits, consisted of agriculture and forestry, commercial fishing and mining. CAGPL believed that even if the agriculture, forestry and commercial fishing sectors were to expand to capacity in the

absence of pipeline development, they would not significantly affect employment and income in the impact area. With respect to mining, CAGPL recognized the potential for development but could not evaluate or define its possible impact on income and employment in the absence of pipeline development since no mine developments had been announced in the impact area for the 1975-1985 period.

Secondary industries were found to be typically small and, in the majority of cases, were marginally profitable. A primary cause for this was seen to be the limitations imposed by the size of the market. Expansion was further constrained by high transportation costs, high operating costs, seasonality, unreliability of supply systems and a lack of skilled management and staff. In the absence of pipeline development or of major new developments, existing secondary industries (including production of handicrafts and fur garments, baking, bottling and printing), would increase their contribution to employment and income in proportion to the increase in population.

Similarly, the rate of expansion of the service sector would generally follow changes in population very closely although increases in employment in tourism and federal government services could outpace the rate of increase in population.

Since most other primary, secondary and service industries in the impact area found their growth limited by population increases, the impact of pipeline development, in CAGPL's view, would be to expand their market potential and thus their potential to contribute to providing increased employment opportunities. The most important potential for pipeline-induced

secondary employment and income generation was thought to be in the service industries.

Containment Policies During The Construction Period

To ensure that communities close to the pipeline route did not suffer adverse impacts and disruption as a result of an influx of southern workers during construction, CAGPL proposed to locate construction camps on the right-of-way, well removed from communities and settlements.

The policy of CAGPL would be to have all construction employees living in these camps which would exist and operate independent of the nearby communities and on a "single status" basis.

CAGPL would actively discourage employees from making other arrangements and recognized that the success of any such policy would require the Government to formulate and enforce land use controls in the area surrounding the camp. Furthermore, CAGPL intended to reinforce the relative isolation of camps by ensuring there was no casual transportation available for access to communities. However, to the extent that interactions might occur between construction employees and communities, CAGPL would co-operate with community representatives to ensure proper planning and appropriate two-way controls.

In addition, CAGPL's construction planning, especially with respect to the location of facilities, had been done in such a manner as to insulate the smaller communities from construction activities. Consequently, activities and facilities had been relocated in order to ensure such isolation. CAGPL had not, on

the other hand, eliminated all proposed activity in the vicinity of larger communities, nor did it think that it was desirable to do so. Activities in these communities would be kept at a practical level.

Impact on Northern Communities

In describing settlements in the impact area, CAGPL categorized communities into two broad groups. The first one encompassed actual or potential growth centres (such as Inuvik, Hay River, etc.), generally dominated by non-natives, including within their boundaries most of the significant economic activity of the region and having a standard of services and facilities that, while short of the optimum, was superior to that in the second group. The second group which included the smaller communities largely populated by native people, provided limited opportunities for wage employment, relied to a relatively large extent on traditional pursuits and had a low standard of urban services and facilities. Services such as sewage disposal, the provision of water, electricity, protection, etc., as measured against southern standards, were inadequate and, in many cases, primitive. Recreational facilities were also much more limited in the smaller communities while medical and hospital facilities were found to be fairly well dispersed throughout the impact area.

In the area of housing, CAGPL observed there was a serious problem in the impact area in terms of both numbers of housing units relative to the population and the quality of the existing

stock of housing; housing shortages and low quality of housing were said to be particularly marked in the native communities.

With respect to the construction period, CAGPL felt that it and its contractors would not significantly affect the facilities and services in communities since activities would be confined to work camps. Furthermore, the activities associated with the construction and operation of the pipeline would not make demands upon the services of the smaller communities because the focus of activities would be primarily on the larger communities. It was not anticipated that there would be any impact on the services and facilities of smaller communities as a result of induced population increases. During the operations phase, CAGPL would work with the appropriate levels of government in dealing with any adverse impacts that might arise in the larger communities.

While CAGPL did not believe the construction period of its project would impact significantly upon northern communities, it did recognize a direct relationship between the success of various measures designed to increase resident employment and such negative impacts as labour market dislocations. Indeed, CAGPL remarked that the attraction of (already employed) workers to pipeline employment might make it difficult for local employers to maintain their level and quality of output.

CAGPL also recognized another potential problem in that people performing important functions in communities could be attracted to pipeline employment and the communities might have no one to replace these people. This type of problem was observed in rural native villages of Alaska as a result of the Alyeska project. Nonetheless, CAGPL felt that efforts to develop a

manpower delivery system as well as the provision of flexible work schedules would allow personal and community needs to be considered. CAGPL did admit, however, that in final analysis, it did not have any control over this inasmuch as it could not control individual Northerners.

CAGPL stated that, prior to pipeline construction, it would intensify its consultation program with the Territorial Government, community representatives and its consultants respecting the general pattern of growth in a community, the level and type of activity in the vicinity of the community, and community planning generally with respect to larger communities such as Inuvik, Hay River, Fort Simpson and Norman Wells. CAGPL intended to locate, within each community, officers whose functions would include consultation with local representatives and businesses as well as local purchasing. In the case of smaller communities, project information officers and liaison personnel, who to the greatest extent possible would be local people, would be involved in a special effort to incorporate local plans and priorities in the construction plans.

During the operations phase, CAGPL said it would work with appropriate levels of government in planning necessary public facilities and services, including sewers and water, power, roads, fire protection and emergency health care, the intention being to supplement existing services so as to assist or benefit communities as a whole. Concisely, CAGPL stated it would provide for the public use of its facilities where this would not impair the safety, efficiency, reliability or economy of its operations,

and where this would not result in CAGPL being subject to liability.

CAGPL generally favoured a phased community development approach which involved moving gradually from a situation where a substantial number of permanent positions were filled by employees rotating to the job site, either from other regional communities or the South, to the desirable long-run situation where most employees would be resident with their families in the district office communities. Extensive consultations would take place with communities to consider the possibility of constructing central facilities, and on matters of housing, recreation facilities and community infrastructure, as the shift away from a pattern of rotating employees takes place.

In the area of housing, CAGPL felt the impact of its project would be limited to the operations period and to growth centres where, in any case, CAGPL intended to ensure that housing provided for its employees within the community would be additional to the community supply. It would not rent or buy the existing stock.

CAGPL recognized that the presence of permanent pipeline staff would intensify the demand for recreational facilities and thus its policy would be to work with community representatives to provide appropriate recreation facilities. CAGPL would not provide or administer such facilities for the sole use of its employees, but would work with others to provide for the needs of the total community, and thereby for its own employees and their families.

Gas Service to Northern Communities

CAGPL's policy on gas service to northern communities was essentially that in those communities where natural gas service was a more economic means of supplying fuel to the community, it was ready, willing and able to facilitate the provision of gas to those communities. This could be done by arranging for gas to be made available at a take-off point on the pipeline to any distribution company which would provide the service to that community. Where deemed desirable, CAGPL would be prepared to build the main lateral to the community and to charge a cost of service appropriate to that facility to the distribution company. The distribution systems in the communities would not, however, be built or operated by CAGPL.

CAGPL further stated that if, after considering all factors, the government decided that gas should be made available to certain communities on a subsidized basis and that the subsidization should be borne by other customers of the pipeline system, then it would undertake to construct those facilities.

In a study prepared by CAGPL concerning gas service to northern communities, it was determined that gas service would be economically feasible in many, but not all, of the communities along the Mackenzie Valley. Indeed, this study showed that under a 'community pricing system' (in which the revenues received for gas sold from each community system must cover all costs of that system), gas distribution systems linked to the proposed CAGPL pipeline would reduce energy costs in the Mackenzie Valley communities of Inuvik, Norman Wells, Fort MacPherson, Fort Simpson, Fort Good Hope and Aklavik. Under an 'overall system

pricing' (in which the cost of gas was constant for a group of communities, that cost being determined from the costs of operating all systems within the group), energy costs in Fort Norman and Wrigley would also be reduced.

Total annual savings to these communities were projected to be in the order of $6 million (in 1979 dollars). These savings considered only annual fuel expenditures and did not consider the cost of converting furnaces, appliances and generators to gas use. Nonetheless, CAGPL felt that such conversion would still prove to be an interesting investment for individual customers.

CAGPL used, for illustrative purposes, a field price of 32¢/Mcf; however, as this field price was not considered the "most likely price" in 1979, it also used a field price of $1.00/Mcf and observed that the resulting higher delivered cost would not materially alter its conclusions with respect to gas service to communities.

Disposal of Surplus Material

CAGPL stated that, after construction, surplus material and equipment would be made available to northern communities or the Territorial Governments in a manner to be negotiated with the appropriate government agencies.

Certain Aspects of Social Impact

CAGPL stated its basic policies had been shaped to ensure that those wishing to pursue traditional activities would not be interfered with while the many others who had made a transition to the wage economy or who would choose to do so, would receive assistance in achieving or improving an alternative means of earning a living and presumably, following an alternative life style.

CAGPL felt the acceleration of the rate of change in the impact area over the last one or two generations had created a new social and economic environment, and it was not likely that the direction of change could be reversed.

In addition, it appeared that most younger native people had lost interest in earning a living through the pursuit of traditional activities, even though they responded to their traditions and practised them, at times, avocationally.

Rejection of traditional economic activities by younger native people seemed linked to the fact that such activities were associated with a style of life which was alien to their new set of values. The school system fostered, at least indirectly, that type of attitude towards the more traditional activities.

It was felt that the feeling of economic marginality and a sense of deprivation (relative to other groups in Canada and the world as reflected by the news media), demoralized and degraded people, and resulted in alcoholism, family breakdown and suicide.

According to CAGPL, long-term stable employment and increased income should have a positive effect in reducing the incidence of

anti-social behaviour in the long-run, even though there could be some, probably temporary, increase in alcoholism and violence.

CAGPL stated it felt native people would be responsive to employment opportunities as these would become available to them even though this could involve extensive dislocations. CAGPL recognized, however, that native people naturally preferred permanent employment in their home community to seasonal employment away from home.

CAGPL basically assumed that the provision of wage employment was a positive factor in the socio-economic impact of the project and based its policies on this approach. Nonetheless, CAGPL recognized that if, indeed, everybody in the Northwest Territories was truly uninterested in wage employment, the pursuit or provision of wage employment could have very serious consequences.

CAGPL also emphasized the fact that wage employment and the pursuit of traditional activities were, in fact, complementary rather than being inherently antagonistic. Earnings gained in the wage sector could be reinvested in the traditional sector in ways which would significantly increase the productivity of the sector.

CAGPL's witness on social matters summed up his observations on social impact in the following manner:

"The conclusion must be that the damage has already been done, and/or is perpetuated and deferred by dependency, welfarization and the lack of opportunities for employment and opportunities to act independently, self-sufficiently and

consequentially. The pipeline would make massively available this variety of opportunities."

Socio-Economic Monitoring of Pipeline Construction

CAGPL's expert witnesses on the impact of the Alyeska project on Alaska stated that during the Alaskan project no uniform method of monitoring impact was developed. The witnesses felt that developing a monitoring system could be of enormous benefit to planners of future projects.

CAGPL's policy position on monitoring was to have people in the socio-economic area performing a monitoring or a liaison function during construction. The company would have officers involved in liaison with the communities providing counselling and assistance to the native people working on pipeline construction.

Social Costs and Impact Funding

CAGPL felt that the careful planning which had gone into its project and the policies which it had adopted would result in impacts of the project being much more positive than negative. Nonetheless, CAGPL undertook the responsibility to bear all those costs which would be a direct result of its project. Such costs, termed "internal costs" by CAGPL, would include, for example, construction of housing and increases in community infrastructure to meet the needs of the permanent work force, construction of new or improvement of existing wharves and airstrips which it intended to use, a company operated community consultation and information system, and on-the-job training for Northerners.

A project the size of CAGPL's would undoubtedly affect the society and economy of the Mackenzie Valley. The disruptions, termed "external costs", by CAGPL were only indirectly related to the project since they would be as much a function of the nature of the economy and the socio-political circumstances of its people. Examples of such external costs included general wage and price inflation, compensation payments and capital provisions to local businesses. CAGPL felt that these adverse effects or disruptions were not "extra-normal" in nature or incidence of cost or effect, but only in scope and timing.

Indeed, one of the problems with such external costs was that revenue flows to governments (particularly those governments bearing the bulk of the impact, ie. municipal and territorial) would occur only well after such costs were incurred.

CAGPL suggested that some changes in revenue sharing arrangements might be required whereby Territorial and municipal governments affected by the pipeline would receive greater shares from the Federal Government. In this context, CAGPL suggested earmarking royalties and corporate income tax paid by CAGPL and the producers; CAGPL also suggested that other arrangements could be worked out for the Territorial Government to recuperate other corporate and personal income taxes from northern contractors and workers.

CAGPL thus thought that an impact fund for "extra-normal" impacts could only be useful as a tool for governments to use in meeting the peculiar demands which might be placed on them due to abnormal scope and timing of any external costs; in other words, it would be very useful in bridging the gap. However, CAGPL

stated that, if such a tool were deemed necessary, it should be established and funded by government.

With respect to compensation for economic loss, CAGPL did, however, indicate its willingness to pay speedy and adequate compensation for any economic loss sustained by Northerners as a result of interference with the current use and occupation of land.

Views on a Mackenzie Valley Pipeline Authority

CAGPL viewed this subject as one of vital concern to it inasmuch as the success and feasibility of the project could hinge on the way it was regulated. CAGPL felt that unnecessary and costly delays caused by a confusion of multiple approvals having to be obtained from different authorities could jeopardize the financing of the project.

CAGPL recommended that the government enact the appropriate legislation to establish a single regulatory agency to enforce all legislative provisions and terms and conditions which would be applicable to the construction of a Mackenzie Valley gas pipeline. Such an agency should, however, provide for input from, and co-operation with, the existing government structures in the Territories, the native people and other Northerners.

Input from native people and Northerners could be by means of a Northern Advisory Board or a Mackenzie Valley Pipeline Advisory Board. The agency's interest in being responsive to local institutions and residents would be balanced against a need by the pipeline, for the viability of the project, for a swift and speedy response as problems arose in construction.

The responsibility of this agency should be limited to those areas associated with environmental protection, design and construction of the project, and with sociological matters limited to impacts **directly** associated with construction progress in the field.

The broader sociological monitoring and controls regarding the hiring of natives and other Northerners, manpower delivery systems, business opportunities for Northerners, in-migration, community housing, community services expansion (hospitals, education and recreation facilities) should be a responsibility of the Territorial Governments working in co-operation with the communities affected.

In effect, the pipeline company should be monitored and controlled by the agency in those functions dealing directly with on-the-ground construction, and monitored and controlled by the Territorial Government in those broader human or sociological functions affecting all Northerners.

CAGPL strongly recommended that the nucleus of such an agency should be the National Energy Board with an expanded mandate and with the appropriate additions to its staff. It would have to be vested with all the legislative authority it required in order to enforce the relevant legislation and terms and conditions without interference from the various agencies which would otherwise enforce such legislation and stipulations.

The duration of the Agency's existence should be the period of major pipeline construction. Upon completion of pipeline construction, the enforcement of any requirements for continuing

stipulations would be the responsibility of traditional bodies and institutions.

Position Concerning Land Claims

An expert witness appearing on behalf of CAGPL on social matters, advanced, under cross-examination, four conditions he felt should be met before a pipeline could be built in the Mackenzie Valley. He felt assurances should be given that:

long-term and stable employment beyond the construction period would be provided to native people;

native people would have participation in entrepreneurial opportunities beyond token participation;

native people would participate in the proceeds of any natural resource extraction in the Northwest Territories; and

native people would be given a feeling that they had some say in what was going on in the land.

CAGPL's witness did not feel that a land claim settlement was necessary for the realization of the above conditions, at least for the first and second conditions while the third condition would be contingent upon some sort of agreement in principle on land claims questions.

CAGPL's policy position on the four conditions advanced by its policy witness was as follows: CAGPL agreed to the condition with respect to employment; it also agreed with the condition with respect to participation of native businesses but only to the extent of possible assistance in financing and it agreed with the spirit of the third principle. Regarding the fourth condition, CAGPL felt it hinged upon the land claims question and

thus responded by citing the Company's policy position on land claims. This position is described in the following paragraphs.

CAGPL took the position that it would be desirable to have the native land claims question settled, but that it was something to be resolved between the native groups and the government. Further, CAGPL felt that the more extreme forms of the native land claims settlements which called for the right of absolute sovereignty or veto over land should not be acceptable in a country where the central government had the national interest in mind and had the power to expropriate land if it were deemed to be in the national interest to do so.

CAGPL urged the parties to proceed on this question of land settlement and stated that, as far as the pipeline being certificated before settlement of the native claims issue, its position was that a "no pipeline" decision would harm rather than further the negotiations of a fair and equitable land claims settlement.

5.2.2 Views of Applicant - Foothills

Impact of Pipeline and Related Developments on Population Levels in the Mackenzie Valley

In considering in-migration and transient influxes into the impact area in relation to the construction phase of the project, Foothills felt that only an insignificant amount of undesirable in-migration into the Northwest Territories would occur as a result of the project. While Foothills recognized that undesirable in-migration could be a major problem it felt that, with a suitable information program in southern Canada emphasizing the Company's hiring policies and practices, such in-

migration would be discouraged. The hiring policies referred to were essentially those of hiring all "Southerners" in the South and of only Northerners being hired in the Northwest Territories for employment on the project. Furthermore, return transportation to the point of hire would be provided for workers who quit, were fired or left their work for any reason. Construction workers would also be housed in single status camps well removed from communities.

Foothills argued that there would be so few people going to the impact area on speculation that it was not possible to make an estimate of them. It did not think there would be a noticeable change in the ordinary pattern of transients going North as a result of the project. Foothills further supported this position by noting that, as its project proceeded in the North, other projects starting or progressing in southern Canada would attract potential in-migrants on their way to the impact area. In addition, Foothills stated it was not aware, in Canadian experience, of waves of people going from one region of the country to another following such projects.

Even with respect to in-migration in relation to secondary job opportunities in the impact area (other than pipeline employment), Foothills felt that such in-migration would match the availability of jobs. Contributing to this would be the fact that the existing infrastructure in the area could not absorb any large number of speculative in-migrants. Without jobs (and accompanying accommodation), transients would have to leave the region.

In closing, Foothills stated the housing of transients who

came to the Northwest Territories seeking pipeline or other employment should not be its responsibility nor should the control of transient movement. Nonetheless, Foothills said that, if a situation did develop where the government was having difficulties with in-migrants, Foothills could very well provide space on its airplanes back to the South, recognizing, of course, that in-migrants could not be compelled to return south.

In the longer term, Foothills stated that population increases in relation to the project would take place in the larger centres such as Inuvik, Norman Wells, Fort Simpson and Yellowknife. Foothills estimated that, in the 20-odd communities in the impact area (which excluded Pine Point, Fort Resolution, Forth Smith and Yellowknife), population increases, above estimated levels of a no-development situation, could range from 1,100 to 3,500 people in 1985 depending on the extent to which Southerners, employed in permanent pipeline and related employment, opted for residency in the impact area. The lower estimate corresponded to a 0 per cent residency assumption and the high one to a 100 per cent residency assumption. In Yellowknife, population increases above the level of a no-development situation would be in the order of 100 to 1,000 people (in 1985) due to Foothills locating its head office there.

With respect to the 1,100 to 3,500 estimated population increase for the immediate pipeline corridor, Foothills felt the higher number was unlikely, as much of these population increases would be in relation to employment in field development where it was not expected that southern workers would take up residence in

the North; it was felt many would continue to reside in the South.

In any case, Foothills estimated that, in 1985, in terms of distribution of permanent population increases throughout the impact area, roughly 84 per cent of the new residents would live in the Mackenzie Delta area, 10 per cent in the Central Mackenzie and six per cent in the Upper Mackenzie area (excluding Yellowknife).

With respect to its long-term population projections, Foothills warned that these forecasts assumed that no other major development would take place in the impact area in the absence of its project. However, this assumption and the reliability of the estimates decreased over time since other projects could develop, such as completion of the Dempster Highway.

Turning to ethnic distribution within the impact area, Foothills noted that the relative proportion of natives would continue to decline in the absence of development, should current trends continue. Foothills felt that the pipeline and related projects should not result in a dramatic change in the ethnic composition of most of the pipeline corridor communities and the least impact would occur in the smaller communities.

The level of participation of native people in pipeline and related long-term employment would, of course, influence the influx of Northerners required to fill long-term jobs in the impact area.

Impact on Employment

Foothills estimated that, at the end of 1974, the available

labour force in the immediate impact corridor (excluding Yellowknife) ranged between 500 and 800 people. These included physically fit males who were unemployed, apparently available for work and residing in the immediate impact corridor. Virtually all of them were natives, mostly young entrants to the labor market and older persons probably lacking specialized skills and an extensive work history. The above represented, for Foothills, the available pool of local labour which could participate in pipeline and related employment opportunities.

With regard to employment opportunities in relation to the construction phase of the pipeline project, Foothills estimated that, assuming a 1982 commencement of operations, aggregate manpower requirements of the integrated hydrocarbon industry development in the Mackenzie Valley and Beaufort Basin would peak at 2,000 men in 1978, 3,700 in 1979, 6,000 in 1980, 7,900 in 1981, 6,700 in 1982, 2,500 in 1983, and 4,300 in 1984 (because of lateral contruction), 3,900 in 1985 and finally, would stabilize at its long-term level of 1,750 to 2,050 by 1986.

These figures represented Foothills' manpower requirements for the construction and operations phases superimposed upon aggregate manpower requirements for exploration and development activities, construction and operations of the gas plants and secondary employment. From the second to the fifth year above, peak manpower requirements for pipeline construction only would account for roughly 60 per cent of the aggregate peak requirements and this demand would occur during the 3 1/2 month winter season, while the manpower required during the summer

season would vary between 40 per cent and 60 per cent of the peak for the year. Foothills further stated that during the construction phase, all unemployed physically able Northerners living in the impact region, regardless of skill level, would be able to successfully obtain employment during this phase if they so desired.

Looking at the long-term or operations phase, Foothills estimated that, by 1986, local labour availability would be in the order of 950 people. Long-term employment opportunities induced by pipeline and related developments, on the other hand, would consist by 1986 of some 200 jobs in pipeline operations and maintenance (mainly located in Fort Simpson, Norman Wells and Inuvik), 255 long-term positions in gas plant operations and maintenance, some 850 (incremental) ongoing jobs in field development and between 420 and 740 permanent secondary opportunities depending on the residency option of non-Northerners. Total incremental pipeline-induced employment in the impact region would thus vary, in 1986, between 1,750 and 2,050 long-term jobs. In addition, some 56 permanent jobs would be created in Yellowknife in relation to the operations head office which Foothills intended to locate there.

Foothills projected that as many as 80 per cent of the above long-term jobs would be located in the Mackenzie Delta while the shares of the Central and Upper Mackenzie Regions would be in the order of 12 per cent and eight per cent respectively.

Foothills did make some estimates of possible participation of local residents in the integrated hydrocarbon industry. However, in final analysis, it observed that the employment

opportunities related to these developments could absorb all of the available local labour as in the construction phase. Foothills qualified this statement by remarking that, if available local labour did not move freely within the impact area to take up employment opportunities, available local labour would, in certain regions such as the Upper Mackenzie, outnumber employment opportunities.

In considering the employment impact of its project, Foothills recognized, as a critical consideration, the extent to which local residents would participate in employment induced by the project. This potential participation could not be accurately predicted.

Employment Policies and Practices

In order that the benefits provided by pipeline development should be realized, and potentially disruptive socio-economic consequences kept to a minimum, Foothills developed a number of objectives it felt were relevant to the contemporary North and in compliance with the Expanded Guidelines for Northern Pipelines, 1972. Among these objectives were the following:

maintenance and growth of a viable northern economy with the provision of employment for northern residents, particularly the native people;

provision of aid in training and counselling for Northerners who wished to take advantage of employment and entrepreneurial opportunities which would be generated by pipeline development.

Furthermore, Foothills felt that pipeline development would generate more wage employment opportunities to accommodate the rising labour participation rate and thereby, would allow those persons, who so desired, to adopt wage employment in the face of demographic growth that was putting pressure on the wildlife and, thereby, on the traditional activities.

Foothills emphasized that, if employment of Northerners was to be optimized, an efficient manpower delivery system would have to be in place prior to the start of construction. To this end, Foothills had held discussions with Federal Government representatives and was prepared to co-operate with the appropriate government agencies, contractors, unions and local organizations towards the development of such a system.

Foothills viewed the manpower delivery system as one which would be designed for the impact region (but with the capability to provide information outside the impact area, if requested) and would avoid unneccessary duplication of efforts. It would also eliminate difficulties in placing northern workers in pipeline and related activities. This system would direct Northerners into the vocation for which they were best suited as well as preparing them for the working conditions they might encounter. Foothills also felt the delivery system functions should be carried out, as much as possible, in the communities, to allow Northerners to remain in their respective communities as long as possible. Furthermore, Foothills thought this system should utilize existing services such as those already being provided by various government departments or agencies.

To achieve its objective in terms of employment of Northerners, Foothills had also held meetings with the Canadian Pipeline Advisory Council with a view to considering a special agreement or agreements which would allow northern residents to be integrated into the pipeline work force in an acceptable manner. Foothills proposed, through a project or special agreement between the contractors and unions, to ensure that the applicable terms and conditions contained in the certificate, plus other appropriate undertakings of Foothills were satisfied. Foothills stated it did not wish to be directly involved in such negotiations but wanted rather to provide the contractors, who are the historical negotiators and who would have to carry out the work on behalf of the pipeline owners, with the policy objectives of Foothills in certain areas and have them negotiate the agreements. Foothills stated that the negotiating process was already under way and the impression Foothills had received was that unions looked favourably upon preferences to northern residents. Therefore, legislation or conditions in the certificate would probably not be required to achieve these preferences.

In relation to the construction period, Foothills had a number of employment, training and orientation policies and principles including policies favouring Northerners' participation in pipeline employment opportunities.

Foothills stated that all "Southerners" wishing employment on the pipeline would be hired "south of 60" and that only Northerners wishing employment on the pipeline would be hired in the Northwest Territories. Foothills proposed to give

preferential hiring treatment to all employable Northerners. When qualifications of a Northerner and a Southerner were equal, preference would be given to the Northerner. Under cross-examination, Foothills stated that, in respect to two Northerners with equal qualifications competing for a job, the length of residency in the Northwest Territories could become a determining factor in hiring. Furthermore, it was Foothills' position that Northerners resident in the impact region should have first priority for employment opportunities, followed by other residents of the Northwest Territories as long as transportation cost for those Northerners residing outside the impact area did not exceed the cost of transporting southern workers.

Foothills also remarked that, within any job category, all workers would be treated equally in respect of benefits and allowances and that no discrimination whatsoever would take place. For the safety of personnel, workers would be assigned responsibilities in accordance with their qualifications.

Foothills proposed to offer employment to Northerners at locations as close to home as possible. Foothills was also prepared to consider employment rotation and labour pool systems for the construction phase insofar as the parties concerned could agree on the system to be adopted.

Foothills intended to direct training and employment opportunities towards new entrants into the labour force and other persons who might not have fully participated in the wage economy rather than recruiting Northerners from existing projects. Northerners electing pipeline employment would be assisted in obtaining information, training and counselling

directed towards their own particular vocational goals. Northerners seeking employment during the construction phase and lacking in skills would be encouraged to take advantage of available training opportunities in those skills presenting long-term employment possibilities.

In terms of pre-construction training, Foothills stated that since Canada Manpower, contractors and unions had traditionally provided this training, this practice should continue. Nonetheless, to ensure that Northerners would be given every chance to participate in construction at skilled levels, as a contractual agreement, Foothills would require contractors to conduct training programs leading to the placement of the greatest number of Northerners in skilled positions. Foothills also stated that all construction personnel would receive orientation courses suited to their needs whether they be Southerners or Northerners. No special orientation would be provided specifically for native Northerners, however.

All training, orientation and counselling would be planned and carried out in co-operation with government agencies responsible for those matters. Through contractual obligations, Foothills would assure itself that contractors and sub-contractors operated in compliance with Foothills' policies respecting employment and working conditions. Foothills recognized that, if the preferential hiring of Northerners was to be enforced, workable, and provide maximum benefits to Northerners, it was important to have a common definition of a "Northerner".

Turning to employment policies during the operations phase, Foothills said they would give priority to Northerners in the filling of all trainee positions and "experienced" positions. Upon approval to construct and operate its proposed pipeline, Foothills would provide additional operational phase training through an expanded NORTRAN program. When the pipeline went into operation, on-the-job training would be transferred to the North. During the construction period, Foothills would offer its operations and maintenance trainees employment in the construction management division of the company. Furthermore, Northerners who became operations and maintenance personnel of Foothills would be given the opportunity for further training to take advantage of long-term employment opportunities offered in the operational phase. This training would be directed towards upgrading skills and qualifying Northerners to assume supervisory and managerial responsibilities.

During the operations phase, Foothills stated it would also be prepared to consider job rotation systems to allow native Northerners to pursue traditional activities if desired. Foothills remarked that this might not be feasible for native Northerners in the supervisory category.

Foothills would provide permanent employees with a benefits program including savings plans. Money management advice would also be available through counselling services to those of its operations staff who desired it. In addition, Foothills would provide accommodation or accommodation allowances for all of its permanent employees in the Northwest Territories.

Foothills stated, during cross-examination, that all of its operations and maintenance positions in the North would be open to Northerners. It felt it would be to its benefit to have as many Northerners in the operations phase as possible as this could result in lower turnover of personnel. Foothills stated that it might be possible to fill as many as 90 per cent of the pipeline operations and maintenance jobs with Northerners within five years of the start of operations.

Participation of Local Business in Pipeline Development

Foothills recognized that not all Northerners would necessarily want to work directly for the pipeline project but some might rather want to participate in pipeline activities as businessmen. It was realized that, since northern businesses employed local residents, this could provide long-term benefits in the northern communities. Foothills felt that participation of northern business in the project would depend to a large degree on the policy positions adopted by the company.

From discussions with northern businessmen, Foothills had observed that, in some instances, they were at a competitive disadvantage vis-à-vis southern based firms. This disadvantage stemmed, in part, from their inability to compete for qualified personnel and from the necessity to maintain large inventories entailing relatively large working capital commitments.

Foothills' prime objective, in the matters of local business participation, was stated as that of maximizing, within practical limits, the participation of northern businesses in the project.

Foothills' prime role was thus the formation and implementation of policies towards entrepreneurship where northern people desired it.

These policies would, hopefully, eliminate many of the competitive disadvantages (vis-à-vis southern firms) plaguing northern businesses.

One of Foothills' objectives would be to encourage people to adequately prepare themselves to take advantage of an attractive entrepreneurial opportunity when it became prudent to do so. Foothills would work closely with governmental agencies to establish a proper program for implementation of such ventures. Foothills stated, under cross-examination, that it would provide assistance and advice to northern businessmen but that, in terms of funding, it would be most appropriate that the normal channels (government programs and banks, etc) of funding be pursued. Nonetheless, the Applicant remarked that, in the past, Trunk Line had sponsored several small Alberta companies by advancing pre-payment for work to be done and by entering into contracts which guaranteed work to those businesses, and suggested that such policies would also apply to any pipeline Foothills might build in the North.

To assist the positive involvement of northern residents in the business opportunities created by the proposed pipeline project and associated activities, Foothills has sponsored the creation of the Mackenzie Valley Pipeline Business Opportunities Board composed of northern residents with wide experience in business. The Opportunities Board's functions included developing a northern bidders list, a tendering system, providing

an advisory mechanism for northern businessmen - all of which should be in place prior to construction - as well as generally promoting information with respect to the business opportunities available and the capabilities of local businesses. With respect to the tendering system, Foothills recognized the requirement for a satisfactory and organized system, and was prepared to participate with other interested parties in its development. For example, the creation of a bid depository in the Northwest Territories would preclude the use of similar facilities in the South which could favour southern contractors to the detriment of Northerners. Foothills stated that, alternatively, the same benefits could be obtained, at least during the construction period, if the Applicant established its own centralized bid-processing system in the Northwest Territories for all pipeline related contracts and subcontracts.

Another stated policy of Foothills was that of using northern firms, wherever practicable, to perform work. Foothills stated it would obtain its supplies and services, including transportation, from local businesses to the extent that supplies and services to Northerners would not be unduly inflated in cost or depleted in number. Furthermore, Foothills indicated that contractors and sub-contractors on its project would be required to purchase from local northern businesses wherever practical and where there would be no adverse effects on community supply or services. Foothills also stated it would locate its construction headquarters in Yellowknife where close contact could be maintained with northern companies and organizations.

Other policies of Foothills towards maximizing participation of local business in the project included making available, whenever practical, contracts in proportions which would be manageable by small local firms and, whenever possible, providing a greater than normal lead-time with regard to bidding on contracts.

Foothills also proposed to use predetermined bidders' listings and procedures which, in its view, were seen as effective means of giving local businesses a fair chance of winning the contracts they were capable of handling. Foothills stated that the preferential treatment of northern business would be furthered by this policy as, in many cases, bidding and the bidder's list, on certain items or contracts would be restricted to northern firms only.

Foothills also suggested it might consider entering into cost-plus arrangements with local entrepreneurs, more specifically native entrepreneurs. Under these circumstances, Foothills said it could put some of its own people into these small businesses to get them started.

While Foothills said it would make every effort to support northern business development, no attempt would be made to stimulate the formation of new businesses or the expansion of existing businesses which could not be sustained following completion of the construction phase. Local business participation would not be restricted to the operations phase. However, Foothills would encourage businessmen to pursue the longer-term opportunites which the operations and maintenance phase could offer.

In relation to the operations phase, Foothills stated its objective, in terms of local business particpation and entrepreneurial opportunities, as one of maximizing the "northern content" of the project. Such a policy would be implemented through continued application of the local procurement policy initiated during the construction period and through input from the Opportunities Board.

Foothills observed that a prime determinant of the magnitude of income retention (extent to which wages and profits remain in the North for long-term community growth and benefit) and secondary employment creation in the impact area would be the degree to which local business would participate in entrepreneurial opportunities generated by the project. Foothills felt that its policies to help develop a vigorous and expanding private sector would be in the best long-term economic interest of the Northwest Territories. Indeed, this policy should help the Northwest Territories in attaining a greater degree of self-sufficiency and a more favorable regional balance of payments.

Personal Income Effects of Pipeline and Related Developments

Foothills held the view that a large portion of income in the impact area was spent on current consumption while the level of savings was low. Foothills also remarked that the level of income retention in the communities was of short duration and produced few, if any, durable benefits.

Foothills stated that the pipeline project could result in a significant injection of revenues into communities, probably larger than other development projects had generated in the impact area previously. The actual increase in disposable income would, of course, finally depend on the extent of local participation in the project.

Nonetheless, Foothills felt that unless there was some change in the existing current consumption patterns (high current consumption and low saving level), the social value of increased incomes would be considerably less. Furthermore, Foothills did not feel it could comment on whether increased disposable income would contribute to a "higher standard of living" since, in the end, this would depend on how local residents spent this income. Foothills thus pointed out there was much potential for both positive and negative impacts from the increased incomes generated by the proposed pipeline project. The impact could be positive insofar as savings were accumulated to spread the advantages of current employment over a longer period of time and could be negative insofar as high income dollars could be "squandered".

While Foothills felt its responsibility was limited in this area, it perceived its jointly-financed employee benefit plan essentially as a lucrative forced savings scheme which, in this context, would be advantageous to Northerners. Foothills was also prepared to provide money management advice as part of its overall counselling services for its operations staff.

In addition, Foothills stated its commitment to the principle that people of the Northwest Territories had a right to purchase

equity ownership in the proposed pipeline project on attractive terms. This scheme would permit Northerners to share in the profitability of the project and would constitute an additional and rewarding alternate savings investment. Under cross-examination, Foothills indicated that "equity on attractive terms" did not imply at preferred prices but rather that Northerners would have first priority to purchase shares at a price no higher than any other person would pay; in other words, Foothills would guarantee Northerners an allocation of its shares at original issue price.

Foothills further suggested that the channeling of increased incomes into economic development at the community level (commercial services, small businesses) could provide another means of creating long lasting benefits in the communities - particularly predominantly native communities where capital pools were scarce. Foothills did add, however, that the success of any such undertakings would depend largely upon the extent of local initiative, responsibility and sustained involvement.

Impact on Prices in the Mackenzie Valley

On the question of inflationary pressures generated by the proposed pipeline project, Foothills remarked that it might reasonably be expected that, with sudden increases in the demand for goods and services available locally and a rise in labour costs, upward pressures might be exerted on prices in the impact area. Nevertheless, Foothills suspected that the magnitude of price increases (over normal trends) would be quite moderate.

Changes could be substantial in some cases, whereas in others, prices could remain virtually unaffected or even decrease.

The factors which should mitigate substantial increases included, in Foothills' view, the present under-utilization of existing local productive capacity and the increase in this capacity which had been accomplished as a result of the extensive planning undertaken in view of the proposed development of the hydrocarbon industry. Such expansions, Foothills noted, were supported by a limited population and increases in population would spread fixed costs over a larger number of consumers. In certain cases, this could serve to lower unit costs such as in Inuvik where additional development might fill the slack presently existing in electricity generating capacity. In addition, Foothills felt that increases in demand for local goods and services could result in lower prices (or at least mitigate increases) inasmuch as it would entail an increase in inventory turnover thus improving the viability of local operators and making it possible to reduce prices and perhaps expand the range of goods available. Foothills observed that this phenomenon had actually occurred in some Alaska communities as a result of the Alyeska project.

Foothills did not think the increased disposable income of residents of the impact area would seriously strain the local supply capability nor would the earnings of non-resident pipeline workers who would be largely removed from communities. Foothills did recognize that the potential for inflation (and shortages) rested, to some degree, on the extent of local procurement. However, Foothills pointed out that policies had been developed

which would ensure that requirements of communities received priority treatment.

In making the above mentioned assessment, Foothills emphasized the importance that would be placed on transportation capacity allocated to impact communities (with some allowance for growth).

Foothills pointed out that, in Alaska, the Alyeska project had taken up too much of the transportation capacity and that this had resulted in the disruption of the flow of goods to certain communities. Foothills felt this would not be the case in Canada specifically because of the awareness of the problems which could emerge if its project monopolized the transportation capacity of the area.

While Foothills did not anticipate major problems with demand-induced inflationary pressures, it recognized that, on the cost side, labour costs could be expected to increase. Nonetheless, Foothills did not feel such increases in labour costs would necessarily lead to proportionate increases in the cost of living in the impact area. Foothills pointed out that local businesses would have to increase wages to compete with the lure of pipeline wages and salaries and thus retain their employees but that this would not affect all firms equally. For example, in some sectors such as mechanical and building sub-trades and transport contractors, union wages were already generally paid and thus the attractiveness of pipeline employment would lie in overtime payments. Furthermore, increased demands imposed by the projects could entail overtime payments in these sectors and thus help minimize labour attrition. Costs, of

course, would go up but, hopefully, would diminish at the end of pipeline construction as hours of work lessened.

On the other hand, Foothills recognized the vulnerability of the merchandising and service sectors in attempting to retain their employees in the face of pipeline wages and salaries. Nonetheless, Foothills noted that the pronounced differences in working conditions between these sectors and pipeline construction should serve to mitigate manpower displacements as well as reduce the additional labour costs required to keep them in these sectors.

In terms of public services, Foothills did not think that shortages and significant price increases were likely to occur in the impact area. This situation it attributed largely to the extensive planning which had already been undertaken in view of impending development in the Mackenzie Valley which had resulted in substantial additions to the infrastructure of the pipeline corridor.

In the housing market, Foothills concluded that increases in housing costs would generally be limited to new in-migrants who would not be beneficiaries of a housing subsidy program (private or public). Barring a sudden and massive move toward the urban centres of the impact area, Foothills felt that established northern residents would be little affected by the project since, presumably, existing housing programs would be maintained.

Similarly, in the transportation sector, Foothills did not expect to have any effect on the rates for the traditional barging system.

Foothills made the point that those engaged in wage employment during pipeline construction would not have any difficulty in coping with inflation and that perhaps, they might be better off economically than previously. Foothills recognized, however, that such would not be the case for all sectors or persons in the impact area. Nonetheless, Foothills remarked that few Northerners were really dependent upon truly fixed incomes (as social assistance and other transfer payments are periodically indexed) although more frequent linkage of transfer payments to the cost of living was deemed desirable. Foothills thought it was important to point out that, in terms of inflationary pressures, the magnitude of these increases would not be in the order of 100 per cent, but rather around 15 per cent (per year) at the most, overall.

While Foothills recognized that a portion of the moderate overall increase in prices (over national trends) predicted for the impact area would be attributable to pipeline activity, it stated its policies were generally directed towards minimizing this impact (such as by giving priority to local community requirements).

Impact on the Public Sector

Foothills recognized that increases in public expenditures would be necessitated by pipeline development. Foothills identified some of the potential impact areas in terms of incremental costs as being, within the federal and territorial fields of responsibility, medical services, education, roads, and

social services, to mention the more important. Foothills did not, however, produce any specific estimates as to the potential cost to the public sector required by pipeline and related developments.

Further, Foothills remarked that the increase necessitated in public expenditures because of the project, would be moderate when compared to the high rate of increase being incurred at present in the current process of upgrading and expanding the existing infrastructure.

On the revenue side, though, Foothills did go to some length to produce estimates of the various fees, taxes and royalties which could accrue to governments. The pipeline project would generate revenues to the federal and territorial governments in the form of stumpage fees, quarrying fees, territorial fuel taxes, right-of-way taxes and/or property taxes. Property taxes, for example, could yield something in the order of $7 million a year once all facilities of the integrated gas system were operative. Foothills pointed out that these were small sums when compared to revenues that could be derived from royalties and income taxes.

With respect to royalties, Foothills estimated these could reach $108 million in 1985, $204 million in 1988 and $246 million in 1991. These estimates were developed from a basic production royalty of 10 per cent and did not allow for the proposed new federal royalty scheme, the progressive incremental royalty (being a function of the profitability of specific fields), since studies had demonstrated to Foothills that this incremental royalty might not be payable until 1997 (which exceeded the time

span under consideration). Moreover, Foothills assumed, for simplicity, that the entire Beaufort Basin constituted one single entity when, in practice, some fields would be more profitable than others and would pay incremental royalties prior to 1997. Foothills felt it was important to point out that royalty revenues to the Canadian Government would not be any greater should a larger pipeline be built to transport gas produced in other jurisdictions, such as Alaska, in addition to Delta production because royalties are levied on production rather than throughput.

In terms of corporate income taxes of producer companies and Foothills, the latter estimated that revenues from these sources would start flowing into federal coffers by 1987 and that in 1988 the level of such taxes would be $121 million for Foothills and $292 million for producer companies; by 1991, such revenues would have increased to $126.5 million and $533 million respectively. Foothills felt the projections of its income taxes carried a higher degree of certainty than those of producers. Indeed, as gas plants would be operational facilities owned by integrated interprovincial corporations, Foothills raised the possibility that future profits earned in the Delta could be offset by losses sustained elsewhere. For this reason, it was felt projections of producer income taxes should only be regarded as approximations. Foothills further pointed out that income taxes could be generated from other sources but that these had not been estimated. These other sources were incremental amounts payable by private businesses as well as personal income taxes generated in the impact area by the proposed project.

Foothills recognized that, under present arrangements, royalty revenues accrued to the Federal Government, that these were of no direct benefit to the government of the Northwest Territories and that nothing indicated, at the present time, that additional monies would be available in the Northwest Territories. Foothills thus admitted that, under existing schemes, the impact on Territorial Government revenues would be moderate.

Nonetheless, as contributions and loans from the Federal Government were estimated to account for roughly 75 per cent of the Territorial Government's budgetary resources, Foothills concluded the potential fiscal revenues resulting from the proposed integrated hydrocarbon development raised the possibility of transforming the chronic territorial deficit into a sustainable surplus in its relationship with the Federal Government. Foothills even went further and stated that aggregate fiscal revenues (including those it had not estimated) collected in the Northwest Territories should at least equal, if not exceed, total public expenditures in that jurisdiction (which would include direct federal expenditures in the region over and above loans granted and contributions to the territorial government) should the project be undertaken. For example, Foothills showed that the present 1976-77 value of royalties and corporate income taxes generated in 1991 was in the order of $220 million which compared favourably with a territorial budget of $216 million in 1976-77. Furthermore, in terms of direct federal expenditures in the region, Foothills estimated these, in 1975-76, at $162 million before normal offsetting revenues of some $40

million. These expenditures, in Foothills' view, could be offset by other sources of revenue such as incremental personal and local private businesses' income taxes, right-of-way lease payments and the territorial fuel tax to name the more important ones.

Foothills further noted that, under present arrangements, pipeline generated fiscal revenues accrued to the Territorial and Federal Governments while a disproportionately high demand for public services would be at the local level. Presumably, the limited incremental financial costs in impacted communities (such as Inuvik, etc.) would have to be borne by the Territorial Government.

Impact on the Traditional Sector

Foothills noted that the traditional activities of hunting, trapping and fishing were intrinsically interwoven with the historical economic traditions and the social structure of the North's native peoples. Foothills ascribed to the concept of a 'dual economy' in the impact area. One segment of the economy was seen to be involved in wage employment and money matters generally. Another segment of the economy relied on the pursuit of traditional activities, these being seen as important factors in the economic well-being of most native people living in the impact area, more particularly in the smaller settlements where the level of dependence on these activities was seen as greater. To give some order of magnitude to the traditional sector, Foothills estimated that hunting and trapping, as a source of

income, accounted for roughly three per cent of the total income generated in the impact area in 1973. This, of course, did not include the value of income in kind gained by the gathering of country food which Foothills recognized as an important source of income. It was noted that in the smaller communities such as Wrigley, the value of country food gathering could be greater than 50 per cent of their income.

Based on known statistics, Foothills observed there appeared to be a decreasing number of Northerners engaging in trapping, with those who would have normally pursued trapping choosing to enter the wage economy. Foothills estimated the number of active trappers in the impact area in 1973 to be 94, compared to an estimated potential native labour force of 1,600. Foothills felt the low entrance rate of young Northerners into the trapping industry, combined with the progressive decline in the number of older skilled trappers, would obviously contribute to a diminishing trapping industry. Nonetheless, Foothills observed that most adult males and many females among the native population of the impact area participated in some form of hunting activity on a part-time basis. Foothills further remarked it thought that the traditional means of earning a livelihood were on the increase although they were still supplemental to wage employment.

Foothills anticipated that, during the construction phase, a reduction in traditional activities would occur as a majoriy of native Northerners would take advantage of increased wage employment thus leaving little time and manpower for these activities. For example, as the prime trapping season would

coincide with the peak pipeline construction season and if large numbers of native Northerners took pipeline employment, trapping returns could significantly decline in the impact area. It was generally felt that pipeline employment (both construction and operation) would attract the young educated native Northerners and that this employment would have a more profound and permanent impact on this group because they had had less exposure to traditional pursuits.

Foothills noted, however, that the special significance which land-based resources have for northern natives could offset some of the trends noted in the preceding paragraph and that traditional activities would survive the duration of pipeline development. The offsetting factors, in Foothills' view, included a northern preference for country food, an increasing demand for fur and hide for local crafts production, an increasing demand for wild furs and the sense of pride in cultural activities.

Overall, Foothills expected that the absolute number of full-time trappers would decline in the face of pipeline development but that increasing numbers of part-time hunters and trappers would probably result in hunting and trapping remaining at approximately present levels. It was felt that participation in wage employment enabled more involvement in traditional pursuits on a part-time or recreational basis.

One of the objectives adopted by Foothills in developing policies was the preservation of opportunities for traditional activities either as full-time, part-time or recreational pursuits.

To preserve the social and physical environment vital to traditional pursuits of native people who wish to continue life on the land, Foothills' policies would be formulated to minimize interference with land essential to such existence. Foothills stated the pipeline would be built and operated so that disturbance to such areas was kept within acceptable limits. Similarly, camps and facilities would be located to avoid adverse impacts on traditional pursuits after consultation with the concerned bodies. Foothills also showed a willingness to devise a workable system, during the operations phase, to accommodate those people wishing to pursue pipeline employment and traditional activities inasmuch as the demands and scheduling of pipeline activity would not be impaired. Further, the use of firearms would be restricted; on the other hand, Foothills felt workers should be allowed to go fishing during their free time if the required permits were obtained. Finally, in the event that lands essential to traditional pursuits suffered loss or damage due to pipeline activity, reasonable claims would be dealt with promptly and equitably.

Foothills believed its proposed project would offer advantages to those people wishing to take wage employment or pursue business opportunities, while permitting those people wishing to pursue traditional activities the opportunity to do so. Foothills observed that, in the absence of additional wage employment opportunities, more people would have to rely upon hunting and trapping which could be a problem if there were too many hunters and trappers, given the wildlife base. The converse was, of course, that as more people became engaged in wage

employment, the economic viability of those remaining in traditional activities increased.

Foothills further suggested that substantial income accruing from pipeline employment could be reinvested into entrepreneurial ventures such as big game outfitting and fishing lodges where the native Northerner would be in a position to utilize some of the skills acquired as a trapper and hunter.

Impact on Transportation and Communications

With respect to communications, Foothills identified its need for an extensive and highly reliable communications system. Foothills stated this system would have sufficient capacity over and above pipeline operational demands to augment the Northerners' existing communications.

On the transportation side, Foothills recognized that the requirements of the proposed gas pipeline project would cause the capabilities of the present Mackenzie Valley transportation system to be exceeded. The transportation capacity of the Mackenzie District would be heavily burdened prior to and during construction of the proposed pipeline, gas gathering and processing facilities.

Foothills wished to avoid any disruption in the normal delivery of consumer goods to the residents of the communities and felt there must be assurances that the northern consumer could obtain his supplies and materials without undue financial hardship or delay.

Foothills pointed out that it would make the arrangements, at its cost, to obtain additional barging facilities (including docking facilities) needed to meet not only its own requirements but also the normal community requirements. For example, Foothills' decision to use Axe Point as a staging site was made to protect traditional or normal requirements of the area because it was felt Hay River did not have the capability of handling these at the same time as pipeline requirements. Furthermore, except for Hay River, there would not be any effect on communities beyond this point because whatever public facilities were required would be put into place by the Company, unless some agreement was struck with any of the communities.

In Foothills' view, to the extent that the facilities required for the project would be costed into the proposal in their entirety (including some allowances for expansion at Hay River), they would have no effect on the rates for the traditional or normal barging system.

Containment Policies During the Construction Period

Foothills' policy on containment consisted essentially of having construction workers housed, on a "single-status" basis, in self-contained, well-equipped camps, well removed from the communities. Foothills would not make Company vehicles available for the casual transportation of construction workers nor would it provide parking space at campsites for private vehicles.

Furthermore, Foothills intended to plan, as expeditiously as possible, the routing of personnel to and from the job site.

Waiting time at existing airports used as points of arrival and departure to and from hiring centres would be minimal.

Foothills recognized that, ultimately, union agreement would be required before many of the aspects of the containment policy could be assured; discussions had taken place regarding these issues but no agreement had been finalized.

Impact on Northern Communities

Foothills designed its project to have a minimum demand on the local infrastructure during the construction phase. Except for Hay River and the use of its barging facilities, Foothills did not expect to have any effect on the communities since the facilities it required would be operated independently from the communities, unless the communities wished to have some other arrangement.

While Foothills maintained that most settlements should not be noticeably affected, it did anticipate that Inuvik, Norman Wells and Fort Simpson would be relatively high impact centres in both the construction and operations phases. Hay River would also experience increased activity, particularly during the construction phase.

Foothills also recognized the potential for indirect impact on communities such as the diverting of local labour, particularly skilled labour, from their present employment. Foothills did point out, however, that this drain could be offset by new entrants into the labour market and that rotation schemes could alleviate some of the difficulties which might be

associated with diversion of manpower in the smaller communities. In terms of goods and services, Foothills said it would ensure that the communities had first priority so as not to create shortage situations.

In any case, as a matter of policy, Foothills would work closely with the communities in order to avoid the overtaxing of infrastructure and would assist in the upgrading of existing facilities should the project make this necessary.

In addition, Foothills established a 'community liaison program'. The objectives of this program were to provide northern people with an opportunity to be well informed about the proposed pipeline system and to provide them with a means for expressing their desires and concerns as they related to the system. If the pipeline project were to provide maximum benefits to the North and its people while causing a minimum of social disturbance, there was a fundamental need for a good working relationship and understanding between the people of the North and the people of the pipeline. Foothills considered its liaison program to be one of the most important components of its overall socio-economic program.

In the longer term, the impact of the proposed pipeline and related developments would be largely concentrated in the operations centres, Inuvik, Norman Wells, Fort Simpson and, to some extent, Yellowknife. The proposed hydrocarbon development was expected to create significant incremental demand for utilities, road extensions, serviced land and recreational facilities.

However, in locating its operation and maintenance facilities, Foothills intended to work with the communities so that the result would benefit the community. Foothills was prepared to work with the appropriate government agencies at an early stage in the project to ensure that adequate public services would be available during the construction and operations phases to meet the needs of the pipeline and public at large.

Foothills anticipated that communities would require assistance to find interim financing for water and sewage lateral distribution systems and street extensions and would require additional revenues to increase the availability of serviced land and resources to meet demands for recreational facilities. Foothills indicated its willingness to alleviate some of the financial problems which might face operations centres by stating it would be prepared to provide the communities with advanced funding through the pre-purchase of those lots which Foothills would require. Foothills stated that another way of avoiding interim financing problems would be for it to supply and pay for the required facilities rather than pre-purchase the lots.

Furthermore, Foothills would ease the impact on the operations centres by moving its operations personnel into these communities gradually over a six-year period commencing one year after the certificate was granted. In addition, having recognized that housing was one of the major problems facing the Northwest Territories in that the quality of housing varied widely and the quantity was inadequate, Foothills would supply

its own housing requirements, rather than upset the housing markets in the operations centres.

Overall, with adequate planning and co-operation amongst the various agencies and communities involved, Foothills felt the existing services should be able to absorb the impact of the pipeline and related developments. Furthermore, in its continuing programs to identify and alleviate potentially adverse socio-economic situations, Foothills did not intend to operate in isolation. Rather, it intended to work in close liaison with the proper levels of government, community councils, native organizations and the northern people and stated that, if more effective solutions were identified, it would modify its approach as required.

Gas Service to Northern Communities

Foothills proposed that, prior to construction, the procedures should be in place under which natural gas services would be provided to northern communities. It was Foothills' conviction that, wherever practicable to do so, residents of an area must be afforded the opportunity and assistance to gain access to and benefit from the resources which are developed within their area, even if it meant that special arrangements would have to be made in order for this to occur.

Foothills thus developed a plan to provide natural gas service to several communities located in the Mackenzie Valley and along the western area of the Great Slave Lake. This plan was integrated in its application and proposed to build those

transmission lateral facilities necessary to deliver natural gas to the "town gate" of selected northern communities at prices which would compete favourably with alternative sources of fuel.

Under this plan, Foothills proposed to deliver gas to the following northern communities, if they so desired: Inuvik, Fort Good Hope, Norman Wells, Fort Norman, Wrigley, Fort Simpson, Fort Providence, Hay River, Yellowknife, Rae-Edzo and Pine Point.

Foothills intended to offset the high unit cost of delivering gas to these communities by taking the extra expense of this operation into its overall account and rolling it in with the cost of delivering the much larger volumes of natural gas to downstream users. Otherwise, if the "traditional utility approach" had been followed, the resulting cost of natural gas would have been such that in only a few northern communities, perhaps only in Inuvik, would it have been economically feasible for northern residents to enjoy the benefits of natural gas service.

Foothills' plans to provide gas to northern communities called for the cost of transporting gas to the "town gate" of each community to be: (1) the actual cost of transportation, or (2) the price to be charged by Foothills for gas which it would deliver to connecting pipelines at the Northwest Territories/Alberta border, whichever of the two was the lesser. This arrangement would apply only to gas used for residential or commercial purposes.

Foothills had initially examined the possibility of providing natural gas service to 24 northern communities. As indicated in a preceding paragraph, Foothills eventually opted to serve 11 of

these communities for the following reasons. As a matter of policy, Foothills established $25/Mcf of annual throughput (as forecasted for the fifth operating year) as the level of capital investment which they could reasonably make towards the installation of each of the community laterals. This level of investment would enable natural gas to be made available to Northerners at a reasonable price while not adding unduly to the mainline transportation cost. Those communities requiring capital investment of less than the established policy level of $25/MCF of annual throughput (in the fifth operating year), as was the case for the 11 communities chosen by Foothills to receive gas service, would not have to make capital contributions towards the cost of constructing the transmission lateral facilities. If other communities desired gas and if the cost of providing the lateral facilities exceeded the established policy level of $25/Mcf, it would then be necessary for these communities to cover the amount in excess of $25/Mcf of annual throughput in the fifth operating year.

As mentioned earlier, Foothills' plan of providing gas to communities was primarily directed to reducing the fuel costs of residential and commercial consumers. Insofar as Foothills proposed to install capacity in excess of that required by the above consumers and, to the extent that spare capacity was available, natural gas would be offered to industrial consumers on terms similar to those for residential and commercial consumers. However, if to supply gas to industrial customers, Foothills was required to expand the transmission laterals initially installed, those industrial users would have to

compensate the company for the cost of constructing additional facilities.

The proposed transmission lateral system to the 11 communities would consist of approximately 460 miles of pipe ranging from 3" to 10" in diameter. This system would provide natural gas service to about 50% of the population of the Northwest Territories. The system was estimated to have an installed cost of $99.1 million. "Rolling in" of the higher unit cost of delivering the small quantities of gas to northern users would add, in the mid-1980's, $17 to $18 million to the mainline cost of service. This would result in an increase of approximately 2¢/Mcf in the cost of delivering natural gas from the Beaufort Basin to market areas in southern Canada, a price which did not appear, in Foothills' view, unreasonable for the opportunity to connect Delta gas reserves to market areas in the South.

Foothills did not intend to own or operate the community distribution systems unless it became absolutely necessary to do so in order for a community to get natural gas service. Similarly, Foothills' position was that community distribution companies should make the initial attempt to acquire gas from the producers and, if for some reason this failed, Foothills would negotiate some arrangement to provide a gas supply to the communities.

Foothills felt that, in the long term, it would be more desirable economically to supply the selected communities with natural gas rather than channeling the funds required to build the laterals towards reducing the cost of fuel oil in these

communities. For example, Foothills estimated that for the 11 selected communities, the saving from using natural gas rather than fuel oil would approximate, in the early 1990's, the $14.8 million increase in mainline cost of service to provide gas to northern communities. In terms of average annual saving per northern household, Foothills estimated this saving to exceed $500 when compared to the cost of purchasing fuel oil. Furthermore, while Foothills' calculations did not include conversion costs, they noted the savings resulting from the use of gas would provide sufficient incentive to convert to gas.

Foothills felt that gas service would be particularly of benefit to those users not receiving fuel subsidies. In the case of commercial establishments, savings of this nature could be reflected in the cost of goods. Furthermore, government-provided housing (which often involves fuel subsidies) could be converted to natural gas and thus realize savings which could be directed to other areas. Another advantage of gas was the added conveniences it provided users (such as cleanliness, etc.). In addition, in those communities where electricity is generated thermally, conversion to natural gas as the generating fuel could result in lower electrical costs to the consumer.

Disposal of Surplus Material

Foothills stated there would be considerable surplus materials available for disposal following the construction period. The Company intended to give residents of the impact

area the "right of first refusal" with respect to this material and equipment. Arrangements for the disposal of surplus equipment and materials would be co-ordinated with the appropriate government agencies.

Under cross-examination, it emerged that first priority or the "right of first refusal" to residents of the impact area would, in the long run, be generally on the basis that it cost the company nothing, in that the locational market value of the material would be recovered. Foothills did indicate its willingness to make certain surplus facilities available for use in communities, provided they were desired and would be used for the good of the community as a whole. Such facilities would include water and sewage treatment facilities, first-aid facilities, sleeping and camp-dining facilities and recreational amenities. During cross-examination, Foothills pointed out these would be available free of charge. However it did admit that, once disassembly costs and transportation costs (back to southern markets) were taken into account, these facilities could well have a negative salvage value.

Certain Aspects of Social Impact

Foothills characterized the impact area's social environment as one where alcohol abuse was its most serious social problem, where the incidence of crime was five to eight times greater than the national average, where welfare and social assistance were a permanent or temporary way of life for a considerable number of

Northerners and where the inadequacy of housing in both number and quality magnified other social problems.

Foothills observed that, with respect to social impact, the construction phase had a greater potential for adverse effect than the operations phase because of the level of activity it generated. To minimize this potential social impact, Foothills had devised its containment policy to limit interactions between pipeline workers and northern communities and people as well as emergency health services in the camps.

In terms of impact of the project on social infrastructure and social conditions, Foothills anticipated that, in the absence of increased prevention and enforcement measures, the incidence of crime in the Northwest Territories would continue to increase and, during the construction phase, it would be likely that these increases would be higher than they would have been in the absence of development. Welfare and social assistance were anticipated to continue to increase in the short term while it was expected that, in the longer term, the expansion of a stable employment base by pipeline and related developments should alleviate some of the circumstances and conditions which were reflected in the need for social assistance payments.

Turning to education, Foothills felt that pipeline development would necessitate limited expansion in all operating centres and that the capability to provide additional facilities was available provided sufficient lead-time was given to the education authorities. During the construction phase, Foothills would make some use of local medical facilities for more serious illnesses and accidents but would retain flexibility as workers

could be flown out to southern hospitals. During the operations phase, the impact of the project on health care facilities would be felt in the four operating centres, where, Foothills believed, adequate medical facilities were available to absorb population increases related to the project, without further expansion or diminished levels of health care services.

While Foothills recognized that the potential for socio-economic impact was greater in native society than the non-native society in the North, it stated, under cross-examination, that the self-concept of most native people had already been ravaged and that pipeline development could do little damage not already done. Foothills did observe, however, that the timing of land claims was an important element in assessing the impact of the project on native people. Furthermore, Foothills' observations were that as more people became employed, their potential to get involved in various social problems and conditions decreased.

Foothills felt that, through the provision of wage employment, business opportunities and through revenues to government, it could contribute positively to the social and economic fabric of the North. While Foothills' approach was evidently largely based on wage employment development, it realized that not all Northerners would necessarily wish to avail themselves of opportunities generated by the project; however, in Foothills' view, the project did not close off options for other types or other means of development whether it was in the traditional sector or elsewhere. Thus, while Foothills felt native people were still interested in wage employment, it recognized that wage employment was not necessarily the answer to

the social problems in the impact area but perhaps only part of it.

Another part of the answer to the native people's social problems was seen to be the re-establishment of their self-image and of their own identity which, of course, went beyond the provision of jobs. Foothills stated, under cross-examination, that tensions and feelings of alienation developed from native people's feeling of having no involvement in the decision-making processes within the impact area; Foothills observed that, if the pipeline proceeded prior to the land claims settlement, it would certainly aggravate these feelings.

During cross-examination, Foothills agreed that community-based development could be an alternative means of development for native people but expressed doubt as to whether or not it would turn out to be a viable alternative; nonetheless, Foothills supported the principle of funds being made available (not necessarily by Foothills) for this type of development.

Foothills felt there existed a requirement for the creation of a significant number of jobs in the impact area and that there did not appear to be any alternative to pipeline and related developments in terms of importance of employment opportunities generated, unless some extensive base metal development took place.

In the final analysis, Foothills indicated it was prepared to deal with the realization that the future of the North should not be pinned solely to the development of non-renewable resources; Foothills did not wish to undercut alternative forms of development such as those found in the traditional sector.

Socio-Economic Monitoring of Pipeline Construction

In response to a request from the Board, Foothills developed a plan for socio-economic monitoring. During the construction phase, its socio-economic monitoring personnel would be required to:

be sure that government and company regulations and guidelines relating to socio-economic matters were adhered to; and

respond to unexpected events which are socio-economic in nature.

Foothills' socio-economic monitoring personnel would liaise with the Company's design, engineering, procurement, construction and environmental personnel, government personnel, construction contractor personnel, supervisors-counsellors assigned to aid those Northerners working on pipeline construction and the Company's community liaison officers.

Foothills' plan called for one socio-economic monitor for each construction spread (eight in all) who would report to a chief district socio-economic monitor; similarly, community liaison officers (10 in all) would report to the chief district monitors. There would be three chief district monitors as the pipeline project would be divided into three districts. The chain of command would be such that it would culminate with the Applicant's vice-president responsible for socio-economic and environmental affairs.

The chief district socio-economic monitor would have the authority to shut down construction activities for a period of up to 24 hours.

Social Costs and Impact Funding

Foothills pointed out that it could not control all elements of change in the impact area and thus it could not submit a "blank cheque" for whatever changes or impacts occurred in the project's timeframe. Foothills was prepared, however, to be responsible for all costs which could be reasonably traced to its project. While certain costs would be easily traceable to the project, it could be difficult to determine the extent to which other costs should be assigned to the project, if at all.

Foothills stated that a procedure should be in place for allocating impact costs prior to the commencement of construction. Foothills was prepared to work with the appropriate government agencies in order to establish such a procedure.

Under cross-examination, Foothills indicated that, for the operations phase, it would deal with the communities with regard to facilities the Company might require. With respect to the construction phase, Foothills expected that costs which could be reasonably traced to its project would not be very large; as it stood,such costs would be paid out of a contingency fund.

Foothills also developed a position on compensation. Its overall philosophy was that a person adversely affected by its project should be compensated in such a manner that he is equally

as well off after the construction of the pipeline as he was initially. As well, the person should not suffer in any way because of any above-ground facilities constructed by the company, nor should he suffer in any way should the pipeline cause him any damage during operations, nor at any time his land was disturbed by the Company's maintenance crews.

Views on a Mackenzie Valley Pipeline Authority

Foothills stated that a regulatory authority would be preferable but not essential to its project. It observed that, in the construction and operation of pipelines in southern Canada, it was necessary to deal with a number of different government agencies and the process had proven to be workable. Nonetheless, if such an authority were to expedite and streamline approvals and the granting of permits, Foothills felt it would be a benefit to the overall project. In any case, if there should be a single regulatory authority, it should be, in Foothills' view, the National Energy Board.

Position Concerning Land Claims

Foothills stated it was imperative that any pipeline venture in the impact area contribute positively to the maintenance and growth of a viable social and economic fabric for the North and its people. To achieve this, Foothills believed the goals and aspirations of northern people had to be identified, assessed and satisfied. Foothills stated that the major aspiration, to which

they had given due recognition, was that of having land claims settled in a just and proper manner. Foothills generally proposed that it was possible to pursue its ends while satisfying the goals and aspirations of the northern people.

While Foothills felt the land claims question was something to be settled between the Dene people and the government, Foothills stated its position was that pipeline development should not proceed before the land claims were settled.

Foothills remarked that a large majority of the population permanently resident in the Mackenzie Valley area was, at the time of the hearing, opposed to the development of any major pipeline; in Foothills' view, the key thing before its project could proceed was public acceptance. Foothills thus took the position that where even a minority, two per cent to five per cent of the responsible local residential citizenry, was opposed to the pipeline, it would not proceed with construction even if it had the certificate to do so; rather, it would wait until such time as it could proceed with the project in an atmosphere of public acceptance.

In terms of land claims, this evidently meant that if a settlement were "imposed", and the residents of the Mackenzie Valley were not in agreement with this settlement, Foothills would not proceed immediately to build the pipeline even if it were the successful Applicant.

5.2.3 Views of Intervenors Resident North of the 60th Parallel (Mackenzie Valley)

The Committee for Original Peoples Entitlement and Inuit Tapirisat of Canada (COPE & ITC)

Mr. Sam Raddi, president of COPE expressed a number of concerns with respect to the projects under consideration as they could affect native people. Principal concerns expressed were:

the consultative process had not worked because no one listened to what native people had to say and insufficient information was furnished with respect to the projects;

project control measures over in-migrants and transients were insufficient, particularly in view of the experience gained with the Alyeska project and, in the longer run, Mr. Raddi was concerned that native people might become a minority in their own land;

the fate of smaller native communities might be jeopardized due to men leaving to work on the pipeline, services being diverted from the communities, and due to increased inflationary pressures even in smaller communities not directly involved in the project;

various negative social impacts could accompany the project such as drug-abuse and alcoholism; and,

environmental impacts could occur to the detriment of traditional activities.

Mr. Raddi stated that native people had been increasingly engaging in wage employment. However, he felt that native people still basically preferred traditional activities. Nevertheless, he suggested that if pipeline development were to proceed, native people should be given the opportunity to work on the project as

well as to cater to the project via business opportunities. Mr. Raddi was glad to see that training programs were offered to native people although he thought few native people were interested in permanent jobs and training was conducted too far away from home. Furthermore, he suggested that scheduling flexibility should be built in to employment opportunities to permit native people to pursue traditional activities.

Mr. Raddi saw a land claims settlement as essential to the survival of the native society. Furthermore, a settlement must be arrived at prior to the commencement of any major project. Mr. Raddi stated, however, that neither COPE nor ITC was opposed to development as long as it was under control.

Indian Brotherhood of the Northwest Territories (IBNWT)

Appearing on behalf of the Indian Brotherhood of the Northwest Territories (IBNWT), its President, Georges Erasmus, stated that no pipeline should be built along the Mackenzie Valley before his people had achieved a land settlement with the Government of Canada and had enough time to establish those institutions, based on the land settlement, that would enable them to control future developments in their best interests. It was thought that this would require a minimum of 10 to 15 years.

According to Mr. Erasmus, the prime issue for the Dene was not the pipeline but the recognition of their rights to be a self-governing people within Canada. He stated that any decision to proceed with a pipeline before a land settlement would violate the Dene right to self-determination and would prejudice the nature of any agreement reached later. The Dene felt that such

an undermining of their self-determination would be cultural genocide, or, as Mr. Erasmus testified:

"Therefore, we are against the pipeline because we know that if the pipeline comes in before we have had the chance to exercise our right to self-determination, to get control of our lives, we will be destroyed. This is cultural genocide..."

Mr. Erasmus emphasized that even if the Dene had achieved a just land settlement prior to project certification, approval in the near future of the pipeline project would be a disaster for them, the equivalent to losing their war for self-determination.

Concerning the suggestion by the Applicants that traditional, land-based, renewable resources activities would not be adequate to support the native people and that wage employment would have to be the major occupation in the future, Mr. Erasmus disagreed. He pointed out that the Dene intended to introduce alternative development, based on renewable resource harvesting and using revenues from non-renewable resources development to help with the financing. The Dene were quite prepared to sacrifice potential jobs in order to protect the land and its resources from irresponsible development. Mr. Erasmus pointed out that increasing numbers of Dene were combining living off the land with part-time wage employment and that this reflected a continuing interest in the life on the land, rather than just another means of earning money. In summarizing the Dene attitude to wage employment, Mr. Erasmus stated that they were not opposed to wage employment per se, but they were opposed to the non-Dene control of the wage-earning situation.

In relation to the traditional way of life on the land, Mr. Erasmus stated that the Applicants' compensation policies were irrelevant in that they were suggesting simple, financial compensation for what the Dene considered to be the loss of their way of life.

In response to the suggestion by the Applicants that a lack of wage employment, if a pipeline were not built, would result in increased poverty and "internal violence", Mr. Erasmus stated that their experience suggested that "internal violence", alcoholism and other social problems were associated with increased exposure to "southern" developments and wage earning situations. He added that a decision by the government to impose a settlement on the Dene would result in the deterioration of the Dene with increased "internal violence", and related problems.

Another major concern of the Dene was the potential impact of the in-migration of job-seekers, attracted to the North by the pipeline project. Mr. Erasmus described the already difficult situation where a vision of the Northwest Territories as a "frontier" has resulted in large numbers of people, particularly students, coming north seeking employment. According to Mr. Erasmus, the Canada Manpower Centre in Yellowknife warned all Manpower offices across the country not to send people north, but it had little effect on the number arriving.

Mr. Erasmus expressed concern that the pipeline might "open the door" to the Mackenzie Valley, and establish precedents for other large-scale projects which might increase even further the negative impacts.

Mr. Erasmus also disagreed with the suggestion of one of the Applicants that the self-image of the native people was so ravaged by previous contact with southern society and institutions that the pipeline project could do little further damage. He cited the existence of the IBNWT, the land settlement negotiations with the government and the Dene's participation in the NEB hearings and the Mackenzie Valley Pipeline Inquiry as evidence of their continuing struggle to preserve their identity and control their future.

Native Working Men of the Northwest Territories

Mr. Joe Mercredi, representing the Native Working Men of the NWT, stated that, by careful planning, the federal and territorial governments could use non-renewable resources to form a stable employment and income base in the North. In his view, it was necessary to do the above because these governments had, in the past, neglected the potential of renewable resources to provide such an economic base.

Mr. Mercredi felt that a natural gas pipeline should be built. His conclusion was that the federal government and the companies should "assist the native working men of the North to establish an independent economy in advance of, during, and after the building of the pipelines".

Town of Inuvik

The Town of Inuvik recommended and supported the construction of a natural gas pipeline through the Mackenzie Valley, provided

there was optimum involvement of northern residents in all aspects of the project, adequate provision for the protection of the environment, provision for compensation and optimum employment of Northerners.

One of Inuvik's major concerns was that for the town to accomodate the requirements of the project, it would have to expand its services in excess of "normal growth" patterns which would require large capital expenditures. However, it was felt present taxpayers should not bear the the costs of expanding services to meet the "impact growth." Inuvik therefore recommended that if the project were to proceed, senior gevernments should provide it with well researched population forecasts, access to development capital and freedom from interest payments on "impact growth" projects.

Other recommendations put forward included: that as many supplies as possible should be bought in Inuvik or trans-shipped through Inuvik and that as many permanent pipeline and pipeline-related employees and facilities as possible be established in Inuvik; work camps, on the other hand, should be located away from the community and construction workers should be discouraged from visiting Inuvik.

One problem foreseen was that transportation services could give precedence to pipeline related personnel and goods to the detriment of northern residents' requirements.

Care would also have to be exercised to ensure that Inuvik's requirements for granular material (located around Inuvik) were

satisfied prior to other parties using available supplies. Adverse impacts could also result from transients coming into town, and from increases in prices, particularly in the area of services.

On the positive side, in addition to the economic stimulus which the project would provide to Inuvik via increases in population and the attraction of new businesses, the Town of Inuvik saw the project improving the transportation system of the area. The provision of gas to communities was also seen to have definite advantages.

With respect to native land claims, Inuvik's position was that any decision with respect to the proposed project must not prejudice current NWT native land claims.

On the question of a Mackenzie Valley Pipeline Authority (MVPA), the Town of Inuvik saw such an organization as a regional advisory body that would be an adjunct to the NEB, with the ability to co-ordinate the input not only from communities and people of the area, but also from all the government agencies.

City of Yellowknife

The Mayor of Yellowknife, Mr. Fred Henne, testified that the City of Yellowknife supported the proposal to build a pipeline, or pipelines to bring natural gas from the North to the rest of Canada. Other major projects such as the DEW Line and the Canol pipeline had taken place in the Territories and the impact seemed to have been acceptable. Mr. Henne was, however, aware of the

social and cultural problems that development created and thus favoured controlled development.

The proposed projects in his view appeared to offer a number of advantages. A pipeline would create new jobs and stimulate the business community. Gas being provided to Yellowknife would be a significant benefit and, furthermore, Mr. Henne thought that gas could be delivered to Yellowknife at economical rates. The pipeline project would also procure political advantages as it would be one step in making the Northwest Territories economically viable.

Generally, controlled development of a pipeline was compatible with the goals of residents of Yellowknife and of many other northerners and, in some ways, was considered necessary to achieve these goals. In addition Mr. Henne did not see any alternative which had the potential for development that the movement of energy would have. A delay in the project would have serious consequences for the region because oil and gas exploration could be curtailed.

Mr. Henne saw a need for a requirement for preferences being given to northern residents for employment on the project and for opportunity for smaller businessmen to participate in the construction and operation of the pipeline. Mr. Henne also identified a need for local input and representation with respect to any project.

Mr. Henne expected the City of Yellowknife to be able to cope with the people who might come to Yellowknife because of pipeline construction and expected the City would be able to cope with any permanent population increases associated with a project.

On land claims he stated that they should be settled but resolution of this issue should not be a precondition for pipeline construction.

Settlement Council of Norman Wells

The Settlement Council of Norman Wells favoured pipeline development as a means of overcoming the present stagnant state of the community. Many advantages were foreseen as accompanying pipeline development. As an operations and maintenance centre, Norman Wells would benefit from permanent population increases which could result in an improved level and quality of services to its residents. The settlement might also be upgraded to village or hamlet status with a resultant increase in local control of community development. The Council was aware that pipeline development would entail problems and difficulties such as lack of facilities in the face of a population influx and potential labour dislocations for resident businesses. The Council was prepared to deal with the problems which in any event were seen to be preferable to stagnation. The Council did not foresee inflation or environmental problems as presenting any major difficulty.

Legislative Assembly of the Northwest Territories

The Council of the Northwest Territories, through the testimony of D.H. Searle, Speaker of the Legislative Assembly of the Northwest Territories, formally recommended and supported the

construction of a pipeline or a system of corridor development through the Mackenzie Valley. In its view, the construction of a gas pipeline appeared to be the only immediately foreseeable means of supplying employment and entrepreneurial opportunities needed if the Territories were to continue on its hoped-for course of economic, social and political development. The Council felt that such development need not and would not take place at the expense of other possible developments in other sectors of the economy.

The Council supported pipeline development provided there were optimum participation and involvement of the Government of the Northwest Territories (GNWT) in the pipeline project, optimum employment of Northerners during all phases of the project, just and equitable compensation for persons adversely affected as a direct result of pipeline construction, and adequate provision for the protection of the environment.

It also felt that it would be desirable to settle the land claims prior to proceeding with the project but did not feel this should be a required precondition. In its view, commencement of pipeline construction should not prejudice the settlement of native land claims.

Paramount in this submission was its concern over having an input into both the construction and the operation of the project. During the construction phase it saw its major inputs being channeled through a Mackenzie Valley Pipeline Authority (MVPA). Its participation in a MVPA would become effective after certification of a pipeline by the Board. Such participation would involve policing the project as well as being involved in

the implementation of conditions to be imposed on the Applicants. The MVPA should be set up solely for this project and should terminate upon its completion. The GNWT could not supply any advice as to the composition or representation of a MVPA. It did, however, express some fears that a MVPA could centralize and keep powers which are rightly those of the Legislative Assembly of the Northwest Territories.

It expressed a desire to participate in the operations phase, more specifically in the training of northern residents for the operation and maintenance of the pipeline, and also expressed an interest in gas being provided to communities insofar as it would be economical to do so.

Robert Sharp

Mr. Sharp objected to the CAGPL application to build a pipeline across the northern Yukon and up the Mackenzie Valley. His objections were basically three-fold. First, he believed the Applicant had underestimated or understated costs of both the construction and operation of the pipeline. Second, he felt CAGPL had not utilized an adequate form of social accounting. Third, he considered the measures that the Applicant proposed to ensure the region would receive net benefits from the project had been both inadequate and superficial.

Mr. Sharp believed costs had been underestimated for a number of reasons. In his view, delays in construction would entail significant cost overruns. Such delays he attributed to lower than expected work productivity, environmental matters, and

certification delays. Manpower costs were also felt to be underestimated. Budgeting for environmental concerns for the period following construction completion was also felt to be inadequate.

With regard to social accounting, Mr. Sharp believed that despite the difficulty of equating dollars with social attitudes and values, an attempt should have been made to do so. In the area of social impact he felt CAGPL had seriously erred in failing to plan for significant in-migration, as was experienced in Alaska. CAGPL was also viewed as having failed to address the issue of the preservation of communities and lifestyles.

In the area of net benefits, Mr. Sharp felt CAGPL had failed to provide either short or long term protective mechanisms to ensure the region's residents would not bear a disproportionate share of development costs. He believed the region should be sheltered from the "boom and bust" cycle, and from pressures on community services. In his view, CAGPL should bear the extra costs for the whole range of social services to the extent they exceeded the "normal" annual increases, including costs due to in-migrants not directly involved with the pipeline.

Mr. Sharp proposed that CAGPL post a surety bond of about 10 per cent of the project cost to cover a variety of social, economic and environmental costs that could arise in the North. However, he did not suggest how such costs could be identified, evaluated and paid out of the bond.

Mr. Sharp suggested the Federal Government establish funding mechanisms to permit community regional planning to minimize potential impacts.

With regard to a Mackenzie Valley Pipeline Authority (MVPA), Mr. Sharp felt it should be an independent agency under the direction of an established board. The MVPA would allow people to bring forward their grievances on a variety of socio-economic and environmental grounds.

As a one time resident of Old Crow, Mr. Sharp further added that he perceived that people in Old Crow did not want any part of the pipeline project because of the consequences of development.

Northwest Territories Chamber of Commerce

The NWT Chamber of Commerce approved and supported the construction of a Mackenzie Valley pipeline subject to the following provisos: adequate protection of the environment; optimum involvement of northern residents including employment in all phases but with no hiring quota for Northerners; provisions for compensation of any persons adversely affected as a direct result of pipeline construction; provisions of preferences to northern business in all phases of the project including the tendering of construction contracts of a size manageable by northern businesses; and provision of social safeguards.

The NWT Chamber of Commerce recommended that construction camps be located some distance from communities and that the influx of "drifters" be limited through not completing the Dempster Highway and by controlling entries at northern airports. The Chamber was concerned that essential services in the communities should be protected during the project, that each

community be allowed to decide whether it wished to directly participate in the project and that gas be provided to the communities if it appeared economical to do so. Inflation was identified as a problem especially for those not involved in pipeline activities or those on fixed incomes. The NWT Chamber of Commerce could offer no solution to the problem of inflation.

Considerable stress was placed on the full involvement of resident businesses in the project. To this end the chamber recommended: the establishment of information channels between the Applicant, major contractors and resident businesses; the provision of assistance to obtain bonding; protection against adverse union regulations; the granting of price differentials in contracting practices in favour of resident businesses; and the allowance of two years lead-time to permit northern entrepreneurs to prepare for the project.

One of the major recommendations was the proposal that a Mackenzie Valley Pipeline Authority (MVPA) be organized. This Authority, in its view, should be set up soon, perhaps even prior to approval of the project. The MVPA should be under the jurisdiction of the NEB, rather than being a super-authority centralizing various federal and territorial functions. The Chamber saw two essential features in the role of the MVPA. First, it would be a body which would ensure compliance with any conditions or regulations. Second, it would be a body which would resolve effectively and expeditiously problems arising from different governmental departments and agencies having legitimate but often dissimilar interests. The goal was to have a small arbitration board located in the North which was capable of

solving conflicts that arose in the field. It was felt that the scope of the MVPA's activities should be restricted to the construction aspects and the construction period of the project.

With respect to native land claims, a just and early settlement was favoured, but without the project being held up by lack of settlement.

The NWT Chamber of Commerce felt that, if the pipeline project were to go ahead, the North would develop a more stable economy and an improved quality of life. It was also felt that "slack" existed in the northern economy and that the project could fill this under-utilized capacity. Furthermore, it felt there was virtually no other alternative form of development to which the North could turn. It also saw the pipeline as one means of eliminating or reducing the financial imbalance between the NWT and the Federal Government.

Northwest Territories Chamber of Commerce
Northwest Territories Chamber of Mines

The NWT Chamber of Mines recommended that a gas pipeline be constructed up the Mackenzie Valley, stating that it would provide economic benefits to the North and to the rest of Canada. It would provide stimulus to the northern mining industry by making gas available and would bring accompanying economic and social infrastructure. The Chamber also expected that the economic activity generated by pipeline construction and operation and associated petroleum exploration and development would assist the North in making social progress. At the same

time, it stated that attention must be paid to ensuring that the potential adverse effects of the pipeline, such as environmental degradation, or destruction of the native peoples' traditional way of life, were carefully avoided or minimized.

The Chamber of Mines did not think that the construction phase of the pipeline project would over-extend the existing infrastructure to the detriment of the mining industry, nor did it see labour shifts as a major difficulty.

Northwest Territories Chamber of Commerce

R. Angus Alberta Limited

Mr. J.E. Barry, on behalf of R. Angus Alberta Limited and the NWT Chamber of Commerce, strongly supported a development such as that proposed by the Applicants, and was against any idea of postponing the project.

The position adopted was based on the belief that an energy shortage situation existed, that the potential supply had been found, that the costs to bring this supply to market were known, that in evaluating the social costs of this project the needs of all Canadians must be evaluated, that in terms of environmental costs, human life must take precedence over animal and plant life and that the information pertaining to the potential social and environmental impact of the pipeline was as complete as humanly possible.

With respect to land claims, this spokesman felt that native land claims should be settled as quickly as feasible. However,

this should not be a pre-condition to proceeding with the project.

Mr. Barry also thought that if a pipeline project were to materialize, increased employment opportunities would occur for northern residents.

Mr. Tom Butters, M.L.A.

Mr. Butters, a member of the Legislative Assembly of the NWT, appeared on his own behalf. He supported continued petroleum exploration and development activity as well as the construction of a pipeline through the Mackenzie Valley. Mr. Butters conditioned his support upon the provision of optimum participation and involvement of the Government of the Northwest Territories and residents in all aspects of the project, optimum employment of northern residents, just and equitable compensation for direct adverse effects of construction and adequate provision for protection of the environment.

Mr. Butters felt northern people required economic development founded on the Territories' non-renewable resource base and that, as far as socio-economic impact was concerned, the impact of change was already being extensively experienced in the District of Mackenzie. Mr. Butters was concerned over the growing imbalance between the region's population and the resource base of the Territories. Mr. Butters felt there existed a trend towards wage employment and that this trend would continue whether or not a pipeline was built.

His concern was how opportunities could be found for a growing number of young people entering the labour market; otherwise, a policy of out-migration might have to be considered. Mr. Butters felt that a moratorium on development would entail economic hardships for the region.

Mr. Butters did, however, recognize certain problems associated with pipeline development. He identified the possibility of transportation services giving pipeline related goods and personnel precedence over requirements for local residents, a possible drain of goods from the stores, and more seriously a possible drain of local manpower resources from existing businesses and services. The intrusion into the North of "undesirables" could also be a problem. Nevertheless, Mr. Butters felt that most problems could be resolved by the municipalities and the Territorial Government. Furthermore, Mr. Butters appeared to believe these problems would be limited to the construction period.

With repect to a Mackenzie Valley Pipeline Authority (MVPA) Mr. Butters felt it should be a "legislative creature" of the people of the Northwest Territories rather than a "creature" of the Federal Government. Furthermore, he adhered to the principle of a MVPA acting in a consultative or advisory capacity.

On the question of land claims, Mr. Butters thought certification of the project could take place prior to a settlement if it were done "without prejudice to the ultimate settlement of the legitimate claims of native people of the NWT".

Mr. Butters also thought that the provision of gas to northern communities was of importance and was an issue often

overlooked by southern Canadians looking to the North for its potential energy reserves.

Northwest Territories Association of Municipalities

The Northwest Territories Association of Municipalities supported the construction of a gas pipeline up the Mackenzie Valley. Furthermore, the Association felt that, among the competing applications, the CAGPL proposal would provide the greatest net benefits to the residents of the Northwest Territories municipalities within the shortest period of time.

The Association made the following recommendations with respect to terms and conditions for the proposed project:

the Applicant should be required to build and operate branch feeder lines to communities where it is economic to do so with possibly subsidization in certain circumstances;

each community should be given the option of handling the community distributional aspects of gas and the control of gas utilities should fall under the Territorial Public Utilities Board;

extraordinary funding should be provided to high impact communities so that they could quickly respond to anticipated demands;

increases in the tax load should be limited to average increases experienced over the 1967-1973 period;

any shortfall in revenue should be recovered through operating grants from the Territorial Government within two years of pipeline construction;

a similar formula should be applied to increases in utility service charges;

senior levels of government should grant special regional supplements to people living on fixed incomes in order to reduce the impact of regional inflation;
a 3 per cent royalty on all non-renewable northern resources should be levied and deposited in a "Quality of Life Improvement Fund" with the Federal Government sharing northern generated resource revenue with the Territorial Government;
construction camps should be isolated; outsiders should be hired from points south of 60 degrees and be provided transportation back to points of hire for holidays and job termination;
the Applicant's involvement in the provision of recreational factilities in northern communities should be limited to the provision of funds which would be allocated by a local recreational board upon which the Applicant would have representation; and
drug and alcohol abuse programs should be strengthened in communities along the right-of-way with such programs to include detoxification centres.

On the question of land claims, the Association urged the Federal Government to settle the land claims in a speedy and satisfactory manner. Furthermore, it urged the Federal Government to ensure that no granting of lands within twenty miles of municipal boundaries should take place unless full consultation took place from the beginning.

Mr. Stewart, Mayor of Hay River, a member municipality of the Association of Municipalities, also supported a Mackenzie Valley Pipeline with, however, certain reservations. Mr. Stewart was mainly concerned over the use of Axe Point as a pipeline staging

site. He felt that the socio-economic effects of a second staging area (Axe Point) would be harmful to Hay River. Also, Mr. Stewart differed slightly from the Association's position on the location of camps. He felt it was not necessary to isolate the pipeline camps (which would be for staging purposes mainly) which might be set up close to Hay River.

5.3 YUKON

5.3.1 Views of Applicant - Foothills (Yukon)

Impact of Pipeline Development on Population Levels in the Yukon

Foothills (Yukon) testified that the present population of the Yukon (22,392 in 1975) was concentrated in 14 communities of 100 persons or more. Of the total, 35 per cent were 14 years of age or younger, and 41 per cent were between the ages of 20 and 45.

Within the proposed pipeline corridor, the total estimated population was 17,361, of which native people were estimated to total 3,133, or approximately 54 per cent of the total native population of the Yukon. The Applicant noted that historically the native population had been declining as a percentage of the population as a whole (currently approximately 25 per cent) and that further in-migration would contribute to the continuation of the decline.

The Applicant stated that the principal potential negative impact of the pipeline during the construction phase could be excessive in-migration and transient influxes. According to the Applicant's evidence, permanent in-migration to the Yukon resulting from pipeline construction would total approximately 1,380, well within the capacity of the social infrastructure, and most of these people would likely reside in Whitehorse. The Applicant testified that an annual in-migration and transient influx rate of 3,000 or more would prove critical, exceeding the capacity of the Territory's infrastructure.

In order to keep in-migration and transient influxes at an acceptable level, the Applicant proposed a number of policies.

Upon receipt of a certificate to build the pipeline, the Applicant would initiate a publicity campaign in southern Canada, informing all people of the company's hiring policy and emphasizing that it would be impossible for non-residents to obtain employment in the Yukon. The Applicant would enforce a policy whereby all southern employees would be hired in southern hiring halls, and in addition, the Applicant would guarantee to return all employees to their point of hire, regardless of the reason for their termination.

During the pipeline operations phase the Applicant anticipated that the population of Whitehorse might increase by as many as 300 people and that several smaller communities might experience increases of 50 to 70 people each, but that such increases would not place an excessive burden on those communities.

Impact on Employment and Employment Policies and Practices

The Applicant estimated the current Yukon labour force to be 10,000 people, with a current unemployed labour force of 2,000. Approximately 600 of these would already be adequately trained to obtain pipeline construction employment.

While the peak, direct employment during pipeline construction would be 2,200, the Applicant felt that many of these positions would be filled by skilled workers from the South. There would be about 600 direct, indirect and secondary jobs for Yukoners during construction.

During pipeline operations there would be 189 positions created and the Applicant expressed confidence that approximately

50 per cent of those positions would be filled by Yukoners, as trainees, at the start of operations.

The following paragraphs set out the employment policies put forward by Foothills (Yukon).

Preferential hiring treatment would be given to all employable Yukoners. Where qualifications were equal, the local resident would receive preference over the non-resident. The Applicant would look to the Yukon Territorial Government to provide a universal definition for the term "Yukoner" to be used in determining employment, training and orientation preferences.

Traditionally, pre-construction training has been provided by Canada Manpower, the contractors and the unions. The Applicant would co-operate fully with these groups to provide such training. In addition, basic orientation would be provided on subjects such as camp rules, safety regulations and permit conditions and stipulations.

As one of the sponsoring companies of NORTRAN, Foothills (Yukon) would provide additional operational phase training through an expanded NORTRAN program, once approval to construct and operate the proposed pipeline had been received. Yukoners would be given priority in the filling of all trainee and experienced operations positions. Selection would be made on the basis of individual aptitudes, interest, compatability and length of residence in the Yukon. For those Yukoners who joined the operations and maintenance staff, there would be additional training to enable them to upgrade their skills and to qualify for supervisory and managerial positions.

During the operations phase, the Applicant would be prepared to implement a job rotation system which would allow native residents to pursue traditional activities such as hunting and trapping, should the workers so desire. However, such a system would be more feasible with non-supervisory positions.

In order to optimize the employment of Yukoners on the project, the Applicant felt that an efficient manpower delivery system would have to be established. Such a system would be designed to deliver Yukon manpower to all pipeline and related construction activities and it would be the Applicant's intention to co-operate with appropriate government agencies, contractors, unions and local organizations in establishing such a system. Foothills (Yukon) felt that the situation in the Yukon would not require as complex a system as that proposed for the Northwest Territories but the goal of both Territories was the same, facilitating the participation of local residents in the pipeline project.

The Applicant testified that all hiring of workers originating from outside the Yukon would take place in hiring halls south of the 60th parallel and that only Yukoners would be hired in the Yukon for employment on the pipeline project.

As with the Foothills project, all construction personnel would be unionized. While union locals in southern Canada frequently had a 60-day residence requirement for members, the Applicant felt that a considerably longer residence requirement, perhaps as much as one year, should apply to the Yukon. In the event that a 60-day requirement was negotiated by the unions, the

Applicant suggested that the Yukon Territorial Government legislate a longer time period.

Participation of Local Business in Pipeline Development

It would be one of the Applicant's prime objectives to maximize, within practical limits, the participation of local businesses in the project. The Applicant had already held discussions with a number of the relevant organizations, such as the Yukon Chamber of Commerce, in order to make local businessmen aware of the opportunities offered by the project, to ensure that the Applicant's policies reflected any special circumstances or local needs and to develop a bidder's list of those Yukon businesses which might wish to supply goods and services to the project.

Foothills (Yukon) anticipated that the project would generate active, but not unusual, trends in business opportunities and that the use of local supplies would create some mutual economic advantages for both Foothills (Yukon) and established local enterprises.

It would be the intention of the Applicant to locate its construction headquarters in Whitehorse, and this would facilitate contact with local businesses. While it would encourage local participation, the Applicant would also guard against such participation producing negative impacts on the communities. Thus, if it appeared that the level of participation in a given community was resulting in shortages or contributing to inflation, the Applicant would reduce its reliance on the local businesses. In addition, Foothills (Yukon) would be guided

at all times by the wishes of the communities as to the amount of local participation in the project.

With regard to actual bidding procedures for project contracts, the Applicant would limit the bidder's list for certain items to northern companies only and would restrict bidding in certain areas of the project to northern firms it felt were capable of handling the work. Foothills (Yukon) would, wherever possible, allow a greater than normal lead time for local businesses bidding for contracts and would make contracts available in portions that would be manageable by small, local firms.

All project contractors and sub-contractors would be required to follow the Applicant's policies regarding local procurement of goods and services.

In order to avoid the potential danger of "boom or bust", which could accompany intensive local participation in the construction phase, Foothills (Yukon) would encourage local businesses to concentrate on the more stable and durable business opportunities related to the operations phase of the pipeline, where the Applicant intended to maximize the "local content" of the project.

Personal Income Effects of Pipeline Development

The Applicant dealt with the question of project impact on personal income primarily in the context of employment, where it was stated that one of the benefits of the pipeline project would be the increased employment opportunities for Yukoners.

In discussing the impact of inflation, it was pointed out that the relatively high level of pipeline wages might well drive up non-pipeline wages, indicating that one possible impact of the pipeline project might be a general rise in incomes and, consequently, inflation within the region. The Applicant said it would provide money management advice for members of its operating staff, as part of the overall counselling program.

Impact of Pipeline on Prices in the Yukon

The Applicant, in describing the economy of the Yukon, stated that in a society as small and widely dispersed as that of the Territory, the supply of consumer goods and services would be particularly vulnerable to inflation. The size of the community limited the ability to absorb sudden, unexpected demand and its isolation tended to delay response to such a demand.

While recognizing this vulnerability, the Applicant felt that the impact of inflation would be controlled to a great degree by Yukoners themselves in that they would have to decide on the extent of their participation in the project. The more the local businesses became involved in the project, the greater the risk of generating an excessive demand and with it, inflation. However, the Applicant felt that this risk could be greatly reduced by giving local businesses enough lead time with pipeline-related orders that their regular business dealings would not be upset. In summarizing its policy regarding the use of local enterprises, the Applicant stated that it would obtain supplies and services locally, to the extent that supplies and

services to residents would not be unduly inflated in cost or depleted in number.

In addition, the Applicant felt that there was an excess capacity in the Yukon, resulting from a series of large projects over the past years, which should be able to absorb increases in demand without generating a noticeable increase in inflation. In the event that increased inflation were to occur, the Applicant felt it would most likely be during the construction phase. If it became evident that business generated by the Applicant's local purchasing policy was contributing to local inflation, the Applicant indicated that it would consider halting such contracts to avoid further disruption of the local economy.

The Applicant agreed that the diversion of local workers into pipeline-related jobs might create an inflationary trend as local employers tried to match pipeline wages to attract replacement staff. While agreeing that some diversion of the Yukon work force to pipeline employment was probable, although difficult to predict, the Applicant argued that such diversions of manpower would not prove to be a major problem.

Impact on the Public Sector

According to the Applicant, the federal departments operating in the Yukon employed 1,231 people and spent, in or on behalf of the Yukon specifically, some $54 million in 1975-76. The Territorial Government employed 1,410 people and had a budget of $64.1 million in 1975-76.

Of the various federal departments, the Applicant felt that the Department of Indian and Northern Affairs and the Department

of Manpower and Immigration were the two most likely to require additional staff as a result of the pipeline.

The pipeline project would affect the Territorial Government in the areas of public inspections and services. Other sectors of the Territorial Government, those providing administrative and support service throughout all departments, were not expected to be significantly affected. The Department of the Territorial Secretary, the Department of Local Government and the Game Branch could all anticipate additional work, while the Department of Highways, according to the Applicant, would not need to increase its activities to handle pipeline-related tractor-trailer movements.

The Applicant saw a continuing role for the governments in providing co-ordination of manpower activities in the Territory, a role that would be expanded during the pipeline project. It would be in this area that the Applicant would be co-operating with the relevant government agencies to establish a manpower delivery system. In addition, Canada Manpower would, in all probability, continue its traditional role in pre-construction training of workers.

While the Applicant agreed that additional staff would be required by government to deal with pipeline-related increases in workload, it did not feel that it should be responsible for augmenting government staff. The Applicant felt confident that given adequate lead time, the Yukon Territorial Government would be able to prepare for pipeline impacts without requiring large budgetary increases. The Applicant also suggested that specific analysis of pipeline impact on the governmental structures of the

Yukon would ultimately have to be carried out by the government itself. The Applicant undertook to provide the various government institutions with all the information it could reasonably supply, and expressed the opinion that the overall impact of the pipeline on these institutions would be minimal.

Concerning the actual costs to the government resulting from pipeline activity, the Applicant felt that the additional revenues generated by the pipeline would be sufficient to meet any additional costs.

The Applicant estimated that revenue, in the form of municipal and other taxes, would amount to approximately $3.5 million in 1982, rising to nearly $5.5 million by 1991. More specifically, the Applicant estimated that during pipeline construction, the Yukon Territorial Government would receive approximately $2.4 million from fuel taxes, motor vehicle registration fees and permits, and approximately $215,000 in tax on liquor and cigarettes consumed.

In addition, the Applicant estimated that the Federal Government would receive $2.2 million from the disposition of land, plus corporate income taxes during the operations phase which would range from$34 million in 1981 to $45 million in 1987, a portion of which would eventually be returned to the Territorial Government.

The Applicant did, however, agree that there would be some time lag between the start of construction and the Governments' receipt of revenue, two years in the case of personal income tax and one year for fuel and other taxes.

Impact on the Traditional Sector

In describing the traditional sector of the Yukon economy, the Applicant noted that domestic fishing (non-commercial) was mainly carried out by native people, and that this, combined with hunting, provided the major source of food for those making their living from hunting and trapping. The domestic fishery was also a significant source of food for those native people either partially or totally involved in the wage economy.

The Applicant stated that there were 501 people engaged in trapping on a full-time or part-time basis in 1973-74 and that the value of furs harvested in that season was close to $500,000. In addition, big game hunting and guiding generated a considerable revenue for the Territory and its residents.

The proposed pipeline route would pass through approximately 50 registered trapping areas and would cause some disruption to the wildlife habitat and trapping activity. The Applicant felt that the fact that the pipeline route paralleled the Alaska Highway would help to keep the disruptions to a minimum.

With regard to whatever damage might be caused by the pipeline, the Applicant expressed the intention of paying compensation for losses incurred by any disruption attributable to the construction or operation activities of the pipeline. More specifically, the Applicant would negotiate (prior to the start of pipeline construction) with hunter and trapper associations to determine the method by which such losses would be compensated.

The Applicant felt that, as almost all big game hunting and the associated guiding took place away from the Alaska Highway

and the pipeline route, there would be minimal disruption of these activities.

Impact on Transportation and Communications

The Applicant stated that the Yukon had a fairly well-developed network of road, rail and air transportation. The existing communications facilities had a current capacity of 960 channels, which would be increased to 1,800 channels by 1978.

Concerning the impact of the pipeline project on the transportation system, the Applicant stated that materials would enter the Yukon via Haines, Alaska (ship and road), Skagway, Alaska (rail to Whitehorse) and by the Alaska Highway. Once in the Territory, transportation would be along the Alaska Highway.

The Applicant felt there would be adequate capacity on the railway to handle project requirements and that highway traffic would not increase excessively.

With respect to air traffic, the Applicant indicated that it would occasionally move large numbers of workers in and out of the Yukon by air, using both the Whitehorse and Watson Lake airports. It was the intention of the Applicant to schedule these charter flights so that they would not interfere with regularly scheduled air traffic. The Applicant stated that representatives of the Ministry of Transport had indicated they thought they could handle any additional pipeline-related traffic without augmenting their staff or facilities.

The Applicant estimated that the pipeline project communications requirements would be 120 channels for all the compressor stations, and that there would be four alternative

back-up communications systems available. In the event of a system failure, switchover to a back-up system would be instantaneous.

Impact on Tourism

According to the Applicant, tourism was one of the prominent primary sectors of the Yukon economy with over 340,000 people visiting the Territory in 1975, resulting in over $27 million worth of business. This, in turn, generated some 1,600 man-years of employment for Yukoners in direct and related support services.

Of the total number of tourists visiting the Yukon in 1975, the Applicant estimated that about 232,000 travelled by road.

Foothills (Yukon) stated that tourism would feel the impact of the pipeline project in the early stages of construction, primarily due to increased highway traffic and some limited use of highway accommodation by small groups such as survey parties.

In particular, increased movement along the Haines Road and along the Alaska Highway between Haines Junction and Burwash, combined with the scheduled reconstruction and paving of that section, would tend to disrupt traffic to a certain degree and would detract from tourist attractions.

The Applicant agreed there would be a period of time when pipeline construction and its related traffic would coincide with the peak tourist season.

Foothills (Yukon) stated that the number of truck movements along the Alaska Highway would not be significant in comparison to the tourist traffic. Concerning actual traffic densities, the

Applicant stated that the Yukon Territorial Government authorities had indicated that a traffic volume increase of 20 to 25 vehicles per hour would be the maximum permitted.

The Applicant expressed the opinion that pipeline-related traffic would not cause more damage to the Alaska Highway than it normally received from tourist traffic, and estimated that a maximum density during construction would be 10 trucks per hour on the highway at one spot. However, the Applicant modified this figure as it included only the major transport units such as pipe trucks, and estimated that if it were to include all vehicles associated with construction, such as buses, and crew cabs, the vehicle density would reach an average of 75 vehicles per hour when crews were going to work, at peak construction periods.

Foothills (Yukon) pointed out that the logistics plan was flexible and that the scheduling could be adjusted for the movement of goods to accommodate existing traffic patterns. Discussions would be held with representatives of the local transportation industry and government officials in order to mitigate as much of the disruption of traffic as possible.

Impact on Other Sectors of the Yukon Economy

The Applicant examined briefly several other sectors of the economy, analysing their current status and the likely impact of the pipeline project.

In 1975, there were over 90 construction or contracting firms in the Yukon. Most of them were located in Whitehorse and the great majority were quite active. Foothills (Yukon) recognized that most of these firms would be unfamiliar with projects on the

scale of the proposed pipeline, and undertook to provide, through direct discussion and other means, information on the project's requirements, so that local firms would be able to assess their ability and interest in participating on the project.

The Applicant felt that the overall construction requirements of the Territory would not be greatly altered by the project and that if local firms did in fact become involved in pipeline-related work, construction firms from outside the Territory would move in to pick up the non-pipeline business.

While there are approximately 18 million acres of potentially harvestable timber in the Yukon, no more than half of it is currently accessible. Most of the present forest products activity is centred on the region around Watson Lake.

The project would require forest products for both pipeline and compressor station construction, and the Applicant felt that timber businesses around Watson Lake could provide much of the project's requirements.

According to the Applicant, the mining sector of the Yukon economy provided approximately 24 per cent of the Territorial wages and salaries and employed, either directly or indirectly, about 30 per cent of the Territorial work force.

The major short-term impact of the pipeline project on mining would be the diversion of members of the mine work force to pipeline employment, forcing the mines to bring in additional "outside" workers as replacements.

In the long-term, Foothills (Yukon) felt that the mining industry might benefit from the supply of energy, in the form of

natural gas or gas-generated electricity, to operate new mines, mills and smelters.

Containment Policies During the Construction Period

It would be the intention of the Applicant to minimize the project's impact on local infrastructure and communities of the Yukon. One of the means proposed to achieve this end would be the provision of a parallel infrastructure in the form of self-contained camp facilities and company-arranged transportation for the work force.

There would be six main construction camps, each with 600-700 men, located approximately at the following mileposts: 30, 90, 163, 265, 360 and 462. Only two camps would be occupied at a time. In addition, there would be smaller camps at each compressor station site of approximately 150 men each.

The Applicant's policies regarding containment would be the same as for the Foothills project. All workers would be housed in self-contained camps, which would be located well away from the communities.

While Foothills (Yukon) would not be able to force workers to remain in camp, it would encourage them to do so by providing high quality facilities as well as free room and board. The larger camps would be equipped with tavern facilities and counselling services would be available in the camp, if required. Company vehicles would not be available to the construction work force for casual transportation, and parking spaces for private vehicles at the campsite would be restricted.

The camps would not be open to the public, but R.C.M.P. or other peace officers would have access to all camps and facilities as required. In addition, a plan for camp and right-of-way security and routine policing of the Applicant's regulations and permit conditions would be developed and the R.C.M.P. would be kept informed.

Short-Term Impact on Communities

The Applicant summarized the overall objectives for its socio-economic program as ensuring that the proposed pipeline system would be planned, constructed and operated in such a manner as to offer the optimum net benefit to the residents of the Yukon.

The Applicant outlined the three types of municipal structure in the Yukon:

Municipalities

Local Improvement Districts (L.I.D.)

Unorganized Communities

Of these three, the municipalities were similar in function to those in southern Canada, the L.I.D.'s were at the initial stages of self-government and the unorganized communities were administered entirely by the Department of Local Government of the Yukon Territorial Government.

The Applicant identified the communities along the pipeline route according to their status as follows:

Municipality - Whitehorse

Local Improvement Districts - Haines Junction

Teslin

Watson Lake

Unorganized Communities - Beaver Creek

Burwash Landing

Destruction Bay

Champagne

Johnson's Crossing

Upper Liard

A prime concern of the Applicant would be to avoid overtaxing the existing infrastructure during pipeline construction and/or operation. To minimize such an impact the Applicant would provide a parallel infrastructure during construction, in the form of self-contained camps and transportation facilities. The Applicant felt that the project would not place an undue burden on community services. Potential benefits for the local communities would include job opportunities and local procurement of goods and services during the construction phase.

While admitting that the construction of the pipeline would have some effect on the character of the communities along the route, in the Applicant's estimate, the project would provide net benefits to those communities. The Applicant felt it would be possible to keep the project's impacts very close in magnitude to those of other projects in the region during recent years.

One of the visible impacts of the project, especially during construction, would be the diversion of workers from their existing jobs to work on the pipeline. Some Yukoners would find the pipeline wages and overtime possibilities as enough incentive to leave their current jobs, but the Applicant felt that these

people would be in the minority and that the overall impact of manpower diversions would be minimal.

The Applicant stated that it intended to further minimize impacts with a policy of open communications with local residents, maintaining a flexible approach to socio-economic matters which would be further enhanced by early consultation with representatives of the local communities. The Applicant undertook the responsibility of remaining receptive to community interest and needs and indicated that some public meetings had already been held in communities along the proposed pipeline route. The Applicant also stated that other meetings, both public and private, with municipal bodies about specific project details could be expected as the project progressed.

The Applicant indicated that once project approval had been granted, it would start reviewing detailed plans for project implementation with local representatives. This review would include consultations with the residents of those communities involved (Beaver Creek, Haines Junction, Whitehorse, Teslin and Watson Lake) concerning the establishment of pipeline area offices.

Regarding the question of impact funding, the Applicant emphasized that it did not anticipate significant impact or demand on local services that might require additional funding from some source. However, the Applicant did agree that it would be responsible for all costs that could reasonably be traced to the pipeline project. It felt that certain costs would be difficult to charge to any single party and that some procedure

should be in place, prior to the commencement of construction for the allocation of such costs.

With regard to compensation, the Applicant stated that a person who had been adversely affected by the project should be compensated so that he would be as equally well off after construction of the pipeline as he had been initially, and that during the operations phase he would not be disadvantaged as a result of any action by the Applicant. The procedure for settling any such claims would generally follow that which had been developed by Trunk Line and Westcoast over the years.

Long-Term Impact on Communities

Of the communities along the proposed pipeline route, five would be involved in the operation of the pipeline. Four of these, Beaver Creek, Haines Junction, Teslin and Watson Lake, would be the location of pipeline area offices, with staffs of 22 people each. Whitehorse would be the location of the operations head office, an area office, the technical maintenance centre and a materials supply depot.

In anticipating the growth of all these communities, the Applicant felt that the population of Whitehorse would increase by approximately 300 people and that the smaller communities would grow by 50-70 people each. Foothills (Yukon) pointed out that the nature of project impacts in Whitehorse would be different from those in the other communities, noting that in a smaller community the size would imply that even a slight change might be felt acutely. It also seemed likely that the number of new residents in the smaller communities might be higher

initially, until more local residents completed training and were able to take up pipeline operations and maintenance jobs. Furthermore, the Applicant acknowledged that there would be a tendency for in-migrants to bring their own values with them, which, in a small community, might well result in some change of lifestyle.

Foothills (Yukon) indicated the intention to provide housing for all its permanent employees and explained that one method of assisting the local communities to meet impact costs might be by pre-purchasing those lots it would require for staff housing.

The Applicant felt that the population growth in the smaller communities, resulting from the project's operations phase, could be expected to contribute to economic stability and provide a broader base for developing community activities.

On a larger scale, the Applicant suggested that the project would contribute to the growing economic and social development trends found in most Yukon communities.

Gas Service to Communities

Foothills (Yukon) felt that the provision of an alternative and relatively inexpensive source of energy, in the form of natural gas, would be the foremost local economic benefit resulting from the pipeline project.

According to the Applicant, the proposed pipeline corridor would include approximately 75 per cent of the Yukon's total population, providing them with easy access to gas supplies if required. The gas would be supplied at the appropriate mainline taps, at the Alberta border price (i.e. the Toronto city gate

price minus TransCanada's transmission charges), where it would be picked up and distributed by a local company (not the Applicant). Foothills (Yukon) did, however, state that if no other company was prepared to operate the lateral and distribution systems, it would do so to ensure that those requiring gas would get it.

A special exchange arrangement would have to be made, so that gas from the pipeline used in the Yukon which would be Alaskan in origin, would be replaced by an equivalent Btu amount of Alberta gas in order that the volume of gas delivered to the lower 48 states would be unchanged as to calorific value. While this might require additional permits in Alberta and the United States, the Applicant felt confident that it would pose no problem. Included in the Applicant's evidence was a letter of intent from an Alberta producer, undertaking to make available the required quantities of gas to the Applicant's pipeline system for the purpose of such an exchange.

Concerning the cost of providing natural gas to consumers along the pipeline route, Foothills (Yukon) produced studies which demonstrated that, for most of the communities, natural gas would be cheaper than alternative energy sources such as fuel oil or electricity. The Applicant agreed that natural gas would be available to domestic, commercial and industrial customers, but pointed out that the use of natural gas would require the conversion of existing equipment and appliances. It was estimated that such a conversion for a domestic furnace would cost approximately $500.

The Applicant also pointed out that while the cost of the proposed laterals to Yukon communities (approximately $2.2 million) had not been rolled into the overall pipeline project costs, as was the case with the Foothills proposal, it might be a reasonable thing to consider.

The Applicant stated that, while it was prepared to make the natural gas available to the communities, the final decision whether or not to use the gas would have to be made by the individual communities themselves.

Disposal of Surplus Material

The Applicant stated that, following the completion of pipeline construction there would be considerable surplus materials available for disposal, and that it would be prepared to give the residents of the impact region the "right of first refusal" with respect to this equipment and material.

Whatever arrangements that would be made for disposal of surplus equipment and materials would be co-ordinated with the appropriate governmental authorities.

Certain Aspects of Social Impact

The Applicant stated that the housing market in the Yukon, primarily in Whitehorse itself, was quite susceptible to even small changes in the economy, and that it tended to fluctuate from month to month in response to such changes. Of the communities other than Whitehorse, the Applicant cited Teslin as being in a critical situation, where a low vacancy rate was

combined with a shortage of developed land, which would make expansion difficult.

It would be likely that the general increase in economic activity accompanying the project would result in an increased demand for housing in Whitehorse; however, Foothills (Yukon) felt that if past housing trends were to continue there would be adequate housing available. Where necessary, the Applicant was prepared to construct housing for its operations and maintenance staff and would assist employees in purchasing their own homes if they wished to do so.

The Applicant also indicated a willingness to pre-purchase building lots for these houses as a means of providing local communities with advanced funding to expand existing facilities.

The Applicant estimated that, in recent years, social assistance had increased in direct proportion to the population, and that much of the assistance went to single transients who were not actually part of the Yukon population. More people were qualifying for Unemployment Insurance Commission benefits as a result of part-time employment, and while the amount of social assistance would probably increase due to pipeline-associated activity, the Applicant estimated that the increase would be only about seven per cent.

The Applicant stated that, according to all available evidence,the consumption of alcohol in the Yukon was very high. Approximately 50 per cent of the accidental deaths and traffic accidents in the Territory were alcohol related. In addition, a large portion of the child abuse and family breakdown problems were associated with alcohol problems.

Foothills (Yukon) explained that a number of programs had been initiated by the Territorial Government and other agencies to deal with the alcohol problem, and that there were some signs of improvement in the situation. However, the Applicant did point out that the increase in population associated with the project might result in an increase in the absolute number of alcohol-related incidents.

In an effort to control the effect of alcohol on the project, Foothills (Yukon) would provide tavern facilities in the major construction camps. In addition, there would be counselling services available for any employees requiring them.

The overall crime rate in the Yukon was double that of many Canadian provinces and, according to the Applicant, there might be a link between increased economic activity and increased crime rates. This suggested that there might be an increase in the crime rate, associated with the considerable activity of the construction phase, but the Applicant felt that the level would drop again, during the pipeline operations phase.

Socio-Economic Monitoring of Pipeline Construction

Foothills (Yukon) stated that during the construction phase there would be socio-economic monitoring staff attached to the work force (one position for each construction spread and two more covering all work other than mainline construction). Their duties would include ensuring that all government and company socio-economic regulations and guidelines were adhered to and responding to unexpected events of a socio-economic nature.

The Applicant described the proposed structure of the socio-

economic monitoring system, which would be incorporated into the Applicant's department of northern affairs, answering, in turn, to the vice-president for socio-economic affairs.

Views on a Pipeline Authority

Regarding the question of a Pipeline Authority, Foothills (Yukon) stated that a single regulatory agency would be preferable but not essential to the project. The current situation in southern Canada involved a number of authorities and the process had proved to be workable. If, however, there were to be a single Authority, it was the Applicant's opinion that it should be the National Energy Board.

Position Concerning Land Claims

Foothills (Yukon) stated that a pipeline should not proceed until there was broad acceptance of the project by the residents of that area.

In his evidence before the Board, the Chief Executive Officer of Foothills (Yukon) stated that land claims were a primary issue because it would not be practical to expect to be able to finance, construct and operate a pipeline in any of the northern regions until the land claims of the northern native peoples had been met or satisfied, or a compromise achieved that resulted in general acceptance of a pipeline project. The Chief Executive Officer further stated that it would be wrong to ignore the claims and aspirations of native Canadians in the name of expediency.

Foothills and Foothills (Yukon) adopted the same position with respect to land claims.

5.3.2 Views of Intervenors Resident North of the 60th Parallel (Yukon)

Council for Yukon Indians

The Council for Yukon Indians stated it was "100 per cent" opposed to the construction of a pipeline until such time as land claims had been settled and implemented. The Council for Yukon Indians understood "implemented" to mean when all of the conditions of the land claims had been defined, certain funds and other conditions had been met by government, and when funds had been earmarked for such programs as economic development. With respect to the Old Crow and North Slope areas, it was felt there should be no pipeline in those areas at any time. At the time of the hearing in Whitehorse, the Council for Yukon Indians did not take a position on a possible Dempster pipeline lateral. However, in its argument the CYI pointed out that it had passed a motion in January 1977 in "support of the Old Crow people in their opposition to the completion of the Dempster highway and any other development in their area".

The Council's basic concern was that the Yukon Indians should meaningfully participate in any major northern development as a means for successfully preserving their lifestyles and cultures. They felt that a pipeline before settlement and implementation of land claims would threaten this. In the Council's view, to wait until implementation was complete would put them in a better position to consider such projects as the pipeline. The Council also had other concerns related to impact on the socio-economic environment of the Yukon Indians. Specifically it was concerned

with increases in alcohol abuse, crime rates, inflation and in-migration.

Government of the Yukon Territory

The Yukon Territorial Government supported the construction of a natural gas pipeline following the Foothills (Yukon) route provided that the concerns of development were balanced with socio-economic and the environmental ones, and that certain terms and conditions were met. Generally the Yukon Territorial Government considered that the Foothills (Yukon) project would increase the amount of financial revenue flowing to the Territorial Government and would increase the employment opportunities available to residents in the area. It would also allow for greater diversification of the Yukon economy.

With regard to land claims the Yukon Territorial Government said that "those engaged in land claims negotiations must be satisfied, if a settlement is not reached prior to the issuing of a certificate of public convenience and necessity, that pipeline construction would not prejudice their claims or their negotiations". However, the Commissioner was not prepared to suggest that it should be a condition precedent to the issuing of a certificate that the Yukon Indian land claims be settled and implemented.

At the time of the hearing, the Yukon Government had not set any specific residence requirement for a worker to be classified as a "Northerner" or "Yukoner" although it did favour southern hiring halls.

Even though it had not studied the concept in detail, the Yukon Territorial Government wanted to be represented on any Authority, should one be created. The idea of impact funding by Foothills (Yukon), whereby the latter should share some of the responsibilities of the financial impacts of this project on the Yukon was supported.

The Yukon Territorial Government recognized that there would be some economic and social disruptions as a result of the project and it held forth the following concerns in this area. It felt Foothills (Yukon) had underestimated the significant effects of in-migration and the consequent strains it could place on government services and facilities. Secondly, it identified the risk of increased pressures on the local prices of goods and services and the need to increase compensation for those people outside the work force. Thirdly, it noted the potential disruption of shifts in the labour force and the diversion of human resources from community work towards pipeline work. Finally, it felt a number of studies would have to be carried out before an accurate assessment could be made of potential socio-economic impacts on the Yukon. The Yukon Territorial Government wanted a major input into such studies to ensure that its concerns were taken into account. No specific mitigative measures were proposed.

The Yukon Territorial Government made the following recommendations:

prior to a certificate of public convenience and necessity being granted:

a clear understanding should be established as to the revenues going to the Yukon Government and the effects of the project on existing financial arrangements and services provided by the Federal Government to the Yukon;

adequate assessment should be made of potential impacts on the Yukon highway systems; and

a just and expeditious settlement of land claims should be negotiated or, in the event this was not possible prior to construction, that acceptable assurances should be provided that land claims would not be prejudiced by construction of the pipeline; and

as conditions of a certificate of public convenience and necessity:

priority should be given to Yukon residents in the area of hiring, sub-contracting and operation and maintenance jobs;

there should be developed a manpower delivery system;

natural gas should be supplied to Yukon communities at a competitive rate; and

the Yukon Territorial Government should be granted meaningful membership in any Pipeline Authority.

The Whitehorse Chamber of Commerce

The Whitehorse Chamber of Commerce supported the construction of a natural gas pipeline along the Alaska Highway route provided the project was orderly and controlled and that there was significant opportunity for local participation including provisions for local hire, union entry and local procurement. It

was also felt that a guaranteed supply of gas to communities should be provided at a fair market price.

While the settlement of land claims were a concern to the Chamber, it felt that pipeline development could proceed prior to a claims settlement. It stipulated, however, that there should be close consultation with the native people and that the concerns of the Yukon Indians must be reflected in the recommendations of the NEB.

Another major concern of the Chamber involved the question of the allocation of costs. It felt Yukon residents should not have to pay for pipeline-generated costs occurring in either the socio-economic or environmental sectors. While recognizing that not all costs could be allocated to Foothills (Yukon), it urged that plans be devised to properly allocate these costs. It was particularly pointed out that the Yukon economy was susceptible to inflationary wage trends and that a severe upward shift in salaries could drain the work force from established enterprises. Generally, it was felt that the Whitehorse community could handle the impact of pipeline development if the Chamber's recommendations were met.

The Whitehorse Chamber of Commerce made the following specific recommendations:

the Yukon Game Ordinance, currently requiring a six-month residency for a hunting licence, should be amended to stipulate a twelve consecutive months residence requirement;

the RCMP should establish a detachment in each construction camp for the purpose of controlling crime;

the pipeline right-of-way certificate should contain stringent and detailed regulations in respect of all aspects of environmental control;

the Yukon Territorial Government should consider the introduction of rent control legislation to protect residents from added expense in that sector;

allocation of costs should be such that Yukon residents would not bear project related costs;

the government should establish a system by which impact costs of the project could be measured;

union agreements pertaining to the Yukon portion of the route should only be signed with Canadian union locals;

definition of a 'local' or 'Yukon' resident should be defined as any person resident in the Territory on or before 1 January 1977;

hiring centres should be established at Whitehorse, Edmonton and Vancouver with only local residents to be hired through Whitehorse;

camps should be established in locations which would allow nearby communities the chance to take advantage of any local business and employment opportunities;

implementation of a complete and comprehensive on-the-job training program for Yukon residents;

all truck transportation in the Yukon should be handled by Canadian drivers; and

the Yukon business community should be given the lead time necessary to obtain inventories or special bulk purchases in order to be able to provide goods and services to the project.

White Pass and Yukon Corporation Limited

The White Pass and Yukon Corporation supported the early construction of a natural gas pipeline from the Prudhoe Bay and Mackenzie Delta areas to Southern Canada. It felt that such development would bring substantial benefits to Canadians in the form of a larger and longer lasting energy supply. In addition, it would generally improve the transportation infrastructure of the Yukon and offer the creation of year-round long-term jobs in connection with the operation of transport systems over the improved road network, with the maintenance of the road network and operation of the supply and services industry. This project would also greatly benefit the company as it would offer a diversification of the existing industrial base which currently supports it.

White Pass and Yukon Corporation did not anticipate problems in handling any additional freight although, depending on the amount and length of pipe to be transported, some straightening out of track might be necessary. It felt increased transportation costs resulting from pipeline development should be recovered from the user, and not from the local resident.

The Corporation was confident it could meet the requirements imposed by any of the pipeline projects which might be approved, provided a lead time of at least six months was available to expand its operations. The White Pass and Yukon Corporation did not think that servicing pipeline requirements would jeopardize the services it presently provided to local residents.

Robert G. McCandless

Mr. McCandless opposed the certification of a Foothills (Yukon) pipeline for several reasons.

Mr. McCandless stated that the Foothills (Yukon) pipeline might not be economically feasible because the Applicant had underestimated costs related to construction in permafrost areas, construction delays arising from environmental considerations, and substantial tax increases which could be sought by the Yukon Territorial Government. Moreover, while Mr. McCandless contended that the Applicant's proposed 16 per cent return on investment would be excessive and not in the public interest, he stated that the proposed rate of return might not be sufficient to induce the investment required.

Mr. McCandless also noted that the amount of Alaskan gas required to make the Foothills (Yukon) pipeline economic had not been firmed up for the following reasons:

(i) the State of Alaska had not established its royalty schedules and production regulations;

(ii) the supply of gas was tied to oil production which in turn would be difficult to market initially on the United States west coast; and

(iii) specific reservoir production performance data had not been firmly established.

Mr. McCandless stated that the Alaskan gas would not be available to Canadian markets and that only a questionable market existed in the United States. In addition, he argued that the United States had several regulatory options available which could increase production sufficiently in the lower 48 states to

meet United States requirements. Under cross-examination, McCandless agreed that he had not studied total requirements for natural gas and had not assessed requirements for delivery systems necessary to market increased production.

Mr. McCandless was opposed to the Foothills (Yukon) proposal because an investment of this size in a service, rather than in a production, sector could be termed a net loss to Canada's wealth.

Mr. McCandless contended that the proposed pipeline was not in the public interest because it would impinge on the safety and convenience of Yukoners.

For example, he voiced concern over the effect of a propogating fracture of the pipe, over compressor noise carrying long distances and over disruption of traffic flow on the Alaska Highway. Mr. McCandless could not foresee any mitigating benefit since he felt no Yukon home could afford to purchase gas carried by Foothills (Yukon) because of its cost relative to other available fuels.

A motion was filed by Mr. McCandless in Whitehorse seeking rulings by the Board on the following three allegations:

(i) that the application by Foothills (Yukon) et al for a certificate of public convenience and necessity was also an application to import natural gas into Canada;

(ii) that the Applicant was required to furnish copies of valid gas purchase and/or sales contracts, and such other evidence satisfactory to the Board that the State of Alaska was likely to make the gas available as anticipated by the Applicant; and

(iii) that a stay of proceedings was required to give the Applicant and all other persons sufficient time to prepare for the supply and deliverability phase of the hearing.

In response, Foothills (Yukon) took the position that no authority to import gas was being sought. This duty would rest with the owners of the gas. The gas used for transmission fuel and supplied to Yukon markets would be acquired within Canada from the shippers.

Evidence as to supply on which contracts were to be based was to be given in subsequent phases of the hearing and could then be tested.

CAGPL was of the view that the issues raised would be dealt with in another phase of the hearing.

The Board ruled that the Foothills (Yukon) application was for a certificate for a pipeline to carry Alaskan gas through Canada. The importation of the gas would be subject to Section 81 of the Act but this was not a matter to be determined in this hearing. The consideration of supply and the status of Alaskan approvals were to be the subject matter of another phase in the proceedings, during which intervenors could test the Applicant's evidence and put their own evidence on the record. For these reasons, the Board dismissed the application by Mr. McCandless.

The Association of Yukon Municipalities

The Association of Yukon Municipalities supported the Foothills (Yukon) application provided it could be assured that:

full precautions would be taken to safeguard the socio-economic environment of the Yukon;
sufficient funding would be made available for increased community expenses; and
communities would not be left with over-extended services and prohibitive operation and maintenance costs after completion of construction.

Its support was also contingent upon written guarantees that long-term benefits would be assured through such things as upgrading of the Alaska Highway, an unlimited supply of natural gas at a preferred rate (Alberta border price would be acceptable) and a gas transmission tax to be shared among municipalities in the Yukon. The point emerged during cross-examination that a transmission tax would be illegal.

The Association of Municipalities supported the Foothills (Yukon) route because it basically followed an already impacted corridor and would protect the wilderness which it considered a valuable commodity, possibly the Yukon's greatest resource in the future.

The concerns of the Association generally covered the whole socio-economic sector including local gas supply, recreation, improved transportation, revenue-sharing from resource taxation, social security, in-migration, labour shortages and increased wages, financial impacts, drug and alcohol abuse and native land claims. However, the major concern was with the impacts on the municipal budget-revenue cycle which, according to the Association, was not geared for rapid changes. It felt that the most critical impacts would be felt during the post-pipeline

period. The Mayor of Whitehorse suggested that in order to provide funds during the lag which would occur from the start of the construction period to the time when revenue from pipeline construction came on stream, the communities affected should be funded through grants from senior governments. These grants would eventually be recoverable from the pipeline by the senior governments.

The Association's specific position on the question of land claims, as developed under cross-examination, was essentially that land claims should be settled but that pipeline development could proceed prior to a settlement if necessary and if native people were consulted throughout. While it was not felt that a total land claims settlement was required prior to development, the Association did state that a definite position should be arrived at with respect to that part of the settlement dealing with pipeline development.

The following specific recommendations were put forward:
extraordinary funding should be granted to cover all contingencies followed by continuing revenue to cover all additional costs accruing to municipalities due to the project;
a supply of natural gas should be provided to communities wanting it;
each community or municipality should have the option to operate its own gas distribution system;
legislative changes should be made to give Local Improvement Districts, municipalities and other northern regulatory agencies control over local distribution of natural gas;

continuing and additional revenue should accrue to communities and municipalities through tax-sharing agreements; and income supplements should be provided to people on fixed incomes.

Yukon Conservation Society

The YCS presented six panels of witnesses which dealt with socio-economic issues in relation to pipeline development in the southern Yukon. These panels dealt with the following matters: population, methodology of socio-economic research, 'boom and bust' development and community change, social services, training and the general position of the YCS. Each panel's position is summarized below.

The YCS's population panel took the position that Foothills (Yukon)'s evidence was so deficient in the area of population projections that the NEB would not be able to arrive at an informed decision about the application. It claimed that the process utilized and the factors considered by Foothills (Yukon) in projecting population changes had misrepresented the impacts the development would have upon the region. The panel felt the Applicant should conduct additional studies in the area of population changes related to the pipeline project.

The YCS's second panel, dealing with methodology, felt that Foothills (Yukon) employed methodology which reflected a lack of competence in socio-economic research and analysis including the ignoring of relevant historical evidence, the selective quoting of research materials in a manner which misrepresented those materials and the inclusion of opinions without supporting evidence. In its view, there were not enough baseline data to

evaluate the social costs of the project, particularly with respect to communities where construction camps would be located. It was felt there should have been research into the potential impacts on the economy, society and population, an overview of socio-economic costs and benefits, an evaluation of these, and research into means of alleviating negative impacts and cost responsibilities for monitoring and alleviation. In its view, Foothills (Yukon) presented little in any of these areas beyond actions immediately within Foothills (Yukon)'s construction responsibilities.

The panel generally felt that further studies in the area of socio-economic issues was required. A requirement was also seen for independent monitoring of the project as well as the establishment of a body to determine responsibility for social and economic costs.

The YCS's third panel dealt with 'boom and bust' development and community change. The YCS felt Foothills (Yukon) had not undertaken an adequate examination of the fundamental aspects of 'boom and bust' development and the implications that this would have for the socio-economic environment of the region. The Society also claimed that the economic analysis done by the Applicant was totally inadequate in that it did not present a satisfactory picture of costs and benefits of the proposed project and did not identify who the principal beneficiaries were. It also criticized the Applicant for failing to analyse and account for the impact of in-migrants on the socio-economic environment of the Yukon.

The Society made recommendations to the effect that Foothills (Yukon) should do additional work in the identification of regional costs and benefits, in the development of scenarios depicting maximum potential impacts of the project, in developing a realistic assessment of training and employment opportunities related to the project, and in analysing the effect of the project on housing in the impact area. The YCS also recommended that the Applicant be required to formulate a process of consultation responsive to demands of the residents of the region and that third-party monitoring agencies should be established with funding provided by the Applicant.

On the subject of community change, the Yukon Conservation Society linked the pipeline project, and the in-migration it could generate, with a loss of autonomy which could lead to personal and social distress, possibly taking the form of behavioural disorders and mental illness. The Society was also concerned over the impact of wage employment on the acculturation process of native people; it was felt that intensive development could accelerate this process. In addition, the YCS set forth a number of recommendations on how to mitigate the effects of the proposed project on the social and mental health problems.

The YCS's fourth panel dealt with the impact of the proposed project on social services in the Yukon. It was composed of representatives of the Yukon Association of Social Workers as well as a representative of the Yukon Family Services Association. The main concern of this panel was that the proposed pipeline project would have potential negative social impacts on the Yukon Terriroty, specifically creating an increased demand

for existing social services. It was felt that the project, and the in-migration it could generate, could tax any and all of the presently dispensed social services and that Foothills (Yukon) had taken a very simplistic view of such potential impacts.

The YCS felt that Foothills (Yukon) should be required to participate in the implementation of pre-planned measures designed to maintain an adequate level of services and thereby circumvent a condition of crisis response to impacts, and that these plans should be implemented immediately following the issuing of a certificate of public convenience and necessity. Furthermore, Foothills (Yukon) should be required to resolve the specifics of its participation in social problem areas in cooperation with agencies delivering social services in the Yukon.

The YCS then presented a panel on matters related to training. This panel criticized the NORTRAN program and expressed the view that this program, as described in CAGPL's application, was merely window-dressing adopted for political expediency. Under cross-examination, this panel did admit, however, that it had no knowledge of the NORTRAN program as it operates today and thus could not comment on its present workings.

Finally, the YCS presented a panel which, in a broad manner, considered and reviewed the proposed project. The views of this panel generally reflected the findings and comments of other YCS panels. This panel felt that a pipeline route closely following the Alaska Highway, as proposed by Foothills (Yukon), would be less damaging environmentally that the CAGPL proposal. The YCS position was that the pipeline should be built as close as

possible to the highway and avoid penetrating all wilderness areas.

Nonetheless, the YCS found the Foothills (Yukon) application unacceptable since it was allegedly full of inaccuracies generally reflecting an inadequate job of research. The route was unacceptable to the Society as it would pass through some wilderness areas despite the proximity of an existing transportation corridor. Foothills (Yukon) had not demonstrated to the satisfaction of the YCS what the social and economic consequences of construction of such a project would be, nor was the YCS convinced that the economics of transporting Alaskan gas had been accurately calculated and forecasted. Furthermore, YCS stated that insufficient consideration had been given to alternative energy sources.

The above conclusions of the YCS led it to present a motion seeking an order of the Board that the applications by Foothills (Yukon), Westcoast, and Trunk Line (Canada) for the proposed project be forthwith adjourned until such time as the Applicants filed sufficient environmental and socio-economic data so that the Board could take into account all matters relevant to the applications and that all intervenors might have sufficient information on which to address the Board on the applications.

Since the Board decided that evidence on socio-economic and environmental matters should be adduced, the Society stated there must be a complete set of data before the Board. The Society alleged that the Applicants had failed to do this, either in adequacy or accuracy of information filed, and the Applicants had

also failed to provide an assessment of probable impacts and mitigative measures.

The Applicants rejected the notion that they were required to satisfy, either in the applications or the evidence, whatever diverse standards or desires intervenors might advance. The Applicants felt their obligation was to lead evidence sufficient to satisfy the Board and that they need be guided only by the applicable legislation and regulations in presenting filings and evidence. What had been filed, Foothills (Yukon) maintained, was in compliance with the foregoing and it was up to the Board to consider the adequacy or inadequacy of this material.

The above argument was supported by Counsel for CAGPL and Alberta and Southern who stressed that the adequacy or inadequacy of the evidence should be dealt with in its totality and not on a phase-by-phase or any other basis.

The Board was, of course, aware that, to satisfy itself that "a pipeline is and will be required by the present and future public convenience and necessity", it must have regard to the applicable legislation and must deal with and weigh the adequacy of the evidence adduced. A decision could, however, in the Board's opinion, be made only after all filings have been made and all the evidence had been heard. To do otherwise might deprive interested persons of the opportunity of being heard or of testing any particular issue. For these reasons, the Board denied the application by the Society.

Yukon Teachers Association

The Yukon Teachers Association felt that the proposed pipeline development could have a significant adverse impact on students and on the quality of education offered them in the region. Consequently, it believed Foothills (Yukon) should share in the responsibility for such detrimental effects. Therefore, it called for some stipulation, within the terms and conditions attached to any certificate of public convenience and necessity that Foothills (Yukon) might receive, aimed at minimizing negative impacts. This responsibility was considered to encompass both the psycho-social and economic aspects of the education sector.

The Yukon Teachers Association had various specific concerns, partially based on extrapolation from the situation in Alaska associated with the Alaska project. It expressed concern that the introduction into the region of high-paying, pipeline-related jobs could divert teaching staff away from schools. It was feared in-migration would put a strain on both urban and rural school systems. More problems were anticipated in the rural schools and greater impacts would occur in the elementary system than in the secondary system. It was feared the Foothills (Yukon) project could encourage a basic shift away from concentration on academic achievement towards vocational training. A general concern over possible social disruption of students was expressed in the Association's statement: "It is our concern that in the light of high-paying jobs and the movement of money throughout the region that a greater number of students

will be drawn into a variety of vices and generally socially disrupt their behavior."

5.4 VIEWS OF INTERVENORS RESIDENT SOUTH OF THE 60TH PARALLEL

Gulf Oil Canada Limited

Gulf recognized that the developement of production facilities associated with the Mackenzie Valley pipeline could have a major effect on the life-styles of many Northerners. However, it also felt that, if the development were properly planned and carefully executed, there would be major benefits to the people of the North.

Gulf stated that there was an increasing and irreversible trend away from the traditional "life on the land" and a rapidly growing demand for a more stable wage-based economy, but that the opportunities for employment had been limited.

Production and processing operations of the Company would provide the opportunity for long-term, permanent employment as well as continuing opportunities for seasonal employment. Such operations would encompass 65 permanent positions or 130 jobs. Gulf was committed to providing an opportunity for Northerners to obtain regular and seasonal employment according to their abilities and aspirations. Gulf had also become an active participant in the NORTRAN program to provide career training and development opportunities for Northerners, particularly native persons.

Gulf also felt that the development of hydrocarbon resources in the Delta would provide local entrepreneurial opportunities and would create jobs for some Northerners who might not want wage employment in the petroleum industry.

Gulf did not think that the movement of permanent residents into communities near its Delta development posed a major problem

as this could be controlled by accelerating or decelerating their entry to suit the wishes of the community and other government bodies.

Gulf also related its experience with its native employment program in Coppermine, Northwest Territories, and stated that, as in the Coppermine case, the concern for monitoring any possible detrimental impact in any community or district affected by proposed future development would continue to be part of Gulf's philosophy in the Delta or elsewhere.

During cross-examination, it was stated that slower development of the hydrocarbon industry in the Delta could have serious consequences for the area as witnessed by the adverse economic effect that changes in the level of activity of Gulf had had, in the recent past, on the Town of Inuvik. Furthermore, Gulf did not see any other development on the horizon that could alleviate the employment and income problems of the study area.

Imperial Oil Limited

Imperial testified that it had been active in the Northwest Territories since 1919 when a geological party went down the Mackenzie River to assess potential drilling sites. Imperial stated it had been spending over $5 million a year for local goods and services in the Mackenzie Delta area and had in 1975, in its Delta operations, as many as 127 temporary employees and 50 permanent employees who were northern residents. Benefits provided to the area by Imperial included the encouragement of local business, support related to innovations for environmentally safer cross-country vehicles, development of

waste disposal units and biological studies. Overall, Imperial felt that the net effect of its exploration and production operations across the country had been considered beneficial in the sense that the contribution to local income and employment and the attraction of related business and social services had generally outweighed any adverse impacts. Imperial stated that experience had shown that it had developed a harmonious relationship with local communities wherever petroleum development had occurred.

Imperial expressed its desire to pursue a progressive recruiting and training effort that would eventually lead to the involvement of northern residents in all levels of its operation. In addition to joining the NORTRAN program, Imperial recognized the desirability of working with the educational branches of the various governments to develop and implement training policies and programs to enable Northerners to qualify for jobs in the industry. It saw the desirability of special in-house training programs to develop managerial, trades and technical skills and the desirability of promoting qualified northern resident employees to management positions as these become available.

Imperial felt that, if the construction of a pipeline were approved, exploration activity would, in all likelihood, increase in the Mackenzie Delta. Conversely, indefinite deferment or cancellation of the project could create quite a few difficulties.

Imperial testified that it had developed plans to systematically open training positions so that by 1981 there would be 123 permanent positions available to Northerners if the

pipeline project received early approval. These 123 positions would cover all of Imperial's permanent jobs in the region.

Shell Canada Limited

Shell stated that exploration activities had generated improved service such as communications, air service and winter roads in the Mackenzie Valley area and it was felt this trend would continue as exploration programs phased into production operations. In general, Shell's activities served to improve life in the communities.

Shell believed that the proposed resource development would provide an opportunity for long-term, meaningful employment for those Northerners, especially the young people, who had prepared themselves, by training and education, to join the wage economy. The Company was committed to a maximum effort to assist Northerners who expressed a desire to join the industry. To this end, Shell had a policy of hiring Northerners for work in the North, on a seasonal, or, where possible, on a permanent basis. Shell encouraged its contractors to do the same. In addition, the Company had joined the NORTRAN program and would be offering 34 permanent positions in its production operations if a Mackenzie Valley pipeline were approved. Furthermore, Shell stated it would continue to support and even assist in the development of local contractors.

Shell felt that the proposed development, while providing permanent or seasonal employment opportunities, would not hamper the activities of those who wished to continue their more tranditional life-style on the land.

Shell did state, however, that some of the communities in the North were at an earlier stage of development than other areas of Canada and so could be subject to detrimental impacts. Nevertheless, it felt that by careful planning, and by good communication and consultation between the operators and the communities, detrimental effects could be minimized. For example, the Company felt that stresses due to large population increases created by proposed developments could be reduced to an acceptable level by careful planning by the communities and the developers.

Pacific Western Airlines

Pacific Western Airlines (PWA) felt that economic development as represented by the pipeline would bring social development to the North. The economic circumstances surrounding this project were viewed as helping PWA to hold down the rate of increase of its fares and rates and to maintain its standards of service. PWA foresaw that if the pipeline did not go ahead it would have to curtail its service because of the negative repercussions on the oil and gas exploration effort in the North and in the Mackenzie Delta.

PWA estimated that in the initial construction stages the volume of cargo and passengers would probably triple. PWA was prepared to meet this challenge and felt it could expand its capacity rapidly enough to meet the successful Applicant's requirements. PWA did not foresee any likelihood of adverse consequences to its present customers from possible overloading

of facilities during the construction period, and was prepared to maintain the level of service to its regular customers.

Canadian Wildlife Federation

E. Skinnarland

Mr. Skinnarland, appearing on behalf of the Canadian Wildlife Federation, addressed his remarks entirely to the question of establishing a special Authority to monitor pipeline construction in the Mackenzie Valley and to implement any conditions to a certificate of public convenience and necessity. As a result of studying existing laws and regulations and several very large northern construction projects as well as proposals for self-regulation of environmental protection, he had come to the conclusion that the Applicants' provision for environmental protection (which included the human and socio-economic environment) might well be inadequate, given the possibility of severe time and economic restraints once construction had actually begun.

To try to enforce the required regulations and stipulations, using the existing combination of agencies and committees, would prove ineffective, Mr. Skinnarland felt, and would result in delays and confrontations which would be contrary to the public interest. The only effective way to cope with such a situation would be to create a single Authority, especially for the Mackenzie Valley gas pipeline project. Such an Authority would have jurisdiction in the region north of the 60th parallel, only, and would be in effect only for the duration of pipeline

construction. Mr. Skinnarland suggested that the Authority's mandate should be based on the NEB Gas Pipeline Regulations but modified to incorporate specific stipulations or conditions pertaining to a Mackenzie Valley pipeline.

Mr. Skinnarland emphasized that, based upon his experience with the Alyeska pipeline project where there were many varying regulatory bodies with overlapping jurisdictions, there was no reason to think that the problems experienced there would not occur in Canada, unless a single Authority were created. He also stressed the importance of incorporating all environmental and socio-economic concerns and stipulations in the project's final design. To the extent possible, issues such as the impact on the local infrastructure should be dealt with in the course of hearings prior to granting a certificate. Once a project as large as the proposed pipeline actually had begun, it would become extremely difficult to modify and, as a result, both socio-economic and environmental issues would become secondary to technical and financial considerations.

In addition, Mr. Skinnarland felt there would have to be provision for a joint design review involving the Applicant and the Authority immediately upon the granting of the required certificates and permits.

Mr. Skinnarland provided a suggested organizational model for such an Authority, outlining the various functions and emphasizing the need to centralize the responsibility for implementation of all terms and conditions of government permits to construct a Mackenzie Valley gas pipeline.

Committee for an Independent Canada

The Committee for an Independent Canada believed that there has been a tendency to underestimate the social cost of development projects in Canada. In view of the potential of the proposed pipeline to "open up" new regions, the Committee was concerned with its possible impact on the social and economic structures of the Mackenzie River Valley and Delta areas.

In stressing this concern, the Committee noted that the stated policy of the Government regarding northern development set the needs of northern people as the first priority. It stated that the proposed pipeline should not be considered in isolation but as the first of a series of potential, large-scale projects for which it would establish a number of precedents.

Appearing on behalf of the Committee, Dr. Page suggested that it was possible to anticipate a number of the impacts of a project such as the pipeline by looking at the history of the construction of the Canadian Pacific Railway and circumstances surrounding it, including the Métis rebellion of 1885, with its central issue of land claims. This offered an example of how national policy and the interests of native people could become closely linked by such a project.

The CIC felt that it was essential to keep construction projects (including the pipeline) out of the Mackenzie Valley region until a land settlement had been achieved and implemented to the extent that new native institutions and structures were fully operational. Then final negotiations concerning a pipeline could be held between the companies and the relevant native institutions.

The Committee felt that a pipeline route following the Alaska highway would be less disruptive than one along the Mackenzie Valley. While a route along the Dempster highway would avoid the Mackenzie Valley, the Committee was not sure of the attitude of the people of Old Crow to such a route.

CIC recommended that if the Government decided to proceed with the pipeline project, a special Authority should be established to monitor the socio-economic and socio-cultural impacts. It would be necessary to establish such an Authority before the start of construction and a major requirement would be to develop an accurate social data base. The Authority should be able to impose financial penalties on the Applicant for non-compliance with regulations and/or conditions of a permit.

The Committee agreed that some of the impacts would be beyond the control of the Applicant, and that it might be difficult to establish responsibilities for certain costs. Particular concern was expressed about an increased rate of inflation in the region due to a pipeline. CIC felt arrangements should be made so that the social costs imposed on the region were paid by the consumers of the gas and not by the Canadian public as a whole, particularly when, in CIC's view, the majority of the economic rent would not accrue to the Canadian Government.

Committee for Justice and Liberty Foundation

Mr. G. Vandezande

Mr. Vandezande, Executive Director of the Committee for Justice and Liberty Foundation, testified on its behalf that a Mackenzie Valley pipeline should not be built until the 1990's.

CJL felt that too much weight was being given to the supply-demand balance as a determinant of whether a pipeline should be approved. In its view, the provision of this additional supply would be detrimental to what was considered to be a sounder energy policy based on the conservation of natural resources.

CJL stated that energy conservation could not be brought about through price increases alone. It felt that the Federal Government, through a broad spectrum of actions, should lead Canada towards a conserver-oriented society.

Concern was also expressed that if a Mackenzie Valley pipeline were built, higher-priced Delta gas could displace lower-cost non-frontier gas.

CJL further testified that lack of funds denied public interest groups a sufficient opportunity to be heard.

CJL recommended that:

the Federal Government impose a moratorium on all northern energy developments;

Parliament take part in a full debate on all the issues connected with a northern pipeline;

energy exports to the United States be terminated;

Canada reduce its reliance on non-renewable energy resources and instead promote the development of renewable energy resources; and

energy policy be based on 'human growth' values and not economic growth values.

The Committee for Justice and Liberty Foundation concluded that neither CAGPL nor Foothills had addressed the real "public interests" of the Canadian people.

Professor M. Brownstone

Professor Brownstone appeared on behalf of the Committee for Justice and Liberty Foundation, in his capacity as Chairman of the Board of OXFAM Canada, to explain why OXFAM felt that a land settlement, recognizing the original title of the Dene to their traditional lands and providing them with the power necessary to chart their own course, was both necessary and consistent with OXFAM's goals of social equality and justice.

The major issue, according to Professor Brownstone, was the achievement of development in the North consistent with the concept of social justice. OXFAM had had considerable experience in development work in the Third World, and felt that many of the problems and issues surrounding development there were similar to those in Northern Canada, particularly with regard to native people, who, OXFAM felt, were in a condition of under-development.

According to Professor Brownstone, one of the characteristics of the Dene was their traditional and continuing commitment to utilizing a development process based largely on the principle of self-help. OXFAM had assisted the Indian Brotherhood of the Northwest Territories to fund a series of economic studies and community workshops so that they could devise their own concepts of development and learn how to control it. However, such a process would require time, and to deny the Dene adequate time to go through this process would risk serious damage to their future. For this reason, OXFAM felt that the Dene position of no pipeline before a land settlement was a minimal demand that ought to be respected.

Professor Brownstone listed the following conditions as those which OXFAM felt would be essential to guarantee social equality and justice for the Dene:

an independent economic base suited to the needs of the Dene and sufficient to provide for their current and future developments; and

a measure of self-determination that would allow the Dene to determine their own development priorities and would secure their direct participation in other development decisions within the region.

Both of these conditions were embodied in the Dene Declaration, which OXFAM strongly supported.

The Dene approach to development would not necessarily, in OXFAM's view, preclude the possibility of a pipeline, but the question would still be, "Who would make that decision?" By the same token, OXFAM would support the right of the Dene to veto a pipeline running through their land.

Professor Brownstone concluded that the Board's decision would determine not only the cultural survival of the Dene, but their material and social survival as well.

K. McCullum and H. McCullum

Testifying on behalf of the Committee for Justice and Liberty Foundation, the McCullums presented evidence in their capacities as staff members of Project North, a group established to represent the combined position of a number of Canadian churches, "in solidarity with the native people of Canada who face the

inseparable connection between themselves as a people and the stewardship of the earth's resources".

According to the McCullums, the churches would like to see a land settlement legally and justly arrived at before more major resource developments (such as the proposed pipeline) were permitted to take place in the North. They considered the position set out in the Dene Declaration to be the proper basis for negotiations with the Government, summing up the essential points of the Declaration as "No pipeline before a land settlement" and "Land, not money, in the settlement itself". In the view of the McCullums, land was an integral part of the Dene way of life, and as such, its loss could not be compensated for with money.

In their view, the Dene were not necessarily trying to return to the "old days" when emphasizing the role of the land, but rather they were hoping to establish their rights as the original inhabitants of the land, with control over political, economic and social affairs.

The McCullums felt that the proposed pipeline project was very similar in many respects to previous, large-scale development projects in the Canadian North such as Churchill Falls, James Bay and the Northern Manitoba hydro developments. These had all resulted in negative social and economic impacts for the native peoples in the respective areas, and they expressed the concern that the pipeline would do the same.

They stated that for native people, a move from the traditional land-based life style straight into a wage employment situation on a large-scale development project was often

disastrous. They also pointed out that with such large projects there was a tendency to justify acknowledged adverse impacts by stating that the project would be "in the greater public interest".

In the event that a pipeline were to be built, the McCullums felt that the only possible way to minimize negative social and economic impacts would be to require the Applicant to post an enormous bond, to guarantee against such impacts. They pointed out that once the project was started there would be large financial pressures and severe time contraints and that unless such a bond were required, socio-economic considerations would be treated as being of secondary importance, in comparison with technical, engineering and financial matters.

Professor Peter Russell

Professor Peter Russell, testifying for the Committee for Justice and Liberty Foundation felt that it was essential for the Board to consider the kind of land claims settlement that would contribute to meeting the "public convenience and necessity" element of possible certification. Professor Russell set out to establish two fundamental points about the proposed Dene land settlement:

that their proposed settlement called for the extension to them of the fundamental principle underlying Confederation that several 'cultural nations' could exist as part of one juridical state; and

that a decision by the government to proceed with the pipeline, before negotiating a land settlement, would

probably preclude any possibility of considering a land settlement along the lines desired by the Dene people.

As outlined in the Dene Declaration filed as an exhibit in these proceedings, the word "nation" identified a cultural entity rather than a nation-state. This was claimed to be the same concept of nation as was used in the development of Confederation, which was designed to ensure the survival of several "cultural nations" within the framework of a juridical nation-state. It was stated that as with the original partners in Confederation, the Dene were claiming the right to survive as a distinct cultural entity, within the country of Canada.

In order to ensure this survival, the Dene proposed two instruments:

legislative recognition rather than extinguishment of collective title to their historic homeland; and

a devolution of governmental authority to their communal organizations.

Professor Russell stated that it was within the power of Parliament to delegate some measure of self-government to Dene institutions which might be established in the Northwest Territories on Dene lands. Such changes could be made by Parliament, without amending the constitution, and Parliament would, of course, retain the right to take back any authority so delegated. Professor Russell stated that he knew of no constitutional barriers to granting the land settlement as proposed by the Dene.

CJL felt strongly that the Dene would not survive long as a people and as a cultural entity under the major disruptions

introduced by a pipeline project unless they had already established their right to survive and the institutional means to do so. CJL also felt that once the Dene had suffered such disruption, they would no longer be in a position to negotiate a meaningful land settlement with the government.

Professor Russell estimated that by September, 1977 it might be possible to reach an agreement in principle on a land settlement. However, he felt that the detailed development of an actual agreement would take much longer.

It was also stated that legal title to the land was very much in question. In the event that the pipeline were approved before a land settlement had been reached, it was Professor Russell's opinion that the logical reaction of the Dene would be to take the issue to the courts, arguing the issue of aboriginal title to the land and demanding due process regarding private property as guaranteed in the Bill of Rights.

Dr. D.G. Simpson

Based on his experience in development work in the Third World over the past 17 years, Dr. Simpson attempted to draw parallels between issues there and among the native people of the North in order to provide a better understanding of the positions and feeling of the native Northerners towards their land, development and the pipeline.

In his view, there were many similarities between the Canadian North and the former colonies of the Third World, particularly with respect to economic development and political status. He felt it was logical for the native people to look

towards the Third World for ideas and solutions to their problems.

Dr. Simpson stated that, until recently, the idea of development had been to make other people as much like Western industrialized man as possible. This approach had, in his opinion, not proved successful and there was now recognition that different cultures produce different concepts of development. He felt another lesson learned from the Third World was that development programs could not be imposed from outside a given culture.

Dr. Simpson felt that little effective development work could be accomplished by a people unless they had a high sense of their own worth and valued their culture. The Dene would have to develop a sense of community before they would be able to consider the various alternatives to development.

According to Dr. Simpson, native Northerners were not absolutely opposed to northern development but they were concerned about who developed the North, where it would happen, when, in what ways it would be done, and who would share in the benefits.

Timing was felt to be a critical issue. Dr. Simpson stated that in developing countries of the Third World, it usually took a whole generation or a minimum of 10-15 years to understand the development process and adapt it to suit the particular nation. One aspect of learning to control development involved the selection of those elements of modern Western technology that could benefit the developing nation's people without destroying their culture. This was being done in the Third World and

Canadian native people in the North were beginning to do the same, but required more time.

Dr. Simpson testified that the social cost of native people trying to adapt quickly to industrialized society had been considerable. Almost an entire generation had been lost in some communities through alcoholism, disease and violent deaths. In his view, the tremendous stress involved in such a sudden transition could, and did, kill people.

Dr. Simpson interpreted the Dene position as a demand for a means to express and preserve their culture, not as a sovereign state, but within a Canadian federal state. This would require, according to the Dene, the establishment of collective institutions that, while not those of a sovereign state, did provide a legal recognition of the Dene's relationship to the land. The Dene feared that without such recognition their rights to live on the land and enjoy its renewable resources would disappear.

He explained that the main concern of the Dene, as he understood it, was to have enough time to examine the development process as it affected them, to identify those elements of modern Western society that were suited to their needs, and then to develop a variety of options in life style for their people. Dr. Simpson recommended that until the native people had had time to do this, no further large-scale development, such as a pipeline, should take place in the North.

Professor M. Watkins

Appearing on behalf of the Committee for Justice and Liberty Foundation, Professor Watkins stated that the central issue for the Dene was not the construction of a gas pipeline but how to avoid irreparable damage to a people through the disregard of their human rights. The Dene's basic position was that there should be no pipeline built before a land settlement had been achieved, since this would be the only means of establishing those institutions which the Dene felt were essential to their continued survival. To the Dene, the land settlement would be a declaration of their right to self-determination and central to that issue would be economic independence. According to Professor Watkins, the Dene intended to achieve this by initiating their own "alternative development".

Other elements which the Dene would require in a land settlement would be control over royalties from non-renewable resource extraction and control over the environment and land use. Closely tied to the economic control would be political control, which might include the introduction of a longer residency requirement, up to ten years, for participation in local and territorial elections.

In discussion of the Dene concept of alternative development, Professor Watkins described how the current economic situation in the Northwest Territories was based on the extraction and export of minerals. These projects had resulted in "underdevelopment" within the region, producing economic marginality, poverty, unemployment and welfare dependency among the native people.

In addition to the "modern," mineral-oriented economy in the Northwest Territories, Professor Watkins stated that there was also a "traditional" sector, involving the native people in land-oriented pursuits such as hunting, trapping and fishing. However, the two sectors were not at all balanced, with the result that the modern sector was gradually destroying the traditional sector.

It was the intention of the Dene, in Professor Watkins' view, to create a genuinely balanced two-sector economy where a modernized renewable resource sector and a non-renewable resource sector would complement each other. This would be alternative development. While it would require time to establish a modernized renewable resource sector, it would be possible to finance it with royalties from existing developments such as mining at Pine Point, natural gas at Pointed Mountain and oil at Norman Wells. Unless this program of alternative development was started by the Dene, Professor Watkins saw no reason why the existing situation of "underdevelopment" would not continue. Wage employment would offer only a temporary solution at best, and when the oil and gas reserves were exhausted in 20 to 25 years, the Dene would be no further ahead.

New mineral developments would be postponed until the Dene economy had become strong enough to cope with the new projects.

Professor Watkins was of the opinion that the conditions suggested by Professor Hobart, who testified before the Board on behalf of CAGPL, would not be adequate to meet the Dene requirement before permitting a pipeline, as these conditions would do little to change the existing mechanisms of under-

development to mechanisms of development. Furthermore, Professor Watkins believed that it was the responsibility of the Applicant to negotiate a settlement with the Dene prior to the construction of a pipeline.

In discussing the issue of "national interest", Professor Watkins cautioned against instituting a "tyranny of the majority" to justify proceeding with the pipeline. However, in the matter of cultural preservation, he argued that the wishes of the IBNWT should override those of the Metis since he believed the IBNWT's position represented the overwhelming tendency of the people of the North. He questioned whether such a large-scale energy project would serve the interest of Canada at all and suggested that the conflict of interest was between the United States and the native people of the Northwest Territories. Professor Watkins suggested that the interests of the native people would be sacrificed due to lack of national energy planning in both Canada and the United States, if the pipeline project were to proceed.

The Canadian Conference of Catholic Bishops

The Canadian Conference of Catholic Bishops was concerned that native peoples would not be consulted and given the opportunity to constructively contribute to the decision making process with respect to the construction of a pipeline. However they did not believe that native people should be given veto power over the project.

The Canadian Conference of Catholic Bishops was fearful that northern development would force native peoples away from their

land-based economy into urban centres where alcoholism and dependence on welfare were prevalent. They believed an adequate evaluation of the social and economic costs of the projects had not taken place.

The Conference urged that a moratorium on northern energy development be imposed to enable the native people to receive a "just" land settlement, and to adequately prepare for pipeline development. It was also felt that a moratorium would allow sufficient public discussion and debate on the issues.

Archbishop E.W. Scott

Archbishop Scott's testimony was put forward as representing his and the Anglican Church's concerns with the social, moral and ethical issues related to energy developments in the North in general and the proposed pipelines in particular.

The Archbishop advocated a moratorium in all energy developments in the North in order to allow all Canadians the opportunity to participate in the decision making process, and to allow close consultation with the native people on the development issues, giving them an active involvement in making the decision which could significantly affect their future.

The setlement of native peoples land claims was considered, by the Archbishop, to be a prerequisite to the commencement of any major northern development project and native peoples should not be rushed into a settlement by the government.

5.5 VIEWS OF THE BOARD

5.5.1 Introduction

The following describes the views of the Board on the socio-economic impact of proposed pipeline and related developments in the Mackenzie Valley and in the Yukon.

Undoubtedly, the Board's socio-economic assessment will be compared with that made by the Berger Inquiry. It should thus be noted that the terms of reference are not identical. Justice Berger was specifically required to have regard to "any proposals to meet the specific environmental and social concerns set out in the Expanded Guidelines on Northern Pipelines as tabled in the House of Commons on June 28, 1972 by the Minister". These guidelines envisaged an energy corridor including a future oil pipeline. The Board was not constrained by these guidelines, and, five years later, the expectation of large finds of oil and gas in the Delta and Beaufort Sea are much reduced, although major discoveries are still possible. However, at this time, the prospect of an oil pipeline and hence an energy corridor appear to be somewhat remote.

The Board's socio-economic assessment assumes that if a pipeline were to be built, the certificate would be conditioned with respect to the following matters or such matters would be contained in an agreement to be entered into by the Applicant with the Government of Canada:

i) preferential hiring treatment for Northerners with the definition of a 'Northerner' to be determined by or acceptable to the Government of Canada;

ii) southern hiring halls to be used for non-Northerners working on the pipeline;

iii) union contracts would contain provisions responsive to the avoidance of work stoppages;

iv) Applicants to abide by undertakings made on socio-economic matters, (as found in the appendices and as given during the proceedings);

v) indirect costs imposed by the project north of the 60th parallel to be paid by the pipeline company; and

vi) an effective governmental monitoring system for socio-economic matters to be in place prior to the start of construction. "

Having said this, the Board's socio-economic assessment is structured along the lines set out below. A few comments on the methodological approach to the Board's assessment will follow as well as a description of the current situation and circumstances which presently exist in the northern areas under consideration. Thereafter, the Board's socio-economic assessment, proper, will be divided into an assessment of impact on the Mackenzie Valley and then on the Yukon (including comments on a possible Dempster link in the event the Foothills (Yukon) route were certificated); these regional assessments will be compared and general conclusions will be drawn as to which route appears more favourable from a socio-economic point of view. Finally, the Board makes some comments on the requirements for a Monitoring Authority as well as areas of concern which the Board believes this Authority should consider.

Methodology

The Board shares Justice Berger's view that statistics on the North are relatively sparse and somewhat unreliable, and that views of professional sociologists and economists often differ on solutions to the major problems which exist in the North today. The Board's assessment is, therefore, one of broad judgment.

In assessing the socio-economic impact of a pipeline along the Mackenzie Valley, since the effects of both the CAGPL and Foothills projects on the area would be similar, they will be considered together.

Summary of Current Situation in the Regions Under Consideration

The North at this time may be said to be a land in transition. The move of natives away from the traditional way of life, living in small groups and relying almost entirely on hunting and fishing, is a recognized fact. Many native Northerners now live in communities where schools and social services are available. Hunting and trapping still take place, but more on a seasonal basis. Little wage employment has been created and many of the people receive welfare cheques. The problems of crime, alcoholism and health greatly exceed those of the South. For the individual native Northerner, the situation seems to be one of turmoil caused by fear of further white encroachment, a striving to retain the essentials of a life close to the land from a non-viable base in a community, a difficulty in adapting to modern technology but more and more exposed to it and, at the same time, a search for radical changes in political institutions to protect and safeguard native culture and ways of

living. It is therefore not surprising that the added problems relating to the possible construction of a pipeline only confound an already confused situation.

The situation in the Yukon is similar in many respects to that in the Northwest Territories. However, the opening up of the Alaska Highway in 1942 and the fact that the Yukon economy and institutions are more developed, and that the land claim negotiations appear to be more advanced in the Yukon, offer more potential for the earlier resolution of difficult and complex problems associated with a land claims settlement.

The outlook of white residents of the North, particularly the individualist and the small business man is generally pro-development, although with some fear of being overwhelmed by the large companies from the South. Municipalities generally feel a need to grow and broaden their tax base if they are to provide the services their inhabitants are increasingly demanding. Finally, a large component of the white population is comprised of territorial and federal public servants.

The Territorial Governments appear to look with favour upon developments such as those proposed by the Applicants. A major consideration for the Territorial Governments would seem to be that these developments would provide them with much needed increased revenues as well as contribute significantly to closing the wide gap between Federal Government expenditures required to maintain the North in a viable state and revenues originating in the Territory.

No description of the potential socio-economic impact of a pipeline could begin without referring to the issue which now

dominates the lives of Northerners - the settlement of land claims. The Board, in its hearing, did not consider the merits of the claims or their settlement since these are matters under direct negotiation between the native people and the Federal Government. But the Board is vitally concerned with the interrelation of the resolution of a land claims settlement with perceptions of Northerners on whether a pipeline should be built, and if so, where it should be built and when it should be built.

It is the Board's understanding that all native peoples' organizations, with the possible exception of the Metis, desire a settlement of land claims before a pipeline is constructed. The Inuit of the Western Arctic live in the area where most of the hydrocarbons are likely to be found. The Inuit do not appear to vehemently oppose pipeline and related developments, provided their land claims are settled, the development of oil and gas is strictly controlled in terms of adverse environmental and socio-economic impacts, and provided they can participate in the control process and they share in the wealth generated - such as by receipt of royalties. The Dene, on the other hand, generally oppose the pipeline development - at least for ten years or longer - and wish, in that time, to devote themselves to shaping Dene institutions and building a renewable resource based economy without being disturbed by the upheaval of pipeline construction. The Metis Association favours construction of a pipeline because it sees business and job opportunities being created by it. The Council for Yukon Indians opposes in perpetuity the construction of a pipeline across the Northern Yukon and wishes land claims to be settled and implemented before a pipeline is built in southern

Yukon. Its position on a Dempster link was unclear at the time of the hearing, but there is a motion of the Council indicating opposition to development activities in the vicinity of the Dempster highway.

5.5.2 Socio-Economic Assessment - Mackenzie Valley

The fragile social and economic fabric of the Mackenzie Valley required that the Board give consideration to a number of regional social and economic concerns raised by the proposed construction of a gas pipeline and related developments in this area.

As described previously, these impacts are assessed by the Board on the basis that a pipeline would be subject to conditions, that an agreement would be entered into between the Applicant and Government on the payment of indirect costs, and that a Monitoring Authority would be in place. The approach chosen is one of identifying and describing potential problem areas and then of considering the costs and the benefits or potential costs and benefits to the area in the event one of the applications is certificated. Finally, the Board makes an overall assessment of the impact of the project on the Mackenzie Valley.

The impact of pipeline and related developments on the level of the population in the Mackenzie Valley is a critical issue, particularly during the construction period. In-migration or an influx of transients could strain the infrastructure of the region, compound social problems and increase inflation.

In general, the Applicants have stated that in-migration and transient influxes would not be a problem. The Board agrees that the Applicant's policies would likely be effective in limiting in-migration and transient influxes as well as minimizing potential disruptions caused by interaction between northern communities and pipeline workers. The Board also recognizes that the lack of low cost means of transportation to the area would impede transients as would the shortage of facilities and accommodation in the region.

Nonetheless, the Board does not believe that in-migration or transient influxes can be fully controlled. Secondary employment opportunities generated by the project or jobs vacated by Northerners joining the pipeline workforce could attract transients and in-migrants. Furthermore, settlements such as Hay River, Fort Simpson, Inuvik and Yellowknife appear particularly vulnerable to in-migrants and transients either because of their easier accessibility or because of their visibility. The Board expects in-migration and transient influxes related to the projects would be centred on the larger communities of the area thus largely sparing smaller communities from the problems generated by any significant in-migration or transient influx.

As people can move freely throughout Canada the prevention of all in-migration or speculative transient movement appears impossible to attain. Furthermore, measures to relieve the pressures created by in-migration and transient influxes during the construction period such as the provision of accommodation or free return transportation could possibly generate additional influxes. In the Board's view, in-migration and transient

influxes will take place in the Mackenzie Valley during the construction period. What is uncertain, however, is the level it could reach.

Nonetheless, the Board believes that the combination of the conditions in any certificate the Board might issue, the undertakings and plans of the Applicants to control it and an effective monitoring system should limit it to levels at which most of the problems similar to those experienced with the Alyeska pipeline can be avoided. Completion of the construction period should put an end to any problems created by in-migration and transient influxes.

The effect of the proposed project on prices is an issue similar to that of in-migration and transient influxes. The Board views the problem of the project's impact on prices in the region essentially as a short-term one related to the construction period. While the Board believes the project will undoubtedly inflate prices beyond normal trends in the region, it is very difficult, if not impossible, to pinpoint the magnitude of any resulting pressures on local prices. Nonetheless, the Board believes that, in the worst years, local inflation would be largely controllable provided that tough regulations are put in place.

The Board views the following as the main causes of inflationary pressures related to the proposed project: local procurement policies proposed by the Applicants, increased disposable income of northern residents, and pressures exerted by the project on local wages. These increases are likely to be passed on, in part at least, to northern consumers.

The Board does not believe the main pipeline workforce would exert significant inflationary pressures in the area. Furthermore, with respect to the effect of a local procurement policy, the Board recognizes the link between inflation and the success of various measures to promote local procurement. However, it feels that government control as well as consultation between the Applicants and other interested parties (such as communities, local businessmen, etc.) should largely contain the inflationary effects of local procurement.

Particularly susceptible to any inflationary pressures generated by the project are those people who choose not to, or who cannot participate in wage labour. These people generally have less flexible incomes which, in the face of any significant increase in prices in the area, would leave them worse off. Furthermore, it should be pointed out that prices in the Mackenzie Valley are already higher than prices in southern Canada; any inflationary pressures resulting from the project would contribute to widening this gap.

Another important consideration is that of the project's impact on the services, facilities and infrastructure of communities in the Mackenzie Valley. During the construction period, the Board believes the Applicants' proposed policies to contain workers in camps, as well as the strategic location of camps (well away from communities), would go a long way towards minimizing contacts between pipeline workers and the communities and this would effectively limit any demands they could impose on communities. Possible exceptions to the above could be Hay River

and Enterprise where transportation and staging activities would be going on close to or in these communities.

Furthermore, the Board believes the Applicants' policies of minimizing the use of services and facilities in communities during the construction period, and of limiting any community service requirements they may have to the larger communities (Inuvik, Norman Wells, Fort Simpson and particularly Hay River) should contain, within practical limits, any over-taxing of community infrastructure by the project.

The Board does not believe, however, that the larger communities will remain unaffected by construction requirements. In all likelihood, the larger communities will have to provide for growth spurred by an increased governmental presence, an expanded business sector and possibly other requirements imposed by in-migration. Even though the pipeline project itself should not directly pose problems for the communities, particularly if consultation between them and the pipeline contractors is maintained, the potential for rapid and perhaps disruptive growth cannot be completely eliminated.

In the longer run, impact on larger communities would be more closely tied to the Applicants' requirements for operating centres in the operations phase. The Board views the Applicants' phased community approach (which consists of phasing, over a period of years, the entry of permanent personnel into the communities) as one which would give communities time to absorb additional residents at their own rate.

Furthermore, the Board does not believe that pipeline staff requirements will put pressure on the housing market as the

pipeline companies would provide their own housing rather than buy or rent from the existing stock. While no difficulties are foreseen for the longer run, the Board still envisages a requirement for close consultation between all interested parties.

With respect to smaller communities, the Applicants' policies avoid placing any demands upon their services and facilities during the construction and operations periods. The Board believes that this can and will be done and that the smaller communities' infrastructure should remain unaffected by pipeline and related development. Smaller communities, however, to a greater extent than the larger ones, would be affected, during the construction period, by diversion of manpower to the project. This could potentially disrupt certain essential services in these communities. This is a sizable problem for the smaller communities and, at this point, it appears difficult to eliminate despite the Applicants' proposal to consider labour pools and flexible work rotation schedules.

In the larger communities, disruption from a diversion of resources to the project would be more likely to be generated by local business participation in pipeline opportunities. However, the Board believes that adequate control and consultation, added to the Applicants' policies of according priority to the needs of communities, should contain most significant problems in this area.

Important to both large and smaller communities of the region is the impact the project could have on transportation and communications. Interests of Northerners and northern

communities must be protected to ensure that transportation costs are not inflated, the quality of service is not reduced and that adequate capacity is available to communities. The Applicants have stated their willingness to avoid any undue burden being imposed on northern residents from their use of the system. The Board notes that planning and control will be required to ensure that this policy is carried out.

The Board's conclusion concerning social conditions is that increased activity generated by a pipeline project could compound rather than alleviate the existing social problems of the area such as crime, violence and alcoholism, mainly during the construction period. The extent to which it could compound social problems, however, is not something that can be determined precisely. The Board can only point to the fact that pipeline construction impacts are more likely to be a negative rather than a positive influence on the social fabric of the North during this period.

The social impact of the project takes on a special significance for native Northerners. George Erasmus, the Dene leader, has gone so far as to suggest pipeline development now would mean cultural genocide for the Dene while the Applicants have suggested that the provision of stable employment, to native people particularly, would reduce social problems and that, in any case,no additonal problems could be created as all the social damage (of development) had already been done. The Board cannot concur with either of these polarized positions. The answer probably lies somewhere in between.

An important element in the native peoples' argument in support of their position is the adverse impact the project would have on the traditional pursuits (of hunting, trapping, and fishing) of native people which, in turn, would have pervasive effects on their social and family structures. The Board believes that there could be an unfavourable impact on the traditional sector particularly in the construction period.

The Board generally believes that the pipeline and related developments have considerable potential for diverting native people away from the traditional sector. Furthermore, there might be adverse impacts on hunting and trapping in areas surrounding the larger centres because of increased activities and because of in-migration. The Mackenzie Delta would be particularly susceptible to these effects.

Native people, the Dene particularly, feel that viable alternative development situations based on increasing the harvesting of the various renewable resources in the area must be developed to provide native northerners with real options prior to any major development project. Such alternatives would strengthen the relationship of the people with the land, provide increased employment at the community level and give native people control over their own social and economic development. The Board is unclear on the extent to which native people, particularly younger native people, see wage employment as a benefit.

The Board believes that the development of a renewable resource base could be beneficial but there is little evidence before the Board to show the extent to which it could provide a

viable way of life in today's circumstances. The Board further believes that wage employment under any circumstances will be an essential component of the North's economy and perhaps an increasing one. At present, few new jobs are being created apart from those proposed in the pipeline and hydrocarbon activities.

The Board thus feels that, overall, the traditional sector and, to some extent, the native people's way of life in the Mackenzie Valley could be adversely affected by the proposed projects. The Board believes that a pipeline project could impose on the Dene population of the Mackenzie Valley unfavourable impacts for which it may not be possible to compensate. This may not be true, however, for the Metis of the impact area who actively seek to benefit from the jobs and business created by pipeline development.

Turning now to another component of the North's economy, the government sector, the Applicants have generally asserted that governmental revenues generated by the project in the impact area would cover any incremental governmental expenditures occasioned by the project and that these revenues would go a long way towards correcting the present imbalance which exists between governmental expenditures and governmental revenues generated in the Northwest Territories. The Board estimates that revenues arising from the project over the next two decades would go a long way towards supporting higher expenditures and towards closing the gap between government revenue and expense.

While considerable governmental revenues in the form of income taxes, municipal taxes and royalties could be generated in the region, the Board notes that these revenues from the project

would not necessarily flow back to the people or governments (whether it be territorial or municipal) where they are most needed. For municipalities, for example,funds would be required to provide services before their tax base has expanded and some assistance to cope with these financial lags may be required. Moreover, the Board envisages that major changes would likely occur in the fiscal arrangements between the Federal and Territorial Governments should a pipeline proceed.

Similarly, the business community in the Mackenzie Valley, in the Board's view, would appear to be in a position to derive significant economic benefits from the proposed pipeline and related developments. The extent of these economic benefits would be determined by the actual level of participation of northern business in pipeline and related activities. The Board notes that such opportunities for participation should be numerous during both the operations phase and particularly during the construction phase in view of the Applicants' policies on this question.

The Board points out, though, that opportunities will have to be focussed on those sectors where local business can effectively participate without requiring over-expansion of their capabilities during the relatively short construction period. The Board believes there will be a requirement for control and consultation between the Applicants, the local businesses the communities and the Territorial Government to prevent any local procurement policy from creating undue inflationary pressures or from drawing services to the pipeline to the detriment of northern residents. Such consultation will also be required, in

the Board's view, to orient, as much as possible, local businesses towards those opportunities of a longer term nature, thus adding to the likelihood of this increased activity strengthening the region's economic base.

Employment opportunities generated by the pipeline project, particularly the long-term employment opportunities, have been presented by the Applicants as the largest and, perhaps, single most beneficial effect of the project on the economy and residents of the impact area. The Board, on the other hand, feels the Applicants have generally overstated the benefits associated with pipeline and related employment opportunities.

Employment data presented by the Applicants suggested that, during the construction period, peak manpower requirements could be close to 8000 people for Foothills while CAGPL estimated a requirement for 6300 man-years for the peak year of construction. These jobs would be largely held by Southerners as the Applicants have estimated the available impact region labour force (unemployed and willing to work) to be in the area of 500 to 800 men in 1974. Permanent employment, on the other hand, would be in the order of 1800 to 2200 (depending on the Applicant) long-term jobs (excluding secondary employment in the region which could be anywhere between 0 and 3000 man-years). Of these jobs, 200 to 250 would be in pipeline operations while the rest would be related to the hydrocarbon industry and practically all would be located in the Mackenzie Delta area.

The Board recognizes that employment opportunities will significantly outnumber the available labour force of the impact area during both the construction and operations phases. The

Board also recognizes that the preferential hiring treatment of Northerners proposed by the Applicants is sound in that it appears to give Northerners every opportunity to participate, at all levels, should they wish to do so in all aspects of the proposed projects.

However, the Board also notes that, during the construction period, the available labour force, which is largely composed of native Northerners, is likely, in general, to lack the necessary training for skilled jobs. The Board believes little time would be available to upgrade the skills of these men for the construction period and that, in any case, few opportunities for continuing employment of this type are likely to exist in the Northwest Territories after pipeline construction is completed.

With respect to the operations phase, the Applicants, in conjunction with others, have developed the NORTRAN training program. To date,this is still the only large-scale attempt to provide Northerners with technical training for long-term employment in the northern petroleum industry. As such, considering all of the circumstances, it has proven relatively successful in attracting and holding northern trainees over periods of several years.

The benefits to be derived from the long-term employment generated by the project are, in the Board's view, significantly reduced because the bulk of these opportunities will be far removed (generally located in the Mackenzie Delta) from the place of residence of the majority of Northerners in the pipeline impact area. The Board believes few Northerners, particularly native Northerners, living in other parts of the impact area

would relocate to take advantage of these opportunities. Obviously, long-term employment opportunities are potentially of much greater benefit to residents of the Delta, particularly the Inuit, than to other residents of the impact area and especially the Dene. Moreover, the Board believes the potential benefits of these opportunities are further reduced insofar as native people of the impact area have pointed out that such opportunities were not coveted over traditional pursuits or even over casual and seasonal wage employment.

Overall, the real personal income of Northerners, in the Board's view, will undoubtedly increase as a result of the project. Impact on real personal income will likely be greater during the construction period than during the operations phase. In view of this, the Board feels the Applicants have not highlighted the very real possibility that, as employment and business opportunities subside following construction, social and economic difficulties could be created.

Benefits could be derived in the impact area if natural gas were made available to northern communities. The Board believes gas should be made available, at least in those communities where it is economically feasible to do so and would condition any certificate accordingly. Both Applicants are prepared to do this in the Mackenzie Valley. However, the Board notes that Foothills goes further and proposes to subsidize, to a limited extent, the cost of transportation of gas to certain communities who would not receive gas otherwise.

However, the Board recognizes that, in the short to medium term, most northern residents especially native residents would

not benefit directly from the provision of gas, because the cost of home energy and the cost of accommodation generally, is already widely subsidized by government and, to a lesser extent, by industry. Nevertheless, the Board believes the provision of gas to northern communities, on reasonable terms, to be a positive step.

The Board believes that approval of a pipeline would undoubtedly induce an increase in petroleum industry activities and generate increased economic activity in the Mackenzie Delta region, particularly in Inuvik. If, on the other hand, the construction of a pipeline to take Delta gas to southern markets were delayed for a significant period of time, the economy of the Mackenzie Delta region would be particularly vulnerable because of its reliance on petroleum industry activity.

Particularly affected would be the local businesses of the Delta region presently servicing the petroleum industry or those hoping to service it or the pipeline. Some would have to fold their operations and some migration out of Inuvik would occur.

A delay in pipeline development would mean a loss of casual or seasonal employment for native people. However, this should not pose insurmountable problems as few native families rely exclusively on the petroleum industry for their livelihood.

The Board notes that the impact of a two or three-year delay in pipeline development could be minimal but that the effect of a ten-year delay would greatly slow down the pace of petroleum activity.

Overall Assessment

The Board believes that the Applicants have generally overstated the expected benefits from their project in the impact area, as well as understated the potential for adverse impacts on the region. Despite the Board's conditioning of any certificate, an agreement with the Government, and the presence of a Monitoring Authority, unresolved potential difficulties will persist in the areas of: inflationary pressures, in-migration and transient influxes, the possibility of disruption of certain services, particularly in the smaller communities, adverse effects on the traditional sector and the probable exacerbation of existing social problems in the impact area.

Local businessmen (non-natives, Metis and natives) appear to be the ones who would gain the most from the construction of a Mackenzie Valley pipeline and from the related developments.

Other gainers, but to a lesser degree, will be all those who choose to take advantage of wage employment and are able to integrate this successfully into their family and social lives. This would include many of the Metis.

Pipeline and related developments in the Delta will provide casual and permanent employment opportunities for the Inuit. However, concerns have been expressed about the social problems associated with a change to further wage employment and many Inuit prefer their traditional pursuits. Furthermore, oil and gas activities could have some adverse impacts on hunting and trapping via localized pressure on the resource base. In the longer run, the Inuit may share in royalties from hydrocarbon developments, which could represent significant benefits. On

balance, the Board believes that the Inuit would benefit from a pipeline.

With regard to the Dene people, the Board sees few ways by which these people could gain from such a development. For one, lasting employment opportunities generated by the project within the areas inhabited by the Dene would be few. The Dene fear the project's potential for adding to the social problems of native people as well as its potential for adversely affecting their traditional way of life. The Dene do not want to see a pipeline built now in the Mackenzie Valley because it would be disruptive to their plans to develop the renewable resource sector. To the extent that taxes and royalties from pipeline and related developments flowed to the Northwest Territories as a whole, then the Dene could benefit economically. On balance, however, the Board believes that the Dene might lose more than they would gain by a pipeline development in the immediate future.

On the other hand, the Board believes that the government sector would benefit if pipeline and related developments were to proceed. Indeed, the government stands to gain from the proposed projects as the revenues generated, if channelled, wholly or in part, back to the Territories, would not only probably cover costs related to the project but would also tend to close the existing gap between government expenditures and revenues in the North.

The socio-economic impacts of construction of a pipeline in the Mackenzie Valley appear, to the Board, to be of manageable proportions in that conditions could be developed and controls applied to keep most adverse impacts within tolerable bounds with

the possible exception of certain social impacts. The Board must point out, though, that while perhaps half or more of all residents of the impact corridor would benefit, the adverse impacts could cumulatively fall on those segments of the population, the Dene particularly, who have the least to gain from such developments.

5.5.3 Socio-Economic Assessment-Yukon

In expressing the views of the Board concerning the socio-economic impact in the Yukon from the Foothills (Yukon) proposal, aspects will be treated in parallel with the Board's treatment of the Mackenzie Valley. When impacts in the Yukon are believed to be similar to those in the Mackenzie Valley, reference will be made to these and only differences will be highlighted.

The Board believes that in-migration and transient influxes into the Yukon during pipeline construction could be one of the major sources of pipeline impact on the region affecting many sectors of the economy and government.

Given the year-round accessibility to all communities in the impact area as well as the established tourist traffic in the Yukon, potential for in-migration and transient influxes appears greater than in the Mackenzie Valley. Such in-migrants and transients could possibly reach the 3000 person level considered critical, and beyond which services and facilities in the Yukon would be severely strained. While in-migration and transient movements cannot be fully controlled, the Board believes that the combination of conditions and controls should limit these to

levels at which most of the problems experienced in Alaska with the Alyeska project could be avoided. In the longer term, changes in the population of the Yukon would not be large. The available estimates of operations staff and dependents suggest a maximum increase of around 600 people, with perhaps half of these concentrated in Whitehorse. This increase would, however, contribute further to the continuing decline of the number of native people in relation to the total population of the Yukon.

Regarding inflationary pressures, the flexibility of the Yukon's transportation system would permit more rapid adjustments in supplies of goods and services than in the Mackenzie Valley, thus limiting the threat of demand-pull inflation. However, the potential inflation from in-migration and transient visitors could offset this advantage.

Turning now to the impact of the project on Yukon communities, the Board's first observation is related to containment. While proposed containment policies are the same for the Yukon as for the Mackenzie Valley, the Board believes the potential for interaction between the pipeline workforce and communities is greater in the Yukon. Camps will generally have easy access to the Alaska Highway, and while the workers themselves may not have access to vehicles, this may not limit men from getting to the communities.

The proposed location of camps may also prove to be critical. Current plans locate spread camp sites very close to Teslin and Whitehorse and within 25 miles of Haines Junction. This raises the question of how isolated these camps will in fact be, given the proximity of the Alaska Highway. It should also be noted

that there will be smaller construction camps at all compressor station sites and possibly at certain river crossings. These will not be as well equipped as the major spread camps, and a number of them will be near communities. This could create problems for most communities in the Yukon along the pipeline route during the construction period, particularly for the smaller communities (of which a number are preponderantly inhabited by native people) which appear to be less able to cope with such impacts or interactions than a city like Whitehorse. This, of course, would be in addition to any problems arising from labour diversion, which could create serious difficulties in certain of the smaller communities. The Board stresses the need for special mitigative measures to alleviate the impact on these communities and the need for full consultations with the Council for Yukon Indians and the communities themselves.

During the operations phase, the impacts would be different but still of considerable scale, particularly in some of the smaller communities. Whitehorse is forecast to experience a population increase of about 300 people. Given the size of the municipal structure there should not be major difficulties with such an increase. The smaller communities selected for operations bases (Beaver Creek, Haines Junction, Teslin and Watson Lake) would all experience a population increase of between 50 and 70 people. Two of these communities have relatively large native populations and none of them are totally self-governing municipalities.

A population increase of this magnitude in the smaller communities could have major impacts on the nature of the

communities themselves. As there are very few Yukoners in the NORTRAN program, it would be several years before local people in fact filled many of the operations jobs, ensuring that outsiders would have to be based in these communities at least during the initial years.

One result of this population increase in these communities would be an acceleration of the territorial trend which sees native people becoming minorities in their own communities.

The proposed project would utilize all modes of the Yukon's transportation network in moving material and men to and from the Territory. The Board believes northern residents and northern communities should not be unduly affected by the Applicant's use of these systems. No significant problems are foreseen for rail and air transport as capacity exists or would exist to accommodate the project; furthermore, air transportation of men will be by charter aircraft. Nonetheless, care would have to be exercised to ensure that air service to an isolated community such as Old Crow was not diverted to the project for short-term contract work. However, the Board notes the possiblity of increased project demand on highway transportation affecting other users of the system.

The above could be an important consideration for the tourist industry in the Yukon which, in 1975, accounted for $27 million in business when 340,000 tourists traveled to the Yukon. Two-thirds of these tourists traveled by car along the Alaska Highway and other roads during the tourist season which is concentrated in the two months of July and August.

Primarily the pipeline project would utilize the Alaska and Haines Highways for movement of men and materials within the Yukon. Construction along certain sections of the pipeline would coincide with peak tourist season and the entire project may coincide with the planned surfacing of the Haines road and the Alaska Highway between Haines Junction and the Alaska border. These factors could severely inconvenience tourist traffic on the highways, particularly as there is some question as to the actual volume of traffic that will be associated with the project.

Considerable maintenance of the roads and bridges might also prove necessary during pipeline construction and could result in bottlenecks at various points along the highway. If highway conditions were seriously affected by the pipeline, the tourist trade in the Yukon could suffer one or two bad seasons, until construction was completed.

Another important consideration is that of the project's impact on the social situation in the Yukon. The Board notes that social problems such as crime, social breakdown and alcohol abuse in the Yukon were significantly above the national average. The construction phase of a pipeline, in the Board's view, could exacerbate these problems.

The native people of the Yukon in particular would be vulnerable to pipeline-related impacts. There could be problems associated with pipeline employment such as some of the effects of sudden increases in disposable income, increasing separation of the wage earner from his family and the possibility of resentment and frustration if high expectation of pipeline benefits were not realized. Such problems could weaken the native

communities as a whole and would place an additional burden on the territory's social infrastructure.

Of importance to native people would also be the impact of the project on the traditional sector. While the traditional sector still plays an important role in the life of the native people in the Yukon, most of the native people are concentrated in communities along the territorial highway system, and, generally seem less dependent on land-based activities than the native people of the Mackenzie Valley. This is not to say that the traditional sector could not play a more signifcant role in the Yukon; however, the Board notes that, unlike the Mackenzie Valley, the traditional sector does not appear to provide the promise for an entirely new approach to development.

The pipeline project would not bring benefits to the traditional sector, unless one considers the possible addition of limited funds for new equipment earned by trappers and hunters in short-term employment. These benefits might be more than offset by the diversion of hunters and trappers away from that sector permanently.

The Board does not believe pipeline construction would significantly affect the resource base used by native people for traditional pursuits. Furthermore, the compensation policy suggested by the Applicant should go some way towards assisting those who are affected by pipeline developments.

In terms of impact on the government sector, in view of the evidence of various intervenors including the Yukon Territorial Government and, taking into consideration the scope and magnitude of the impact of the Alyeska project on the various levels of

government in Alaska, the Board believes the Applicant has underestimated the potential impact of its project on the need for increased government structures and services in the Yukon.

Government would have to increase its staff in a number of areas such as public works, game management and local government, and would be just as vulnerable to the diversion of its staff to pipeline employment as other sectors of the economy. Such sources of potential impact as in-migration and inflation would be extremely difficult to assess and control but would nonetheless require prompt action and considerable resources if their effect is to be contained.

The pipeline project would provide the Yukon with employment opportunities for those residents possessing the required skills. The Board observes that, at present, there are some 600 Yukoners with adequate skills to qualify for jobs during the construction period out of peak requirements for 2200 men. In the operations phase, 189 long-term positions are planned and, with adequate training, most of these jobs could be filled by Yukoners by about the tenth operating year.

The Board believes that employment during the construction phase would not bring lasting benefits to those involved, other than a temporary increase in earnings. There would not be sufficient time to provide Yukoners, particularly native people, with new skills, and only in isolated cases would their position on the labour market be improved.

Among the native people of the Yukon, the Board observes that unemployment and under-employment are very high, suggesting that

special efforts would be necessary to assist them to participate to any significant extent in the project.

During the operations phase, employment opportunities would be far fewer and would require high levels of training. The Board believes that if Yukoners were to benefit from these jobs, the number of Yukoners on the NORTRAN program would have to increase. Given the present situation, the Board believes few trainees from the Northwest Territories would relocate to the Yukon and that, with the length of time required for training, it would be several years before Yukoners began to fill a significant number of pipeline operating positions.

Employment would not be the only opportunity generated by the project. Indeed, the Board believes that the pipeline project could be the source of considerable benefits to the business sector in the Yukon. Nonetheless, there are certain concerns related to local business participation such as the maintenance of services to northern residents (without undue price increases) and the possibility of over-expansion. These concerns are similar to those expressed for the Mackenzie Valley.

The Board believes that the combination of conditions, controls and the Applicants' undertakings would ensure that participation of local business in the project should not unduly burden northern residents.

Real personal income would undoubtedly increase in the Yukon as a result of the project. The Board also notes that local income could rise dramatically at the start of pipeline construction but then drop back rapidly upon completion, even more sharply in the Yukon than in the Mackenzie Valley as there would be fewer

long-term opportunities for participation in pipeline and related activities. There is a danger that debts incurred when pipeline earnings are high might prove to be a burden to individuals when incomes revert to pre-construction levels.

A significant benefit to the Yukon could be, in the Board's view, the availability of gas to northern communities. Compared to the Mackenzie Valley, there appears to be greater latitude for industrial applications of gas in the Yukon, thus suggesting the project could contribute to strengthening the economic base of the region.

Overall Assessment for the Yukon

One of the major benefits offered by the pipeline project to the Yukon would be in the form of increased business activity during pipeline construction and, to a lesser extent, during the operations phase. There could be considerable benefits for the large companies, particularly in the transportation sector. There would be lesser benefits for smaller businesses although participation in the operations phase could be important to them in terms of increased stability and growth. The tourist industry, one the other hand, could be adversely affected by the project but this would be restricted to the construction period. On balance, there is a fairly well developed business sector in the Yukon which should benefit from the project in spite of the risks of over-expansion and inflation.

The Board believes the native people and the traditional sector would gain little, if anything, from the project. If the native people's fears of pipeline impact prove justified, they

would suffer social disruption which could permanently damage their culture and way of life. Several predominantly native communities would likely be affected by increased activity along the Alaska Highway and by a permanent increase in the non-native population during the operations phase.

The short-term employment benefits during construction could be offset by increased crime, family breakdown and alcohol abuse. Special mitigative measures would be needed to lessen these impacts. On balance, the Board believes costs would likely exceed benefits for native people and native communities.

In addition to government revenues generated by the project in the longer run, the Board believes the public sector would benefit from an increasingly developed local economy within which the provision of natural gas service at reasonable cost may prove to be helpful in attracting new industry to the area.

On the whole, the Yukon is well along the road to becoming an industrialized economy, similar in many ways to the southern economy, and it has an adequate transportation infrastructure to make possible a certain degree of integration of the various sectors. If adequate controls could be maintained during pipeline construction, the negative impacts on the native people could be kept to a tolerable level although the Board believes they could not be entirely eliminated.

Generally, it appears that a pipeline could provide a new stimulus that could improve the overall economic situation in the Yukon. It might not be a large improvement, but with proper planning and control, the balance of impacts could be favourable.

Preliminary Observations on a Dempster Link and a Rerouting of the 48-Inch Diameter Pipeline

The Foothills (Yukon) project raises the possibility of having Delta gas reach southern markets via a link with this pipeline. While no application is presently before the Board for such a project, an engineering study has been made where a pipeline would be built from the Delta gas plants, along the Dempster Highway, to a point near Dawson (a length of approximately 500 miles). At this point, the Dempster link would connect with the 48-inch mainline, rerouted along Highway Number 3, entering the Yukon west of Dawson and continuing roughly along the route of the Klondike Highway from Dawson to Whitehorse (approximately 330 miles).

The following are a few preliminary observations on the impact of such a project on communities along these potential routes.

Dempster Link

There are two communities along the Dempster Highway, Arctic Red River and Fort McPherson; Inuvik is not included as, in fact, it would be within the impact sphere of hydrocarbon exploration and development in the Mackenzie Delta and Beaufort Sea. Native population in these two communities is in the order of 650 to 700 people.

While there are no communities along the Dempster Highway between Fort McPherson and Dawson, the people of Fort McPherson and Old Crow are likely to be concerned about the potential impact on the Porcupine Caribou herd.

Rerouting of the 48-Inch Diameter Mainline

There are few communities along the prospective pipeline route from the Alaska border to Dawson. Along the Klondike highway from Dawson to Whitehorse, there are a number of communities (including Dawson itself, Stewart Crossing, Pelly Crossing and Carmacks) with a significant proportion of native people. The total population along the route is estimated to be around 1500.

Over the past ten years these communities have been impacted by development of the highway and by the mining industry in the area. However, as with other predominantly native communities, it seems likely that the people of these communities would voice concern about a pipeline.

Nonetheless, the proximity of relatively cheap energy flowing along the Dempster and Klondike routes could potentially be of benefit to mining development in the Yukon.

The Mackenzie Delta

A Dempster link to move Delta gas to markets in the South would result in an expansion of petroleum industry activities very similar, if not identical, to those predicted with a Mackenzie Valley pipeline. If a Demptster link is built, the only significant difference in the economic impact on the Delta would be in the timing of the construction of a Dempster link which might result in slower development of the Delta gas fields. Obviously, the Dempster link would scarcely impact on areas of the Mackenzie Valley other than the Delta except that increased petroleum industry supplies would continue to be routed down the Mackenzie River.

5.5.4 Comparative Assessment of Mackenzie Valley and Alaska Highway Routes

The following highlights the major differences between the impacts the pipeline routes would have in their respective regions.

Compared to the Mackenzie Valley, the Yukon economy appears to have a more developed economic infrastructure which largely stems from its versatile year-round transportation network.

On the other hand, the easier accessibility to communities in the Yukon would, in the Board's view, mean that the problems of in-migration (and transient influxes) and impact upon communities are potentially greater in this region. Native communities, particularly, appear more vulnerable to the impact of pipeline construction in the Yukon. Furthermore, in the operations phase, the ethnic distribution in certain predominantly native communities chosen as operating centres could be significantly altered.

Considering the social impact of the project, it would appear that the Yukon route poses less problems than the Mackenzie Valley route.

On the basis that native people have more to lose socially and culturally than other segments of northern society, and on the basis that there are about three to five times the number of native people along the Mackenzie Valley route compared to the Yukon route, the Board can only conclude that social problems would be greater in the Mackenzie Valley to the extent that more people could be impacted.

In terms of employment, the CAGPL project would offer more opportunities than the Foothills (Yukon) pipeline both during the construction and the operations phase since the length of the line in Canada is greater. During the operations phase, long-term employment generated by the CAGPL or Foothills projects could be up to ten times greater than those generated by Foothills (Yukon), largely as a result of petroleum industry activities. Of course, if Delta reserves were connected to the Foothills (Yukon) project, employment generated would be roughly the same as for CAGPL.

Turning to the government sector, it is likely that in both areas Territorial Governments would have to expand in conjunction with pipeline development. In addition, the CAGPL project offers substantially more governmental revenues than Foothills (Yukon) without a Dempster link, mainly because the latter would not generate producer income taxes or royalties in the Delta. A Demptster link associated with the Foothills (Yukon) pipeline, however, would eliminate any significant difference in governmental revenues generated by the projects.

Conclusion

The Board believes that construction and operation of pipelines in either the Yukon or the Mackenzie Valley would create problems in these northern regions (particularly during the construction period). However, the Board believes that, in most cases, these problems should not be insurmountable. Conditions attached to any certificate which might be issued by the Board, the undertakings of the Applicants and the controls applied by a Monitoring Authority should limit adverse impacts to

levels tolerable to northern residents. The exception, in the Board's view, would likely be in the social and cultural areas where adverse impacts could occur despite effective monitoring. While these can be controlled and conditioned to some extent, the Board does not believe they can be managed or offset to the same degree as the economic impacts.

Thus, when assessing the relative impact of the Alaska Highway route compared to the Mackenzie Valley route, the Board notes that, if a Dempster link materialized, regional economic benefits derived from either project could be roughly of the same magnitude. The development of Delta gas with a pipeline project would clearly generate much larger regional economic benefits than if only transmission of Alaska gas by an Alaska Highway route is considered in isolation.

Furthermore, while the Board believes adverse economic impacts of the proposed project could be controlled equally well in either region, the adverse social and cultural impacts would be higher in the Mackenzie Valley region, mainly because of the larger native population resident in this area.

On balance, if a Dempster link were built, thus roughly equalizing the economic benefits from each project to the North, the Board's regional socio-economic assessment indicates that the Foothills (Yukon) project would be preferable due to the lesser adverse social and cultural impacts.

5.5.5 Observations on a Monitoring Authority

Earlier the Board indicated that it had made its assessment of socio-economic impact on the basis that there would be conditions in a certificate and an agreement between the Applicant and the Government controlling certain activities of a socio-economic nature, that the Applicant would be obligated to carry out the undertakings it provided during the hearing and as set forth in Appendices 5-1 and 5-2 to this chapter, and that an effective monitoring system would be in place before construction would be allowed to start. Some amplification of these matters is now appropriate.

First, the nature and wording of conditions which the Board would include in any certificate it might issue and the Agreement with the Government are contained in its Reasons for Decision and in the Decision.

Secondly, before discussing the more specific undertakings of an Applicant and the matters to be dealt with by a Monitoring Authority, some preamble would appear to be necessary.

The Board is firmly of the view that special measures are needed to control socio-economic impacts north of the 60th parallel. This is partly because of the very serious social and economic problems which now exist. To allow major new projects with potentially unfavourable impacts to be constructed without adequate controls thus compounding the already grave problems, is unthinkable. Furthermore, the machinery for monitoring the socio-economic impacts of large and complex projects such as Arctic pipelines just does not exist today.

It is the Board's firm conviction that the lead and controlling role in creating and administering an effective socio-economic monitoring system must be vested neither in the Applicant, nor in the Board, but in the Government. Several Federal and Territorial Government departments would be involved and close coordination would be needed. A company constructing a pipeline north of the 60th parallel essentially needs a "one-window access'' to the Government in respect of socio-economic monitoring, because coordinated and prompt responses are needed from the Government both to prevent unfavourable impacts on the one hand and, on the other, to prevent unnecessary and costly delays in construction. Since controls, to be effective, need to be in place before construction is started, an effective monitoring organization and system needs to be created once a certificate with conditions is issued. The Board assumes that this will be done. Further observations of the Board are contained in its Reasons for Decision.

Turning now to the responsibilities of the Applicant, it is clear that a positive approach and full cooperation with the Government is required of the Applicant, and the hearing evidenced that these would be forthcoming. However, the hearing dealt primarily with the feasibility of the project and the broad plans of Applicants for socio-economic monitoring falling within their orbit. It would be unreasonable for an Applicant at the certificate stage to have carried out all the research, studies and consultation needed to translate broad principles into specific programs and action. In the Board's view, this is the course to be pursued between the time of issuance of a

certificate with conditions attached, and final design. The Board assumes any successful Applicant will do this.

More specific comments follow on the areas of concern on socio-economic matters which would need to be considered by a Monitoring Authority. These comments are not meant to be exhaustive nor do they purport to eliminate all adverse impacts which have been identified for the regions under consideration.

The Monitoring Authority would need to keep a balance between its controls applicable to the pipeline and those which would be needed in respect to the gas plants and other hydrocarbon developments in the Delta and Beaufort Sea.

Mechanisms and controls would have to be developed to limit and minimize speculative in-migration or an influx of transients which the project could potentially generate.

A Northern Manpower Delivery System would have to be put in place prior to construction, on the one hand to ease the access of Northerners, particularly native Northerners, to pipeline and related employment and, on the other, to reduce the project's impact on individuals and communities by permitting Northerners to go directly from home to job site and by making direct employer recruitment in the communities unnecessary. A successful Applicant's co-operation and assistance would be required in all aspects of the development and functioning of such a Manpower Delivery System. Along the same lines, consideration should be given to flexible work rotation schedules as well as labour pool systems to enable Northerners to tend to community needs (particularly in the smaller communities) and to pursue traditional activities if they so wish or if required,

both during the construction and operations phases.

Consideration should also be given to devising a payroll system for southern workers on the pipeline workforce which would limit the amount of cash at their disposal while on duty north of the 60th parallel. This latter comment would be particularly relevant if the Foothills (Yukon) route were chosen, both to limit inflationary pressures and to strengthen the Applicant's containment policies.

Consideration should be given to the provision of special funding to northern communities impacted by the project in both the short and long-term.

Plans should be formulated to ensure that transportation services, and the cost of these, are not adversely affected by a pipeline development; monitoring will be required to make sure that this is effectively carried out.

The use of community services and/or infrastructure should be avoided, where possible, during the construction period. Furthermore, wherever the Applicants propose to use community facilities, consultation will have to take place and mechanisms to resolve conflicts may have to be developed both for the short and long-term.

Means will have to be devised to give special protection to northern communities, particularly smaller native communities, from adverse impacts of a pipeline. This is especially important in the Yukon where the location of these smaller native communities does not afford them the same isolation and protection as in the Mackenzie Valley.

The Monitoring Authority should give consideration to developing special protective measures to minimize adverse social impacts which pipeline construction could generate as well as measures to protect those native people opting to pursue traditional activities during and after construction.

5.6 EVIDENCE AND VIEWS OF THE BOARD ON PIPELINES SOUTH OF THE 60TH PARALLEL

5.6.1 Westcoast-Foothills

With respect to its participation in the Foothills Group project, Westcoast adduced socio-economic evidence in relation to its proposed mainline extension from its Fort Nelson Plant to a point just north of the 60th parallel on the border of Alberta and the Northwest Territories, a distance of 141 miles.

The construction phase of the project would be of a very short-term nature and the Applicant expected only a limited effect upon the local economy and social life of the area because of the isolation of its pipeline personnel from the only settlement in the area, Fort Nelson. Apart from its starting point, Fort Nelson, the area was described as unpopulated and land use limited to petroleum industry activities, logging, trapping and some hunting.

The Applicant concluded that present land use activities would not be greatly changed and that its project would strengthen Fort Nelson's economy and thus permit the provision of better services to its residents.

Views of the Board

The project appears to be sufficiently small and restricted in time that it should not have major adverse effects on the area. Furthermore, Fort Nelson is already the scene of significant petroleum industry activity which, in the Board's view, should enable it to cope with a project such as this one.

5.6.2 Westcoast - Northern British Columbia

Westcoast proposed to construct this segment of the Foothills (Yukon) Group project from the Yukon/British Columbia border (near Lower Post) to the Alberta/British Columbia border (near Fort St. John), a distance of 439 miles. The route would generally follow the Alaska Highway.

Overall, the Applicant expected its project to have positive impacts on the regional economy provided appropriate measures were taken. While all communities might have some of their local services diverted to pipeline-induced activities, Westcoast observed that the smaller communities would be vulnerable. In addition, Fort St. John could be subject to pressures on its housing market.

In order to alleviate potential difficulties, Westcoast proposed local participation in decisions related to the containment of pipeline workers and an information program designed to discourage overreaction by local business to pipeline-related opportunities and speculative in-migration.

Manpower requirements for the project were estimated at 1600 men throughout the winter and summer of 1980, and 800 and 1600 men during the winter and summer of 1981, respectively. Westcoast stated it would encourage local hiring which could account for perhaps 20 per cent of the required manpower (for a potential wage bill of close to $15 million for 1980 and 1981). A small number of permanent jobs would be created in the area during the operations and maintenance phase. In 1976, the population of the area was over 14,000 of which more than 95 per cent was located in Fort Nelson and Fort St. John.

Views of the Board

In the Board's view the impact of the proposed Westcoast project on this area of northern British Columbia might be similar in some respects to that which would occur in the Yukon as a result of construction of the Foothills (Yukon) segment of the pipeline project. The Board believes that some monitoring would be required to mitigate and control any adverse impact which could be imposed on communities along the highway, particularly the smaller communities.

5.6.3 Westcoast/ANG-Southern British Columbia

Westcoast proposed to construct 106 miles of pipeline from a location near Coleman at the British Columbia/Alberta border to the international boundary near Kingsgate, British Columbia.

The construction schedule and the size of the work force involved indicated, in the Applicant's view, that the impact on the region would be small and easily accommodated by the existing range of services. A beneficial impact could result from the winter program through the use of commercial accommodation by assisting the local economy during the low period in its annual cycle.

During the operation and maintenance phase of this pipeline, a beneficial impact could be generated by the expected addition of eight man-years.

Views of the Board

The Board notes that this proposed pipeline would generally follow the existing ANG right-of-way from Coleman to Kingsgate. In the Board's view, the project is sufficiently small not to

create any significant socio-economic problems. ANG as part of the CAGPL project applied for a similar pipeline certificate covering the same route. The views of the Board are therefore the same as for the Westcoast Application.

5.6.4 Trunk Line (Canada)

Trunk Line (Canada) has presented socio-economic material in relation to the Foothills and Foothills (Yukon) projects. A summary of evidence and views of the Board follows.

Trunk Line (Canada), Foothills Project

Trunk Line (Canada) stated this pipeline would traverse an uninhabited region of northwestern Alberta. It felt the impact of the project would be temporary but beneficial as it would boost local employment and business in a region disadvantaged compared to the rest of Alberta.

The project would operate independently and away from the existing communities, the closest one being 18 miles away from the project. The project would provide short-term employment benefits with a requirement for 88 persons during the winter of 1979-1980 for line clearing and for some 450 persons during the following winter for pipeline construction. The magnitude of these benefits would depend on local participation; however, the Applicant stated it would put special effort into hiring locally. In terms of business opportunities, the Applicant said it would examine the capability of local business with a view to providing opportunity for participation, particularly in the areas of gravel supply, skids and equipment transport.

Overall, Trunk Line (Canada) expected the economic impact of

the project to be beneficial with some temporary but minimal adverse impact on hunting and trapping in the immediate vicinity of the right-of-way.

Trunk Line (Canada), Foothills (Yukon) Project

Trunk Line (Canada)'s project consisted of laying 630 miles of pipe between Boundary Lake and Empress and 176 miles between James River and Crowsnest Pass. The Applicant observed that, in a 12-mile wide corridor along the right-of-way, land use was largely devoted to agricultural activities and that, furthermore, there was a very low population density thus minimizing potential socio-economic difficulties. In addition, Trunk Line (Canada) felt the construction period was sufficiently short to restrict the potential for impact on local populations, community services or social structures. Under cross-examination, the Applicant stated it did not have a containment policy similar to the ones found in areas north of the 60th parallel.

The Applicant stated the project would confer a net socio-economic benefit on Alberta through the increased income it would generate via employment and business opportunities. Over the years 1980 to 1982 (inclusively), the project would offer close to 1,500 man-years of employment for a potential payroll of more than $60 million. While the Applicant stated it did not have any specified local hiring policy, it did remark that unskilled and semi-skilled jobs would be open to local residents. With respect to business opportunities, the Applicant stated its willingness to buy locally.

The Applicant remarked that the adverse economic impact posed

by disruption of present land uses along the right-of-way were considered to be low. For example, no significant loss of hunting and trapping potential was expected. In any case, Trunk Line (Canada) indicated it maintained a program of compensation to mitigate adverse economic impacts of land use productivity.

Views of the Board

The areas traversed by the Applicant's projects are either uninhabited (northwestern Alberta) or are areas of Southern Canada which have had exposure to projects of a similar nature in the past. The Board does not foresee any major socio-economic problem in relation to this project and generally concurs with the views of the Applicant.

5.6.5 Foothills (Yukon) - Saskatchewan

The Applicant proposed to construct a pipeline, approximately 160 miles long, through the southwest corner of the Province of Saskatchewan to a point on the international boundary near Monchy. Pipeline construction activities would take place over the summers of 1979 and 1980.

The Applicant stated that, while the southwest corner of Saskatchewan had a population of some 24,000 people in 1971, the area along the route was sparsely populated. The major economic activity in the area consists of agriculture, primarily wheat farming and cattle raising.

The Applicant predicted that during the construction period, there would be short-term increases in the use of local infrastructure, primarily railroad and highway networks and recreational facilities, in addition to the increased activity in

the local business sector. During the operations phase, the level of business activity and use of local infrastructure was expected to stabilize at levels slightly above those which currently exist. Construction and operation of the pipeline would not, in the Applicant's view, have a significant impact on present land use activities in the region.

Furthermore, the construction period could provide benefits to the economy of the region through additional income derived from employment and from the supply of goods and services; during the operations phase, these benefits would continue but on a reduced scale.

Views of the Board

The Board agrees with the Applicant's assessment of the impact on the southwestern corner of Saskatchewan and does not foresee any major socio-economic difficulties associated with pipeline construction or operations.

CAGPL- Views of the Board

CAGPL did not adduce any evidence on socio-economic impacts south of the 60th parallel. The route for most of the way is similar to that for Foothills or the Foothills (Yukon) projects and the Board concludes that no significant adverse socio-economic impacts are expected in these areas.

APPENDIX 5-1

CAGPL[1] - Socio-Economic Undertakings

(Exhibit No. AG-3-207)

Introduction

During the course of the cross-examination of the CAGPL Pipeline socio-economic phase, the Board requested CAGPL to file one document which contained a statement of the various regional socio-economic witnesses during Phase 3C.

It should be borne in mind that the following policy statements and undertakings are not meant to be all inclusive of the policies which would be implemented during the life of the pipeline. The policies are based mainly upon the regional socio-economic policy principles which are expressed in the 1972 Northern Pipeline Guidelines and reflect refinement of those principles resulting from consultations with Northerners and governments and from undertakings made to the National Energy Board and the Mackenzie Valley Pipeline Inquiry. CAGPL recognizes that further development of such policies is clearly an ongoing and continuous process and therefore specific applications of the basic principles may be varied as increased knowledge and experience clarifies the precise nature of the required socio-economic policies.

As requested by Mr. Edge at page 25,363 of the February 25, 1977 transcript, CAGPL has endeavoured to classify the following

(1) For the purpose of this report NEB has changed the company name "Arctic Gas" to "CAGPL" in this exhibit.

socio-economic policies and undertakings into three different parts, the pre-construction phase, the construction phase and the operations and maintenance phase. Mr. Edge requested that CAGPL should indicate the conditions which it "would expect to fulfill before the Certificate was released to permit the start of construction". While the exact nature of the certificate being sought by CAGPL will be described during the course of its final argument, CAGPL feels that such Certificate should not be conditioned upon the implementation of its pre-construction socio-economic policies before its Certificate becomes final. It will be observed that any further refinement to, and the timing of the implementation of, a number of these policies requires further ongoing consultation with, and the co-operation of, various levels of governments, communities and organizations. While CAGPL intends to continue its efforts to ensure that its policies can be in place by the required times, regardless of the timing of the issuance of a final certificate, it must be recognized that such implementation could be affected by parties other than CAGPL. To delay the issuance of a final certificate, with its resultant delays in financing and construction scheduling, when implementation has been so affected is undesirable. Consequently, CAGPL does not envisage that its socio-economic policies and undertakings should form the subject matter of conditions precedent to a final certificate in the sense that it would not become operative at all until they have been carried out, but rather as general obligations upon

CAGPL which would take effect if CAGPL were to be granted a certificate. They would be enforced (insofar as they are obligations of CAGPL alone not requiring the co-operation of other parties e.g. communities, government organizations, labour organizations, etc.) by way of terms included in the final Certificate or in the right-of-way agreement entered into with the Minister of Indian and Northern Affairs.

1.0 Policies Respecting the Pre-Construction Phase of the Proposed Mackenzie Valley Pipeline

1.1 Employment and Training of Native Peoples

CAGPL recognizes a special obligation to the native peoples of the North. Having studied the Alyeska experience in detail, it will ensure that its employment policies are realistic and, at the same time, consistent with policies established in the Expanded Guidelines for Northern Pipelines, 1972.

1.1.1 Native Organizations

CAGPL is prepared to meet formally with native organizations to discuss the training and employment of natives during construction. Informal meetings have been held with officials of some native organizations and there have been personal contacts with many northern residents.

1.1.2 Manpower Delivery Systems

CAGPL has joined with the Department of Indian and Northern Affairs, the Territorial Governments, petroleum companies, and gas transmission companies to discuss a co-ordinated recruitment procedure for northern residents, which is called the Manpower Delivery System and which is now being developed..

CAGPL has had under discussion with the Department of Indian and Northern Affairs for two years the development of possible arrangements with respect to the employment and training of northern residents in both construction and operations. The

latest draft agreement is not final, however, it is intended that employment and training arrangements will be in place prior to construction. One of the key elements of this system and one which must be determined by government is a practical definition of a northern resident.

1.1.3 Trade Unions and Contractors

Meetings have been held with representatives of the Pipeline Advisory Council, which consists of representatives of the four pipeline craft unions (U.A., Labourers, Operating Engineers and Teamsters), and a number of pipeline contractors to exchange views and information and to seek the appropriate commitments so as to maximize employment opportunities for northern residents and minimize harmful impacts on northern communities during construction.

Some of the policies which will require the concurrence of the unions and contractors in advance of construction commencement and which are outlined in more detail in the construction section of this paper are as follows:

- flexible rotation schedules for northern residents
- preferential hire for northern residents
- elimination of the need for northern hires to be made through hiring halls
- equal wages for northern residents
- camps isolated from communities

- southern hire for all but northern residents
- rest and recreation for southerners only in the south

1.2 Gas Supply Laterals to Communities

In these communities where natural gas service is indicated to be a more economic means of supplying fuel to the community, CAGPL is ready, willing and able to facilitate the provision of gas to those communities. This can be done by arranging for gas to be made available at a take-off point on the pipeline to any distribution company whether privately owned or governmentally owned, which would provide the service to that community. In this connection, where deemed desirable, CAGPL would be prepared to build the main lateral to the community and to charge a cost of service appropriate to that facility to the distribution company which would be purchasing the gas at the end of such a lateral.

If it were the government's decision, after considering all the factors, that gas service should be made available to certain communities on a subsidized basis and that the subsidization should be borne by other customers of the pipeline system, then CAGPL would undertake to construct those facilities. It would include the charges associated therewith in its total cost of service, and its rates would be structured so that gas service to those communities would be available on a competitive cost of service basis, with any additional costs for so doing being borne by other customers on the system.

1.3 Mitigating Community Impacts

1.3.1 Pre-Construction Planning

The policies of CAGPL are shaped in an effort to ensure that those persons who wish to continue to follow the more traditional style of life and means of earning a living will not be precluded from doing so. Their freedom of choice will not be interfered with. It is primarily the smaller, predominantly native Mackenzie Valley communities in which traditional activities continue to be pursued by some residents with income in kind accounting for a significant proportion o the total income in a community. Consequently, CAGPL construction planning, especially with respect to the location of facilities, has been done in such a manner as to insulate the smaller communities from construction activities.

CAGPL has not eliminated all activity from the proximity of larger communities, nor does it think that it is desirable to do so. What it has done is to keep activities in those communities at what it believes to be a practical level, bearing in mind that the communities will be experiencing development in any event as a result of secondary effects and pipeline operations.

Prior to pipeline construction, CAGPL will be intensifying its consultation program with the Territorial Government and community representatives and their consultants respecting the general pattern of growth in a community, the level and type of activity in the vicinity of the community, and community planning generally.

In the case of the smaller communities project information officers and liaison personnel, who to the greatest extent possible will be local people, will be involved in a special effort to incorporate local plans and priorities in the construction plans.

1.3.2 Local Procurement of Goods and Services

The Expanded Guidelines for Northern Pipelines include the following specific guidelines:

"Contracts and sub-contracts shall be so designed and publicized as to invite and encourage bids from native organizations, settlement councils and local contractors. In addition, the business and commercial organization of the Territories shall be invited and encouraged to supply goods and services required for the pipeline development and operation."

CAGPL has said, in Section 14.c of its application:

"The applicant is in agreement with the intent of this guideline, but cautions that there would be adverse consequences if the guideline were converted into policy without careful planning. Care must be exercised to avoid encouraging the formation of new businesses or the expansion of supply capacity in existing firms on the basis of unjustified expectations, concerning the volumes of materials that will be required at a particular location and/or the

duration of increased business activity associated with pipeline construction."

This attitude was further reflected in the response to Question 6 of the Pipeline Application Assessment Group Requests for Supplementary Information (Exhibit N-PD-358):

"Applicant's policy will be to utilize local contractors and suppliers of goods and services to the maximum extent, consistent with the welfare of the community. The benefits to such businesses and their employees from increased patronage are obvious, as are the indirect and secondary effects of such increased income in the area, but the applicant is also aware of other responsibilities; that is, the applicant will endeavour not to monopolize contractors to the extent that other unrelated work cannot be done and to avoid creation of demands for goods to the extent that local supplies are depleted and prices inflated. In addition, applicant believes that it should not encourage the establishment of those types of local businesses for wich demand will be minimal when construction is completed. The above principles, which the applicant believes are all valid, tend to create an uneasy balance. It will be difficult to determine when one principle or the other should be emphasized."

The main objective from the perspective of CAGPL is to facilitate liaison between existing and potential northern business interests and the management of CAGPL, with a view towards its eventual role as a purchaser of goods and services. CAGPL intends to take direct steps to ensure the provision of adequate information by hiring suitable personnel who will be responsible for liaison with local communities and local businesses regarding the procurement of goods and services.

CAGPL, however, cannot solve the dilemma outlined above. CAGPL looks to government and the northern business community to co-operate with the company in establishing reasonable and effective northern procurement policies and procedures in advance of the commencement of construction. CAGPL has suggested the formation of a Study Region Economic Liaison Group as described under heading 5.10 in Section 14.c of its application as one way of approaching this problem.

1.3.3 Manpower Delivery System

To make the Manpower Delivery System function smoothly and properly serve the interests of the communities, Arctic Gas would hope to directly involve residents of the communities to serve as the interface between the organizations involved in the delivery system and other community residents interested in employment opportunities.

2.0 Policies Respecting the Pre-Construction Phase of the Proposed Mackenzie Valley Pipeline

2.1 Hiring, Employment and Training of Northern Residents

2.1.1 Hiring and Training Preference

CAGPL will give preference to all employable northern residents who are desirous of construction employment, in accordance with the Expanded Guidelines for Northern Pipelines, 1972. A policy of preference for northerners requires special measures which will be made available by CAGPL as follows:

- In situations in which qualifications of a northern and southern resident are equal, the northern resident will be given preference.
- In any case where the qualifications of a particular job can be relaxed, that will be done for the northern resident, and then they will be given preference over fully-qualified southerners for that job.
- In those cases where a candidate cannot meet the relaxed qualifications, special training will be made available to bring skills up to a level satisfactory for employment.

2.1.2 Equality of Employment

CAGPL will ensure that all northern residents employed in pipeline construction will enjoy benefits and privileges in respect to employment matters equal to those accorded employees who are not resident and are employed in similar positions.

2.1.3 Work Schedules

Once northern residents have been hired, CAGPL will be flexible in establishing construction work schedules for northern residents in order that community and personal requirements can be taken into account. Every attempt will be made to employ northern residents on sections of the pipeline as close to their home communities as possible.

2.1.4. Transportation to and from Construction Camp

CAGPL will arrange transportation for northern resident employees to their home communities on regular or chartered flights for scheduled rotational leaves, and will attempt to arrange the rotational leave schedule in a manner which would maximize the use of the aircraft. The company's obligations in respect to the provision of transportation for a northerner will not exceed the cost associated with transporting a southerner out on a rotational leave. Northern residents working sufficiently close to their home community to make it practical for them to travel to and from their homes on a regular basis if they wish, will be able to do so.

2.1.5 Orientation to Wage Employment

CAGPL will ensure that employed northern residents will be provided orientation on matters associated with wage employment. Such orientation will include discussion and instruction on matters such as camp life, fundamentals, environmental concerns,

safety, fire training, basic first aid procedures, money handling, and motor vehicle driver education when appropriate. The content of these programs would be determined by consultation with all relevant authorities and other interested parties, including native organizations.

2.1.6 Counselling

It is intended to offer a counselling service on an ongoing basis during construction, with emphasis on the needs of employed northern residents. CAGPL will adopt measures to attract northern residents who have had industrial work experience and exposure to southern workers and southern management, with a view to using such people as counsellors. Such people, after training, would act as counsellors for northern residents in both work related and social matters, as well as providing communication and co-ordination between management and northern workers.

2.1.7 Notice of Construction Jobs

CAGPL will provide information on all construction jobs on a continuous basis to whatever government agency is designated to co-ordinate northern job placement.

2.1.8 Manpower Delivery System

CAGPL's concept of this system would include a "co-ordinating council" with representation from the government agency(s)

responsible for employment, the unions involved in the project, native organizations interested in employment of their people, and, of course, employers, including CAGPL. This council would direct the overall activity of the Manpower Delivery System. The essential elements of the system would include recruitment and selection procedures, travel and accommodation arrangements, medical examinations, clothing and equipment checks, union enrollment as required, orientation, and personal and family counselling. Other elements may be identified as discussions and developments proceed. It is CAGPL' expectation that this system will make the use of hiring halls in the north unnecessary.

2.1.9 On-the-Job Training

CAGPL recognizes the importance of providing on-the-job training to upgrade the skills of those who initially accept unskilled or semi-skilled positions, and will support and encourage programs sponsored by contractors and unions which will favour northern natives in on-the-job training and employment opportunities during construction.

2.2 Mitigating Community Impacts

2.2.1 Hiring Non-Resident Employees

CAGPL, in co-operation with the contractors and unions involved, will require that all hiring of non-northern resident employees be done in southern locations. Non-residents who apply north of the 60th parallel will not be accepted for employment, and CAGPL will give the widest possible publicity to this policy.

2.2.2 Indoctrination and Orientation of Non-Resident Employees

CAGPL, in co-operation with the contractors and unions involved, will have all indoctrination for non-resident employees carried out in southern Canada. The process of indoctrination will involve, among other things, travel and accommodation arrangements, medical examinations, clothing and equipment checks, and union enrollment. In addition, all southern hires will be given orientation, safety, fire and survival training. Orientation will include training in such things as camp life and camp rules, with special emphasis for the non-resident employee on familiarization with northern life styles and an understanding of northern peoples.

2.2.3 Rotational Leave for Non-Resident Employees

Non-resident employees will be required to take their rotational leaves in a southern location, and personnel logistics

will be handled in such manner as to eliminate the need for stop-overs in northern settlements on the way to or from job sites.

2.2.4 Construction Camps: Regulations and Security

The policy of CAGPL is to have all construction employees living in camps which will exist and operate independent of the nearby communities and on "single status" basis. CAGPL will actively discourage employees from setting up other arrangements such as housekeeping in mobile homes or other temporary accommodation outside of, but in proximity to, the construction camp, while recognizing that for any such policy to succeed it will be necessary for the government to formulate and enforce land use controls in the areas surrounding the camps.

In those areas where there is road access to communities, CAGPL intends to ensure that there is no casual transportation. All of the major camp facilities will be fenced with security personnel at the gates on a 24-hour basis. As a general rule, local residents who are not employed on the project will not be allowed access to the camp facilities.

It is the intention of CAGPL to make it a condition of employment for all employees, including northern residents, that there will be no hunting, trapping, or fishing while living in the camps. Firearms will not be permitted in the camps, with the exception of any required for emergency or security purposes. The current preference of CAGPL is to have alcohol available in the camps on a controlled basis. CAGPL plans to provide camps

that are comfortable and well maintained, with a full range of high quality facilities. All of the camp facilities will be completely self-contained with respect to water, power, fire-fighting, and sewer services, unless it is determined that it would be mutually advantageous for CAGPL to utilize a specific community service.

2.2.5 Medical Facilities

To ensure proper health care, a medical support system will be established to provide for the treatment of illness and injuries. CAGPL does not intend to use the medical facilities in the small communities.

2.2.6 Transportation and Communications

The general policy of CAGPL with respect to transportation and communications services and facilities is that the project will meet its own requirements using local capacity where it exists, but without overextending the demand on that capacity to a point where regular community service is disrupted. If due to unforeseen circumstances CAGPL's efforts fail to adequately provide for the increased volume of project traffic, CAGPL believes community needs should take priority over pipeline needs. The following are specific examples of how this policy is applied:

2.2.6.1 Transporting Personnel

All southern personnel destined for northern job sites will be flown out of a southern centre on large jet aircraft. Those destined for a job site close to a CAGPL 6,000 foot airstrip will be flown directly to that strip. Personnel destined for job sites that have only a 2,400 foot airstrip will be flown to a large airstrip for transfer directly to the job site. This transfer operation would take place at one of the large CAGPL airstrips or at the airport of one of the large communities (Inuvik, Norman Wells, Fort Simpson, or Hay River), depending upon the location of the destination job site, and would not involve layovers in northern communities. To the extent possible, the CAGPL airstrips will be used in order to minimize air traffic at the community airports. Essentially the same procedure would be used for personnel returning to the south.

2.2.6.2 Highway Maintenance

During the movement of materials from Entreprise to Fort Simpson and Axe Point, or to the right-of-way south of Fort Simpson, CAGPL undertakes to work with the appropriate government authorities to ensure that dust and maintenance problems are adequately controlled. Further, the current planning of CAGPL is to accomplish much of the highway movement during the winter months, thus reducing both problems.

2.2.6.3 Communications Facilities

CAGPL is undertaking engineering design agreements with Telesat Canada and the other common carriers along the pipeline route, including CN Telecommunications, which is responsible for providing communications service to the Mackenzie. These agreements require CAGPL to keep the communications firms informed on the latest construction communication requirements in order that they may carry out their long-range planning in accordance with their responsibility as charter common carriers. All of CAGPL' discussions with the carriers have been on the basis that they must demonstrate in their proposed systems that there will be adequate spare capacity to avoid overloading of the services to communities along the pipeline route.

2.2.6.4 Freight Rates

With regard to the question of changes in freight rates in relation to the expansion of facilities for pipeline construction, CAGPL expects to negotiate arrangements with the carriers that will minimize the exposure of other traffic to rates greater than those that would prevail in the absence of the project. The intent of CAGPL would be to attempt to negotiate in such a way that costs reflected in the acquisition of equipment or facilities would not be passed through to the general rate structure.

2.2.6.5 Air Transport Facilities

CAGPL has stated its intention of leasing, chartering, or otherwise contracting for aircraft to service construction. Public airports near Inuvik, Norman Wells, Fort Simpson, and Hay River will be used for the movement of personnel and materials. An adequate shelter or waiting room area will be provided to avoid any inconvenience to the public or congestion in the existing terminal facilities. Further, CAGPL will co-ordinate its activities with the Ministry of Transport, the airlines, and the communities to ensure that normal ground crew operations, cargo handling facilities, and other airport services are not disrupted.

2.2.6.6 Barging Facilities

CAGPL recognizes and accepts the responsibility for the provision of dedicated barge and tug sets to meet the requirements of its project. There are several options open, and although the precise arrangements are yet to be negotiated with the various operators, the one which is favoured and has been used to make cost projects is described here.

CAGPL is prepared to backstop the investment which northern carriers are required to make in order to meet the needs of the project. Initial analysis suggests that new equipment so acquired should be depreciated over a 15-year period. During the life of the project, operators will be able to recover some of their investment, including financing charges and depreciation through the tariff they charge CAGPL. However, the amount of

river traffic is projected in studies by Transport Canada to grow at about a 9% annual rate once a pipeline is completed. As the new and improved fleet is needed to meet increased requirements, the financial responsibility, including financing charges and depreciation, would pass on to other users of the equipment. If growth in river traffic does not require full utilization of the equipment, then CAGPL would be responsible for any financial consequences. It must be remembered that much of the equipment operating on the river today is old and inefficient, and some operators may wish, as part of their initial agreement with CAGPL, to negotiate for using equipment acquired for the project to replace part of their existing fleet once the project is completed. CAGPL feels these arrangements will reinforce the long-term viability of Mackenzie barge operations and thus prove to be in the best interests of the northern communities and businesses which those operations serve, while at the same time meeting our requirements.

2.2.7 Compensation for Economic Loss

CAGPL has indicated its willingness to pay speedy and adequate compensation for any economic loss sustained by northerners as a result of interference with the current use and occupation of land. An example of how this policy could be applied can be seen in its response to Question 8 contained in the Responses of CAGPL to Pipeline Application Assessment Group Requests for Supplementary Information.

2.3 Other

2.3.1 Local Procurement

In addition to the measures outlined in section 1.0 of this paper, CAGPL will, in certain situations where possible, break large contracts down into smaller packages on which local businesses might readily bid.

CAGPL would also encourage consortia of local businesses which could, as a group, bid on larger contracts.

2.3.2 Surplus Material and Equipment

Material and equipment which is surplus to CAGPL after construction will be made available to northern communities and/or the Territorial Governments in a manner to be negotiated with the appropriate government agencies.

3.0 POLICIES RESPECTING THE OPERATIONS AND MAINTENANCE PHASE OF THE PROPOSED MACKENZIE VALLEY PIPELINE

3.1 Employment and Training

3.1.1 Preferential Employment

During the operations and maintenance phase of the pipeline, CAGPL will seek to preferentially hire all employable northern residents who seek employment.

CAGPL intends to assist those northern residents who desire to make a transition from their present lifestyle to accommodate involvement in a wage economy and will provide:

- Jobs for operations and maintenance personnel desirous of a mixed lifestyle in which pursuit of employment in a wage economy and continuation of traditional occupational pursuits related to the family and community can be accommodated.
- A transportation policy which would provide benefits to northerners who choose to live in communities in the Northwest Territories and Yukon other than District Headquarters, comparable to those benefits provided southern employees who may commute and rotate on work schedules to an established southern location.
- Innovative and flexible payroll arrangements, designed to meet the needs of the individual and his family. Encouragement and assistance

in ways and means to increase propensity to save and invest for the long-term benefits possible in a wage economy.

3.1.2 Notice of Job Opportunities

The services of Canada Manpower and the Northwest Territories Employment Division will be utilized to bring job opportunities to the attention of northern residents. For seasonal and casual labour required on company maintenance programs, local residents will be given the first opportunity of employment.

3.1.3 Training

CAGPL will co-operate with governments in arranging training, including academic upgrading, which will prepare local residents for both regular and casual employment opportunities, and will encourage vocational programs related to the industry at the high school level and in the technical trades program at A.V.T.C. in Fort Smith.

Training opportunities for northern residents desiring employment with CAGPL will be maintained with the long-term objective of staffing the entire operations and maintenance department in the north with northern residents. CAGPL will co-operate with government agencies to ensure that nothern residents are provided the opportunity of academic upgrading when required, prior to skill training and employment in operations and maintenance.

CAGPL will follow industry practice and establish in-house training programs that will enable employees to advance to more skilled job categories. This will include the establishment of programs designed to train employees to the technician and higher levels.

CAGPL will arrange special programs designed to train technicians, which will provide for on-the-job training, specialized training conducted by equipment vendors, and related theory sessions at government training institutions.

3.1.4 Nortran Trainees

CAGPL will ensure that employment opportunities are made available to present and expanded numbers of Nortran trainees. Such employment will accommodate their continued development as operating and maintenance personnel when the pipeline enters the operating phase. CAGPL is in full agreement with Nortran's plans and programs designed to enable trainees to progress to pipeline operations and maintenance employment.

3.1.5 Orientation Programs

Northern residents, when employed by CAGPL, will be provided with orientation programs designed to acquaint them with work habits and life styles of other workers in the company and the industry, and to acquaint them with the opportunities and responsibilities associated with a wage economy. These programs and the counselling program discussed below are already in place

and administered by Nortran. For southern workers assigned to the Northwest Territories and the Yukon, CAGPL will provide orientation programs designed to familiarize them with northern culture and an understanding of northern people.

3.1.6 Counselling

CAGPL will also make available counselling for northern employees and their families to help them adapt to the requirements of wage employment.

3.1.7 Work Schedule and Residency

The employment objective of CAGPL is to have a stable work force consisting of employees at all job levels who make their permanent homes reasonably close to the work place.

Initially, CAGPL will have to establish work schedules for permanent and continuous positions to accommodate the following four kinds of employees:

- Highly qualified personnel at all skill levels from technician to management, some of whom will come on loan from existing pipeline companies. The company would require a rotational arrangement for loanees whose term of employment would probably not exceed two years;
- Northern residents who have been trained under Nortran or who are direct hires, and who prefer

to maintain their permanent residence in the home community and rotate on the same work schedule established for southern hires. There may be a few who wish to rotate and whose home community is remote. In such cases, it might be practical to establish a more extended work schedule;

- Employees who would prefer to make their homes in one of the district office communities and for whom housing will be made available;
- A small senior management group of employees will be required to make their home in one of the district office communities from the commencement of employment.

3.2 Community Housing

It is CAGPL's intention, whether for people who are permanently resident in the community or for those who are rotating in for some period, to ensure that housing is provided as an augment to the community supply and not to either rent or buy the existing housing stock.

3.3 Phased Community Development

CAGPL favours a phased community development approach, which involves moving gradually from a situation where a substantial number of permanent positions are filled by employees who rotate to the job site, either from other regional communities or from the south, to the desirable long-run situation where most employees are resident with their families in the district office communities.

While planning for facilities in the communities has been initiated, plans will not be finalized until there have been extensive consultations with the communities. This would include discussing the possibility of constructing central facilities that can evolve in terms of the specific use of space as the shift away from a pattern of rotating employees takes place.

Further, discussions will be held with the individual communities with respect to such matters as housing, recreation facilities, and community infrastructure in order that the unique characteristics and requirements of each community, as well as the development plans of each, can be properly taken into account and reflected in final decisions.

APPENDIX 5-2

Foothills and Foothills (Yukon) - Socio-Economic Undertakings

(Exhibit No FH(Y)114-53)

Alaska Highway Pipeline Project

Introduction

The following is a summary of the socio-economic policies and undertakings of Foothills Pipe Lines (Yukon) Ltd. relating to the Yukon portion of the Alaska Highway Pipeline Project. This is provided in response to a request of the National Energy Board (Reference: National Energy Board March 10, 1977 Transcript of Proceedings, Page 27, 116.) An expansion of the items covered in this summary is contained in:

a) Foothills Pipe Lines (Yukon) Ltd. Socio-economic Statement - Alaska Highway Pipeline Project - as filed with the National Energy Board.

b) Foothills Pipe Lines (Yukon) Ltd. - prepared evidence of Panel 1 of Phase 3C as filed with the National Energy Board.

c) The National Energy Board Hearing Transcripts of the testimony of the Foothills Pipe Lines (Yukon) Ltd. Socio-economic panel.

Overall Objective of the Foothills Pipe Lines (Yukon) Socio-Economic Program

The overall objective of Foothills' socio-economic program is to ensure that our pipeline system is planned, constructed and

operated in such a manner that it offers the optimum net benefits to the residents of Yukon.

In stating this objective, Foothills recognizes that it must remain responsive to the society and economy of Yukon and thus intends to remain as flexible as possible in its policies towards minimizing the detrimental impacts and maximizing the beneficial impacts of its project. In the development of this program Foothills intends also to rely upon the extensive background and knowledge in this area of its two sponsor companies, Westcoast Transmission Company Limited and The Alberta Gas Trunk Line Company Limited. In fact much of the program is an extension of the basic approach which these two companies currently practice, and also that which AGTL followed in its earlier involvement with proposed northern pipeline systems.

Means of Achieving this Objective

Probable impacts as a result of the project are assessed and policies and procedures are then formulated and implemented which we believe will best serve to provide the maximum overall benefit to a community or region. In following this procedure:

1. the first step is to assemble a description of the current and past socio-economic patterns and trends of the area;
2. the second step is to identify the potential areas of interaction between our project and the existing socio-economic environment; and,

3. the next step in the process is to predict the effects and intensity of this interaction, and then to obtain feedback from the persons, communities or governments affected, so that this feedback can be used as input to possible project modifications in order that our overall objective will be achieved.

PART I

Policies and Undertakings - Pre-Construction

The following is an outline of policies and undertakings that Foothills Pipe Lines (Yukon) Ltd. sees as necessary to have in place and functioning or ready to function before final authorization to proceed with construction is given.

1. Settlement of Land Claims and Public Acceptance of the Project

Foothills has taken the position that construction of a pipeline in Yukon should not proceed until there is a broad acceptance of the project by the residents of that area. (Reference: Mr. S.R. Blair's testimony to the NEB December 10, 1976 - transcript pp. 18780 - 18793)

2. Employment and Training of Yukoners

a) Foothills believes that an efficient manpower delivery system must be in place if employment of Yukon workers on the project is to be optimized:

i) In order to avoid unnecessary duplication and competition for the local worker, the system should be designed to deliver Yukon manpower to the total project ie. pipeline and related activities.

ii) The system should, as much as possible, direct persons into the vocation for which they are best suited.

iii) The system should prepare the people for the working conditions which they will encounter.

iv) As much of the delivery system functions as practical should be carried out in the communities, thus allowing Yukoners to remain in their home communities as long as possible.

v) The system should utilize services available from existing sources as much as possible.

Since government departments are already providing services similar to those described and in fact have offices located in a number of Yukon communities, it is Foothills' opinion that it would be appropriate for government to continue to provide such services.

Foothills will co-operate with the appropriate government agencies, contractors, unions and local organizations towards the development of such a manpower delivery system. Discussions have already taken place in this regard.

b) Foothills will develop and make known to the public its employment policies. This process is presently ongoing.

c) Definition of "Yukoner"

In order to maximize local hire and training on the project, Foothills believes a universal definition of "Yukoner" is a necessity. Foothills looks to government to provide such a definition.

d) Pre-construction Training

The mechanism for providing pre-construction and construction training should be developed and made known to the public. While Foothills will co-operate fully in this, Canada Manpower, Contractors and Unions have traditionally provided this training

and Foothills believes this practice should continue. The required training program for the operations phase is part of the Nortran program. (See Operations section)

e) Orientation

The Alaska Highway Pipeline Project is to be constructed in a manner which will be familiar to most, if not all of the southern workforce needed to be brought into Yukon in order to complete the project. Likewise, it is expected that because of previous construction activities in Yukon, Yukoners will experience little or no difficulty in adjusting to work on the pipeline project, since standard construction practices will be used.

For these reasons, extensive orientation programs are not considered to be necessary for the construction phase of this project. During the Operations and Maintenance phase, however, orientation programs similar to the one now being conducted by Nortran will continue to be part of the normal recruitment and training program.

Notwithstanding the above, during the construction phase Foothills does intend to provide an orientation program which will include:

i) an explanation of camp rules and regulations including conduct codes, and equipment, building and vehicle usage;

ii) Explanation of permit stipulations and other applicable regulations;

iii) introduction to and explanation of the on-site counselling services; and,

iv) safety practices and working conditions.

The program will be tailored to suit the various segments of the work force.

3. Project Agreement

Foothills will, through a project or special agreement between the Contractors and Unions, assure that the applicable terms and conditions contained in the permit plus other appropriate undertakings of Foothills are satisfied. For example, for matters pertaining to pipeline construction, Foothills would arrange such matters through the Canadian Pipeline Advisory Council. General discussions have already been held with the Canadian Pipeline Advisory Council.

4. Local Business Involvement

a) A prime objective of Foothills is to maximize within practical limits the participation of local businesses in our project. Foothills' prime role is the formation and implementation of policies designed to encourage entrepreneurship.

b) In order to accomplish this objective, discussions have been initiated and will be continued between Foothills and representatives of the Chamber of Commerce, Yukon Contractors Association, etc. These discussions are designed to:

i) ensure that Yukon businessmen are aware of the opportunities to participate in and benefit from the construction and operation of the proposed Alaska Highway Pipeline Project.

ii) ensure that the Foothills purchasing policies reflect any special circumstances or needs of Yukon businessmen.

iii) develop a bidders list composed of potential Yukon suppliers of goods and services to the pipeline project.

5. In-migration

Foothills considers that undesirable in-migration to Yukon could be the major detrimental impact created by the pipeline. As one means to discourage this, Foothills will undertake at the time the permit is issued, a suitable information program in southern Canada which will emphasize the Company's hiring policies and practices. (See Construction Section)

Foothills is confident that with this program, its hiring and working policies and practices, the nature of the project and the extensive pipeline construction occurring "south of 60", an insignificant amount of undesirable in-migration into Yukon will occur as a result of the pipeline project.

6. Community Liaison

Foothills will put in place a community liaison program. This will involve the placement of company representatives (preferably local people) in selected communities. The program will have a two-fold objective:

- to provide the northern people with an opportunity to be well-informed about the proposed pipeline system; and,

- to provide them with a means for expressing their desires and concerns as they relate to this system.

Through this program we hope to assure northern residents that these desires and concerns will be listened to and considered when pipeline construction and operational plans and policies are being developed.

7. Compensation

The overall philosophy of our compensation policy is that a person who has been adversely affected by our project should be compensated in such a manner that he is equally as well off after the construction of the pipeline as he was initially, and that during the operations phase he will not be disadvantaged as a result of any action by the Company. The procedure for settling of any claims will generally follow that which AGTL and WTCL have developed and found successful over the years. In particular for hunting and trapping losses due to pipeline activities, Foothills will negotiate (prior to the start of pipeline construction) with the Hunters and Trappers Associations the method by which such losses will be compensated.

8. Gas to Communities

Foothills firmly believes the supply of natural gas to northern communities is a major beneficial contribution which the

pipeline should bring to northern residents, even if special arrangements are necessary in order to do so.

Since the Alaska Highway Pipeline Project will be transporting only United States natural gas, a plan was developed to provide gas to Yukon communities which involves an Alberta gas supply exchange arrangement. Pan Alberta Gas Ltd. has provided a letter to Foothills stating their willingness to make the required quantity of Alberta produced gas available provided approval is granted to cover its export from Alberta. Pan Alberta is presently in the process of making the necessary application to obtain such approval.

9. Security

Prior to construction, adequate security arrangements must be in place not only for the project, but for the communities as well. The latter, in Foothills' opinion, is a matter for the RCMP. Foothills will co-operate with the RCMP to the extent required. A plan for camp and right-of-way security and routine policing of our own regulations and permit conditions during construction will be developed by Foothills. The R.C.M.P. will be kept fully informed on this matter.

10. Pipeline Authority

Foothills believes a single regulatory authority would be preferable but not essential to its project. At present in the construction and operations of pipelines in southern Canada, it is

necessary to deal with a number of different government agencies, and the process has proven to be workable. However if there is to be a single regulatory authority, it is Foothills' opinion that it should be the National Energy Board.

11. Equity Ownership

Foothills believes the people of Yukon should have the right to purchase equity ownership in the pipeline project on attractive terms, and Foothills will develop a plan for doing so.

12. Impact Funding

Foothills will be responsible for all costs which can be reasonably traced to its project. While certain costs will be easily traceable to the project, it will be difficult to determine the extent to which other costs should be assigned to the project, if at all.

Foothills believes that a procedure must be in place for allocating impact costs prior to the commencement of construction. Foothills is prepared to work with the appropriate government agencies in order to establish such a procedure.

PART II

Policies and Undertakings - Construction

The following list of policies and undertakings have been adopted by Foothills Pipe Lines (Yukon) Ltd. for the construction phase of the Alaska Highway Pipeline Project. It should be noted however, that the implications of those policies and undertakings listed in Part I of this document will of course carry over into the construction phase of the project.

1. Camp Management and Local Infrastructure Requirements

a) For the construction phase the project has been designed so as to have a minimum demand on the local infrastructure.

b) Routing of construction personnel to and from the jobsite will be done as expeditiously as possible. Existing airports will be utilized as points of arrival and departure from and to the hiring centres and connecting transportation will be scheduled so that there will be minimal waiting time at these airports.

c) Return transportation to the point of hire will be provided for all workers who quit, are fired, or leave their work for any reason.

d) Construction workers will be housed on a single-status basis in self-contained well equipped camps, well removed from the communities. Controlled tavern facilities will be provided in the larger camps.

e) Company vehicles will not be available to the construction work force for casual transportation, and parking spaces for private vehicles at the campsite will be restricted.

f) No personal firearms will be allowed in the construction camp.

g) Alcohol and financial counselling services will be provided as required in the construction camps.

h) The Foothills policy is directed towards not overtaxing the existing health care delivery systems in Yukon. Emergency health services will therefore be provided in the construction camps and suitable transportation arrangements will be made to evacuate patients to the South as required. All camp medical services and facilities will be under the direction of a medical doctor.

i) Access to the camps and work sites will be available to the R.C.M.P. or other peace officers pursuant to their responsibilities. Further, Foothills will provide office space, accommodation and access to communication facilities at all major campsites for use by the R.C.M.P.

2. Employment, Training and Orientation

a) It is Foothills' policy that all "southerners" wishing employment on the pipeline will be hired "south of 60" and that no pipeline employment hiring of "southerners" will occur in Yukon. Only Yukoners will be hired in Yukon for employment on the pipeline project.

b) Foothills intends to give preferential hiring treatment to all employable Yukoners. When qualifications of a local resident and a non-resident are equal, preference will be given to the local resident.

c) In any given job category, all employees will be treated equally, and each will receive equal benefits and allowances including housing provisions.

d) In order to ensure the safety of personnel, all workers will be assigned responsibilities in accordance with their qualifications.

e) Yukoners will be offered employment at a location as close to their place of residence as it is practicable to do so.

f) Foothills will, by contractual obligations, assure itself that all contractors and sub-contractors operate in compliance with Foothills' policies respecting employment and working conditions.

g) Training and employment opportunities will be directed at those persons who will be new entrants into the labour force, and other persons who for a variety of reasons have not fully participated in a wage economy.

h) Yukoners who elect pipeline employment will be assisted in obtaining information, training and counselling directed towards their own particular vocational goals.

i) There will be no discrimination regardless of race, sex or religion.

j) Those Yukoners who seek employment during the construction phase and do not have sufficient skills, will be

encouraged to take advantage of the available training opportunities in those skills which will present employment possibilities on a continuing basis in the North.

k) All construction personnel will receive an orientation course, the content and length of which will be adjusted to suit their requirements (refer to the Pre-construction section).

3. Northern Entrepreneurship and Local Purchasing

a) As a matter of policy, Foothills will encourage local entrepreneurship and will, wherever practicable, use Yukon firms to perform work. It will obtain its supplies and services including transportation from local businesses to the extent that supplies and services to residents will not be unduly inflated in cost or depleted in number.

b) Foothills will locate its construction headquarters in Whitehorse where close contact can be maintained with northern companies and organizations.

c) Contractors and sub-contractors on our project will also be required to purchase from local business wherever practical and where there will be no adverse effects on community supplies or services.

d) Foothills will identify the business opportunities which are potentially available to the local businessman in light of their capabilities and desires. The local Chambers of Commerce and other business organizations will play an important role in this identification of opportunities.

e) Whenever practical, contracts will be made available by Foothills in proportions which will be manageable by small local firms.

f) Whenever possible, a greater than normal lead time with regards to bidding on contracts will be provided the local businessman.

PART III

Policies and Undertakings - Operations & Maintenance

During the operations and maintenance phase, Foothills will rely upon the many years of operating experience of its two sponsor companies and exercise flexibility in establishing policies and procedures affecting its employees and the communities where its personnel and facilities are located.

The following policies and undertakings are intended to augment the pertinent commitments made in the two preceding sections of this document which will still be in effect during the operations phase, e.g. employment and local procurement policies, community liaison programs. Moreover, since the division of this enumeration of policies and undertakings has been made on a functional rather than on sequential timing basis, some of the undertakings listed below will be initiated prior to the commencement of the operations and maintenance phase.

1. Employment, Training and Employee Benefits

a) Foothills will give priority to Yukoners in the filling of all trainee positions and "experienced" positions. Selection of personnel will be made on the basis of individual aptitudes, interest, compatability, etc. and length of residency in Yukon.

b) Upon receipt of the necessary approvals to construct and operate its proposed pipeline, Foothills intends to provide the additional operational phase training through an expanded NORTRAN program. We have been assured by our two sponsoring companies,

Westcoast Transmission Company Limited and the Alberta Gas Trunk Line Company Limited, that when we receive the necessary approvals to construct and operate our proposed pipeline, they will make the on-the-job training positions we require available to us. We intend to place the trainees with these two pipeline operating companies until such time as our pipeline goes into operation. At that time, on-the-job training will be transferred to the North.

c) During the construction period, Foothills will offer its operations and maintenance trainees employment as inspectors, materials men, inventory controllers, etc. in the construction management division of the company.

d) Those Yukoners who become operations and maintenance personnel with our company will be given the opportunity to receive training which will enable them to take advantage of the long-term employment opportunities offered by the pipeline operational phase. This training will not only be directed towards the upgrading of skills, but also towards qualifying Yukoners to assume positions of supervisory and managerial responsibilities.

e) During the operations phase, Foothills is prepared to consider the implementation of a job rotation system to allow native residents to pursue traditional activities of hunting and trapping, should this be desired. However, such a system would tend to be more feasible in the case of the jobs outside the supervisory category.

f) In order to enable its permanent employees to extend the benefits of their salaried employment over a greater span of time, Foothills will provide a permanent employee benefits program. As presently contemplated, this package will include a savings plan, investment options, pension plan, life insurance and disability protection, all to be financed jointly by the employee and the Company.

g) Foothills will provide money management advice as part of its overall counselling services to those of its operations staff who desire it.

h) Foothills will provide accommodation or accomodation allowances for all of its permanent employees in Yukon. Foothills will also encourage its O & M personnel to purchase their homes rather than rent them from the Company. While it is premature at this time to outline the actual mechanism of such a home ownership plan, it is our intention to make it at least as attractive for our employees to own their own home as it is to rent. (Westcoast Transmission Company Limited already has in place a policy regarding home ownership assistance.)

2. Use of Local Facilities

Foothills will work closely with the communities in order to avoid the overtaxing of infrastructure and will assist in the upgrading of existing facilities should our project make this necessary. (A method for consideration and one which Foothills would be prepared to adopt is to provide the community with

advanced funding through the pre-purchase of those lots which Foothills will require.)

3. Disposal of Surplus Facilities

Following the construction phase, there will be considerable surplus materials available for disposal, and Foothills intends to give the people within the impact region the "right of first refusal" with respect to this equipment and material. Arrangements for the disposal of surplus equipment and materials will be co-ordinated with the appropriate governmental agencies.

4. Entrepreneurial Opportunities

Foothills will encourage the involvement of local residents in the durable business opportunities created by the operations and maintenance phase of its pipeline towards maximizing the "local content" of the project.

This policy will be implemented through the continued application of the local procurement policies initiated during the construction period and through continued input from the local business organizations.

PART IV

Saskatchewan Section

While the previously stated policies and undertakings are addressed to the proposed pipeline project for Yukon, Foothills also has an application before the National Energy Board to construct and operate approximately 160 miles of pipeline in southwestern Saskatchewan. Since the construction and operation of pipelines is not unique to Saskatchewan, Foothills believes it will be more appropriate to adopt procedures for this section which follow a philosophy similar to that already being used by The Alberta Gas Trunk Line Company Limited. It is Foothills' intention to follow such an approach.

SOCIO-ECONOMIC POLICIES AND UNDERTAKINGS

MAPLE LEAF PROJECT

Introduction

The following is a summary of the socio-economic policies and undertakings of Foothills Pipe Lines Ltd. relating to the Northwest Territories portion of the Maple Leaf Project. This is provided in response to a request of the National Energy Board (Reference: National Energy Board March 10, 1977 Transcript of Proceedings, Page 27,017). An expansion of the items covered in this summary is contained in:

a) Foothills Pipe Lines Ltd. - Socio-economic Statement - Maple Leaf Project - as filed with the National Energy Board.

b) Foothills Pipe Lines Ltd. - prepared evidence of Panels 1 and 2 of Phase 3C as filed with the National Energy Board.

c) The National Energy Board Hearing Transcripts of the Testimony of the Foothills Pipe Lines Ltd. Socio-economic panel.

Overall Objective of the Foothills Pipe Lines Ltd. Socio-Economic Program

The overall objective of Foothills' socio-economic program is to ensure that our pipeline system is planned, constructed and operated in such a manner that it offers the optimum net benefits to the residents of the Northwest Territories.

In stating this objective, Foothills recognizes that it must remain responsive to the society and economy of the Northwest Territories and thus intends to remain as flexible as possible in its policies towards minimizing the detrimental impacts and maximizing the beneficial impacts of its project. In the development of this program Foothills intends also to rely upon the extensive background and knowledge in this area of its two sponsor companies, Westcoast Transmission Company Limited and The Alberta Gas Trunk Line Company Limited. In fact much of the program is an extension of the basic approach which these two companies currently practice, and also that which AGTL followed in its earlier involvement with proposed northern pipeline systems.

Means of Achieving this Objective

Probable impacts as a result of the project are assessed and policies and procedures are then formulated and implemented which we believe will best serve to provide the maximum overall benefit to a community or region. In following this procedure:

1. the first step is to assemble a description of the current and past socio-economic patterns and trends of the area;

2. the second step is to identify the potential areas of interaction between our project and the existing socio-economic environment; and,

3. the next step in the process is to predict the effects and intensity of this interaction, and then to obtain feedback from the persons, communities or governments affected, so that this feedback can be used as input to possible project modifications in order that our overall objective will be achieved.

PART I

Policies and Undertakings - Pre-Construction

The following is an outline of policies and undertakings that Foothills Pipe Lines Ltd. sees as necessary to have in place and functioning or ready to function before final authorization to proceed with construction is given.

1. Settlement of Land Claims and Public Acceptance of the Project

Foothills has taken the position that construction of a pipeline in the Northwest Territories should not proceed until there is a broad acceptance of the project by the residents of that area. (Reference: Mr. S.R. Blair's testimony to the NEB December 10, 1976 - transcript pp. 18780 - 18793)

2. Employment and Training of Northerners

a) Foothills believes that an efficient manpower delivery system must be in place if employment of northern workers on the project is to be optimized:

i) In order to avoid unnecessary duplication and competition for the northern worker, the system should be designed to deliver northern manpower to the total project, ie. pipeline and related activities.

ii) The system should, as much as possible, direct northerners into the vocation for which they are best suited.

iii) The system should prepare the northerners for the working conditions which they will encounter.

iv) As much of the delivery system's functions as practical should be carried out in the communities, thus allowing the northerner to remain in his home community as long as possible.

v) The system should utilize services available from existing sources as much as possible.

Since government departments are already providing services similar to those described and in fact have offices located in a number of northern communities, it is Foothills' opinion that it would be appropriate for government to continue to provide such services.

Foothills will co-operate with the appropriate government agencies, contractors, unions and local organizations towards the development of such a manpower delivery system. Discussions have already taken place in this regard.

b) Foothills will develop and make known to the public its employment policies. This process is presently ongoing.

c) Definition of "Northerner"

In order to maximize northern hire and training on the project, Foothills believes a universal definition of "Northerner" is a necessity. Foothills looks to government to provide such a definition. Foothills, however, has put forward for consideration that "Northerner" be defined as all members of native groups indigenous to the Northwest Territories and "others" who are residents of the Northwest Territories on the

date the permit is granted for the construction of the proposed pipeline.

d) Pre-construction Training

The mechanism for providing pre-construction and construction training should be developed and made known to the public. While Foothills will co-operate fully in this, Canada Manpower, Contractors and Unions have traditionally provided this training and Foothills believes this practice should continue. The required training program for the operations phase is part of the Nortran program. (See Operations section)

e) Orientation

Foothills believes that because the majority of the work force will be working in an environment unfamiliar to them and under regulations that may be unique to this project, it will be necessary to provide an appropriate orientation program. Foothills will therefore undertake (in co-operation with government, contractors, unions and native organizations where appropriate) the development of an effective orientation program which will include an:

i) explanation of camp rules and regulations including conduct codes, and equipment, building and vehicle usage;

ii) explanation of permit stipulations and other applicable regulations;

iii) provision to the southern workers of some understanding of northern cultures and lifestyles and to the northern worker some understanding of the working conditions they will encounter;

iv) introduction to and explanation of the on-site counselling services; and,

v) techniques of survival under arctic conditions.

The program will be tailored to suit the various segments of the work force. Such an orientation program for operations and maintenance personnel already exists under the Nortran program.

Orientation for the Operations phase will continue to be a part of the Nortran program.

3. Project Agreement

Foothills will, through a project or special agreement between the Contractors and Unions, assure that the applicable terms and conditions contained in the permit plus other appropriate undertakings of Foothills are satisfied. For example, for matters pertaining to pipeline construction, Foothills would arrange such matters through the Canadian Pipeline Advisory Council. General discussions have already been held with the Canadian Pipeline Advisory Council.

4. Northern Business Involvement

a) A prime objective of Foothills is to maximize within practical limits the participation of northern businesses in our project. Foothills' prime role is the formation and implementation of policies towards entrepreneurship where northern people desire it.

b) To accomplish this, an appropriate northern bidders list, a Northwest Territories Tendering System and an advisory mechanism for northern businessmen must be in place prior to commencement of construction. To this end, Foothills has sponsored the Mackenzie Pipeline Business Opportunities Board. This Board has been in place since November of 1975. Its objectives are:

i) to ensure that resident northern businessmen have the opportunity to participate in and benefit from the construction and operation of the proposed Mackenzie Valley pipeline;

ii) to provide present and potential northern business with an understanding of pipeline asociated business opportunities;

iii) to promote an awareness of pipeline business opportunities amongst the northern public, special interest groups, government and industry; and,

iv) to provide an interface for two-way communication between resident northern businessmen and the pipeline companies, including their construction contractors and sub-contractors.

In addition, Foothills has requested the Board to advise it on those policies and procedures which we should undertake in order to maximize northern business involvement in our project.

The development of a northern bidders list and northern tendering system among other matters has been undertaken by this Board for Foothills.

5. In-migration

Foothills considers that undesirable in-migration to the Northwest Territories could be the major detrimental impact created by the pipeline. As one means to discourage this, Foothills will undertake at the time the permit is issued, a suitable information program in southern Canada which will emphasize the Company's hiring policies and practices. (See Construction Section)

Foothills is confident that with this program, its hiring and working policies and practices, the nature of the project and the extensive pipeline construction occurring "south of 60", an insignificant amount of undesirable in-migration into the Northwest Territories will occur as a result of the pipeline project.

6. Community Liaison

Foothills will put in place a community liaison program. This will involve the placement of company representatives (preferably local people) in selected communities. The program will have a two-fold objective:

- to provide the northern people with an opportunity to be well-informed about the proposed pipeline system; and,
- to provide them with a means for expressing their desires and concerns as they relate to this system.

Through this program we hope to assure northern residents that these desires and concerns will be listened to and considered when pipeline construction and operational plans and policies are being developed.

7. Compensation

The overall philosophy of our compensation policy is that a person who has been adversely affected by our project should be compensated in such a manner that he is equally as well off after the construction of the pipeline as he was initially, and that during the operations phase he will not be disadvantaged as a result of any action by the Company. The procedure for settling of any claims will generally follow that which AGTL and WTCL have developed and found successful over the years. In particular for hunting and trapping losses due to pipeline activities, Foothills will negotiate (prior to the start of pipeline construction) with the Hunters and Trappers Associations the method by which such losses will be compensated.

8. Gas to Communities

Foothills believes that prior to construction the procedures must be in place under which natural gas services will be provided to northern communities. It is Foothills' firm conviction that whenever it is practicable to do so, residents of an area must be afforded the opportunity and assistance to gain access to and benefit from the resources which are developed within their area, even if it means that special arrangements must be made in order for this to occur.

In Foothills' opinion, the plan which it has put forward in its Application is a reasonable one and should be approved. This

plan calls for the rolling in to the cost of the mainline the cost of the lateral lines to certain communities.

9. Security

Prior to construction, adequate security arrangements must be in place not only for the project, but for the communities as well. The latter, in Foothills' opinion, is a matter for the R.C.M.P. Foothills will co-operate with the R.C.M.P. to the extent required. A plan for camp and right-of-way security and routine policing of our own regulations and permit conditions during construction will be developed by Foothills. The R.C.M.P. will be kept fully informed on this matter.

10. Pipeline Authority

Foothills believes a single regulatory authority would be preferable but not essential to its project. At present in the construction and operations of pipelines in southern Canada it is necessary to deal with a number of different government agencies, and the process has proven to be workable. However if there is to be a single regulatory authority, it is Foothills' opinion that it should be the National Energy Board.

11. Equity Ownership

Foothills believes the people of the Northwest Territories should have the right to purchase equity ownership in the

pipeline project on attractive terms, and Foothills will develop a plan for doing so.

12. Impact Funding

Foothills will be responsible for all costs which can be reasonably traced to its project. While certain costs will be easily traceable to the project, it will be difficult to determine the extent to which other costs should be assigned to the project, if at all.

Foothills believes that a procedure must be in place for allocating impact costs prior to the commencement of construction. Foothills is prepared to work with the appropriate government agencies in order to establish such a procedure.

PART II

Policies and Undertakings - Construction

The following list of policies and undertakings have been adopted by Foothills Pipe Lines Ltd. for the construction phase of the Maple Leaf Project. It should be noted however, that the implications of those policies and undertakings listed in Part I of this document will of course carry over into the construction phase of the project.

1. Camp Management and Local Infrastructure Requirements

a) For the construction phase the project has been designed so as to have a minimum demand on the local infrastructure.

b) Routing of construction personnel to and from the jobsite will be done as expeditiously as possible. Existing airports will be utilized as points of arrival and departure from and to the hiring centres and connecting transportation will be scheduled so that there will be minimal waiting time at these airports.

c) Return transportation to the point of hire will be provided for all workers who quit, are fired, or leave their work for any reason.

d) Construction workers will be housed on a single-status basis in self-contained well equipped camps, well removed from the communities. Controlled tavern facilities will be provided in the larger camps.

e) Company vehicles will not be available to the construction workforce for casual transportation, and parking spaces for private vehicles at the campsite will be restricted.

f) No personal firearms will be allowed in the construction camp.

g) Alcohol and financial counselling services will be provided as required in the construction camps.

h) The Foothills policy is directed towards not overtaxing the existing health care delivery systems in the N.W.T. Emergency health services will therefore be provided in the construction camps and suitable transportation arrangements will be made to evacuate patients to the South as required. All camp medical services and facilities will be under the direction of a medical doctor.

i) Access to the camps and work sites will be available to the R.C.M.P. or other peace officers pursuant to their responsibilities. Further, Foothills will provide office space, accommodation and access to communication facilities at all major campsites for use by the R.C.M.P.

2. Employment, Training and Orientation

a) It is Foothills' policy that all "southerners" wishing employment on the pipeline will be hired "south of 60", and that no pipeline employment hiring of "southerners" will occur in the Northwest Territories. Only Northerners will be hired in the Northwest Territories for employment on the pipeline project.

b) Foothills intends to give preferential hiring treatment to all employable northerners. When qualifications of northerner and southerner are equal, preference will be given to the northerner.

c) In any given job category, all employees will be treated equally, and each will receive equal benefits and allowances including housing provisions.

d) In order to ensure the safety of personnel, all workers will be assigned responsibilities in accordance with their qualifications.

e) Northerners will be offered employment at a location as close to their place of residence as it is practicable to do so.

f) Foothills will, by contractual obligations, assure itself that all contractors and sub-contractors operate in compliance with Foothills' policies respecting employment and working conditions.

g) Training and employment opportunities will be directed at those persons who will be new entrants into the labour force, and other persons who for a variety of reasons have not fully participated in a wage economy.

h) Northerners who elect pipeline employment will be assisted in obtaining information, training and counselling directed towards their own particular vocational goals.

i) There will be no discrimination regardless of race, sex or religion.

j) Those northerners who seek employment during the construction phase and do not have sufficient skills, will be encouraged to take advantage of the available training opportunities in those skills which will present employment possibilities on a continuing basis in the North.

k) All construction personnel will receive an orientation course, the content and length of which will be adjusted to suit the needs of: (i) the southern workforce; (ii) the northern workforce; and, (iii) supervisory personnel employed by Foothills and the contractors. All training orientation and counselling courses, whether proposed by the Applicant or by its contractors, will be planned and carried out in co-operation with the various agencies of the government responsible for these matters.

3. Northern Entrepreneurship and Local Purchasing

a) As a matter of policy, Foothills will encourage northern entrepreneurship and will wherever practicable use northern firms to perform work. It will obtain its supplies and services including transportation from local businesses to the extent that supplies and services to northerners will not be unduly inflated in cost or depleted in number.

b) Foothills will locate its construction headquarters in Yellowknife where close contact can be maintained with northern companies and organizations.

c) Contractors and sub-contractors on our project will also be required to purchase from local northern business wherever

practical and where there will be no adverse effects on community supplies or services.

d) Foothills will identify the business opportunities which are potentially available to the northern businessman in light of their capabilities and desires. The Pipeline Business Opportunities Board and local Chambers of Commerce will play an important role in this identification of opportunities.

e) Whenever practical, contracts will be made available by Foothills in proportions which will be manageable by small local firms.

f) Whenever possible, a greater than normal lead time with regards to bidding on contracts will be provided the northern businessman.

PART III

Policies and Undertakings - Operations & Maintenance

During the operations and maintenance phase, Foothills will rely upon the many years of operating experience of its two sponsor companies and exercise flexibility in establishing policies and procedures affecting its employees and the communities where its personnel and facilities are located.

The following policies and undertakings are intended to augment the pertinent commitments made in the two preceding sections of this document which will still be in effect during the operations phase, e.g. employment and local procurement policies, community liaison programs. Moreover, since the division of this enumeration of policies and undertakings has been made on a functional rather than on sequential timing basis, some of the undertakings listed below will be initiated prior to the commencement of the operations and maintenance phase.

1. Employment, Training and Employee Benefits

a) Foothills will give priority to northerners in the filling of all trainee positions and "experienced" positions. Selection of personnel will be made on the basis of individual aptitudes, interest, compatability etc. and length of residency in the N.W.T.

b) Upon receipt of the necessary approvals to construct and operate its proposed pipeline, Foothills intends to provide the additional operational phase training through an expended NORTRAN

program. We have been assured by our two sponsoring companies, Westcoast Transmission Company Limited and the Alberta Gas Trunk Line Company Limited, that when we receive the necessary approvals to construct and operate our proposed pipeline, they will make the on-the-job training positions we require available to us. We intend to place the trainees with these two pipeline operating companies until such time as our pipeline goes into operation. At that time, on-the-job training will be transferred to the North.

c) During the construction period, Foothills will offer its operations and maintenance trainees employment as inspectors, materials men, inventory controllers, etc. in the construction management division of the company.

d) Those northerners who become operations and maintenance personnel with our company will be given the opportunity to receive training which will enable them to take advantage of the long-term employment opportunities offered by the pipeline operational phase. This training will not only be directed towards the upgrading of skills, but also towards qualifying northerners to assume positions of supervisory and managerial responsibilities.

e) During the operations phase, Foothills is prepared to consider the implementation of a job rotation system to allow native northerners to pursue traditional activities of hunting and trapping, should this be desired. However, such a system

would tend to be more feasible in the case of the jobs outside the supervisory category.

f) In order to enable its permanent employees to extend the benefits of their salaried employment over a greater span of time, Foothills will provide a permanent employee benefits program. As presently contemplated, this package will include a savings plan, investment options, pension plan, life insurance and disability protection, all to be financed jointly by the employee and the Company.

g) Foothills will provide money management advice as part of its overall counselling services to those of its operations staff who desire it.

h) Foothills will provide accommodation or accommodation allowances for all of its permanent employees in the Northwest Territories, without regard to geographical origin. Foothills will also encourage its O & M personnel to purchase their homes rather than rent them from the Company. While it is premature at this time to outline the actual mechanism of such a home ownership plan, it is our intention to make it at least as attractive for our employees to own their own home as it is to rent. (Westcoast Transmission Company Limited already has in place a policy regarding home ownership assistance).

2. Use of Local Facilities

Foothills will work closely with the communities in order to avoid the overtaxing of infrastructure and will assist in the

upgrading of existing facilities should our project make this necessary. (A method for consideration and one which Foothills would be prepared to adopt is to provide the community with advanced funding through the pre-purchase of those lots which Foothills will require).

3. Disposal of Surplus Facilities

Following the construction phase, there will be considerable surplus materials available for disposal, and Foothills intends to give the people within the impact region the "right of first refusal" with respect to this equipment and material. Arrangements for the disposal of surplus equipment and materials will be co-ordinated with the appropriate governmental agencies.

4. Entrepreneurial Opportunities

Foothills will encourage the involvement of northern residents in the durable business opportunities created by the operations and maintenance phase of its pipeline towards maximizing the "northern content" of the project.

This policy will be implemented through the continued application of the local procurement policies initiated during the construction period and through input from the Mackenzie Pipeline Business Opportunities Board.

CHAPTER 6

ENVIRONMENTAL IMPACT

6.1 CAGPL PROJECT

6.1.1 CAGPL

CAGPL stated that, in developing the construction procedures, it recognized that pipeline construction in the Arctic required the development of special techniques and the implementation of many safeguards to ensure the integrity of the pipeline and to minimize its effects upon the environment.

In order to develop appropriate techniques and establish proper safeguards, the Applicant had conducted a comprehensive review of the literature and initiated on-going discussions with environmentalists, government representatives, contractors and representatives of industry experienced in northern construction. It had also established facilities in the Arctic for testing and development of design, construction and operating procedures and restoration following construction, and had initiated studies pertaining to the biological and physical components of the environment.

CAGPL submitted a series of more than 40 biologically oriented reports, called the Biological Report Series which were based upon its field and laboratory studies conducted since 1971. Other environmental reports and maps were also submitted. The environmental work included baseline and "disturbance" studies on aquatic and terrestrial ecosystems.

CAGPL sponsored the preparation of reports by a professional group called the "Environment Protection Board", dealing independently with the environmental impact of the proposal in Canada.

The Applicant said that it would continue to carry out studies in an effort to achieve the greatest possible degree of protection of the environment. These studies would include the proposed Coastal and the alternative Interior Routes in the Yukon Territory in corridors several miles wide.

CAGPL said it was determined to safeguard the environment of the parts of Canada that might be affected by its project, that it was satisfied with the available mitigative methods, and that the pipeline would have very little impact on the natural environment.

The Applicant undertook to include environmental mitigative measures in the contract specifications, to provide an environmental education program for pipeline construction personnel from management to the field worker, to provide environmental supervision and monitoring during construction, and to monitor the effects of the project on the environment after construction.

CAGPL stated that the viable routes were the Coastal Route with the Cross-Delta amendment, (this was the route for which CAGPL made application), the Coastal Route with the Circum-Delta option and the Interior Route, and that a pipeline could be built and operated on any of these three routes without unacceptable environmental impact.

CAGPL stated it preferred the applied-for Cross-Delta to the Circum-Delta option and would rank the Interior Route in third place.

6.1.1.1 Environmental Impact and Mitigative Measures

Terrain

For the three routes, cross-Delta, Circum-Delta (option), and Interior, the Applicant submitted alignment sheets which displayed the terrain classification of the surficial deposits. With respect to the protection and the types of the terrain, similar problems would be encountered along the three routes.

CAGPL stated that control of accelerated erosion and drainage in the vicinity of the pipeline ditch and right-of-way would be necessary to minimize detrimental biological effects. Erosion-prone terrain would generally be found on sloping ground. The sensitivity to erosion would be accentuated on slopes with high ice content and fine-grained soils, and if not protected, these slopes would experience intensive erosion, slumping and thermo-karst development.

The applied-for route would predominantly traverse ground less than three degrees in inclination, although this would not always be possible. CAGPL's evidence was that there were approximately 700 slopes greater than three degrees in inclination situated along the Route and about one-half of the slopes lay between three and six degrees and were less than forty feet in height. The

slopes were inspected and examined in the field by CAGPL's consultant who concluded that many were stable.

The Applicant stated that drainage and erosion along the pipeline right-of-way, at compressor stations, at wharves, and at access roads would be controlled by a combination of preserving the existing vegetation as much as possible, constructing various run off control structures and implementing revegetation programs.

With respect to preserving the original vegetation the Applicant stated that clearing of the right-of-way would be carried out six or more months prior to the actual laying of the pipe and that trees would be removed from approximately 12,000 acres.

In permafrost areas, hand clearing and Arctic construction techniques would be employed, rather than the conventional machine clearing, in order to protect the surface organic layer and to minimize the possible effects due to permafrost degradation. On slopes in sensitive permafrost terrain, such as river crossings, clearing would be left until immediately prior to pipe-laying operations to minimize the potential for permafrost degradation. Also, as a special precaution, conventional clearing techniques would be modified by equipping dozer blades with shoes to prevent cutting into the terrain and by burning the vegetal debris over the proposed ditch line or in burning sleds.

On the tundra, the organic mat would be removed prior to ditching and then replaced after backfilling in order to assist revegetation, and the tundra stripping and

replacing would be supplementary to seeding and fertilizing. The consultant stated that if the techniques were combined and the options were maximized in the revegetation program, there would not be any adverse impact on the tundra.

In the zone of discontinuous permafrost between mileposts 661 and 880, where the pipeline would not be chilled, the peat mounds would be levelled off. This would affect 65 miles of the route. The peat material would be stockpiled at one side of the right-of-way; then the peat mounds would be revegetated. However, the Applicant acknowledged that it would be difficult to revegetate the peat. The Applicant stated that this material would remain essentially in the pile rather than erode. Should thaw settlement occur over the pipeline, this peat would be used to fill the depressions.

With respect to controlling erosion and drainage by constructing various runoff control structures, CAGPL's consultant recommended diversion dykes, drainage ditches, breaks in the backfill mounds, ditch plugs, and other common construction procedures.

CAGPL acknowledged that a considerable part of the route would be subjected to thaw settlement, and that within these areas backfill mounds would still be constructed over the pipeline. Ponding would be prevented by the provision of additional drainage measures and by barriers along the right-of-way to prevent channelling of water.

In general, drainage ditches would not be constructed in permafrost terrain where thermal degradation could follow surface disturbance, except where a ditch would be required to drain ponded surface water in order to prevent thermokarst activity. If ditches were necessary in such areas a wide shallow configuration would be used.

With respect to control of erosion resulting from pipeline activities south of the 60th parallel, wind erosion of sandy soils would require special control techniques such as matting, mulching, wind breaks and surface roughing, in order to promote the re-establishment of the stabilizing plant cover.

CAGPL's consultant stated that the erosion control measures appropriate for a given section of the alignment would be determined in final design and that these measures would be based on the techniques described in the consultant's report.

The Applicant recognized that maintenance of all areas affected by the pipeline construction would be required during the initial years. All environmentally critical areas would receive detailed attention during design and construction. The Applicant was confident that its line patrols and other monitoring procedures would enable early detection of slope or surface failures.

CAGPL stated that, with respect to its frost heave redesign proposal, new concerns would arise regarding the protection of the terrain, however, the former concerns relating to erosion of the surcharge berm would be removed.

A 400-mile long power line required for the heat probes and the heat-traced pipe would be situated about ten feet from the edge of the right-of-way. This would necessitate clearing the trees taller than 20 feet situated within 15 feet adjacent to the right-of-way in order to protect the power line. CAGPL's consultant acknowledged that this would affect 320 miles of the route.

With respect to mitigating the environmental impact of excavating borrow pits and quarries required for the proposed pipeline construction, CAGPL's consultant described a series of criteria. These criteria included on-site environmental pre-evaluation of the borrow pits and quarries with respect to protection of fish, mammal and bird populations, study of the effect of borrow pits in floodplains upon the adjacent water courses, provision of an adequate buffer zone of vegetation between the borrow pits and the water courses, proper timing of the borrow or quarry operations, and other procedures for mitigating the impact upon the environment.

The Applicant stated that, when a borrow pit was opened in the permafrost area, any organic material present would be stockpiled separately, and, after the removal of sand and gravel from the pit, the slopes would be contoured for stability, the organic material would be replaced, and if necessary, the area would be revegetated.

For those pits that would be used as disposal areas for waste materials, the waste would be placed at one side of the pit, away from any potential reserves of borrow

materials, to avoid any conflict in the future should it become necessary to open the pit again, and the pit would be rehabilitated.

Access to the terrain would be achieved by helicopters, fixed-wing aircraft and low-ground-pressure vehicles when the active layer was not frozen.

Some summer construction activity would occur at compressor stations including construction camps, and at wharf locations; however, the impact upon the terrain would be minimized as these facilities would be constructed on gravel pads from local borrow material. Also, snow fences would be installed on the tundra with the aid of helicopters and rolligons during September, in order to facilitate the building of snow roads. Snow roads would be required at all locations where Arctic construction methods were necessary.

From its tests of snow roads at Inuvik, the Applicant determined that there was a noticeable reduction in the vegetated ground cover, particularly the evergreen and deciduous shrubs. Lichens and mosses were not severely affected, and the root structures of the shrubs remained intact.

CAGPL's consultant stated that the snow roads should be built to the standards of the test road at Inuvik which had eight to ten inches of frost penetration and at least four inches of snow prior to use, so that the first vehicles on the terrain would have low ground pressure and wide tracks.

CAGPL's consultant acknowledged that he had not established any limits for the types of loads or tracked vehicles to operate on snow roads. The Inuvik snow road was not tested with equipment that would simulate the loading anticipated by the amount of traffic on a pipeline spread.

Prior to spring thaw, it would be necessary to closely monitor the condition of the snow roads, the prevailing weather and weather forecasts to ensure that all construction activity was completed and all equipment was moved to the summer storage area before surface vegetation damage could occur.

With respect to the overall impact of the pipeline construction and of related activities upon the drainage and erosion of the terrain, the Applicant's consultant stated that the measures proposed for control of drainage and erosion would be adequate to protect the integrity of the pipeline as well as to ensure that any adverse impacts of the proposed project on the physical environment would be within acceptable limits.

The Applicant also stated that, if steps were taken to minimize short-term disturbance, particularly during the construction and immediate post-construction periods, it would not expect the pipeline to have any serious consequences for aquatic habitats or populations of aquatic organisms.

Land Use

CAGPL stated that, to its knowledge, no national or territorial parks were proposed by the Government along the proposed pipeline route north of the 60th parallel. Only one of the proposed International Biological Program sites, namely the Ebbutt Hills site, would be traversed by the proposed pipeline. CAGPL stated that the Ebbutt Hills site had been given a low priority in terms of reserve status by the Canadian Committee of the International Biological Program thus making potential conflicts minimal. CAGPL stated that proposals had been made on occasion for the creation of a Yukon wildlife range to adjoin the Arctic National Wildlife Range in Alaska.

CAGPL's environmental statement for the proposed pipeline south of the 60th parallel included a description of the parks and recreation areas in Alberta and Saskatchewan. In Alberta and Saskatchewan no campgrounds, provincial parks, regional parks or developed recreational areas were within 25 miles of the proposed pipeline route.

CAGPL stated that the long-term impact of the project on designated outdoor recreation areas, such as provincial parks, campsites and private resorts were expected to be insignificant because these areas would be almost wholly avoided. However, some loss of recreational quality would occur in the immediate vicinity of the pipeline route during the construction phase, due to dust, noise and smoke, and further impact could occur from congestion on roads or competition for limited services in

isolated areas, particularly during peak recreational periods.

CAGPL proposed to prohibit recreational use of project vehicles during the construction and operational phases, to minimize the impact on recreational areas. Construction of the portion of the pipeline north of Caroline would be carried out during winter months to minimize potential conflict with outdoor recreational activity.

Upon cross-examination, CAGPL stated that it had not considered the recreational potential of specific areas that might be affected by pipeline construction, but that the route had been assessed in general terms for its recreational potential.

The recreational potential of sites such as river crossings and campsites associated with the proposed highways would be taken into consideration during construction planning. It was claimed that the recreational potential for the Yukon coast and Mackenzie Valley would not be affected by construction of the pipeline.

CAGPL's environmental statement presented a general survey of agricultural land along the proposed pipeline route south of the 60th parallel. The evidence indicated that the primary effect of pipeline construction upon cultivated lands would be the loss of production on the right-of-way for one or two years depending on the particular land use at the time of construction. The proposed measures to protect agricultural land included removing, stockpiling and returning the topsoil to the ditch crown after backfilling the trench, revegetating the disturbed

areas, and avoiding disturbance of the domestic livestock. The procedures for stripping the topsoil prior to trenching, and for revegetating disturbed pasture land were explained in detail.

Wildlife

CAGPL submitted descriptions of the distribution and habitats of mammal, bird and fish species found in the northern Yukon, Mackenzie Delta and the Mackenzie River Valley.

Winter construction along the proposed Prime Route would avoid interaction with all winter habitats of the Porcupine caribou herd. Construction activities at the compressor station sites, if restricted to the area of the station pad, would not contribute an inordinate hazard to the Porcupine caribou herd. No construction activity, with the exception of that at compressor station sites, should occur during the Porcupine caribou herd's calving period between 27 May and 5 June.

Although pipeline construction was scheduled from November to April, there would be construction of compressor stations and staging areas on the Yukon Coastal Plain, and vehicular traffic from these coastal staging areas inland to the compressor station sites during the summer. CAGPL also had proposed mining gravel from the active flood plains of six rivers on the Yukon Coastal Plain during the period of the year from late summer to freeze-up.

The consultant recommended that the minimum altitude for aircraft overflights should be 2,000 feet to avoid

adverse affects on the herd, and that aircraft flights be avoided over the herd's calving area during calving periods and post-calving aggregation which would continue for about ten days in July.

CAGPL stated that the impact of the proposed pipeline construction on the Mackenzie reindeer herd would be minimal and CAGPL would consult with the reindeer herders in order to minimize adverse disturbance during construction.

CAGPL's witness stated that the population of the Blue Nose caribou herd had extended its winter range westward in the vicinity of Travaillant Lake (although this was not necessarily an annual occurrence) and therefore, interaction between this herd and the proposed pipeline was possible at that location. CAGPL's consultant recommended that the Applicant should carry out pre-construction surveillance to define to what extent the Blue Nose caribou were utilizing the area of the proposed pipeline alignment, and then it should implement measures to keep the animals from encountering the hazards resulting from construction activities.

According to the application, Woodland caribou inhabited areas around Travaillant Lake and the Cameron and Redknife Hills. CAGPL anticipated that the net effect of the proposed pipeline would be insignificant due to the limited areas of disturbance and the scattered populations of Woodland caribou.

CAGPL testified that the greatest potential impact upon moose populations would be the loss of riparian

habitat in the many valleys crossed by the pipeline and the possible disturbance of over-wintering moose during the periods of extreme cold. CAGPL stated, however, that winter range for moose had been identified and had been largely avoided by route location.

CAGPL said that no denning sites for grizzly bears, Arctic foxes, and wolves were located on its proposed Prime Route. If any such denning sites became known subsequently, they would be avoided during construction by minor changes in alignment in the field as required.

CAGPL stated that the applied-for route avoided large areas of productive muskrat and beaver habitats. Small areas of potential disturbance to beaver populations included streams in the vicinity of Holmes Creek, Travaillant Lake, Hanna River, Oscar Creek and an area south of the Liard River. Disturbance to the beaver populations would be avoided by minor alterations in pipeline alignment which would be done on the basis of on-site environmental guidelines.

With respect to the cross-Delta portion of the route, CAGPL said that the beluga whale population in Shallow Bay constituted the major concern. The Applicant's map showed the areas within the Bay, of the whale concentrations during the calving season, based on observations made during three consecutive years. For two of these years, the calving areas of the whales extended across the proposed alignment of the pipeline crossing of the Bay. The whales usually arrived in Shallow Bay during the last

days of June and few whales were observed after 5 August. CAGPL reported that Shallow Bay appeared to be a preferred calving area for the beluga whales because of their arrival in the Bay during their calving period. The number of whales calving in the Bay had been difficult to assess and population estimates had varied from 2,000 to 4,000 whales.

CAGPL's witness stated that, while the beluga whale could accommodate some disturbance from increased barge traffic, the effect on the whales of very extensive barge traffic in the order of six barges per day was one of his concerns. He recommended that barge traffic should be kept to a minimum and that pipeline construction in Shallow Bay should take place after July, to minimize disturbance to beluga whale populations. CAGPL's consultant testified that construction activity across Shallow Bay in July could obstruct the whales from penetrating the innermost part of the Bay. This obstruction could be avoided by scheduling construction during August or, if begun in July, by suspending activities during the migration of the whales into the inner Bay.

As a result of the frost heave redesign, construction timing for the Shallow Bay crossing had been revised by CAGPL. The construction period would be from approximately mid-June to the end of September, and preliminary dredging in the Bay could be done during September and October of the preceding year. Pipe welding would take place simultaneously with dredging, and pipe would be laid in August and September.

CAGPL said that dredging could take place in Shallow Bay from mid- to late-June prior to the arrival of the whales and also during the window of some 40 days which would be available between approximately mid-July after the departure of the whales from the Bay and prior to the arrival of the snow geese around 25 August. CAGPL concluded that, even discounting 7 days per month for storm occurrences, and the moving of equipment, this window would allow adequate time for dredging.

CAGPL's consultant testified that, while whale movements into Shallow Bay generally did not begin before 25 June, the departure times of whales from Shallow Bay had been observed to vary considerably. In 1973, whales appeared to depart from Shallow Bay on 6 July, while in 1975 the whales did not depart until 28 July. CAGPL stated that, in 1972, no whales were found in the estuary after 15 August, and in 1973, few whales were observed anywhere in the estuary after 5 August.

With respect to bird populations, CAGPL stated that human presence would disturb nesting shorebirds and waterfowl on the Yukon Coastal Plain and Mackenzie Delta sufficiently to force the birds to abandon their nests. CAGPL's consultant stated that its locations of wharves, material stockpiles, and airstrips at Shingle Point and Komakuk Beach in Yukon were the best possible sites as there were no concentrations of breeding or moulting shorebirds and waterfowl in that area. The moulting period for waterfowl in the north coast area would occur in August.

CAGPL said that during August, barge traffic to and from the wharf sites would avoid making close approaches to sensitive bird moulting areas.

Pipeline construction activities on the Yukon Coastal Plain would proceed during winter when shorebird and waterfowl populations were absent.

The Applicant's evidence was that the outer Mackenzie Delta, particularly the area around Shallow Bay was used as a staging area by very large numbers of snow geese (in the order of 325,000 birds) during those years when the Yukon and Alaska north slopes were snow covered in early September.

CAGPL's ornithological consultant recommended that the proposed summertime pipeline construction in Shallow Bay not be extended beyond 25 August as the ensuing period to 30 September was the period of heaviest use of the Bay by geese and swans. He was also concerned about the proposed summer construction of the gravel work pads for the Mackenzie Delta channel crossings. The consultant recommended that preparations of the work pads be completed prior to the arrival of the snow geese which would occur around 25 August.

CAGPL's ornithological consultant testified that the effects on snow geese, of helicopter and barge traffic servicing construction activities in the Bay, of the dredging for the pipeline crossing, and of the vehicular movements for the construction of the gravel work pads, would be of concern if these activities were to take place from

25 August to the end of September during a year when the outer Delta was being used extensively by the geese.

CAGPL's ornithological consultant recommended the relocation of compressor stations CA-05 and CA-06 four or five miles in either direction along the proposed right-of-way to reduce potential conflict with geese and raptors. CAGPL's witness testified that the question of relocation was under consideration for final design.

CAGPL stated that the proposed pipeline right-of-way had been located to avoid known nest sites of rare and endangered bird species, such as golden eagle, bald eagle, osprey, peregrine falcon and whooping crane. CAGPL's ornithological consultant said that, on the basis of recent information on raptor sites along the Yukon Coastal Plain and in the lower part of the Mackenzie Valley, the location of the proposed pipeline was closer to the raptor nests than the two and a half miles minimum acceptable distance that he had recommended. He added that this matter had not yet been resolved by CAGPL. The consultant also testified that the eastern part of the Mackenzie Valley along the McConnell Range had yet to be surveyed for peregrine falcon habitats.

CAGPL's ornithological consultant recommended that aircraft should maintain a minimum altitude of 2,500 feet when flying over nest sites of gyrfalcons and other diurnal raptors, over the spring and fall migration and staging areas and over the summer nesting and moulting areas for waterfowl.

To avoid and reduce disturbance to bird populations by aircraft traffic, CAGPL stated that it would control routing, altitude and frequency of aircraft flights. Enforcement of regulations governing aircraft traffic would be the responsibility of CAGPL's environmental staff.

CAGPL's ornithological consultant stated that line patrol flights during the operational phase of the proposed pipeline would not have a severe impact on bird populations if the frequency of flights was no more than twice a week. This frequency should be reduced during the period from mid-August to the end of September over the areas of snow geese concentrations in the Arctic Coastal Plain and the Mackenzie Delta.

CAGPL said that, where there was a possibility of disturbing wildlife by aircraft patrols, the patrol program could be substituted by ground patrols. CAGPL's ornithological consultant testified that the effectiveness of ground patrols in preventing disturbance to bird populations would depend upon the site-specific conditions.

The consultant testified that CAGPL's satellite communication system would obviate the necessity for building tall towers; therefore, the hazard to flying birds was no longer present.

With regard to powerlines for the frost heave redesign for the proposed pipeline, CAGPL's ornithologist stated that the chief concern was the possibility that birds would straddle the electrical wires and be electrocuted. CAGPL's ornithologist testified that this concern

had been mitigated by separating the powerline conductors by a greater distance.

With respect to fish populations, siltation from stream crossings, stream banks, and other parts of the proposed right-of-way and from winter roads, borrow sites, access roads and fires, was identified as one of the serious short-term effects of pipeline construction. CAGPL proposed to mitigate siltation problems by avoiding crossing of ponds and lakes, by leaving vegatative buffer zones between the proposed right-of-way and paralleling stream and lake shorelines, by controlling drainage from the right-of-way and from borrow sites, and by using erosion control devices and revegetation. CAGPL's fisheries consultant said that borrow operations in flood plains or streams should not restrict or impede fish migration and that the excavated area should be graded after use to prevent ponding, and trapping fish during periods of declining water levels.

CAGPL stated that winter construction would be completed by 1 April, which would allow a time safety factor for the protection of the spring spawning migrations of fish.

The removal of large volumes of water from small lakes and streams for winter roads, pipeline testing, and domestic use, could affect the survival of eggs of fall-spawning Arctic char, whitefish and cisco or overwintering Arctic char and Arctic grayling. CAGPL's fisheries consultant stated that sources from which water would be with-

drawn had not been identified. CAGPL's fisheries consultant recommended that at no time should more than ten per cent of the total volume of water be withdrawn. However, he stated that the individual water sources for water withdrawal would have to be determined on a site-specific basis.

CAGPL's fisheries consultant recommended that springs known to support fish populations should not be developed as sources of water if suitable alternate sources were available. He stated that it would be preferable to utilize springs in some cases rather than lakes, for two reasons: firstly, two of the lakes proposed to be used had already been identified as containing sensitive fish populations, and secondly, using lakes alone would necessitate hauling water by numerous trucks over greater distances and this would be environmentally more damaging. Culverts planned for access roads would be designed to allow fish passage through them.

With respect to CAGPL's proposed pipeline crossing schedule for the Mackenzie Delta channels and Shallow Bay and the effect construction would have on fish migration past the crossing sites, the Applicant's fisheries consultant recommended that, if fish migration were being affected, modifications in the construction procedures should be made. Such modifications should include short-term shutdowns to permit fish passage and rescheduling of potentially damaging construction activities, such as blasting.

CAGPL's environmental statement included a description of critical areas of mammal, bird and fish habitats which would be encountered along the proposed circum-Delta segment of the pipeline route. The circum-Delta segment of the proposed pipeline would pass within one mile of the eastern extremity of the major Dall's sheep range at Mount Goodenough. CAGPL indicated that the winter range of Dall's sheep had been identified and largely avoided in route location. CAGPL's consultant recommended that, to avoid the Dall's sheep population at Mount Goodenough, the segment of the circum-Delta route adjacent thereto should be moved away from the mountain and closer to the Delta.

CAGPL's consultant stated that the cross-Delta routing was preferable to the circum-Delta routing with respect to beaver and muskrat habitat quality and population levels.

CAGPL's ornithological consultant stated that the reduction in route mileage, which would result from the cross-Delta routing as compared with the circum-Delta routing, would not outweigh the effects of the temporary disturbance in the Shallow Bay area, and the effects of the long-term impact of land pre-emption and operational activity in the lower Mackenzie Delta.

CAGPL's fisheries consultant stated that he had been unable to designate either the cross-Delta or the circum-Delta alignment as the preferred route from a fisheries point of view.

CAGPL stated that the Interior Route would cross the spring and fall migration routes of the Porcupine caribou herd. The potential environmental impact of pipeline construction and operation on caribou would be habitat loss, disturbance and deflection of movement from their normal migration patterns. The effect of habitat loss was expected to be insignificant. Disturbance to the herd would be considerably reduced by scheduling construction for the winter period as it would prevent deflections of caribou migrations in spring and fall. In the Old Crow range and important caribou crossing sites of the Porcupine River and the Chute Pass, construction should be scheduled so as to avoid disturbance to, and deflection of, migrating caribou herds.

CAGPL's evidence indicated that the majority of the Porcupine caribou herd (approximately 100,000 animals) wintered in the Yukon Territory during 1974-75. From 10,000 to 15,000 caribou wintered in the Richardson Mountains along the Bell River and Summit Lake while another 3,000 to 3,500 caribou were located in the Rat River drainage southwest of Aklavik. The 1974-75 ungulate survey showed that the bulk of the Porcupine caribou herd spent the winter in Yukon where the majority of animals utilized the more northern and eastern parts of their range to a much greater extent than had been documented in past years.

To provide access to the Interior Route in the Yukon Territory, CAGPL had proposed two winter roads linking

the Dempster Highway to the material stockpile sites at pipeline milepost 335 near Old Crow and pipeline milepost 417 near Lapierre House. Access to the route in the Northwest Territories would be provided by the construction of a 12-mile all-weather road from the Dempster Highway to the proposed material stockpile site at milepost 450.

A cleared right-of-way on the Interior Route was not expected to present a significant hazard to migrating caribou since this pipeline route would generally be at right angles to the migration route, and caribou had been observed to follow cutlines only where the orientation of the line was close to the direction of their movements.

It was stated that there were no significant populations of moose or Dall's sheep in the vicinity of the Interior Route. Barren ground grizzly bear dens were located along the interior route near Schaeffer Mountain and King Edward Mountain and along the south edge of Old Crow Flats. It was stated that destruction of these den sites would have a significant impact on the grizzly bear population. Arctic fox denning sites were not found along the Interior Route. Old Crow Flats, which was identified as an area of significant muskrat habitat, would be avoided by the Interior Route.

The Interior Route would pass through known raptor habitats. The evidence showed that there were areas of important potential habitats of raptors at the Alaska-Yukon border which would be crossed by the proposed pipeline route. At one point along the Porcupine River, the Inter-

ior Route would traverse within one-half mile of a known peregrine eyrie and, at the Yukon-Northwest Territories border, the route would be four miles away from a known gyrfalcon nest and one-half and two miles away, respectively, from two known golden eagle nests.

By passing south of Old Crow Flats, the proposed pipeline route avoided a most important waterfowl area. It was said that this route was still a less productive habitat for waterfowl and shorebirds than that along the Yukon Coastal Plain and the Mackenzie Delta. Large populations of waterfowl could be affected should drainages or water quality be altered substantially. In order to prevent such drainage alterations, CAGPL would schedule construction and follow procedures outlined for drainage control as proposed for the Prime Route. CAGPL's ornithological consultant testified that, from the point of view of bird habitat and populations, he preferred the Interior Route as originally proposed by CAGPL over the Prime Route.

The proposed pipeline along the Interior Route would parallel closely the Porcupine River and would cross several of the large tributaries to the river including the Old Crow, Driftwood, Bell and Rat Rivers. Since construction along the Interior Route would take place during the winter, the utilization of the rivers by fish populations would be the major concern.

CAGPL's fisheries consultant recommended that construction should be scheduled for early winter when water discharge and oxygen levels were relatively high. He

did not express a preference between the Prime Route along the Yukon Coast and the Interior Route.

With respect to the portion of the route south of the 60th parallel, the evidence showed that moose, elk, bighorn sheep, antelope, deer and Woodland caribou would be affected to some extent by pipeline construction. Moose and elk would be temporarily displaced from their range although this effect was said to be negligible. Bighorn sheep and antelope were described as sensitive to disturbance while on winter range; but pipeline construction activities would be scheduled for the summer or fall. It was stated that any effects on these ungulates would be negligible.

Deer were also said to be sensitive to disturbance while on winter range. Their winter range, located along streams, would be crossed by the pipeline at right angles so that the deer populations and habitat would not be greatly affected.

It was stated that the Woodland caribou along the route south of the 60th parallel were sensitive to disturbance during the calving period in late May and early June; their calving areas would be identified and avoided to minimize the disturbance in the critical periods. Bears, coyotes and wolves would be affected on a long-term basis if den sites were disturbed. To minimize these effects, CAGPL proposed pre-construction identification of denning sites, with minor route adjustments to avoid the sites. Preservation of normal drainage patterns, combined with

erosion control measures to limit siltation, would result in only temporary impact on furbearers. It was stated that with respect to mule deer in Saskatchewan, construction would occur in summer to minimize the stress on them.

With respect to bird populations in Alberta and Saskatchewan, there would not be major short-term or long-term effects since extensive habitat loss and disturbance had already taken place along the proposed pipeline route. Continued field studies of golden eagles in the Rocky Mountains and in southwestern Saskatchewan would identify areas of concern prior to the start of construction and CAGPL proposed to avoid these areas particularly during the nesting season.

With respect to wetland areas important to waterfowl, CAGPL proposed to maintain a suitable distance between the pipeline route and waterfowl habitats.

Evidence indicated that in northern Alberta, south of the Whitemud River, the major concern was that the pipeline would not damage aquatic environment during and after the construction period. Of special concern were the stream crossings between the Peace and McLeod Rivers where localized areas of potential instability had been identified. Another concern was with respect to the segment of proposed pipeline from Caroline south to Crow's Nest Pass, where the fish and aquatic organisms in the streams were known to be generally intolerant to substrate sedimentation. CAGPL stated that precautions would be taken in the vicinity of these aquatic environments to prevent erosion

and sedimentation. Regarding the prairie portion of the proposed pipeline route east of Caroline to Monchy, Saskatchewan, CAGPL said that normal construction methods and precautions would minimize disturbance at stream crossings and protect aquatic habitats.

Vegetation

It was stated that CAGPL's major objectives of the vegetation program were to collect baseline data on natural plant communities and on soils in order to assess the probable impact of construction and operation of the proposed facilities, and to develop a program for revegetating all land surfaces disturbed by pipeline construction and related activities in order to mitigate the effects of soil erosion. The vegetation program was organized along three major lines of investigation, namely landscape surveys, revegetation trials, and monitoring.

With respect to the landscape surveys, the Applicant described the major types of plant communities in each physiographic region in detail within a broad corridor through the Northern Yukon and Mackenzie Valley. This work began in 1972 and included the cross-Delta route and a new alignment near Fort Simpson.

CAGPL's consultant stated that the primary objective of the revegetation program was to provide an initial erosion control cover which, in conjunction with the physical control techniques, would provide stabilization to all the disturbed areas along the right-of-way. The second

objective was to aid natural processes of plant succession in the re-establishment of a permanent, stable plant cover. Other considerations for the revegetation program were maintenance of wildlife habitat and aesthetics.

In establishing its revegetaton program, CAGPL set up field research sites in the two major ecological zones to be traversed by the proposed pipeline north of the 60th parallel. The field research sites were located at Prudhoe Bay in the tundra zone of the north slope of Alaska, in the Firth River area on the Yukon coastal plain, at many sites within the Delta, on the Peel plateau, together with sites at Norman Wells, Sans Sault, and Fort Simpson in the northern boreal forest of the Mackenzie Valley. CAGPL stated that the test sites were selected to include terrain types representative of the most difficult conditions under which a pipeline might have to be constructed and maintained.

CAGPL stated that agricultural varieties of grasses, cereals and legumes and native species of grasses were evaluated for the revegetation program on the basis of rate of growth, ground covered by the shoot, biomass production, rate and depth of rooting, litter accumulation, winter survival, nutrient requirement for establishment and continued growth, and insulative value and effect on soil energy budget.

With respect to revegetation within the Delta, CAGPL's consultant said that seeding trials had been tried on abandoned rig sites throughout the Mackenzie Delta area and within the Delta itself and that the results of the

trials were presented in two reports of CAGPL's Biological Report Series. It was concluded in these reports that natural revegetation in the outer Delta would grow rapidly after pipeline construction. The consultant testified that seeding and fertilizing on the cross-Delta portion of the route would be limited to very small areas, and that plans for revegetating the construction pads would be dealt with during the final design stage. Another conclusion in the reports was that, in the Mackenzie Delta region, in contrast to the outer Delta region, the adjacent uplands would be more difficult to revegetate. CAGPL's consultant said that these conclusions might be modified to reflect results of recent field studies in the Mackenzie Delta region and any new information that might be gathered in future.

The consultant testified that the success of the seeding trials was variable in relation to the texture of the soils, and that a 40 per cent ground cover the first year after construction would be considered a very successful program. This could be achieved, according to the consultant, with a combination of the seeding techniques outlined in the reports.

An example of the specifications for revegetation was provided in CAGPL's application for the part of the proposed route from Fort Good Hope to the 60th parallel. This example included the agricultural and native grasses to be used, the rate of application of the seeds for each species, the use of erosion control mats and shrub cuttings, and a description of the type of site where each

specification would be applied during the terrain restoration phase of construction. The locations where seeding and supplemental shrub cutting would be required would be included in the construction specifications. The revegetation procedures were said to be continuing, and specifications would be updated as warranted by any new data. In addition to seeding, CAGPL would fertilize the right-of-way in order to promote vigorous growth of the plant cover.

With respect to the part of the proposed route south of the 60th parallel, CAGPL's consultant defined and categorized areas having potential revegetation problems along the proposed route, and described the revegetation materials and techniques that were then under consideration for use in the final design.

CAGPL stated that all seeding and restoration would be carried out under direction of a senior agrologist, with trained field supervisory personnel responsible for each spread. The reseeding operations would be carried out by fixed-wing aircraft and helicopter. Winter seeding would follow backfilling of the pipeline trenches in order to reduce the amount of air traffic during the spring following construction.

To assist in the design of the revegetation plans, CAGPL's consultant summarized in his report the materials and techniques that had been used in other projects for mulching and stabilizing the soil surface during revegetation of disturbed areas.

The effectiveness of the revegetation program would be monitored using criteria in terms of whether or not the revegetation was effective in controlling erosion rather than just in terms of percentage ground cover. CAGPL's consultant testified that maintenance, by way of additional seeding and fertilization, might be required for several years following construction.

With respect to the introduction of exotic species of plants into northern plant ecosystems, CAGPL stated that both theoretical and experimental evidence suggested that the species proposed for use in the reseeding program would pose no real threat to the ecosystems. There would be no harmful effects on the plant communities bordering the right-of-way of the use of commercial varieties for revegetation. The inclusion of those species in any seed mixture would not only speed the natural revegetation process, but would act as a back-up against the failure of the agronomic species.

With respect to wild fire in the plant communities, CAGPL stated that fires sweeping across the right-of-way could cause long-term effects on terrain stability, but regular patrol flights along the pipeline would contribute to the early detection of fires, and a contingency plan would be prepared in conjunction with federal and provincial agencies to coordinate fire watching and suppression efforts. CAGPL's witness testified that a wild fire contingency plan had not been prepared as it was a matter for final design.

Water Supplies, Pollution, Toxic Materials

CAGPL stated that it had not evaluated the possible impact of the pipeline construction on the sources of potable water used by the communities of Fort Good Hope, Norman Wells and Fort Norman.

CAGPL's consultant stated that, because of the possibility of serious oxygen depletion in lakes and streams as a result of pipeline-related activities, stringent measures should be taken to prevent the introduction into natural waters of materials with a high biochemical oxygen demand.

With respect to domestic sewage disposal, it was stated that treated effluent would be discharged to streams or lakes only if dilution would be sufficient to make any effect negligible in terms of depression of oxygen levels, and effects on population of aquatic organisms. All effluent disposal locations would be situated sufficiently downstream of any possible water intake locations to avoid health hazards. CAGPL stated that the requirements of the appropriate authorities concerning sewage treatment would be observed and that with respect to secondary treatment CAGPL was attempting to meet the guidelines issued by the Environmental Protection Service of Environment Canada.

With respect to domestic sewage treatment for construction camps, CAGPL's consultant proposed that a separate system of sewage treatment be provided for each camp module of 100 or 200 men. The treatment system would consist of a "package" sewage treatment plant to provide

secondary treatment. The effluent from the plant would flow to a "polishing" lagoon with the capacity to hold 10-day maximum flow from the camp module to be served. The lagoon would act as a standby facility in the event of failure of the treatment plant. Wherever possible the effluent from the lagoon would be discharged into a swamp. Lagoons would not be feasible on the Yukon Coast and the cross-Delta portion of the pipeline. CAGPL stated that, if a "polishing" lagoon could not be built, protection against plant failure would be achieved through the provision of additional standby packaged equipment. CAGPL discussed the problems experienced in Alaska with "package" sewage treatment plants with respect to design and operator training. It was stated that the design of the sewage treatment systems had taken Alaska experience into account and that CAGPL would implement the recommendations of its consultant in this regard. CAGPL expected to train sewage treatment plant operators and it was stated that there would be two trained operators in each camp with back-up personnel.

Compressor stations would have single or dual-cell sewage lagoons. It was stated that, where the construction pad would be used later as a station pad, the "polishing" lagoon provided to service the construction camp would meet the waste treatment needs of the operation and maintenance phases of the project. CAGPL stated that it would prepare site-specific plans for sewage disposal in final design.

CAGPL identified the possibility of water pollution by toxic materials and stated that methanol was of particular concern. Several consultant reports which described the toxicity of methanol to terrestrial vegetation and aquatic life were submitted to the Board.

Fuels, lubricants and toxic liquid materials would be stored within impermeable dykes which would impound spills. Welded steel tanks would be used for permanent fuel storage. Bladder tanks would be used for fuel and methanol during the construction phase. CAGPL's environmental consultant recommended that fuel storage be set back 300 feet from water bodies; but the Environment Protection Board recommended 500 feet. CAGPL stated that it wished to retain flexibility on the distance, particularly where the natural topography would tend to divert drainage away from the water body.

With respect to the disposal of pipe test media containing methanol, it was stated in evidence that the solution would be reduced in strength to less than one per cent methanol by volume either by dilution or by continuous distillation. Later, upon cross-examination, it was stated that CAGPL would distill the solution. The concentrated methanol distillate would either be salvaged for reuse or incinerated. It was proposed that the reduced solution containing less than one per cent methanol by volume would be disposed of by spray dispersal onto land and snow surfaces, or by discharge onto ice over a large water course such as the Mackenzie River. CAGPL's testing with methanol

disposal on land had demonstrated no long-term changes in vegetation, soil microflora or active layer depth, but the tests had been made with small volumes of liquid. CAGPL could not assess the capacity of the soil to absorb the actual volumes of waste methanol solution.

CAGPL's consultant stated that he did not approve of the proposal to spread the methanol solution on the ice and recommended that the solution be metered into the receiving water so that the concentration in the receiving water would not exceed ten ppm methanol. He also stated that it was possible that there could be detrimental effects from raising the biochemical oxygen demand of the receiving water as a result of methanol disposal, in that there could be a significant reduction in the oxygen level in that body of water. Later the witness claimed that a methanol concentration as low as ten ppm would have a negligible effect on oxygen concentration in the water.

With respect to solid waste disposal, CAGPL's consultant recommended incineration of waste foodstuff to avoid attracting bears and foxes. It was proposed that all combustible solid wastes together with excess sewage sludge and combustible liquid wastes would be incinerated. For construction camps the incinerators would be of the dual chamber "starved air" type. It was stated that the emissions from the stacks of these incinerators would contain very low quantities of particulate matter. Incinerator ash and non-salvageable, non-combustible wastes would be buried in landfill sites in non-permafrost areas, which would be

designated and operated in accordance with government regulations. In permafrost areas burial would be in used borrow sites and in roads, pads, and airstrips where these wastes would be used a supplementary fill. In abandoned borrow pits, wastes would be put to one side away from any remaining reserves. It was stated that borrow pits used for waste disposal would be rehabilitated.

With respect to air pollution from compressor station turbines, it was stated that the natural gas had less than two grains per 100 cubic feet of sulphur which would result in less than 0.6 ppm of sulphur in the exhaust gases. At full load the carbon monoxide emission would be from ten to 50 ppm in exhaust gases and the amount of unburned hydrocarbons would be negligible. Nitrogen oxides would be from 59 to 130 ppm with an average of 105 ppm, primarily in the form of nitric oxide. Calculations of the ambient air quality at ground level around compressor stations were made for a wide range of conditions.

In all cases the calculated values were below the Federal Ambient Air Quality Objectives and the limits set out in Alberta and Saskatchewan regulations. For example, the maximum level of sulphur dioxide in the ambient air at ground level for a 30,000 HP station with refrigeration was calculated to be 0.0008 ppm, which was said to be well below the threshold damage concentration for lichens, regarded as the most sensitive of plant life, and well below the annual federal objective of 0.011 ppm. It was stated that CAGPL would expect to take advantage of the latest

technology in combustion chamber and fuel nozzle design to ensure that the emission of oxides of nitrogen were as low as possible.

With respect to ice fog, it was stated that the experience in Western Canada with compressors using natural gas as the turbine fuel, was that ice fog was not common at temperatures above -40° F, unless other contaminants were present in the atmosphere to provide the nuclei to form ice particles. At temperatures below -40° F, the formation of ice particles was said to be spontaneous. The density and thickness of the ice fog layer were stated to be dependent on the terrain and the stability of the atmosphere.

Noise

The Applicant proposed to install 39 compressor stations along the route, 16 of which would be 30,000 H.P. in size and 23 would be 38,000 H.P. Their calculations showed that the noise levels at the station boundaries would range between 60 to 68 dBA, and at 1000 feet from the station boundary the noise levels would vary between 50 and 54 dBA at 1000 feet from the station boundary.

The Applicant's consultant studied the effect of noise upon wildlife, especially snow geese, and determined that the most direct effect to geese would be the loss of feeding areas within the vicinity of the gas compressor stations. He stated that it would be improbable that a single station would act as a total barrier to the east-west movement of geese along the North Slope. The stations

would probably cause the birds to make extensive detours. CAGPL's consultant recommended that the noise should not exceed an average sound pressure level of 50 dBA at 1,000 feet from the compressor station boundary, in order to minimize the impact upon wildlife.

The Applicant stated that the design of compressor stations would render the noise levels to be below 85 dBA within the station yard, and 50 dBA at 1,000 feet from the station boundary. The Applicant also undertook to make a detailed noise survey during final design in order to determine what noise abatement measures it would have to adopt for each compressor station to keep the noise within these levels.

Archaeology

In its Environmental Statement the Applicant provided evidence on the environmental setting, and project impact and mitigative measures with respect to archaeological resources along the pipeline corridor. CAGPL submitted supporting documents prepared by its consultant, regarding its proposal for archaeological salvage along the pipeline corridor in Yukon, Northwest Territories, Alberta and Saskatchewan. These reports contained information on the archaeological significance of the area and the objectives, terms of reference and methodology for the archaeological salvage program.

Upon cross-examination CAGPL stated that it recognized the significance of archaeological evidence in terms

of its value in re-constructing the heritage of the country and for the renaissance of the native culture of the north. The Applicant recognized the area as having been an important historical routeway of the arrival of ancient peoples to the Americas, as was evident from the Old Crow and Firth River areas. CAGPL indicated that its archaeological protection policy is based largely on the principle of avoidance of sites with archaeological resources rather than on the protection of archaeological sites through salvage operations.

With respect to further surveillance since the preparation of the consultant's report of February 1974, the Applicant said that some additional work had been done in the Old Crow area and on the Yukon coast in the vicinity of the proposed pipeline route. It was not considered necessary by the Applicant to carry out additional research and surveillance on the Interior Route. Regarding the identification of high priority archaeological sites, CAGPL stated that it had received some information from governmental agencies and that it had closely followed the reports prepared by the Federal Government Task Force on Northern Oil Development.

With respect to the Archaeological Study and Salvage Program the Applicant said that some changes in its approach were made as a result of consultations with the National Museum of Man. CAGPL's revised policy recommended the examination of the entire pipeline route in detail, without variations in the nature and extent of investiga-

tion. According to this policy the Applicant would not confine detailed investigations only to these areas of high priority already identified, but it would also carry out detailed investigations in a uniform manner in those areas that had not indicated any archaeological potential in the preliminary air photo analysis.

With respect to archaeological reconnaissance along the proposed pipeline route, CAGPL stated that it had completed the survey from Caroline, Alberta to the British Columbia border and that a similar type of surveillance was planned for the lower Mackenzie area during the summer of 1977. The remaining area to be surveyed would extend from the lower Mackenzie down to Caroline, and from the Alaska border across to the Mackenzie Delta.

With reference to the Southern Alberta section of the right-of-way within about 2 miles of the Dinosaur Provincial Park, the Applicant agreed that the Park area was well known for palaeontological deposits. However, the Applicant stated that it did not have any specific palaeontological concerns, nor any plans of study or salvage operations for the proposed right-of-way.

CAGPL confirmed that preliminary archaeological investigations would be conducted along the entire pipeline route and the areas of archaeological resorces would be identified by means of ground survey. Following the identification of such sites, the Applicant would be in a position to consider minor realignments to the pipeline route

in order to avoid damage to the archaeological sites on or adjacent to the right-of-way.

The Applicant further stated that it would make recommendations for relocations of the pipeline alignment in the autumn before the winter construction for any particular segment, based on the results of the field work of that particular summer. With reference to the possibility of making very small route changes during construction, the Applicant said that it would be possible to include minor relocations of the pipeline, but that such changes might not necessarily save the archaeological resources from being damaged as it would be impossible to fully identify or salvage the material under winter conditions. If a realignment to avoid significant archaeological resources were not possible, salvage operations would be conducted prior to commencement of construction activities.

With respect to monitoring of archaeological resources during construction, there would be one qualified professional archaeologist and a trained assistant on each spread, and the monitoring of the ditch walls would be done by these qualified personnel. The inspection of the ditch walls and spoil piles would have to be done during the short time when the ditch was left open, before backfilling was completed. The time available for the examination would be very short as the ditch walls and spoil piles might be covered with snow and frost if left exposed for any length of time and it would then be very difficult for the archaeologist to identify any significant material.

The Applicant said that if any archaeological material was identified for salvage during construction, the sites would be marked for future work: the actual salvage operations would then be carried out during the following summer when soil conditions would be more suitable.

The professional archaeologist would be responsible for ensuring that the recovered materials were properly recorded, assessed and the results made available to the scientific community. CAGPL said that it would permit archaeologists to have access to its right-of-way after the burial of the pipe, to continue their work and conduct excavation programs.

Other Environmental Concerns

The entire pipeline route was divided into 14 representative zones of broadly different visual appearances. The aesthetic appeal of the right-of-way was evaluated by the Applicant with reference to these zones. Within each zone the pipeline would pass through areas of various landscape features. The visual impact of the pipeline was described in relation to the major land forms and physical appearance of these zones, such as the Richardson Mountains and foothills, the rolling hills of the Porcupine plateau, the Mackenzie River, braided network of river channels and alluvial fans, the scenic composition (panorama and focal points) and the landscape textures of the area.

The Applicant stated that its principal method of achieving aesthetically desirable results was to separate the pipeline right-of-way from scenic waterways and other transportation corridors by means of a vegetative buffer zone, to provide tree cover around structural facilities such as compressor stations and compressor pads, and to locate structural facilities where they would not be in direct view from the right-of-way.

CAGPL stated that its measures to achieve aesthetically desirable results would be applied along the entire pipeline right-of-way even though much of the area would be remote from extensive public use in the foreseeable future.

Upon cross-examination the Applicant confirmed that it would leave a vegetative buffer zone across the right-of-way at highway crossings and along scenic waterways. All locations where special care needed to be taken to maintain an aesthetically pleasing view would be identified during the final design phase of the project. The locations of aesthetically sensitive sites where vegetative buffer zones would need to be left would be indicated in the construction specifications.

CAGPL stated that it had not identified any particular areas having an unacceptable visual impact at the time of its survey and that it expected the proposed mitigative measures to minimize visual impact of the pipeline to be sufficient.

6.1.1.2 Environmental Inspection and Supervision

Education/Briefing

CAGPL stated that it would provide environmental training for all project personnel from management to field labourers and for outside supply and service personnel. The training would be integrated with the environmental inspection program. Specific curricula had not yet been developed, but a brief outline of the subject area which might be included was given. The environmental training program would be individually formulated for each employment classification.

Program Organization

CAGPL stated that the results of environmental research were integrated with project engineering design and that measures for environmental protection would be written into construction specifications. The approach to enforcement would be similar to the engineering approach to supervision of construction. There would be an environmental design manual and a specific design manual for each spread in addition to the environmental data sheets. It was stated that there would be four environmental inspection personnel available for each spread, with three on site at any one time. One inspector would have expertise in archaeology and another would monitor socio-economic impacts and liaise with local communities. CAGPL would also expect to have a representative in each village. One of the four environmental inspectors would be designated

chief environmental inspector and would report to CAGPL's project manager on the spread. The qualifications of the inspectors were described. The chief environmental inspector would also have direct access to Head Office technical staff and the Director of Environment. It was stated that a qualified environmental inspector would be at each of the main channel crossings during construction, and that construction staging sites would be inspected regularly. The chief environmental inspector would liaise with government regulatory officials regarding compliance with land use, water and other environmental regulations. Provision would be made to enable government officials to perform their responsibilities and to facilitate their communications with their superiors.

Coincident with the activities of the environmental inspectors during construction, there would be a program of general surveillance along, but not restricted to, the pipeline route, which would be associated with the regular aerial line patrols. Also, the movement and distribution of wildlife populations would be continually monitored before, during and after construction by use of aerial and ground transects.

With respect to the environmental code proposed by the Environment Protection Board, CAGPL believed that the first eight sections of the code should be deleted and be replaced with the appropriate portions of the National Energy Board Act and the Gas Pipeline Regulations thereunder. CAGPL accepted many of the recommendations con-

tained in the code, but held that some of the recommendations dealing with the timing of the project would not allow a proper expedition of the project. The Applicant also believed that some of the detailed environmental stipulations ought to be decided on a site-specific basis. A detailed list of specific objections to the code were provided. CAGPL referred to the Recommended Environmental Code of Good Practice for Gas Pipeline Development produced by Environment Canada and stated that it agreed in principle with most of the items in this code, that it was well organized, and more appropriate than the Environment Protection Board's code.

With respect to the Environment Protection Board's recommendation for an independent environmental auditor group, CAGPL said that the role proposed for the group was more properly a role for a government agency. CAGPL's witness stated that he was afraid that the proposed independent environmental auditor would become a special interest group rather than a public interest group.

With respect to government regulation of the project CAGPL said that it was necessary that a single agency should be charged by the government with the responsibility for ensuring adherence to the necessary standards, codes, guidelines, legislation, and right-of-way stipulations, for environmental protection along with all other matters directly associated with pipeline construction north of the 60th parallel. CAGPL claimed that without such an approach, it would be impossible for any construc-

tion company to do the job and it would well jeopardize the financing of the project. CAGPL emphasized the need for a single decision-making body for promptly settling disputes arising during construction.

CAGPL urged that the agency should be the National Energy Board with a mandate, expanded as necessary, to carry out this enlarged role, which should not interfere with but rather complement the Territorial Government's responsibilities and programs. CAGPL believed that the formation of an independent agency would jeopardize the National Energy Board's current authority. CAGPL stated that the staff of the agency be left to develop its detailed organization and operational procedures in consultation with the interested parties. CAGPL saw the process of monitoring and regulation as encompassing two phases, namely design and construction. The design phase would be where the main input from other interested parties would be dealt with. All plans for environmental protection would be approved in sufficient detail so that construction could proceed with confidence, and without changes except in extraordinary or unforeseen circumstances. The construction phase would be primarily a period of enforcement of the approved plans.

Authority and Responsibility

CAGPL stated that it would maintain very close control over all construction activities by direct supervision of contractors, by providing all construction camps, by direct provision of other services and by being respon-

sible for procurement and supply, to ensure that the project would not produce unacceptable environmental impacts. CAGPL also stated that it would retain authority to order a stoppage of work if it were deemed essential because of environmental concerns. The chief environmental inspector would direct the efforts of the other environmental inspectors having the responsibility for the day-to-day field control of construction activities and monitoring of environmental factors. If at any time there were an environmental concern which was considered to be critical, the chief environmental inspector would recommend cessation of construction activity to the spread manager. The chief environmental inspector would not have the authority to stop construction by himself. Should the spread manager refuse to stop construction, the chief environmental inspector would have the authority to refer directly to the Director of Environment for an immediate decision. The Director of Environment would be able to immediately set up a video-telephone conference with all concerned parties for the study and resolution of disagreements in the field. The environmental inspectors on a construction spread would monitor the withdrawal of water from any water body and would have the authority to control it.

Environmental Emergencies

CAGPL stated that contingency plans for fire-fighting would be developed for the construction and operational phases in cooperation with the appropriate

government authorities. With respect to other environmental emergencies, contingency plans would be formulated in advance, and unforeseen variations would be resolved by consultation with CAGPL's senior management, and environmental or social consultants. CAGPL submitted two reports on the control of hazardous substances and on contingency planning for spills. The reports described the general approach to preventing the occurrence of accidental discharges of harmful substances to the environment, and for remedial action which would be taken in the event of a spill. It was stated that these reports would be the basis for preparing detailed, site-specific contingency plans. CAGPL would cooperate with all federal, provincial and territorial authorities in preparing these plans.

CAGPL stated further that it would ensure that all personnel connected with the project would be familiar with the contingency plans, and that in the event of a spill of toxic material, all employees of CAGPL and of its contractors, and equipment engaged in the pipeline-related activities could be diverted to containment and cleanup of the spill.

With respect to the environmental impact of a pipeline rupture during the operational phase, CAGPL described the remedial measures which would be implemented. The environmental consultant for CAGPL stated that the activities associated with pipeline repairs would have an impact on small segments of wildlife populations, but there would be no long term impact on the population as a whole.

Post-Construction Monitoring and Surveillance

CAGPL stated that post-construction monitoring would be conducted to determine both short- and long-term environmental changes which might develop as a result of CAGPL's project, and described those factors which would be monitored. The frequency of monitoring would be established by the experience which had been gained in the research conducted before and during construction. Inspection of facilities would be made on a regular basis. This would include checks on drainage and erosion, surveillance of revegetation, monitoring of gaseous emissions from compressor stations and of the ambient air quality, and control of toxic materials and of waste disposal. Terrain stability would be monitored by aerial line patrols with the use of infrared photography to determine the success of revegetation. The aerial patrol program would be supplemented by ground patrols. The frequency of patrolling would vary with the season. CAGPL anticipated that the post-construction monitoring program would be documented prior to final design and submitted to the Board.

Cost of Environmental Protection Programs

CAGPL stated that up to December 1976 it had expended some $20 million for "purely" environmental, and socio-economic programs of which the socio-economic portion was approximately $4 million. CAGPL stated that in addition to the expenditures for the "purely" environmental programs, a very substantial portion of a sum of $70 million

had been expended for "mixed" environmental, socio-economic and engineering measures.

CAGPL mentioned that an additional sum of $26 million (1974 dollars) would be expended for identifiable environmental programs in the remaining pre-construction period and during the construction period. This estimate included approximately $4 million for a research program, environmental impact assessment, and environmental data and guidelines for engineering design; approximately $3 million for detailed design and specific information inputs into design and construction planning; approximately $1 million for further regulatory proceedings and functions; and approximately $17 million for environmental activities during construction, including monitoring and assessment activities, implementation of environmental programs, orientation and training of personnel, and inspection of regulatory enforcement.

During the operational phase, approximately $359,000 per year would be spent on restoration, maintenance and environmental management.

Concerning provision for payment of compensation for damages which might occur during the construction phase, CAGPL stated that these estimated costs were included under "land costs", a breakdown of which indicated that, for construction in the Yukon and Northwest Territories, only damage to timber was included in the estimate, and that damages to third parties such as trappers were not included. CAGPL stated that surveys to determine the number and loca-

tion of active traplines would be undertaken at least a year prior to the construction of each segment, and that during construction the information would be kept current. With regard to the question whether CAGPL would negotiate on the matter of trapline damages on an individual as opposed to a group or community basis, CAGPL stated that this would be a matter for the native people to decide.

Among categories of environmental costs to the Applicant were those that would be incurred for "mixed" environmental, socio-economic, engineering or other purposes where the environmental portion of the cost was not segregated and presented as evidence, such as the cost of routing changes or diversions for environmental reasons. CAGPL stated that 28 significant diversions for environmental reasons had been incorporated into its preliminary design. Other multipurpose categories of cost where environmental considerations played an important role were construction camp sewage treatment, construction of snow roads, prevention of excessive siltation due to erosion, tundra stripping and replacement, construction clean-up and restorative costs and training and orientation programs.

6.1.1.3 Views of the Board

The Board has carefully considered the Applicant's evidence on the existing environment, on the environmental impact of the proposed pipeline, and on the proposed measures to mitigate the impact.

The Board notes the statements of the witness for the Applicant that a pipeline in the Fairbanks Corridor and in the Fort Yukon Corridor would be much longer, more expensive and more diffiuclt to construct than a pipeline in the proposed route, and that he does not recommend these corridors as viable alternatives. Accordingly, from an environmental point of view, the Board does not draw a conclusion on the tolerability of the impact that would be associated with these alternative corridors. The remainder of this section addresses the Applicant's Prime Route and Interior Route.

The Applicant's Prime Route

The Board notes the Applicant's statements that winter construction of the pipeline on the northern Yukon coastal area would avoid interaction with all winter habitats of the Porcupine caribou herd. The Board also notes the evidence that summer construction at the compressor station sites, if restricted to the area of the station pads, would not constitute an inordinate hazard to the herd. The Board has considered the constraints on construction, operation and maintenance activities, recommended by the Applicant's consultant, to protect the herd particularly during its calving and post-calving periods.

The Board's view is that the Applicant's evidence is not compelling enough to conclude that the construction, operation and maintenance activities for the proposed pipeline in northern Yukon would have little or practically no adverse effect upon the Porcupine caribou herd, particularly in the event of any pipeline-related emergencies or of emergency repairs to the

pipeline during the critical periods of the herd's calving and post-calving aggregation.

The Board notes that various types of activities, such as construction of wharf sites, roads, airstrips, stockpile sites, and compressor stations, excavation and stockpiling of granular material from flood plains, rock blasting and quarrying, transport of heavy modular units from coastal wharf sites to compressor station pads, aircraft and helicopter movements including aerial vegetative seeding operations, would all take place in spring or summer. The Board is not convinced that the impact of these activities on the caribou herd would be nil, or at worst minimal, as claimed by the Applicant.

With respect to the biology of the Porcupine caribou herd, the Board notes, in the Applicant's evidence, the great variations, in time and space, in the distribution, location of over-wintering habitats, and path of migratory movements of the herd. These variations are such that, in the opinion of the Board, the potential effectiveness of the Applicant's proposed mitigative measures based essentially upon avoidance of the herd, is highly uncertain. Therefore, the Board concludes that the Applicant's statement that the impact of the pipeline on the caribou herd would be minimal, is too optimistic.

The Board is concerned that, if the northern Yukon segment of the proposed pipeline were built, it would likely have irreversibly detrimental effects on this herd. The Board is not satisfied that the Applicant's proposed measures to mitigate the impact would assure adequate and effective protection of the herd.

For these reasons, the Board concludes that the northern Yukon coastal segment of the proposed route of the pipeline is unacceptable from an environmental standpoint.

With respect to the cross-Delta segment of CAGPL's Prime Route, the Board notes the Applicant's evidence that the beluga whales in Shallow Bay constitute the major concern. The Board notes in the evidence that the proposed pipeline would cross through areas of calving whale concentrations in the Bay; such areas extend south of the location of the proposed pipeline crossing. It is noted that the times of arrival of the whales in the Bay for calving and that of their departure after calving are not precisely known, though it was stated in evidence that few whales had been observed in the Bay after 5 August. The Board also notes the recommendation of CAGPL's consultant that the pipeline construction in the Bay should take place after July.

The Board further notes the consultant's concern about the effects of very extensive barge traffic (of the order of six barges per day) upon the calving whales in the Bay, and the consultant's recommendation that the barge traffic should be kept to a minimum. The Board is aware of the consultant's testimony that proper timing (including temporary stoppage) of pipeline construction, and monitoring of the whales in the Bay would ensure protection of calving and post-calving aggregations of the whales.

The Board has considered CAGPL's consultant's recommendation that, in order to protect the staging areas of large numbers of snow geese and swans in Shallow Bay, the proposed summer construction in the Bay should not be extended beyond 25 August.

The evidence of CAGPL clearly indicated that at least four months would be required in summer to build the pipeline across Shallow Bay. The Board concludes that, because of the insufficient time interval between 5 August (based on the whales consideration) and 25 August (based on the birds consideration), the proposed pipeline crossing of the Bay cannot be built within the environmentally-based time constraints and still provide adequate protection for the calving beluga whales and the staging snow geese and swans.

The Board considers it to be in the public interest to protect the beluga whales and the snow geese and the swans in Shallow Bay. The Board is not satisfied that the Applicant's proposed measures to protect the whales and the birds in the Bay would be sufficient and effective and, therefore, it finds that the proposed cross-Delta segment of the pipeline route is not acceptable from an environmental standpoint.

In light of the Board's finding that the northern Yukon coastal and the cross-Delta segments of the Applicant's Prime Route are not environmentally acceptable for the reasons stated, the Board considers it unnecessary to express its view on the other environmental aspects of this portion of the route.

The Applicant's Interior Route

The Board notes that the Applicant provided only an overview of the environmental aspects of the Interior Route, and it did not study these aspects in as detailed a manner as for the Prime Route. The Applicant's evidence on the potential environmental impact of the pipeline along this route is based on insufficient analysis of available information.

The Board notes in the evidence that, based on various considerations including environmental factors, the Applicant itself rated the Interior Route as its third preference as compared with the Prime Route and the cross-Delta amendment.

The Board notes the Applicant's statement that many of the measures to mitigate the environmental impact as proposed for the Prime Route would also apply to the Interior Route. The Board is not satisfied that the applicability of such mitigative measures to this route has been sufficiently evaluated by the Applicant. Furthermore, the Board does not agree with the Applicant's statement that, because of winter construction, there would not be any major environmental impact.

As the evidence of the intervenors presented at Whitehorse indicated, there could be major environmental impact of the pipeline along this route, particularly because of activities related to construction and maintenance that, according to the Applicant's evidence, would take place not only in winter, but also in spring, summer and autumn.

The Board notes that, although the Applicant stated that the proposed Interior Route would avoid the over-wintering areas of the Porcupine caribou herd, the evidence was that the over-wintering areas of the herd are variable from year to year and that the herd has been observed to over-winter in the Richardson Mountain area north of the Dempster Highway.

The Board also notes that there would be two temporary winter roads and two permanent access roads between the proposed right-of-way and the Dempster Highway, and that these roads would cut through a portion of the over-wintering range, and the migratory

routes of the Porcupine caribou herd; the impact of these roads on the herd is also left uncertain in the evidence. It is the Board's view that the Applicant did not give adequate consideration to the potential impact of the pipeline on the herd in this probable over-wintering area, and on the mgiratory movements of the herd through this area.

The Board notes that the proposed pipeline right-of-way would be near the habitats of the rare and endangered raptor species, near the habitats of the rare, barren ground grizzly bear, and near important habitats of mammals and birds in the Old Crow Flats area. In the view of the Board, the Applicant did not assess in sufficient detail the potential impact of the pipeline on these habitats of important wildlife.

The Board is concerned about the potential consequences of the disposal of very large quantities of water-methanol solution, the pipeline test medium. The Board notes the Applicant's evidence that the water-methanol solution reduced to one per cent methanol by volume would be disposed of by spray dispersal onto land and snow surfaces or by discharge onto the ice-cover over a large water course such as the Mackenzie River. The Board's view is that the Applicant's experimental disposal of the small volumes of the water-methanol solution onto land and snow surfaces did not demonstrate that the capacity of the soil to absorb very large volumes of the solution would be similar to that observed during the experiments.

The Board notes in the evidence that CAGPL's consultant did not approve of the proposal to discharge large volumes of the water-methanol solution onto the ice-cover of large water

courses, but recommended that the discharge should be metered into the receiving water so that the methanol concentration in the receiving water would not exceed ten parts per million. The Board does not agree that a methanol concentration even as low as ten parts per million would have a negligible effect on the oxygen concentration in the receiving water. Furthermore, the Board is concerned about the impact of the water-methanol solution on water quality and fisheries, which was not studied by the Applicant.

It is the opinion of the Board that the disposal of very large quantities of water-methanol solution onto land and snow surfaces in relatively pristine wilderness areas is undesirable. The Board finds that no alternatives have been proposed which would solve the problem of the disposal of the test medium in that area.

The view of the Board is that the Applicant's overall assessment and study of the Interior Route did not provide sufficient support for a finding that the route is environmentally acceptable. From an environmental viewpoint, it is undesirable to develop a new pipeline corridor, as the Applicant's proposed Interior Route would do, in a valuable wilderness and wildlife area in northern Yukon, particularly when other developed corridors could be utilized with relatively less impact on the environment.

Although the Board has concluded that the Coastal and the cross-Delta segments of the Applicant's Prime Route are unacceptable from an environmental standpoint, the Board's opinion, based on the evidence, is that the potential

environmental impact of a pipeline along the Mackenzie Vally corridor could be controlled and made acceptable by suitable mitigative measures.

6.1.2 ALBERTA NATURAL GAS COMPANY

ANG provided evidence on the environmental aspects of the proposed project and on its policies, practices and procedures to mitigate the environmental impact. ANG'S environmental consultant recommended measures to mitigate adverse environmental impacts. ANG stated its intention to incorporate the data and the recommendations from the consultant's reports into the contruction program and to use environmental consultants in the development of the construction specifications.

6.1.2.1 Environmental Impact and Mitigative Measures

Terrain

ANG proposed to loop 102.2 miles of its 106-mile pipeline from Coleman, Alberta to Kingsgate, British Columbia. Construction would take place within the existing right-of-way of the ANG pipeline. The evidence showed that erosion was under control and native vegetation was growing on most of the existing right-of-way. However, approximately 3.8 miles of the route was classified as extremely sensitive to erosion and a regular maintenance program, especially after high runoff periods, was recommended by ANG's consultant.

Land Use

The evidence showed that the proposed pipeline would cross two Class "A" Provincial Parks, Crow's Nest Park at milepost 2.0

and Ryan Park at milepost 93.0 as well as a park reserve called the Yahk Park Reserve at milepost 98.0. The Plumbo Park Reserve bordered the south side of the proposed right-of-way from milepost 56.2 to milepost 56.5.

The Applicant's consultant said that additional right-of-way clearing would result in the alienation of less than two acres of land per park. If construction equipment and activity were restricted to the undeveloped sections of the parks and if revegetation and grooming of the right-of-way occurred promptly, the parks would maintain their aesthetic appeal.

The Applicant's consultant indicated that Public Grazing Units occurred along much of the proposed pipeline route west of the Elk River and that livestock, chiefly beef cattle, provided the main farm income in the East Kootenays. Pipeline construction would remove from forage production 80 acres in the Waldo Ridge Unit and 110 acres in the Gold Creek - Plumbo Range Unit. The Applicant's consultant recommended that revegetation techniques should be designed to restore satisfactory ground cover on grazing lands within three years of construction clean-up.

Wildlife

With respect to wildlife, the environmental reports of the ANG consultant described the area traversed by the proposed pipeline route as one which had a rich and varied fauna of mammals and birds.

The proposed right-of-way would traverse habitats used by deer, elk, moose and mountain sheep throughout the year. Two significant wildlife areas were said to be: a) Phillips Pass,

an important winter range for elk and deer, and b) Mount Broadwood, the most heavily used wildlife range along the proposed route. It was identified as an overwintering area for mountain sheep, mule deer, elk, white-tailed deer and moose, as well as being the lambing grounds for mountain sheep.

The consultant for ANG provided evidence on the sensitivity of the mammals in these wildlife areas to construction activities. The consultant recommended that, in Phillips Pass and other areas of ungulate winter range, ANG keep vegetation clearing to a minimum to maintain as much ungulate browse as possible and that ANG avoid construction activities during the period from November to May. For the Mount Broadwood Area (mileposts 34 to 39.5) the consultant recommended that pipeline construction activities be scheduled for the period from August to October, in order to avoid the lambing period for the mountain sheep which utilize this area.

With respect to birds, the evidence was that the proposed pipeline would affect a few areas of waterfowl production and that the effects would be insignificant to the waterfowl population.

The pipeline right-of-way served as a foraging area for some insectivorous and seed-eating birds. Construction would temporarily alter the habitat on the right-of-way, but the impact would be negligible.

With respect to fish, four major drainages (the Moyie River, Michel Creek and tributaries to the Kootenay and Elk Rivers) which would be crossed by the proposed pipeline were described. The major impact on aquatic life, resulting from pipeline

construction, would be related to increased sediment loads in the rivers. Potential sources of sediment would include stream crossings, sections of the right-of-way which closely parallel stream channels, new access roads and new aggregate borrow sources.

The consultant for ANG made recommendations regarding minimizing siltation in the fish habitats, and minimizing the impact upon the fish populations. These included the recommendations that all construction activities should be confined to periods when fish would be least affected, which was mid-April to late June for spring-spawning fish and late June to mid-September for the streams supporting both spring and fall-spawning fish. The consultant also recommended that surface runoff from the right-of-way access roads and new borrow sites should be controlled to prevent siltation and that adequate vegetation buffer strips should be left between streams and paralleling construction to reduce siltation. Streams which should not be crossed during the sensitive spawning periods were identified.

The consultant for ANG recommended that it should be determined prior to hydrostatic testing whether removal of the required amount of water would adversely affect aquatic habitat. Under cross-examination the Applicant admitted that this was an area which required further investigation, and that further evaluation of sources of water for hydrostatic testing would take place two years prior to the start of construction.

Vegetation

The environmental report of ANG's consultant described the vegetal communities to be traversed by the proposed pipeline.

The environmental consultant recommended that a revegetation program should be implemented. Its objectives were to maintain range quality and suppress weed growth, to stabilize soils for colonization by native species, to stabilize slopes against erosion, and to screen disturbed areas for aesthetic reasons. It was stated that grasses and legumes would be required along much of the route, in order to achieve the objectives.

The consultant made recommendations with respect to seeding mixtures and methods, time of seeding, fertilizing and weed control. It was strongly recommended that hydro-seeding (a technique of hydraulically applying a mixture of seed, fertilizer, mulch and soil stabilizer)should be used where the pipeline would cross major rivers, roadways and park lands, and along the portions of the right-of-way visible from the highway. Rehabilitation with shrubby species was recommended along stream banks, and where treed, wildlife corridors crossed the right-of-way.

With respect to control of vegetation on the right-of-way during operation of the proposed facilities, it was recommended by ANG's consultant that shrub and tree control should be achieved by mechanical rather than chemical means in order to permit vegetation development over as large a portion of the right-of-way as possible.

Water Supplies, Pollution, Toxic Materials

Upon cross-examination ANG stated that construction debris,

solid waste and toxic substances would be disposed of by burning. The evidence showed that permits would be required for burning within one-half mile of forest lands during the period 1 May to 31 October.

ANG's environmental consultant recommended that stationary petroleum storage facilities should be clearly marked, and enclosed by impermeable dykes capable of containing maximum spills, and that temporary fuel drum caches should be situated above flash flood levels.

Archaeology

ANG provided a detailed report prepared by its consultants on the prehistoric and historic sites along the right-of-way. Evidence was provided on the location, site values, project impact and mitigative measures for the identified prehistoric and historic sites on or adjacent to the pipeline right-of-way.

With respect to historic sites, the consultant stated that construction of the original pipeline and the upgrading of a haul road had impaired 14 of the sites identified in the area, and that these sites were of no further value and therefore required no further study.

The consultant's report stated that 15 prehistoric sites were identified on or adjacent to the right-of-way, 13 of which had been directly or indirectly impaired in the original ANG system construction; eight of the prehistoric sites would be directly affected by the proposed looping program. Two of the eight, situated in Phillips Pass, were identified to be of high value, and the remaining six were of unknown value. Sites on the right-of-way would be flagged in order to avoid further impairment

during construction and the construction personnel would be instructed to avoid them.

For sites of known or potential value along the right-of-way, ANG outlined a two-stage program of sub-surface archaeological test evaluations, and an excavation program prior to and following construction. At the sites of unknown value which would be impaired during the looping, test evaluations would be designed to determine their value. Excavations of archaeological sites and artifacts would be carried out according to the regulations contained in the British Columbia Archaeological and Historical Sites Protection Act, 1972.

With respect to construction monitoring, ANG indicated that pipeline ditch monitoring would be carried out by professional archaeologists who would examine ditch side walls and spoil sites for archaeological and palaeontological materials. If any materials of value were located, these would be recorded and evaluated for further studies.

It was also stated by ANG that the impact of a ditch five feet wide would not be significant on major archaeological sites. In the event of materials being discovered during construction, the construction schedules could be altered if necessary to retrive such materials. Burial sites would be flagged and investigated, after construction, by the provincial archaeologist.

Other Environmental Concerns

ANG provided evidence on aspects of recreation and aesthetics along the existing pipeline right-of-way proposed for the looping

program, and stated that the construction of the pipeline would not adversely affect the recreational potential of the region.

With respect to aesthetics, ANG indicated that little of the existing pipeline right-of-way was visible from the public highways, and that road-crossings on the existing pipeline were not eyesores to the travelling public.

Upon cross-examination, ANG indicated that landscaping around the existing compressor stations would be done, and that some landscaping had already been done at one of the stations.

ANG's consultant recommended that the rights-of-way should be revegetated with native species in order to maintain the aesthetic appeal of recreational sites. In Ryan Park, the consultant recommended that the potential recreational area presently inaccessible to tourists should be revegetated for wildlife use, and that in Crow's Nest Park the right-of-way silhouette should be broken with small shrubs.

6.1.2.2 Environmental Inspection and Supervision Education/Briefing

ANG stated that there would be an environmental training program for field supervisors and construction crews prior to commencement of construction. ANG's environmental consultant recommended that a set of guidelines should be distributed to supervisory personnel, that the supervisory personnel and the contractor should be briefed on a site-specific and mile-by-mile basis, and that the supervisory personnel should have time to study and discuss the guidelines, and to visit identified sensitive areas with an environmentalist before construction

commences. With respect to wildlife, it was recommended that all construction personnel should be made familiar with game regulations and that the harassment of animals be strictly forbidden.

Program Organization

ANG stated that two environmental inspectors would be employed on site for the duration of the construction period. The qualifications and proposed duties of the environmental inspectors were described. The inspectors would ensure that construction was conducted so as to minimize environmental damage, in accordance with the contract documents. The inspectors would maintain written records of the environmental mitigative measures. These records would be made available for examination by appropriate government agencies. Environmental consultants would be retained throughout the construction program to advise on specific concerns.

Environmental Emergencies

It was stated in evidence that contingency plans for fire prevention and suppression would be in accordance with the B.C. Forest Protection Regulations.

Post-Construction Monitoring and Surveillance

ANG stated that there was existing access to all sections of the right-of-way and that it would maintain regular aerial and overland inspection of the right-of-way to detect erosion, mass movement, unstable stream banks, and ineffective revegetation. Remedial action would be initiated if problems were detected.

6.1.2.3 Views of the Board

The environmental reports adequately described the environment and the mitigative measures necessary to protect and restore the environment during the construction and operation phases of the pipeline.

The Board notes the Applicant's claim that the utilization of the existing corridor would minimize the environmental impact of the construction and operation of the proposed pipeline looping. The Board agrees that this might be the case insofar as land use is concerned; however, while impact would be less than if a new right-of-way were used, significant construction-related environmental impact could still occur in these areas. The Board would require, as a condition of a certificate, that the erosion potential of the route, including the three new segments, be reassessed along with those areas known to be potentially sensitive to erosion, and that a regular maintenance program be established.

The Board notes ANG's intention to use environmental consultants in the development of construction specifications including the recommendations contained in the environmental reports filed with the Board. In the view of the Board, the effects upon fish, wildlife, terrain, archaeological and water resources and other aspects of the environment could be kept to an acceptable level if these recommendations were implemented. The Board would require, as a condition of a certificate, that ANG implement its policies, practices and procedures for protection of the environment.

The Board notes the detailed study of prehistoric and historic sites along the route completed by ANG's consultant. The Board feels that, if the proposed two-staged excavation program were carried out at the sites of high value, the impact of the pipeline upon these sites would be mitigated as much as possible.

The Board accepts ANG's undertaking to further evaluate the effect upon aquatic habitat of removing water from water bodies for hydrostatic testing, and would require, as a condition of a certificate, that ANG make the evaluation and submit it to the Board.

The Board would require, as a condition of a certificate, that the Applicant submit for Board approval its plans for environmental inspection during construction and for monitoring and surveillance of post-construction effects upon the environment, and its contingency plans for dealing with environmental emergencies.

6.2 FOOTHILLS PROJECT

6.2.1 FOOTHILLS

The Foothills proposed pipeline route would proceed southward from the Taglu gas processing plant on Richards Island and would roughly parallel the east bank of the Mackenzie River until the pipeline crossing of the river at approximately ten miles above the confluence with the Liard River. From that point the route would continue in a generally southerly direction and would join the proposed Trunk Line (Canada) pipeline 6.5 miles north of the 60th parallel. A supply lateral from Parsons Lake would start at the boundary of the Parsons Lake gas plant and join the mainline at approximately milepost 51. The pipeline system would ultimately include seventeen compressor stations.

Foothills proposed supply laterals to communities in the Mackenzie Valley located along the proposed pipeline route, namely Inuvik, Fort Good Hope, Norman Wells, Fort Norman, Wrigley and Fort Simpson, as well as to several communities bordering the shores of the western half of Great Slave Lake, namely Fort Providence, Rae/Edzo, Yellowknife, Hay River and Pine Point.

The Applicant submitted an environmental statement, an environmental atlas, and a series of four reports on a biological field program undertaken in 1975. The environmental statement had been prepared by reviewing existing literature on the biological environment along the proposed pipeline alignment. The statement was not considered to be complete and would be subject to modification based on further research. The additional baseline studies undertaken in 1975 were designed to aid in the refinement of environmental protection measures.

Foothills considered that its environmental program had progressed to the final assessment phase for sites of pipeline facilities and stream crossings, although the assessment was not complete for all sites examines.

The final proposal of all environmental protective measures would be detailed in a manual of environmental stipulations which would be prepared as part of the final design phase and used by the Applicant's environmental surveillance staff. Foothills stated that the design would minimize any alterations to the existing environment and, where practical, the environment would be returned to its original state. Foothills recognized that special designs would be required to accommodate and maintain the permafrost terrain.

6.2.1.1 Environmental Impact and Mitigative Measures

Terrain

The Applicant provided alignment sheets including the areas of sensitive terrain, along with profiles of steep river crossings, and a report on the Applicant's geological drilling program, along the pipeline route.

The Applicant stated that localized terrain alteration would be unavoidable. Borrow materials would have to be excavated, access roads cleared, wharf and compressor station sites prepared, and the right-of-way graded. The presence of permafrost and the naturally slow vegetative recovery rate in the northern regions would aggravate the situation by such processes as thermal subsidence, slope instability and erosion. Cross-slope drainage was also identified by the Applicant as a major

concern from the point of view of avoiding major changes of soil moisture regime upslope and downslope of the pipeline. Therefore, the route was located so as to avoid all known or suspected unstable slopes.

On stable terrain, clearing of the right-of-way would be done one year in advance of pipeline construction and would involve cutting and stacking the merchantable timber. Non-merchantable timber and brush larger than three inches in diameter would be cut and laid over the working area to form a stable working surface where needed, or would be chipped and spread to assist in soil stabilization and in minimization of permafrost degradation.

In more sensitive terrain, the Applicant would use hand clearing extensively and this would not be carried out until the actual pipeline construction was in progress. Prior to excavation, the tundra mat would be carefully stripped and piled so that it would be separate from the pipeline ditch spoil.

In order to prevent thermal degradation of the soil in sensitive permafrost areas, care would be taken to avoid any damage to the organic mat, and, where damage would be unavoidable, natural or artificial insulation would be provided. Where cuts would be necessary in sensitive permafrost areas, stabilization of the terrain would be achieved by using artificial insulation, gravel blankets and mulch binders.

Most of the pipeline construction would be scheduled for winter in order to minimize damage to the terrain. Snow and ice roads would be composed of one or two feet of compacted snow, and at no time would any equipment be permitted to operate over unprotected natural vegetation. Adequate drainage facilities

would be provided to handle both the natural runoff and the concentrated runoff resulting from melting snow roads. Care would be taken to ensure that snow roads, which would take longer to melt than the surrounding snow cover, would not block off natural drainage or cause ponding.

With respect to summer construction activities, the Applicant would use gravel pads in order to protect the terrain and to prevent abnormal melting of permafrost. The Applicant would build the northernmost fifty miles of the route from a gravel pad during the summer. Where the gravel pad would cross an identifiable drainage course, sufficient borrow material would be placed to allow vehicular traffic to pass. Immediately prior to construction in mid-August, these drainage channels would be closed. Any surface water drainage would be diverted to another drainage course, or by pumping the water directly over the pipe.

Surface erosion control measures would be implemented at the time of clearing of the right-of-way and during the post-construction phase. Effective control of erosion would be achieved by allowing drainage to flow in its natural course wherever possible. Erosion on slopes and cleared land would be controlled by ditch checks and linings, granular blankets on slide slopes, drainage intercepts at the top of slopes, insulation of ice-rich terrain, contouring of side slopes, and by erosion control mats.

After the pipeline was buried, the construction zone would be returned to as close to its original condition as would be feasible, in order to restore the natural drainage patterns, and the right-of-way would be revegetated.

The Applicant provided an environmental assessment respecting development of borrow pits along the route including a list of site-specific recommendations concerning control of related environmental effects. With respect to the recommendation of the Applicant's consultant that borrow materials should not be taken from flood plains, the Applicant stated that this recommendation would be considered at the time of identification of alternate borrow sites. Each borrow pit would be evaluated prior to its being developed. Drainage at borrow sites, and the type and extent of expected wastage of borrow materials would be ascertained; in some cases, siltation ponds might be necessary.

With respect to the potential problem of slumping occurring in a borrow pit during rehabilitation of the pit, ahd Applicant's consultant stated that appropriate steps would be taken at the end of the construction period, in order to properly grade the slopes before abandonment of the pit. Revegetation of borrow pits would be considered by the Applicant on a site-specific basis. Rehabilitation of the borrow pits would be carried out by stabilizing the slopes and controlling any potential drainage from the pits.

With respect to the construction of the laterals to northern communities, little terrain damage would occur; the terrain sensitivity, especially near Yellowknife and Pine Point, was considered to be low.

Part of the geotechnical design would include erosion and drainage control, and it would be done on a mile-by-mile basis during final design.

Land Use

The Applicant reviewed the literature to ascertain existing and proposed parks and areas having recreational potential. Territorial and National Parks plans and proposals were also reviewed. No National Parks along the proposed route were being considered by the Government. The development of wayside parks along the future extension of the Mackenzie Highway could be a concern. The Applicant's consultant recommended that selection of the final route location would be coordinated with the federal Department of Public Works, in order to avoid any potential sites for recreational use.

The proposed pipeline route would be close to four proposed International Biological Program Reserves but would not pass through any of them.

Wildlife

The mammal species of major importance in regions of the Mackenzie River Delta, the upper Mackenzie Valley, the mid-Mackenzie Valley, and the lower Mackenzie Valley, were described in the evidence.

Foothills submitted in evidence that construction-related vehicular traffic could detrimentally affect mammal populations. In order to prevent such detrimental effects on mammals, harassment by aircraft and terrestrial vehicals would be strictly prohibited. Aircraft disturbance of mammals would be minimized during construction and operation, through control of flight plans and flight corridors and minimum altitudes would be established in consultation with the appropriate government

agencies. Concentrations of mammals on or near roads and rights-of-way would be monitored, and appropriate protection measures, such as posting of warning signs, reduction of vehicle speeds or rescheduling of vehicle movements, would be applied in consultation with appropriate government agencies. In the snowbanks created by snow-ploughing operations along access roads, breaks to facilitate mammal movements would be made.

In order to prevent destruction, or to control alteration, of mammalian habitats, Foothills proposed the scheduling of regular aerial surveillance over the pipeline right-of-way to permit early detection of any fires; the development of contingency plans to cope with fires; and the implementation of further investigations along the proposed right-of-way, access roads and at borrow sites to determine the location of den sites and to assess the importance of these sites so as to avoid them where possible. Where the avoidance of prime denning and over-wintering areas would not be possible, the Applicant proposed to minimize disruption in the area through appropriate control of pipeline-related activities. The string of pipe along the proposed right-of-way and open pipeline ditch could create a barrier to mammal movements. Blasting and pipe-laying activities could disturb the animals in the vicinity to the point where they would withdraw. Foothills proposed to leave frequent breaks in the string of pipes in order to permit animals to cross the right-of-way. The length of pipeline ditch open at any time would be minimized. Blasting would be avoided within one mile of active barren ground grizzly bear dens during the period from 15 November to 15 May. Machinery and equipment operations would be

confined to the right-of-way, access roads, wharf and stockpile sites, aircraft landing strips, and borrow sites. Willful harassment of mamals would be prohibited at all times.

Disturbance due to construction activities and aircraft overflights, of nest sites of rare and endangered raptor species, especially during the early part of their breeding season, and of critical waterfowl migration, moulting and nesting habitats, would result in reductions of their populations. In order to mitigate these effects on the raptors and waterfowl a minimum of two miles would be maintained between the pipeline alignment and known raptor and waterfowl habitats; where this would not be possible, the location of the final route would be chosen in consultation with the appropriate government agencies. All construction activities, which would disrupt nesting raptors in critical areas, would be restricted to the period from 15 April to 15 September, or as determined through consultation with appropriate government agencies. Pre-construction activities including wharfing, stockpiling and gravel borrowing, would be carefully regulated during and after spring break-up to avoid disturbance to migrating waterfowl in critical areas in the lower Mackenzie River; construction activities, especially blasting, would be avoided within two miles of designated critical migration areas of waterfowl between 1 May and 15 June. Foothills' ornithological consultant had recommended that pipeline construction activities between mileposts 0 and 23 should not take place during June, July and early August, this being the nesting and breeding season for waterfowl.

Aircraft flights in the vicinity of raptor nesting areas would be strictly controlled and a minimum flight altitude of 1,000 feet would be maintained from 15 April to 15 September, to minimize disturbance to critical raptor habitats. Overflights of aircraft, especially large helicopters, at altitudes less than 2,000 feet would not be permitted over critical waterfowl migration areas, from 1 May to 15 June; aircraft flights over waterfowl moulting and staging areas would be at a minimum altitude of 2,000 feet; and flight corridors would be so designated as to avoid these areas, or cross them over the shortest possible distance, where avoidance would not be possible.

In order to minimize the effect of habitat alteration on bird populations, Foothills would not remove borrow materials from islands or river bars. Post-construction clean-up and rehabilitation procedures would be designed so as to restore natural drainage patterns coincident with stabilization of the terrain and vegetation.

Appropriate watershed management practices, including slope stability and erosion control measures, would be carefully applied during construction and operation phases of the pipeline.

In order to mitigate the effects of animal habitat alterations as a result of fire or accidental spills of toxic materials, Foothills proposed to develop suitable contingency plans to cope with fires and to deal with spills of toxic materials. These plans would be presented to appropriate government agencies, prior to commencement of construction.

In order to prevent hazards to birds, communication towers would not exceed 150 feet in height, and the towers would be lighted.

To minimize excessive shooting of birds, Foothills would enforce strict control of firearms at all facilities of the pipeline project. Care would be taken in the design and operation of support facilities so that subsidiary exploitative hunting would not be inadvertently promoted, and public vehicular access would be prohibited along the right-of-way. The proposed gravel pad from mileposts 0 to 50 would have drainage breaks every 200 to 300 yards thereby rendering it impassable for normal vehicular traffic.

Pipeline development activities would pose threats to aquatic ecosystems and fish resources, if design, construction and operational commitments were made without knowledge of their effects on aquatic ecosystems and fish resources. Aquatic ecosystems would be affected by degradation of the habitats due to excessive sedimentation, introduction of toxic pollutants, disruption of drainage systems and physical alteration of water bodies, destruction of critical fish spawning, rearing and feeding areas. Foothills would generate, from on-going studies, information regarding locations within the pipeline developmental area that would be critical to the aquatic ecosystems and fisheries resources and particularly sensitive to disturbance, as well as information on preferred locations for crossing water courses or for by-passing lakes. Foothills' fisheries consultant recommended that studies should be done one year prior to

construction of the particular crossing to identify fish over-wintering areas.

Vegetation

Foothills' environmental evidence included descriptions and maps of the types of vegetal communities that would be traversed by the proposed pipeline. The land area requirements for pipeline development in each of the types of vegetal communities were given in the evidence.

A major concern with regard to the impact of the proposed facilities on vegetation would be the effect of interruption of drainage on vegetal communities, and Foothills would employ appropriate geotechnical measures to avoid this problem.

Foothills proposed a program to revegetate disturbed areas. Natural re-invasion by plants would be relied upon for revegetating some disturbed lands, such as flat-lying lands. The objectives of the revegetation program were to help restore a self-supporting ecosystem, to provide erosion control on both short and long-term bases, to aid in maintenance or restoration of soil thermal conditions, to reduce maintenance costs by using grasses, legumes, and shrubs to control invasion by trees, and to leave the area in an aesthetically acceptable condition after completion of construction.

Revegetation would be done using ecotypes of vegetal species currently growing in the vicinity of the proposed facilities. The species would include native grasses, legumes and shrubs, and naturalized varieties of introduced grasses. Foothills'

revegetation plans were not yet approximating what would be in the final design since its research was not completed.

Foothills' consultant proposed four environmental districts for revegetation purposes, and recommended types of basic seed mixtures for moist, well-drained soils in each district. Additional species mixtures were proposed for dry slopes, for moist, poorly-drained regions, and for alpine areas. The consultant estimated that 200,000 to 300,000 pounds of seed would be required to revegetate the disturbed areas of the pipeline and associated facilities, and admitted that the proposal to produce that amount of seed from native wild ecotypes was unprecedented in Canada.

The gravel pad and the berm would not be revegetated in the northernmost 50-mile portion of the proposed pipeline, which was scheduled for summer construction.

Foothills had not yet decided whether the revegetation proposals would be included in its construction specifications, or whether it would be implemented separately.

Failed plantings of previously revegetated areas would be reseeded or replanted at the first opportunity in the spring of the following year. To ensure that the plant communities would be protected, Foothills' consultant proposed that aerial inspection should be made annually and ground surveys should be made every two years. Surveillance of the success of the revegetation program would be carried out by trained technicians under the direction of a plant scientist.

Foothills recognized that construction and operation of the proposed facilities would increase the potential for wildfires in

the vegetation along the right-of-way, and described the types of construction and operation activities which could start wildfires. Personnel would be trained in fire safety, and contingency plans for fire detection and suppression would be prepared in cooperation with government agencies.

Water Supplies, Pollution, Toxic Materials

Foothills had not evaluated the possible impact of pipeline construction activities on the sources of public water supplies for the communities of Fort Good Hope, Norman Wells, and Fort Norman.

Foothills' consultant stated that the discharge of organic wastes into water bodies would deplete the oxygen available to gill-breathing aquatic fauna. The impact of sewage effluents could best be minimized by discharging the effluents away from sensitive aquatic areas. Direct discharge to open bodies of water would be avoided wherever possible and all proposed discharge sites would be evaluated by environmental and engineering personnel befoe site selection. This had not yet been done since the final locations for construction camps had not bee determined.

Waste disposal would be in accordance with the requirements or guidelines of the Territorial and Federal governments. However, Foothills stated that the effluent standard of 20 milligrams per litre for biochemical oxygen demand, established in the federal "Guidelines for Effluent Quality and Wastewater Treatment at Federal Establishments", was too stringent for application to the Applicant's construction camps. Foothills

proposed a maximum limit for effluent biochemical oxygen demand of 75 milligrams per litre in 75 per cent of samples tested.

Foothills' consultant proposed that large construction camps be made up of modules. Each module would be served by a "package" sewage treatment plant and the effluent would flow to a "polishing" lagoon. The lagoon would have the capacity to hold 10 days' maximum flow from the camp module. The lagoon would act as a standby facility to provide at least primary treatment in the event of failure of the treatment plant. Wherever possible the effluent from the lagoon would be discharged into a swamp. Foothills' consultant discussed the problems experienced in Alaska with "package" sewage treatment plants, and stated that these problems would be taken into account in the final design. Foothills would generally implement the recommendations of its consultant in this regard and would prepare site-specific plans. Foothills would also have two trained persons available to operate the sewage treatment plant at each camp, but had not yet finalized its plans for arranging their training.

Compressor stations would be served by sewage lagoons with a one year retention time. Meter stations would have no waste disposal systems other than self-contained chemical toilets. Waste products would be transported to the gas plants or compressor stations for disposal.

Foothills proposed to locate the construction camps at wharf sites on the Mackenzie River and said that discharge of the treated sewage effluent directly to the river would occur if a suitable swamp area was not available. With respect to the possible location of a construction camp at Police Island five

miles upstream of Fort Norman, where the Mackenzie River is used by residents as a source of domestic water, Foothills would investigate the potential public health hazard from camp sewage effluent discharges.

Foothills recognized the potential of hydrocarbon pollution to cause mortality to wildlife resulting from ingestion or loss of insulation due to oil-soaked fur. All fuel storage tanks would be situated within impervious dykes which would have a capacity of 125 per cent of the total fuel stored. Bladder tanks would be fenced as well as dyked to prevent damage by animals. Fuel storage would be set beyond the high water or high ice marks, but no minimum set-back from water bodies had been established.

Liquid wastes such as lubricants, paints, corrosion materials could be incinerated or recycled. Foothills had not established specific plans for the disposal of such materials, nor had it estimated the quantities that might be generated, but would develop methods to conform with government regulations or guidelines. Herbicides and pesticides would not be used on the project.

Foothills recognized that the presence of many people with accompanying sewage, garbage and residual food odours would attract many mammal species including large carnivores. In order to avoid attracting wildlife, garbage would not be allowed to accumulate, but would be collected and incinerated on a regular basis together with excess sewage sludge and other combustible solid and liquid wastes. For construction camps, the incinerators would be of the multiple-chamber or controlled-air

types with fixed hearths and batch charging. It was stated that the highest standards for air pollution control could be met. The incinerator residue, together with non-combustible, non-salvageable solid wastes, would be buried in landfill sites or in spent borrow pits if suitable, and if there would be no impairment of other potential uses of the borrow pits. Large metallic items would be salvaged or used as supplementary fill in pads, roads or airstrips. Foothills would cooperate with government salvage programs and comply with government regulations and standards. Foothills stated that it would revegetate solid waste burial pits.

With respect to air pollution from compressor station turbines, Foothills stated that ground level concentrations of sulphur dioxide would not exceed 0.002 ppm, which was described as the threshold damage concentration for lichens which were regarded as the most sensitive of the plant life. The maximum ground level concentration of carbon monoxide would be 0.05 ppm, which would be about two orders of magnitude less than the maximum desirable objective set out in the Federal Ambient Air Quality Objectives. The maximum ground level concentrations of oxides of nitrogen would be 0.02 ppm for a neutral atmosphere and irregular terrain, and about 0.10 ppm for a stable atmosphere and irregular terrain. These values assumed no chimney down-wash or building down-draft. Foothills would design exhaust stacks with exit velocities that were at least the maximum recorded hourly wind velocity so as to avoid chimney down-wash, and with their heights one and three quarter times that of adjacent station building so as to avoid building down-draft.

With temperatures below -40° F., ice fog from combustion sources would be unavoidable. With respect to the operation of compressor stations, Foothills claimed that the phenomenon of ice-fog would be short lived. For the month of January, the probability of the mean daily temperature falling below -40° F. would be about eight per cent for Aklavik; nineteen per cent for Fort Good Hope; and four per cent for Fort Simpson. Recent studies had indicated that limited atmospheric mixing layers of the depth required to entrap a compressor station plume were rare during the winter months in the Mackenzie Valley region, so that the plumes would remain above ground and not restrict ground-level visibility. Compressor stations would be located at least six miles from other human activity centres as to avoid problems due to ice fog.

Noise

The pipeline system would have 17 compressor stations located at approximately fifty-mile intervals. Stations 1 to 13, which would be situated in the chilled part of the pipeline, would be powered by 26,000 HP units, and stations 14 to 17 would be powered by 29,000 HP units.

The compressor stations would be located at considerable distances from centres of populations. Although the proposed locations were not final, the shortest distance between any compressor station and the nearest community was expected to be seven and a half miles.

Conventional mufflers would be installed at each gas turbine inlet and exhaust. The noise which would emanate from gas and

propane pipes would vary with the velocity of the gas and the propane in the pipes. By designing for low velocities, the noise emission from the pipes would be controlled to a low level. Where necessary, the pipes would be insulated or buried to further reduce the noise. Acoustic insulation would be installed on the building walls to further surpress noise levels. As a result of these control measures, the aggregate noise level at the fence line for a compressor station under continuous operation would be approximately 60 dBA.

Archaeology

The Applicant provided evidence on the environmental setting, on impact prediction and on environmental concerns and protection measures with respect to archaeological resources along the proposed pipeline route. The Applicant's policy would be to avoid pipeline construction in areas of archaeological significance.

Foothills' preliminary study on archaeological resources along the proposed route included information from published and unpublished reports and from airphoto interpretation. CAGPL's archaeological supplements were also consulted and reviewed. No further studies had been planned.

Based on the information available to the Applicant, no archaeological sites were identified on or adjacent to the proposed pipeline route. However, deeply buried archaeological sites might be found in forested areas and at stream or river crossings during construction. Such sites would be subject to the impact of construction activities. The value of those

archaeological sites whose significance is presently unknown in zones of direct or indirect impact of the pipeline, could be assessed only by ground surveys to determine whether the right-of-way should be relocated to avoid such sites.

Foothills had developed a detailed program of archaeological reconnaissance, evaluation, and excavation to cope with the contingencies of pipeline development. The program was divided into eight phases, namely: ground reconnaissance and inventory; site evaluation; pre-construction site salvage excavations; archaeological inspection of pipeline construction; post-construction excavation; analysis and interpretation of materials; archaeological training of northern natives; and co-operation with government agencies.

Precise relationships of the archaeological sites with the proposed pipeline route would be determined during the ground reconnaissance phase prior to commencement of construction. During pipeline construction, a close liaison with the National Museum of Man would be maintained.

Materials discovered during ditching would be evaluated and the information would be recorded. Spoil sections containing artifacts would be left on the surface, and the trench would be backfilled with material from other sources. If the uncovered material required excavation operations, then the areas would be marked for further work to be done, during the summer following construction, when soil conditions would be more suitable.

The implementation of these mitigative procedures would reduce the impact on archaeological resources to acceptable levels. Archaeological personnel would have access to the

pipeline right-of-way after the burial of the pipe, to continue work on excavation programs. The Applicant stated that the results of archaeological findings would be published, and any salvaged material would be placed in appropriate museums.

Other Environmental Concerns

Prior to final design, the pipeline alignment would be correlated with airphoto mosaics, to ensure spatial separation from visual features such as Big Smith Falls. During the final design phase, a review of the pipeline alignment would be made to ensure that it would not pass through high priority visual zones and features.

Careful site planning would be undertaken to reduce the aesthetic impact of compressor stations. There would be no tree planting programs around compressor stations since a fire break wold be required. Sites of pipeline facilities, and vegetative buffer zone locations would be selected so as to minimize visual impacts from waterways, roadways and from the air.

Six regional landscape zones were defined fo further study, based on common physical, biological, and climatic conditions, and on forms of spatial composition evident in each region, such as the presence and location of mountain ranges. The aesthetic conerns in these zones were examined with reference to their regional impacts. The proposed pipeline route would avoid major visual features in these areas. The Applicant's assessment of the aesthetic appeal along the pipeline right-of-way recognized the linear view of the right-of-way as being in contrast to most natural physical forms in the environment. The pipeline route

would be in close proximity to the Mackenzie Highway in some areas, and open views of the right-of-way from the highway at crossings, or in the immediate sections, would be of an aesthetic concern. Areas of significant visual concern, such as at highway crossings and recreational areas, would be revegetated to reduce the contrast between treed areas and the right-of-way.

The Applicant would minimize the number of crossings of the Mackenzie Highway. The right-of-way would be at an angle as nearly perpendicular to the highway as possible, where crossings of the highway could not be avoided.

The pipeline would be aligned so as to avoid extended views of the cleared right-of-way from the highway and scenic waterways.

The pipeline route would be located at least one mile away from townsites and at a higher elevation so as not to be visible from the roadways. Temporary facilities would be so located that their visual impact from highways and the Mackenzie River would be minimal. Existing vegetative buffer zones would be retained, and any clearing of vegetation would be kept to a minimum. After the completion of construction, all temporary above-ground structures would be removed and the disturbed ground surfaces revegetated. The Applicant was not aware of any areas where it would not be possible to provide vegetative buffer zones.

The gravel pad in the northernmost fifty miles of the proposed pipeline route would be in contrast to the tundra environment in terms of its colour and texture. Revegetation of the gravel pad would be difficult as the area was basically a sterile environment.

Future areas for recreational development had been identified in consultation with the Territorial Government and Parks Canada. All known recreational sites and potential recreational sites identified by the Environmental-Social Committee of the Federal Government were mapped. The direct impact of the proposed pipeline on the existing recreational sites was evaluated. In general, the conflicts between recreational areas and the proposed pipeline construction were said to be minimal. Only community and wayside parks existed along the route, and the proposed service laterals would be the only facilities that would conflict with these park areas. Recommendations for site-specific investigations were made and the final review of the route location would eliminate or minimize the problem.

No National Parks were proposed by government for the area to be traversed by the pipeline route. Some sections of the route, such as the area from mileposts 445 to 527 had been described as having potentially excellent recreational capability. It was recommended that adequate buffer zones be provided in these sections and sites of special features be avoided.

Foothills claimed that the implementation of the protection measures recommended by its consultant would adequately mitigate any impact pipeline construction would have on the aesthetic qualities of the region.

6.2.1.2 Environmental Inspection and Supervision Education/Briefing

Foothills stated that it would implement an environmental orientation program for all personnel involved in the project, which would provide a clarification of the environmental issues together with an explanation of relevant legislative requirements, guidelines and protective measures.

The specific choice and scope of orientation materials to be presented, and the length of briefing sessions would vary with personnel category according to its potential for effecting an impact on the environment. The orientation program would be conducted by the Applicant's environmental inspection staff. They would be trained by specialists who would also prepare the program materials. The field environmental staff would also evaluate the effectiveness of the orientation programs during construction.

Changes to the program resulting from the evaluation would be communicated to project personnel during construction and also incorporated into the orientation programs for future construction seasons. The environmental inspection staff would have a training program to familiarize them with the project area, relevant environmental legislation, government conditions and guidelines, and various construction operations and techniques.

Program Organization

Foothills stated that its environmental inspectors would be present in the field during all major pre-construction work and two of three environmental inspectors together with a geotechnical inspector would be present on a spread at all times during construction activity. One of these individuals would have overall responsibility for the spread and would report to a district chief who would supervise and coordinate environmental inspection within a district of two or more spreads. The district chief would report to Foothills head office.

Specialists would be available to provide guidance on short notice to the environmental inspectors. Foothills envisioned hiring, as environmental inspectors, persons with a background in either the biological or physical sciences.

Foothills was not in favour of the independent environmental auditor as proposed by the Environment Protection Board. Foothills placed in evidence detailed comments on the environmental code proposed by the Environment Protection Board.

Authority and Responsibility

Foothills stated that the senior environmental inspector on a spread would have the authority to shut down construction operations which might not be conforming to established standards or which could result in a significant and unnecessary environmental impact. The district chief would have the authority to maintain the shut-down for one day to allow resolution of the problem. If the problem could not be resolved

in the field within one day, then it would be referred to Foothills' head office for a decision.

Environmental Emergencies

Foothills stated that it intended to avoid any unnaturally induced wildfires in the vegetal communities unless they posed no threat to the project or to other individuals and the appropriate authorities agreed to allow the fire to burn. The presence of large numbers of men and machines during construction would allow the Applicant to respond immediately and effectively to fight fire. Fire-fighting equipment would be available and comprehensive training programs would be established for fire prevention and fire fighting. The Applicant's inspectors would make fire inspections of all facets of the project. The Applicant proposed to coordinate all its fire prevention and suppression activities with the Department of Indian Affairs and Northern Development.

Foothills would have strict guidelines to minimize the potential for accidental spills or contamination of natural drainages with fuels, toxic chemicals and industrial waste materials. Foothills was aware of the need to develop practical and comprehensive contingency plans to deal with potential fuel and lubricant spills, but its contingency planning was in a very preliminary stage. The Applicant had had discussions with several prospective consultants about the preparation of contingency plans. With respect to site-specific contingency planning, the Applicant's environmental consultant recommended that barges be boomed during loading and unloading in order to

contain any spillage and further that corrals rather than booms be used at the Axe Point wharf site because of the particular sensitivity of a waterfowl concentration area two miles downstream.

Post-Construction Monitoring and Surveillance

Foothills stated that, following construction, a regular surveillance schedule would be maintained along the entire length of the pipeline. The conventional types of line patrol would be by aircraft. Where there was a possibility of disturbing wildlife by aircraft patrols, the patrol program would be supplemented by ground patrol by at least two specially-trained persons, eiher on foot or in a small vehicle suitable to the terrain. The District Superintendent would ensure that the frequency and method of the patrols would reflect any known environmental concerns.

With respect to the monitoring of long-term environmental changes, the emphasis would be on the physical environment and on those factors in which change could be related to pipeline project causes and for which remedial action could be taken. Foothills would coordinate its program with the programs of government agencies to avoid duplication. A list was given of the environmental factors which would most likely be monitored, but Foothills had not yet determined site-specific requirements for a monitoring program. Foothills expected that the methods used for monitoring would be generally those which had previously been employed for similar purposes. The applicability of remote sensing techniques was also being investigated.

Cost of Environmental Protection Programs

Foothills estimated that it would spend approximately one and a half million dollars for environmental programs up to the end of 1977. For the entire pre-operations period, the cost of its environmental programs would total approximately seven million dollars, not including approximately two million dollars for salaries and other associated costs of environmental personnel. These cost estimates did not include expenditures for revegetation, and for erosion and drainage control, which were included in the estimated budget for engineering and construction. The environmental cost estimates were based on the assumption that the Foothills project would be constructed independent of the Foothills (Yukon) project.

Concerning provision for compensatory payment for damages which might be incurred during construction, Foothills' estimated capital cost included cost of damages to commercial timber of $196,000, excalating to $248,000 in 1980. In addition, the cost of insurance and public liability and property damage insurance would be carried under estimates for Head Office and Pre-operational costs to cover extraordinary claims which might develop.

Foothills did not estimate possible damages to traplines during construction. Foothills did not know whether damages to trappers would be paid on an individual basis or on a community basis.

Foothills stated that it would be impossible for it to isolate the cost of measures proposed for environmental reasons as distinct from other reasons. To protect wildlife resources

which formed the renewable resource base for northern lifestyles, several measures, including winter construction, methods of carrying out aircraft patrols, and manpower requirements to complete the project within a given period of time, were incorporated in project design, the total cost of which would reflect environmental as well as other considerations.

Foothills' cost estimate included, provision for the cost of monitoring by the Applicant's inspectors. With regard to possible costs associated with shutdown of construction due to environmental or other reasons, Foothills stated that allowance for this factor was implicit in the productivity factors used in making the cost estimate.

6.2.1.3 Views of the Board

The Board has carefully considered the Applicant's evidence on the existing environment, on the environmental impact of the proposed pipeline, and on the proposed measures to mitigate the impact.

It is the opinion of the Board that some damage to the terrain along the proposed route would be inevitable, especially at river crossings and embankments in permafrost zones, and at the borrow pits, and in the event of improper use of snow roads. However, the Applicant would be able to effecively minimize erosion and to control drainage if the proposed measures to mitigate these effects were implemented in the right place and at the right time.

The Board acccepts the Applicant's undertakings respecting drainage control and erosion, as described in the evidence, and

as a condition of a certificate, would require the Applicant to submit, for Board approval, prior to final design, the plans and schedules for implementing such measures.

With respect to the development of borrow pits, the Board is of the opinion that, if all criteria recommended by the Applicant's consultant were implemented, these pits could be developed with a minimum impact upon the environment. Accordingly, the Board would require the Applicant, as a certificate condition, to implement its consultant's site-specific recommendations, prior to developing these pits.

Concerning the use of snow roads, the Board is of the opinion that the Applicant should carry out tests on snow roads that would simulate the traffic loads and frequencies related to pipeline construction activities in order to establish criteria for snow road use and for the protection of the tundra terrain from the impact of such use.

With respect to using a gravel pad along the first fifty miles of the proposed route, it is the Board's opinion that considerable maintenance work would have to be carried out in the spring to remedy any erosion that might be caused by flooding. The Board would require the Applicant, as a condition of a certificate, to submit, for Board approval, a detailed plan indicating how this maintenance work will be carried out.

The Board accepts the Applicant's undertaking to restrict ambient noise levels at the fence line of compressor stations to 60 dBA. The Board would require the Applicant, as a condition of a certificate, to measure the noise levels at the fence line of all compressor stations at six months and at 18 months after the

issuance of leave to open, to ensure that the 60 dBA noise level is not exceeded at the station fence lines, and to report to the Board any adverse effects of the noise emissions upon the public and the wildlife, together with any further noise abatement measures that might be necessary to prevent such effects.

The Board notes that the biological part of the Applicant's environmental program has progressed to the final phase of the environmental assessment of the facility sites and stream crossings, although the assessment was not complete for all sites examined. The Board also notes the Applicant's position that some of the sites might be rejected as a result of future biological studies.

The Board recognizes that the major emphasis of the Applicant's 1975 biological field program was to identify major site-specific conflicts between the proposed pipeline development and the environment. The Board agrees with the Applicant's view that, through on-going research, the Applicant would continue to upgrade its knowledge of site-specific environmental conditions and improve its ability to minimize environmental impacts of the proposed project.

The Board agrees with the Applicant that scheduling most of the pipeline construction activities for winter could minimize environmental impacts, but only to the extent that adverse effects on the fauna, directly resulting from construction, could be minimized. The Board's view is that the Applicant's environmental policies and procedures would effectively control the construction and operation-related effects upon mammals, raptors, waterfowl and fish, recognizing that some site-specific

studies remain to be done in order to identify what specific measures to protect these fauna would be needed.

With regard to the revegetation program proposed by the Applicant, the Board accepts in principle the use of native grasses, legumes and shrubs and naturalized varieties of introduced grasses. However, the Board is concerned that the proposed procedures for revegetation were not based upon proven results. Therefore, any procedures that would be used, would have to be proven effective before the Board could approve them. Accordingly, the Board would require the Applicant, as a condition of any certificate, to submit, for Board approval, prior to commencement of construction, its revised revegetation procedures to demonstrate the effectiveness thereof.

In the Board's view, the archaeological resources, and the aesthetic quality of the region would be effectively protected if the protection measures proposed by the Applicant were implemented.

The Board is concerned about the probable impact of construction activities on the sources of public water supplies for the communities of Fort Good Hope, Norman Wells and Fort Norman. The Board would condition any certificate to require the Applicant to evaluate the probable impact of construction activities on these water supply sources and to submit, prior to commencement of construction, a report, for Board approval, on the measures to be taken to mitigate the impact.

The Board notes with concern the problems experienced by others in operating package sewage treatment plants at workcamps in Arctic and sub-Arctic North America. The Board does not

accept the Applicant's conclusion that a sewage effluent biochemical oxygen demand of 75 milligrams per litre obtainable in 75 per cent of the effluent samples would be a reasonable standard to meet. The Board would require the Applicant, as a certificate condition, to ensure that at least 90 per cent of the effluent samples taken during any consecutive 30-day period would have not greater than 20 milligrams per litre biochemical oxygen demand.

With respect to other effluent quality factors, the Board would require the Applicant, as a condition of a certificate, to meet the recommended limits set out in "Guidelines for Effluent Quality and Wastewater Treatment for Federal Establishments" issued by the federal Environmental Protection Service. For any cases where the Applicant would be unable to meet these recommended limits, the Applicant might apply to the Board for review of this condition.

The Board accepts the Applicant's undertaking to dispose of other wastes and toxic materials in accordance with existing government requirements or guidelines, and to store fuels and toxic materials within impermeable dykes and away from critical aquatic habitats.

The Board is concerned about the emissions of nitrogen oxides from the compressor turbines. The Board's view is that the Applicant's preparations for final design should include site-specific analyses to ensure that the ambient atmospheric concentrations of nitrogen oxides, measured as nitrogen dioxide, would meet the Ambient Air Quality Objectives promulgatged under the Federal Clean Air Act. The Board would condition a

certificate to require the Applicant to monitor the nitrogenous emissions from the compressor turbines, and the ground-level concentrations of nitrogen oxides at appropriate locations in the vicinity of the compressor stations, periodically during the first year after granting leave to open, and to submit the results to the Board within 90 days after the completion of the first year's operation.

From an overall environmental standpoint, the Board's opinion, based upon the Applicant's evidence, is that a gas pipeline could be constructed and operated along the proposed Mackenzie Valley route with acceptable environmental impact provided that appropriate measures to mitigate the impact were implemented subject to the conditions stated in this section.

6.2.2 WESTCOAST

Westcoast's pipeline proposal was in two parts: a 140.6-mile extension of the mainline (the Territories extension) to connect with the proposed Foothills system; and a 201-mile looping program of its existing mainline (mainline looping).

The proposal for the Territories extension of the pipeline was selected by Westcoast from six alternatives for extending the mainline to connect with the Foothills system. One of the specific reasons given by Westcoast for this selection was that it had the lowest environmental impact due to the minimum pipeline mileage and the type of terrain involved. Construction of the Territories extension would be subject to the constraints and contingency plans contained in the environmental section of contract documents currently used by Westcoast. Westcoast's evidence was that these constraints and contingency plans would

form part of Westcoast's construction specifications contract with its contractors.

The balance of Westcoast's proposed construction consisted of a total of approximately 201 miles of 36-inch O.D. pipeline looping on its main gas pipeline from Fort Nelson and Fort St. John to Vancouver in nineteen loops varying in length from 5.3 to 21 miles. Some 20,000 H.P. additions would be made to each of the mainline compressor stations 4A and 4B.

Westcoast submitted an environmental assessment report prepared by its consultant for the proposed looping program. Westcoast stated that the assessment suggested minimal impact from the proposed pipeline looping.

Westcoast testified that it would follow the recommendations contained in its consultant's environmental impact assessment report. Construction of the looping would be subject to the environmentally based constraints and contingency plans presented to the Board in its consultant's report.

6.2.2.1 Environmental Impact and Mitigative Measures

Terrain

Westcoast's consultant classified the terrain and the permafrost conditions along the route of the proposed Territories extension by using aerial photographs and by a brief field examination.

The Etsho Escarpment, rising some 1,300 feet above the surrounding terrain, was described as the main topographic feature and was located approximately midway along the route.

Experience obtained from the Pointed Mountain line suggested to the consultant that the greatest care would have to be taken when laying a pipeline across the sloping terrain on either side of the Etsho Escarpment, if subsequent erosion along the line were to be avoided. The consultant recommended that, in that area, revegetation by natural means should be augmented by artificial means, such as hand planting of willows and alders, immediately after laying the pipe.

The consultant stated that problems with restabilization of the landscape were not formidable, and that they might become serious only in limited areas of sloped terrain.

With respect to permafrost conditions, the proposed pipeline's southern terminus at Fort Nelson is in a zone of sporadic permafrost and the northern terminus lies within the discontinuous permafrost zone. In the southwest, the ground ice deposits described are about 20 inches thick; northeast of the escarpment, the thickness increases to 40 inches and ranges up to 60 inches at the extreme northeast end of the route.

It was stated that, in the southern part of the route, it would be possible to excavate the ground ice since the pipeline trench would be deeper than the ground ice; however, in the northeast, the trench and hence the pipe would sit on ground ice.

According to Westcoast's consultant, a warm gas pipeline would be expected to produce minor subsidence in most permafrost areas directly over the refilled pipeline trenches. However, the experience of the Beaver River line suggested to the consultant that proper measures could be taken to limit subsidence to the

formation of a shallow furrow, which should eventually be hidden by natural revegetation.

In some local areas on the northeast part of the route where greater subsidence could be expected, it might be necessary to bring in fill in order to create a higher berm over the pipeline. It was the consultant's conclusion that the permafrost found along the proposed route should not present serious problems if his recommendations were followed.

The surficial deposits for each of the nineteen proposed loops in British Columbia, described in the consultant's report, were tills, outwash sand and gravels, lacustrine deposits and recent alluvium. Any permafrost present would be sporadic and would occur only in the organic terrain in two of the northern loops (numbers 1 and 2) near Fort Nelson.

The stability of the slopes was assessed in the consultant's environmental report, and it was concluded that in most parts of the route there would be only minor erosion problems. Two exceptions to this general finding would occur with respect to loops 2 and 17 where erosion problems would require appropriate mitigative measures.

The consultant's report stated that for loop 2 (milepost 54.8 to 70.6) erosion related problems were identified at Trutch Creek where the south bank showed signs of active erosion by undercutting of the bank. It was recommended that the proposed pipeline loop should be buried to a sufficient depth so that the pipe would not be exposed by stream erosion. Signs of downcutting were detected on two other small stream crossings,

where remedial measures, such as the installation of berms, and revegetation, would be required.

The other erosion problem that was identified in the consultant's report was with respect to loop 17 at the Coquihalla River; there, the three crossings of the river could expose the pipeline by meander migration and/or by downcutting at milepost locations 580.4, 584.4 and 584.9. The consultant recommended that the pipeline should be buried more deeply at these locations.

With respect to river crossings, Westcoast stated that it would have to co-ordinate its efforts with the provincial, federal and international fisheries agencies. These agencies would determine when the rivers should be crossed; they could suggest possible relocations of the pipeline; they would be involved in any works on the banks of the river; and their approval should be obtained as to the kind and manner of placing of rip-rapping.

Agricultural activities occur in some of the areas of the looping program in the southern end of the proposed route (loops 18 and 19), especially around Chilliwack where there was intensive crop production. The consultant recommended autumn construction in order to minimize conflict with agricultural activities in those areas.

Land Use

The Land Use section of Westcoast's environmental impact assessment report for the Territories extension contained a description of the existing land use patterns over the pipeline study area. Land use activities are limited to gas exploration

and construction, logging, trapping and some hunting. The evidence showed that there were no nature conservation areas within the study area. The nearest proposed ecological reserve that was mentioned in the report was ten miles north of Fort Nelson on the west side of the Fort Nelson River and the nearest existing reserve was at Parker Lake, west of Fort Nelson. The consultant for Westcoast stated that extreme cold in winter, as well as muskeg, and flies in summer, limited the recreational capability of the region.

Westcoast's consultant submitted in evidence that the proposed pipeline crossed a limited amount of the class 3 agricultural land associated with the well-drained terrain just east of the Fort Nelson River.

It was the opinion of Westcoast's consultant that land use patterns would not be greatly changed by the proposed Territories extension and that the area would continue to remain unattractive for recreational pursuits.

The proposed mainline loops, as described by the environmental consultant, would not cross any government or private parks, reserves or recreational facilities. The consultant said that sites for future development had been designated at the proposed locations for four of the loops, and that no plans existed for these sites to be developed before or during construction of the loops. No land use conflicts were anticipated between the period of the proposed construction of the loops and that of the development of parks and recreational areas.

The consultant stated that two of the proposed loops would traverse land under intensive crop production and that there was some limited cultivation on three of the other proposed loops. Eight proposed loops would cross terrain currently being used as rangeland. No conflict was anticipated between the proposed construction of the loop and agricultural activities. For the two proposed loops, where there would be intensive crop production, the consultant recommended that construction be scheduled when fields would not be in crop, thereby lessening the impact of the proposed pipeline construction on agricultural activity.

Wildlife

The wildlife section of the environmental impact statement pertaining to the proposed Territories extension contained a description of the wildlife species known to inhabit the pipeline study area, and of the preferred wildlife habitats. The consultant for Westcoast pointed out that data on wildlife were limited.

Aerial surveys by the consultant had yielded data on moose and caribou and the numbers and location of beaver lodges. Westcoast's consultant observed that there was no area of critical habitat for either moose or caribou in the study area. The densities of both ungulate species were relatively low and the animals were widespread with no areas of significant concentrations. Westcoast's environmental consultant testified that the impact of winter construction upon the moose and caribou populations would be negligible even where the proposed mainline extension would cross areas of their winter range. The reasons for this were that the ungulate populations were small, their

winter range was large and there would be no restrictions to ungulate movement.

The results of the aerial surveys of the consultant suggested to him that the proposed pipeline route missed much of the prime beaver habitat in the study area.

Westcoast's consultant stated in evidence that information on the bird species, which would be present in the study area, was also limited and was restricted to summer observation. Waterfowl were expected to utilize only the larger lakes in the study area. The presence of any bird species on the endangered list remained to be investigated. The consultant's opinion was that winter construction would have a minimal impact upon such birds since they leave the area each fall.

Of the fish species identified by Westcoast's consultant to be in the study area along the proposed mainline extension, only the mountain whitefish would be active during the winter. The report stated that information on the locations of fish overwintering areas was non-existent. Westcoast's consultant testified that while there might be some movement of mountain whitefish past the stream crossing sites on the Petitot River and Thettlaandoa Creek, the disruption to whitefish would be minimal providing construction across the streams was done quickly.

The environmental impact assessment for the proposed mainline looping program contained a description of the existing wildlife setting along each of the proposed pipeline loops.

The evidence indicated that good-to-excellent ungulate winter range would be crossed by six of the proposed pipeline loops. The consultant for Westcoast recommended that, if construction of

the proposed loops occurred in the winter, harassment of overwintering wildlife should be prevented.

The Applicant's environmental evidence showed that the nesting habitat of waterfowl was insignificant throughout the area traversed by the proposed pipeline loops.

The two proposed pipeline loops which traversed the Fraser River Delta had a moderately high capability as stopover or overwintering areas for waterfowl and bald eagles. Under cross-examination, Westcoast's consultant stated that, since the proposed loops were in the middle of the well-developed mainland of the Fraser River, construction of the proposed pipeline loops would not significantly affect the bird species.

Fish habitat was described by the consultant as varying from marginal to very good for the spring spawning fish species, namely Arctic grayling and rainbow trout, or for the fall spawning fish species, namely Dolly Varden and mountain whitefish, in streams crossed by nine of the proposed pipeline loops. The consultant recommended that pipeline construction should occur during periods of low water flow, namely from late summer to March, in order to minimize adverse effects of siltation on the fishes during construction. It was pointed out in Westcoast's consultant's report that three streams, the Nicola River, Guichon Creek and the Coquihalla River, were under management by federal, provincial and international agencies. During cross-examination, Westcoast stated that it had designed the proposed pipeline crossings of the streams, but construction schedules and mitigative measures would be approved by the various fisheries regulatory agencies. During further cross-

examination, Westcoast's consultant said that the schedule and mitigative measures at the proposed pipeline crossings of the backwaters of the Fraser River in the Fraser River delta area would have to be approved by the Federal Fisheries and Marine Service prior to construction.

Vegetation

The environmental consultant described in the evidence the types of forest cover through which the route of the Territories extension would pass. The forest cover types were said to be typical of the boreal white and black spruce biogeoclimatic zone.

Westcoast's consultant recommended that revegetation should be left to natural means, and that artificial revegetation should be practised only if required to inhibit erosion that standard practices would fail to control. The consultant included in his report the procedures and requirements for artificial revegetation in relation to the seed mixture, the rate of seeding, the method of applying the seed and fertilizer, and the schedule.

Westcoast stated that, due to the very flat nature of the terrain and the lack of slumping and erosion, it did not anticipate it would be necessary to artificially revegetate any of the proposed pipeline route. However, under cross-examination, the consultant said that slopes susceptible to erosion would be revegetated if during the first spring runoff an assessment of the mechanical control of erosion showed the need.

With respect to the mainline looping program, Westcoast stated that its criterion for the use of artificial revegetation was to employ the practice where natural revegetation was

insufficient or too slow for the control of surface erosion. It was generally expected that artificial revegetation would be required on severe slopes to assist other erosion control methods, such as water breakers, sand bags and other means, in the control of soil stability.

In the written evidence Westcoast observed that it had successfully revegetated portions of its existing pipeline system where the seeding and fertilizing operation was performed as part of winter work or as part of a normal summer or fall construction and maintenance program. In addition, Westcoast's consultant presented lists of the species of shrubs and herbs growing at field-check locations on the existing pipeline at locations of the proposed loops.

The consultant recommended, as a standard procedure for the looping program, that revegetation should be left to natural means unless it was required to control erosion at which time artificial seeding and/or fertilization would be undertaken, and that revegetation would also be done at the request of the landowner or controlling government authority. Artificial revegetation was recommended at four specific locations along loop 2.

For artificial revegetation, the consultant recommended two mixtures of seeds of agronomic species, one for the dry areas to be applied at the rate of eight to ten pounds per acre, and another for the wet areas to be applied at the rate of 15 to 20 pounds per acre. Seeding would take place in the autumn up to the first snowfall, to ensure that germination would occur in the spring. Fertilizers would be used only if required in the

spring, with application rates of 500 pounds of one type of fertilizer per acre on dry sites and 200 pounds of another type of fertilizer per acre on wet sites.

Water Supplies, Pollution, Toxic Materials

Upon cross-examination, Westcoast stated that it did not expect that the construction of the pipeline crossing of the Nelson River, on the Territories extension, would have any effect on the use of river water by the residents of the Fort Nelson Indian Reserve Number 2. Westcoast also stated that all sewage facilities for the Territories extension and the mainline looping program would meet the requirements of the British Columbia Pollution Control Board and of the British Columbia Pollution Control Act. Lagoons had been used for previous construction camps and septic tanks with leaching fields had been used at compressor stations except at one station where a sewage treatment plant had been installed. The existing environmental section of Westcoast's current pipeline construction specifications was submitted to the Board. These specifications defined the contractor's responsibilities for pollution control which would be part of the contract documents for both the Territories extension and the mainline looping.

Archaeology

Westcoast mentioned that the probability of encountering archaeological and prehistoric sites along the route of the Territories extension was low and that, if any such sites were found, the impact of construction on them would be minimal. The value of any potential sites identified would be assessed prior to construction.

Westcoast provided evidence on the location and significance of archaeological and prehistoric sites along the proposed mainline loops. It was stated that the overall archaeological potential of the area was low, but that some specific locations were assessed as having a high potential. In areas having high archaeological potential, care would be exercised during construction. At Seabird Island, milepost 613.9 - 620.0, the proposed pipeline loop would be located on an Indian Reserve and the local Indian Band Council and the Minister of Indian and Northern Affairs should be consulted when dealing with prehistoric sites.

At loop 19 (Chilliwack milepost 621.1 - 628.3), a large number of known archaeological sites have been identified adjacent to the proposed loop. A site designated by the Archaeological Sites Advisory Board of British Columbia is located close to the proposed right-of-way at Smithvale. It was, therefore, recommended by Westcoast that construction should be undertaken cautiously in this area.

6.2.2.2 Environmental Inspection and Supervision

Program Organization

Westcoast stated in evidence that it was co-operating with the Special Services Division of the British Columbia Department of Lands, Forests and Water, and with the Environmental Protection Service of Environment Canada with respect to both the Territories extension and the mainline looping.

Environmental Emergencies

Contractors would meet the requirements of the British Columbia Forest Service with respect to equipment and personnel for fire suppression.

Post-Construction Monitoring and Surveillance

It was stated in evidence that, during operation, Westcoast would monitor the effects of the Territories extension and the mainline looping on the environment by routine aerial and ground reconnaissance, and that particular attention would be given to erosion at stream and river crossings, especially after each annual freshet. Westcoast's environmental consultant recommended remote sensing by infrared photography to monitor the progress of revegetation.

6.2.2.3 Views of the Board

The environmental report contains an adequate description of the environmental setting for the Territories extension and the measures to protect and restore the environment during construction and operation of the pipeline.

The Board notes Westcoast's efforts to consider relevant environmental factors in selecting the proposed route. The Board accepts Westcoast's undertaking that it would subject the construction of the proposed Territories extension to the constraints and contingency plans presented to the Board in the environmental section of its filed typical contract documents, and that it would include these constraints and plans in its construction specifications contract with its contractors.

The Board is cognizant of the Applicant's experience in constructing and operating pipelines in this area of northern

British Columbia, which fringes on the discontinuous permafrost zone, and of the Applicant's experience in mitigating the effects of thermal degradation of these shallow ground ice deposits.

Should a certificate be granted to Westcoast, the Board would require the Applicant to apply all those procedures that it has developed so far to control the effects of thermal erosion and to implement the recommendations of its consultant for the protection of the terrain from thermal erosion. The Board would also require that the Applicant implement its consultant's recommendations for the protection of the terrain from water erosion on slopes, including the mechanical and the vegetative means of erosion control.

With respect to the evidence concerning environmental impact on mammals, birds and fish, the Board accepts the consultant's conditional views that the location of the route and the construction of the pipeline extension would have minimal effects, provided that Westcoast implements its consultant's recommendations for mitigative measures in addition to the environmental protection requirements that would be included in the construction specifications contract.

With respect to the proposed mainline looping program, the Board considers that the assessment of the environmental impact is satisfactory. The Board accepts Westcoast's undertaking to follow its consultant's recommendations for environmental protection made specifically for each loop. The Board would require Westcoast, as a condition of a certificate, to implement these recommendations.

With respect to potential erosion problems at the mainline loops 5 and 17, it is the opinion of the Board that further studies should be undertaken during final design, in order to determine the depth at which the pipeline should be buried and to design the remedial measures that would have to be implemented on the slopes to control erosion.

The Board notes that the Applicant's current procedures manual specifies that the topsoil should be removed and kept separate from the sub-soil, and that it should be returned to its original state during the clean-up operation. If a certificate is issued for the looping program, the Board would require that the Applicant confirm with each owner or tenant the manner and timing of separating and restoring the topsoil on agricultural lands. The Board would require further that the Applicant confirm with each landowner or tenant the specific measures required to restore the agricultural soils to full production.

With respect to construction activities at the crossing of the Nelson River, the Board notes that Westcoast expects that there would be no effect on the use of the river water by the residents of the Fort Nelson Indian Reserve Number 2. If a certificate is issued, the Board would require Westcoast to monitor the suspended sediments in the water downstream from the crossing to ensure that the water used by the residents of the Indian Reserve is not impaired.

The Board notes Westcoast's undertaking to co-ordinate its efforts with the provincial, federal and international fisheries agencies with respect to the schedule for construction activities and mitigative measures for protecting the fisheries at river

crossings in the looping program. If a certificate is issued for the looping program, the Board would require Westcoast to co-ordinate its construction activities with these agencies and to keep the Board informed of the results of its co-ordination with these agencies.

The Board notes Westcoast's evidence that the archaeological potential is low in the areas proposed for the looping and that Westcoast would exercise caution during construction. The Board would require, if a certificate is issued, that it should be conditioned to require Westcoast to implement its precautionary measures as submitted in evidence to protect archaeological sites.

With respect to the Territories extension and the mainline looping, the Board would require that Westcoast, as a condition of a certificate, submit for approval its plans for environmental inspection and supervision during construction and its plans for post-construction monitoring and surveillance of the effects of construction upon the environment.

6.2.3 TRUNK LINE (CANADA)

Trunk Line (Canada) proposed to construct an 81-mile pipeline, extending from approximately 7 miles north of the 60th parallel southeasterly to Zama Lake in northwestern Alberta.

The Applicant presented evidence on the environmental setting for the proposed route, the environmental impact of pipeline construction and operation in this region, and the measures to mitigate the environmental impact. The Applicant had modified its construction, operation and maintenance procedures to implement

the environmental and archaeological mitigative measures recommended by its consultants. The Applicant would also implement the consultant's recommendations that might be made during the construction and operation of the proposed pipeline.

The Applicant maintained that, if its consultant's recommendations were implemented, the proposed pipeline could be constructed and operated without any significant environmental effects.

6.2.3.1 Environmental Impact and Mitigative Measures

Terrain

The Applicant provided maps of the route showing the various terrain types, and the Applicant's consultant carried out studies to define the boundaries and the extent of the permafrost areas along the route.

Since regional and local slopes along the pipeline route were very gentle, slope instability and solifluction movements would not be expected to occur. The area was described as poorly drained and covered with a thick organic layer, and having a varied tree cover. River bottom scour was expected to be slight or insignificant. During and after construction, river channels would not be restricted in a manner which would cause bottom scour in the vicinity of the pipeline crossing. The granular material removed from the river bed would be replaced after laying the pipe. The hydrologic problems would be minimal and the standard pipeline construction techniques would not appreciably affect the ground and surface water flows. The scheduling of

construction of the river crossings would be such that disruptions to fish would be minimal.

Permafrost areas extended over approximately the northern 50 miles of the pipeline route. The Applicant's consultant estimated that in excess of 50 per cent, and perhaps up to 60 per cent, of the route would be underlain by permafrost, and that the permafrost thickness was estimated to vary from less than one foot to 40 feet. The most critical section of the route would be a 22-mile segment north of the Petitot River, which was underlain by extensive peat in association with permafrost. Significant subsidence could occur in this area if the permafrost were to degrade.

Significant thaw ponding would not develop because much of the excess moisture from the permafrost thaw process would be confined to the organic mat cover. Where existing drainage paths would be crossed, flow breaker berms and ditch checks would be provided to maintain drainage courses and to prevent water flow along the pipeline right-of-way for extensive distances.

Based on the observations of Westcoast's pipeline construction and operation in areas of discontinuous permafrost in northeastern British Columbia, the Applicant would not expect adverse environmental effects to result from its proposed pipeline construction and operation.

Land Use

The area to be traversed by the proposed pipeline was described as wilderness. No public recreation areas were established in the vicinity of the proposed pipeline.

Wildlife

Thirty-eight species of mammals had been recorded in the Alberta boreal forest region, including moose and woodland caribou, sixteen furbearers of commercial value and twenty species of small mammals such as rodents, bats and shrews. Clearing of the piepline right-of-way would have little negative impact on the moose and woodland caribou as the ranges of these ungulates were large enough to allow the animals to avoid construction activity.

Trunk Line (Canada)'s consultant testified that the timing of construction of the proposed pipeline would not interfere with the use of the habitat by woodland caribou. Clearing and construction of the proposed pipeline would be completed by 1 April, thereby avoiding the moose calving period which normally occurred in May.

Measures to protect populations of bald eagles, golden eagles, osprey, and perigrine falcons would include two basic procedures. First, construction would be carried out between late fall and the end of April to eliminate all disturbances to these birds. Second, avoidance of known raptor nesting sites on the right-of-way would minimize any decrease in the number of nesting birds. Data on the general distribution of raptors were available, but precise information on nesting birds was unknown. The Applicant would collect data on nesting birds in order to schedule pipeline operation procedures so as to reduce disturbance to the birds.

Waterfowl breeding habitat was of low quality along the proposed pipeline route in the boreal forest region, relative to

other ecological regions, and any disturbance associated with pipeline construction would have minimal effects on waterfowl populations.

Environmental concerns with regard to fish were: possible increase in silt load to water bodies, removal of river substrate, stream blockage and accidental spills of hazardous liquids. To ensure minimal impact on the aquatic fauna, Trunk Line (Canada) proposed the following measures:

winter construction of river crossings during periods of low water flow in order to reduce the volume and distribution of silt;

restoration, revegetationa and stabilization of the slopes to control erosion;

maintenance of buffer zones of undisturbed vegetation between the right-of-way and parallel waterways to prevent siltation and accidentally spilled materials reaching waterways;

utilization of backfill similar to the river substrate in order to return the river bottom to its natural condition;

completion of river crossings and restoration of natural drainage prior to the initiation of spring spawning migrations of fish;

storage of fuels and chemicals so as to prevent any accidental spill from entering water bodies;

refueling of machinery away from watercourses; and

treatment of all domestic sewage to prevent pollution of surrounding waters.

Vegetation

The proposed right-of-way would traverse lowland and upland boreal forest communities, including muskeg.

With regard to potential impact of forest fires, the close proximity of Trunk Line's district office at High Level, Alberta, the availability of its communication system, earthmoving and firefighting equipment, and of its personnel trained in firefighting would enable Trunk Line (Canada), in conjunction with the Alberta Forestry Service, to deal with any fires quickly and effectively.

Trunk Line (Canada) proposed to leave all disturbed areas in a stabilized condition by means of revegetation, seeding, planting or mulching, or by other physical techniques. Seeding and fertilizing of all affected areas, where the natural revegetation process would be considered insufficient, would be implemented in the first spring following construction. Borrow pits, which would have no further use after construction, would be graded, contoured and seeded.

Native and agronomic grasses would be used for the revegetation program, by aerial seeding operations. Revegetation of Crown land would be carried out according to the specifications of the Alberta Department of Lands and Forests.

Trunk Line (Canada)'s witness stated that a revegetation study of three years' duration was commissioned early in 1976 to determine the optimum right-of-way reclamation procedures in the discontinuous permafrost zones, and on potentially erodible slopes. The benefits of this research would be available during construction and operation of the proposed pipeline.

In forested areas, vegetation on the pipeline right-of-way would be maintained at the grass, herb and shrub level by either mulching or using 2,4-D foliar spray.

Water Supplies, Pollution, Toxic Materials

With respect to waste disposal, Trunk Line (Canada) would use established methods and would comply with the Alberta standards for sewage effluents and receiving water quality, so as not to contribute to water pollution. Machinery would be fueled, and fuels and chemicals stored, so as to prevent any spillage from entering any water course.

Archaeology

Evidence was provided on the environmental setting, on environmental concerns and on mitigative measures with respect to archaeological resources along the proposed pipeline right-of-way.

The Applicant's archaeological assessment of the proposed pipeline route indicated that the archaeological potential along the route was generally low, but some areas of limited archaeological significance would be intersected during construction. Burial sites would be of interest to both archaeologists and natives, and advice would be solicited from relevant native organizations concerning the reburial or disposition of any human remains uncovered.

A five-phase program of archaeological reconnaissance, evaluations and excavation had been developed by the Applicant to meet any contingencies during pipeline development. The program would consist of ground reconnaissance and inventory, site evaluation, pre-construction salvage excavation, surveillance during pipeline construction, and post-construction excavation.

The program would be carried out in co-operation with the Archaeological Survey of Alberta.

With respect to the identification of areas of potential archaeological significance, an aerial reconnaissance of the proposed pipeline route had been done, but no ground surveys had been carried out. The Applicant would prepare guidelines for further investigations at archaeological sites that might be identified prior to and during construction, and for post-construction excavation. Trunk Line (Canada) would have an archaeological study prepared during the final design stage of the project. The right-of-way would be cleared before a complete ground reconaissance was conducted, and sensitive archaeological sites would be examined prior to finalization of the pipeline alignment. Some flexibility in the alignment would be maintained so that any necessary deviations of the alignment to avoid areas of archaeological significance could be made during construction.

Procedures to reduce the impact of construction on archaeologically sensitive areas would be developed by the archaeological personnel working in co-operation with the construction personnel. Project personnel would receive archaeological training, concerning the nature and value of archaeological materials, and on legislation governing such mattters. The project engineer would be responsible for enforcing control measures respecting archaeological sites during construction.

The pipeline ditch and its sidewalls, and the excavated soil piles would be inspected during construction by a professional archaeologist for evidence of any archaeological or

palaeontological materials. The findings of these investigations would be recorded and sites of archaeological interest located and marked. If the materials uncovered during ditching required excavation operations, the areas would be marked for further work to be done after the completion of construction.

6.2.3.2 Environmental Inspection and Supervision

Trunk Line would maintain control over construction on behalf of the Applicant and the environmental concerns would be monitored. Trunk Line would apply its existing contingency plans with respect to oil spills and forest fires.

Regular inspection of the right-of-way would be conducted following construction, to detect soil movement, gullying and ponding; Trunk Line would undertake this inspection on behalf of the Applicant. There would be monthly line patrols by fixed-wing aircraft, or by helicopter when terrain conditions would require ground inspections.

6.2.3.3 Views of the Board

The Board accepts the Applicant's undertaking to implement during construction and operation, the environmental mitigative measures recommended by its consultant. The Board would condition a certificate to require the Applicant to implement this undertaking. The Board would also condition a certificate to require the Applicant to implement the environmental protection measures as submitted in the evidence.

The Board agrees that the environmental protection related knowledge and experience gained by Westcoast from building and

operating gas pipelines in northeastern British Columbia would be useful. However, in light of the fact that the proposed route of the Applicant would traverse a different physiographic region, namely the Alberta Plateau, the Board's opinion is that the potential problem of thaw settlement in the peat mounds of the Alberta Plateau should be evaluated further by the Applicant. Accordingly, the Board would condition a certificate to require the Applicant to study more thoroughly the potential problem of thaw settlement and to develop appropriate measures to protect the terrain from possible thaw settlement resulting from pipeline construction, and to submit, for Board approval, the results of the study, including the measures the Applicant would use for protecting the terrain.

With respect to the rare and endangered raptor species, the Board would require the Applicant, as a condition of a certificate, to implement, prior to construction, its consultant's recommendation to identify the location of the nesting sites, and to demonstrate to the Board that such sites would be protected from any disturbances resulting from construction and operation activities.

The Board notes that the Applicant would monitor the environmental effects of the pipeline during construction. The Board would condition a certificate to require the Applicant to implement an environmental inspection and supervision program during construction, and to submit, for Board approval, prior to commencement of construction, the Applicant's plans and procedures for implementing this program.

The Board also notes that the Applicant intends to inspect regularly the right-of-way after construction. The Board agrees that the environmental effects of the construction and operation of the proposed facilities should be monitored. Accordingly, the board would condition a certificate to require the Applicant to monitor, after construction, the environmental effects resulting from the construction of the proposed pipeline, to submit for Board approval, prior to making application for leave to open, its plans and procedures for carrying out such a monitoring program, and to submit to the Board the results of such monitoring. The Board would also require the Applicant, as a certificate condition, to monitor the environmental effects of the pipeline operation periodically, and to submit annually the results of such monitoring.

6.3 FOOTHILLS (YUKON) PROJECT

6.3.1 FOOTHILLS (YUKON)

The Foothills (Yukon) proposal was in two parts. One part was for a 512-mile long, 48-inch diameter pipeline in the southern Yukon Territory. The other part was for a 160-mile long, 42-inch diameter pipeline in southern Saskatchewan.

The pipeline would enter the Yukon Territory from Alaska and the route would generally parallel the Alaska Highway in a southeasterly direction to Whitehorse. From there the route would proceed in an easterly direction to a point on the southern boundary of the Yukon Territory near Watson Lake. Seven compressor stations were proposed to operate the pipeline at full capacity.

In southern Saskatchewan, the pipeline would enter the province on the western border near Burstall and would proceed southeastward to the international boundary near Monchy. Two compressor stations were proposed along this portion of the route.

The Applicant submitted an environmental statement and an environmental atlas. The environmental statement was regarded as the Applicant's initial conclusions. The Applicant's environmental review process would proceed through to the final design and implementation phases of the pipeline.

The environmental statement served to identify the environmental concerns pertinent to the project, to develop the protection measures to mitigate environmental impact, and to determine deficiencies in the available information. The Applicant stated that further work would have to be done. Field

programs would be conducted by its consultants to further substantiate or update the environmental statement and to develop the environmental protection measures necessary for mitigating the impact of the project.

The Applicant concluded that the potential environmental impact along the Saskatchewan part of the route would not be serious; however, in the Yukon part of the route, it would be significant due to the present development and the overall sensitivity of the physical environment in the project area.

Environmental criteria would be considered in the design of the pipeline in order to minimize any alterations to the environment, and where practicable, the land would be returned to its original state. The Applicant would comply with applicable environmental regulations of government.

6.3.1.1 Environmental Impact and Mitigative Measures

Terrain

The Applicant described the terrain encountered along the proposed pipeline route and provided alignment sheets showing the distribution of these units. The Applicant provided supplementary reports on its geological drilling program, and its river crossing studies in the Yukon portion of the proposed route.

The Applicant's consultant stated that the potentially sensitive terrain was identified by flying over the route; it was then assessed by a geological drilling program. In general, the terrain to be traversed by the proposed pipeline route and the

adjacent Alaska Highway would offer good ground conditions for summer construction and year-round access.

The Applicant concluded that the most sensitive terrain was in the northern portion of the Yukon between mileposts 0 and 100. Along this portion of the pipeline, the surficial soils were mainly peat and highly erodible volcanic ash, fine sands and silts. Permafrost was discontinuous but widespread with some permanently frozen soils containing massive ice inclusions.

The construction of the proposed pipeline would raise concerns of possible disturbance to the terrain and the associated hydrologic regime, such as slope instability, drainage disruption, erosion and siltation.

Creep could occur on steep mountain slopes of colluvium, talus or granular debris. Soil slopes would also be a concern, especially on steeper slopes of fine grained materials comprised predominantly of silt or clay.

A potential threat of landslides would exist on mountain slopes adjacent to Kluane Lake, especially between mileposts 140 and 145. Landslide debris was evident at milepost 143 along the slopes of Mount Wallace. Other areas where the right-of-way would be confined by topography and where mass movement phenomena might pose a threat to the environment included the Boundary Ranges of the Coast Mountains, the Cassiar Mountains and along the east side of Teslin Lake.

The Applicant identified six locations along the Yukon portion of the route where extensive side hill cuts and fills, rock excavations, blasting and slope grading would be required.

Terrain instability problems would be minimized by judicious routing, but some potentially hazardous areas would be unavoidable. In such areas, slope stability would be improved by using toe berms and granular blankets, by installing internal drainage measures such as drain wells or drainage ditches to reduce pore pressure, or by deeper burial of the pipe.

The Applicant acknowledged that there was concern that slope stability problems could be aggravated by seismic activity along the pipeline route in the Yukon section. Major earthquake epicentres had been recorded about 100 miles south of the proposed right-of-way. A major fault zone occurred in the Shakwak Trench along the proposed route between mileposts 44 and 185.

Severe seismic vibrations or actual fault movements could trigger landslides in areas having a low margin of safety under static loading conditions. The potential for liquefaction could exist in unfrozen, loose, saturated fine sands and silts which might be found in the unfrozen deposits of the Shakwak, Dezadeash and Takhini Valleys.

In developing the parameters for design, the Applicant's consultant reviewed the seismic activity in the Yukon portion of the pipeline and had adopted earthquake parameters representative of the extreme conditions of acceleration and velocity.

In the final design of the pipeline alignment, consideration would be given to avoiding slopes that could be unstable during seismic activity, and areas of recognized instability. Where such avoidance would not be feasible, stability analysis would

include an allowance for seismic factors so that proper design for slopes, and cut and fill embankments could be developed.

Foothills (Yukon)'s consultant acknowledged that further work relating to potential seismic effects would have to be done in order to prepare sufficiently precise and reliable long-term stability parameters for final design.

Flooding due to summer storms in some of the steeper gradient streams and rivers was a concern with respect to instability of adjacent river channels and embankments. The consultant's hydraulic studies of the White and Donjek Rivers included the development of acceptable design procedures and protection measures against river scour. These two rivers were of the most concern hydraulically, and the remaining rivers situated along the route would be of less concern and could be left for the final design phase.

Undercutting and slumping of the river embankments would be combatted with the use of rip-rap protection. This procedure had been followed on highway crossings of the White and Donjek Rivers and it had been quite successful in controlling the eroding of abutments and the flow of the river.

Foothills (Yukon) stated that, since it would have all-weather access to the river crossing areas, there would be considerable flexibility in the timing of construction activities at river crossings. This flexibility would permit environmental concerns to be taken into consideration, and high water periods to be avoided.

Sufficient data would be collected during the design phase to permit the prediction of river behaviour and the effects of

rivers on the stability of the banks at the locations of the pipeline crossings.

Natural drainage patterns would be altered by the construction of the proposed pipeline facilities. A frost bulb could develop around the chilled pipeline in unfrozen soils. Where the pipeline is not chilled in permafrost terrain, thawing of the ground ice could occur. Both of these effects would disrupt drainage and groundwater flow.

The Applicant stated that between the Alaska-Yukon border and at milepost 80, permafrost was widespread and the thermal regime of the ground was in a delicate equilibrium with the climate. East of milepost 80, permafrost was sporadic and more sparsely scattered towards the southeast.

The chilled portion of the proposed pipeline would extend from the Alaska-Yukon border southwards to the first compressor station, a distance of about 40 miles. In frost susceptible areas the pipe would be buried or insulated to retard the formation of frost bulb.

The Applicant stated that some thermal subsidence would occur along the pipeline route, and that the amount of subsidence had been identified in general terms in that portion south of the last point of cold flow. The Applicant's consultant said that if the magnitude of the subsidence were within the tolerable limits for pipe design, there would be no problems; if it were beyond those limits, he would recommend relocating the pipeline. Alternatively, if rerouting were not possible, the pipeline should be buried below materials prone to excessive thaw settlement.

In areas of sensitive permafrost terrain, construction of the pipeline would be carried out in the winter. Grading would be kept to a minimum and, where required, fills would be used in preference to cuts for attaining a level right-of-way.

On the right-of-way in non-permafrost areas, individual breaks in the pipeline mound would be provided at all creek crossings. Sheet flow would be intercepted and diverted into flat ditches or behind low mounds on the upslope side of a cut in highly erodible soils. Drainage parallel to the right-of-way would be controlled by ditches which would be directed across the right-of-way at appropriate breaks.

Potential drainage disruption from road construction would be minimized by using the Alaska Highway as the major access route. Short haul roads from the highway to the right-of-way would be built at selected locations where drainage impedance would not occur.

The Applicant stated that some drainage controls might be required in some of the steeper valleys in the Saskatchewan portion of the proposed pipeline route.

Potential erosion due to uncontrolled drainage was a concern in fine-grained soils, particularly on side hills, slope cut and in high-relief terrain. A thin veneer of easily erodible volcanic ash overlay the surficial soils in the first 200 miles of the Yukon portion of the route. However, much of the surficial soils on slopes along the route was granular and not highly erodible.

The detailed location of the pipeline route would be selected to minimize the extent of cross-slopes that might have a

potential for erosion. Final selection of the appropriate measures for erosion control would be done on a site-specific basis; they could include specially constructed channels with drop structures where large flows and steep gradients would be present.

There could be problems of wind erosion in the Sand Hills area of Saskatchewan between mileposts 40 and 75. This area would be avoided where possible during final alignment; and when it was not possible, rehabilitation and revegetation would be carried out as necessary.

Foothills (Yukon) stated that no long-term impact of pipeline construction or operation on water quality was expected in the Yukon Territory or in Saskatchewan. Measures for erosion control would be employed during construction. Upon completion of construction, damaged areas would be revegetated. The effectiveness of erosion control procedures would be monitored through periodic surveillance during the construction and operational stages. Remedial measures would be taken where problems were encountered.

Foothills (Yukon) stated that the distribution of borrow supplies was quite even throughout the route. There would be virtually no need to open new borrow pits since there were already a number of pits opened for other purposes along the route and the amount of borrow material available was expected to be sufficient. Since only the existing borrow pits and haul roads would be used, there would be no need to build new roads to these pits. There would be no necessity to remove borrow material from active flood plains.

Foothills (Yukon)'s consultant stated that protection measures against siltation from some borrow pits might be necessary, and that they would include the use of containment dykes, siltation ponds and placement of waste materials at suitably shallow slope angles in order to ensure stability.

Land Use

Foothills (Yukon) submitted a description of the boundaries of the Kluane National Park, the Kluane Game Sanctuary and the proposed International Biological Program sites which are adjacent to the Alaska Highway. The proposed pipeline route parallels the boundary of the Kluane National Park from milepost 135.6 to milepost 149. From mileposts 90 to 105, 111 to 122 and 150 to 168, the proposed pipeline route traverses the northern edge of the Game Sanctuary.

The Applicant was seeking an exact survey of the park boundary and would establish the final right-of-way location so as to minimize crossings of the boundary.

Foothills (Yukon) would discuss with appropriate government authorities the environmental aspects of the areas where the proposed pipeline would cross the boundary of Kluane National Park.

The proposed pipeline is immediately adjacent to five of the proposed International Biological Program sites. Site-specific surveys would be conducted to assess potential environmental disruption to these sites. The proposed pipeline alignment would be refined to avoid the International Biological Program sites if necessary.

The major portion of the proposed pipeline would traverse uninhabited Crown land in the Yukon Territory and productive wheat fields and grassland in Saskatchewan. In the Yukon, from milepost 178 to 260, the proposed pipeline would traverse much of Yukon's limited agriculturally suitable land situated in the Dezadeash and Takhini River valleys. In these valleys the proposed pipeline would cross two agricultural reserves currently used for grazing, one northwest of Haines Junction between mileposts 178 and 183, the second north of Champagne between mileposts 217 and 227. There are also numerous grazing leases along the Alaska Highway from Haines Junction at milepost 185 to Takhini Hotsprings, north of milepost 255 as well as large grazing leases of the Department of Indian Affairs and Northern Development on either side of the Alaska Highway at Morley Bay at milepost 375.

The evidence showed that in Saskatchewan, for approximately two-thirds of its length, the proposed pipeline would pass through primarily wheat-producing farm land. The impact of the proposed pipeline would be a one-season disruption of crop production and related normal agricultural operations, and disruption of cattle grazing patterns.

Disturbed productive topsoil in significant agricultural areas would be carefully stockpiled and replaced, and agricultural areas would be restored in consultation with individual landowners. Cattle grazing operations would be protected by fencing, and the cattle would not be allowed to wander from their designated ranges.

Wildlife

The environmental statement described the four main wildlife habitat types found along the Yukon portion of the proposed pipeline route, namely muskeg and wetlands, riparian communities, upland forest and subalpine forest. The mammalian species of major economic or aesthetic importance were identified as mountain sheep, woodland caribou, moose, grizzly bear and aquatic furbearers.

Among the ungulates, mountain sheep were considered to be the most sensitive to disturbance. Two species of mountain sheep, namely the Thinhorn Mountain Sheep and Dall's Sheep, occupied a range along the proposed pipeline route. The proposed pipeline route would traverse the Thinhorn Mountain Sheep range at Mount Wallace, milepost 140, which provided winter habitat from September to May and lambing area from mid-May to early June. Construction of the pipeline in the immediate area of Mount Wallace would take place from mid-June to mid-September in order to minimize any long-term impact on the sheep.

The Ibex River valley and Haekel Hill were identified as excellent year-round Dall's sheep habitats. The construction and operation of the pipeline might interfere with the movements of the Dall's sheep population between seasonal ranges, and might displace them from their natural habitats. An alternative route was being considered for the portion of the proposed pipeline through the Ibex River valley from milepost 237 to 290. If the original, proposed pipeline route were retained, construction activities would be limited to the summer season when movements of Dall's sheep were less likely to occur. The necessary

protection measures would be applied to minimize the potential impact of the compressor station on the Dall's sheep population.

The evidence showed that woodland caribou were heavily dependent upon arboreal lichens in coniferous forests and this would be an important factor in their choice of winter range. An extensive overwintering area for woodland caribou was reported to be the Mount Michie - Squanga Lake area, and the proposed pipeline route from milepost 312 to 320 would traverse this area. Foothills (Yukon) had recognized that there would be some potential impact on woodland caribou and other wildlife in the Mount Michie Squanga Lake area. The Applicant had not determined whether the relocation of the right-of-way was the only feasible alternative to mitigate the impact. In order to minimize the impact on woodland caribou herds, pipeline construction in this area would be carried out in the summer and clearing of the coniferous forest would be kept to a minimum.

Foothills (Yukon) stated that moose were relatively insensitive to environmental disturbance as they were basically solitary ungulates having no traditional group calving areas or migration routes, and as they were flexible in habitat requirements and behaviour.

The proposed pipeline route would pass through at least one wolf denning area in the glacial deposits near Squanga Lake and the possibility existed that other denning wildlife, such as grizzly and black bears, and foxes, could be affected. Destruction or disturbance of den sites by pipeline activity could result in the abandonment of the dens or of the young in them, thereby affecting the reproductive potential of the

species. Foothills (Yukon) would carry out more detailed investigations along the proposed right-of-way, access road locations, and at potential borrow sites to determine whether den sites were located in these areas and if so, to assess the impact of the pipeline on them. Prime denning areas would be avoided where possible. Where it is not possible to avoid prime denning areas, site-specific plans to minimize impact on denning sites would be made.

Most water bodies along the proposed pipeline route support beaver and muskrat populations. Alteration of stream and subsurface drainage near wetlands, increased siltation, and alteration of aquatic plant communities by pipeline activities would result in displacement of aquatic furbearers. Foothills (Yukon) would maintain surface and subsurface drainage patterns in as near normal conditions as possible through the use of select granular material and berm breaks where applicable. Siltation of wetlands would be minimized through the use of erosion control procedures and applicable restoration measures. Regular monitoring of the right-of-way to detect potential drainage, siltation and aquatic biological problems, and intensive restoration measures in problem areas would be implemented.

Foothills (Yukon) identified the Sand Hills, valley complexes and rangeland as three habitat types of particular importance to ungulates in the Saskatchewan segment of the proposed pipeline route. To protect the wildlife habitats in the Sand Hills area, Foothills (Yukon) would consider alternate routing in the vicinity of Bigstick and Crane Lakes; however, if the present

routing were to be maintained, special measures for protection of this habitat complex would be adopted.

To minimize the threat of prairie fires, stringent fire safety regulations would be enforced. The Applicant would develop contingency plans, in conjunction with the appropriate authorities, to suppress fires.

In the Yukon section of the proposed pipeline, preliminary studies had suggested that there were four waterfowl activities of major concern: spring migration from 15 April to 15 May, breeding from 15 May to 15 July, moulting from 15 July to 15 August and staging and migration from 15 August to 30 October. In the Saskatchewan section, spring migration occurred during late March and April, breeding from 15 April to 15 July and staging from August to 1 November. Foothills (Yukon) would designate for the contractors critical waterfowl habitats and associated periods of their sensitivity in order to regulate pipeline activities in these areas to avoid or minimize direct disturbance to waterfowl. Efforts would be made to avoid impairment of wetland drainage systems and wildlife habitats by construction activities, release of pollutants and fire, and by strict control of aircraft flights over critical waterfowl areas during the periods of high waterfowl sensitivity.

Disturbances to wildlife by aircraft would be minimized through flight planning and through specifying corridors and minimum altitudes where applicable, in consultation with government biologists and civil aviation authorities. Where low-flying, line-patrol aircraft would have an impact on bird habitats, surveillance of the right-of-way would be done by

ground patrols using small vehicles suitable for operation on the respective terrain types, or by foot; aerial photography would also be used where necessary. Because of the existing all-weather roads, the need to use aircraft would be much less than in the Mackenzie Valley. Strict control of firearms and vehicle access along the pipeline right-of-way would be implemented to prevent unauthorized hunting of waterfowl.

The significant habitat areas of upland game birds in southern Yukon and Saskatchewan were identified. Habitats of upland game birds would be avoided during construction activities where possible. Firearms and vehicle access along the pipeline right-of-way would be controlled to prevent unauthorized hunting of these birds during all stages of pipeline construction and operation.

Foothills (Yukon) would develop specific measures to protect, and to minimize sudden or persistent disturbances to endangered or rare species of raptors and their breeding activity. Foothills (Yukon) would undertake further site-specific studies to locate raptor nest sites, and the information would be used for refinement of the raptor protection measures. Where possible, a minimum distance of two miles would be maintained between the pipeline alignment and known nest sites of rare or endangered raptors. Where it would not be possible to maintain a 2-mile separation owing to topographic or other constraints, a route would be selected after consultation with appropriate government agencies. Where construction activities, particularly blasting, were to take place within two miles of an active nest site of a rare or endangered raptor, the appropriate government

agencies would be consulted; aircraft flights in the vicinity of the nest site would be strictly controlled and minimum flight altitudes during critical times would be imposed.

Foothills (Yukon) stated that, with respect to fisheries,its main concern was the loss or deterioration of habitats necessary for the maintenance and propagation of the fisheries resources. Siltation from land clearing, ditching and backfilling and streambank failure, interference with fish movement, pollution, blasting and river substrate removal would result in serious alteration of critical fish habitats.

To minimize effects of siltation on aquatic habitats, Foothills (Yukon) proposed minimal use of vehicles in streams, timely clearing of vegetation from river banks in sensitive permafrost areas, terminating pipeline trenching at least 300 feet from significant watercourses until the actual crossing was initiated, the use of dykes, ditches and settling ponds in areas of excessive erosion, and stabilizing all stream banks, with frequent post-construction inspection, restoration of stream beds to their original or improved substrate condition, and maintenance of a 300-foot strip of undisturbed vegetation, where possible, along all aquatic systems paralleled by the pipeline corridor.

To minimize interference with fish movements, Foothills (Yukon) would install culverts or bridges for significant stream crossings on all summer access roads. Culverts would be designed to accommodate fish movement where possible, and they would be maintained free of debris. The Applicant would avoid major stream channel diversions, would remove all debris introduced

into aquatic systems, would breach all ice bridges by physical means prior to spring flooding, and would remove any temporary water diversion structure. Foothills (Yukon) would also avoid removal of water from aquatic systems in quantities that would significantly alter aquatic habitats and the integrity of the water body particularly during the winter.

Blasting would be controlled so as to minimize impact on fish populations, particularly during sensitive periods, and on fish spawning, rearing and overwintering areas. Extraction of river substrates other than during trenching would be avoided.

In the Yukon Territory, pipeline facilities and activities would be controlled to minimize adverse impact on the fisheries resources, and pipeline construction would be scheduled in consultation with local fishermen to avoid any conflict with commercial or domestic fishing operations. Should unavoidable conflicts arise, fishermen would be compensated for losses incurred, in accordance with prior agreement. All personnel associated with any aspect of pipeline construction would abide by all governmental laws and regulations relating to fisheries matters and the protection of aquatic systems.

Foothills (Yukon) proposed that instream construction activity would be scheduled wherever possible to avoid salmon spawning migrations. At known salmon and lake trout spawning areas, construction activity during September and October would be reduced to a level that would not seriously interfere with spawning activity. Route refinements to avoid critical salmon habitats would also be considered.

The Applicant's consultant testified that a full-scale study was planned for 1977 to document utilization of the streams within the pipeline corridor by fish.

River crossings would generally be constructed during low water periods. Foothills (Yukon) would utilize the Alaska Highway for all-weather access to the river crossing areas, and to ensure proper timing of river crossings relative to physical and biological considerations.

In Saskatchewan, no major rivers, streams or lakes would be crossed by the proposed pipeline, and all flowing waters to be crossed were characterized as small intermittent prairie creeks.

Vegetation

The Applicant's environmental report described the various types of vegetal communities along the right-of-way in the Yukon section of the proposed pipeline. Although the major part of the proposed right-of-way of the Yukon section was in the boreal forest, loss of marketable timber was not a major concern as only a very small percentage of the timber was of commercial grade. Foothills (Yukon) would, however, consult with the appropriate authorities in relation to disposal of any commercial grade timber that might be cut down.

The proposed route in the Yukon would be in an area which had not been extensively investigated by botanists, and there was a small possibility of the destruction of some rare species of plants as a result of the proposed construction.

Cleared brush and small trees would be burned or laid over the working area if needed to form a stable working surface, or,

where warranted, they would be chipped and spread to aid the establishment of seed beds and the stabilization of soil.

Foothills (Yukon) undertook to implement a revegetation program in the areas where natural revegetation by reinvasion of local species would be inadequate. A prime concern to Foothills (Yukon) would be the revegetation of slopes at river and stream crossings and other potentially unstable slopes. Reseeding in these areas would be designed to assist in long-term erosion control but if warranted, vegetative propagation by stem and root cuttings and shredded native shrubs and herbs would also be implemented.

Revegetation in other disturbed areas, such as stockpile sites, borrow areas, construction camps, and land adjacent to compressor stations, would be considered on a site specific basis. If warranted, they would be revegetated but the decision would depend upon the proposed future use of each site, its location, and the assessed potential for natural rehabilitation. The Applicant would allow natural revegetation to take place where immediate revegetation would not be necessary to protect the integrity of the pipeline and of the physical environment and where aesthetic considerations would not be an overriding factor.

Foothills (Yukon) proposed a basic seed mixture of native and naturalized grasses and legumes for revegetating the Yukon section of the proposed right-of-way, with additional species for dry slopes, or for moist, poorly drained areas, or for alpine areas.

Some of the factors important in the selection of vegetal species for revegetaton were reported to be longevity, cover

production, erosion control ability, resistance to disease, and aesthetic value. Native and naturalized species would be relied upon because they were most likely to be resistant to local diseases and were best adapted to the local environments.

Seeds would be applied by helicopter for much of the seeding operation. In specific areas, the seed would be turned into the soil by using harrows and rollers and Brillion seeders to establish the ground cover quickly.

A fertilizer program would be applied to keep the plants growing vigorously. Chemical analyses of soil samples taken from various parts of the pipeline route before and after construction would be made to determine the proper amount and type of fertilizer for the seeding program.

The Applicant's consultant said that the approach to revegetating was essentially the same as that proposed for the Foothills pipeline.

Foothills (Yukon) proposed to monitor the status of the revegetated cover by means of trained observers in the line patrol aircraft during operation of the system. It might be necessary from time to time to make ground checks of areas suspected of having a decrease in the plant cover to determine what remedial measures would be needed.

Foothills (Yukon) stated that there would be some potential for large scale, long-term impact on vegetation. Although fires might occur naturally in the plant communities, any areas severely damaged by fire would be revegetated.

With respect to the Saskatchewan segment of the Foothills (Yukon) proposal, the environmental report described the various

types of vegetal communities along the proposed right-of-way in the mid-grass section of the prairie. The dominant vegetation was described as a mixture of short and mid-grasses.

Revegetation of the right-of-way for the Saskatchewan segment of the proposed pipeline would be based on the same principles as described for the Yukon segment of the route. A smaller proportion of the right-of-way would be revegetated in Saskatchewan, as compared with the proportion in the Yukon Territory, since a significant portion of the Saskatchewan segment would pass through agricultural land. The basic seed mix of native and naturalized species, and the rate of applying the seeds to the ground were specified. In addition to the basic seed mix, seeds of other species would be included for revegetating dry slopes, moist, poorly drained areas, and saline flats.

The vegetal cover on the right-of-way would be monitored during the operational phase.

CAGPL pointed out that the Foothills (Yukon) environmental report lacked important baseline data, and that reliable conclusions could not be made relating to the environmental impact of the proposed route, particularly for the Yukon segment. CAGPL's witness estimated that, if intensive efforts were made and if sufficient funds were provided, the needed studies on vegetation could be carried out in two years.

CAGPL's witness said that some of the tasks to be performed to obtain the reliable data and to make valid conclusions would be a detailed vegetation and soil survey along the entire Foothills (Yukon) route, preparation of a mosaic of the plant

communities and soil conditions, preparation of basic revegetation specifications for the pipeline route, identification of specific problem areas such as steep slopes and other areas of instability where special revegetation techniques would be required, field work to test and analyze these techniques and a program to ensure the availability of sufficient quantities of native seed.

Water Supplies, Pollution, Toxic Material

Foothills (Yukon) identified a potential for the degrading of water bodies by the discharge of sewage effluents or by the accidental release of fuels and toxic materials. The Applicant would not intentionally permit any wastes or toxic materials to enter aquatic systems, but would dispose of them in accordance with existing legislation and guidelines established by regulatory agencies.

Foothills (Yukon) would provide secondary treatment of sewage of all major work camps and would avoid discharge of the effluent into critical fish habitats. The proposals for camp sewage disposal were the same as had been proposed by Foothills. The Applicant would have trained personnel available to operate the secondary sewage treatment plants. Foothills (Yukon) presented site plans for compressor stations, which included sewage lagoons as the method of sewage treatment. Tests of sewage effluents would be conducted regularly to ensure compliance with government standards. Meter stations would have only self-contained chemical toilets. Waste products from the meter stations would be transported to a compressor station for disposal.

Regarding the handling and storage of fuels, Foothills (Yukon) identified the potential of hydrocarbon pollution to cause mortality to wildlife resulting from ingestion or loss of insulation due to oil-soaked fur. Fuels and toxic materials would be stored within impermeable dykes and away from critical aquatic habitats wherever possible. The approach to the handling and storage of fuels was the same as had been proposed by Foothills with the difference that transportation of the fuels or toxic materials would be primarily overland.

Waste lubricants or other liquid hydrocarbons would be incinerated or recycled. With respect to other toxic materials, Foothills (Yukon) did not plan widespread use of herbicides and pesticides. The quality of the hydrostatic test medium would be assessed before discharge into aquatic systems, and special treatment or alternate discharge sites would be selected where warranted. Small quantities of methanol would be discharged to the environment from the flushing process following hydrostatic testing which would use about 150 gallons of methanol per mile of 48 inch diameter pipe, much of which was said to adhere to the pipe's inner surface.

Foothills (Yukon) stated that, to avoid attracting wildlife, garbage would not be allowed to accumulate. Solid wastes would be collected and incinerated on a regular basis with the residue being buried in disposal pits. The proposals for solid waste disposal would be generally the same as those proposed by Foothills. Foothills (Yukon) did not expect its incineration facilities to be close enough to centres of population to cause any problem.

With respect to air pollution, Foothills (Yukon) identified the emissions from compressor exhausts as the only source of potential long-term effect on the environment. Emissions from compressor stations would contain carbon monoxide in the concentration range of 10 to 15 parts per million as well as insignificant concentrations of unburned hydrocarbons. The Applicant did not expect environmental effects from sulphur dioxide because Prudhoe Bay gas is low in sulphur. Foothills (Yukon) would provide adequate stack height to minimize plume downwash which could otherwise increase ground level concentrations of air pollutants. Calculated ground level concentrations of oxides of nitrogen would not exceed the desirable level specified in the Federal Air Quality Objectives. The air quality standards to be observed would be the same as those proposed by Foothills. Ice fog at compressor stations was expected to be infrequent. CAGPL's consultant stated that the addition of compressor stations along the Alaska Highway would add to the emissions from vehicles which could elevate the point at which ice fog would form; ice fog could affect traffic on the Alaska Highway.

Noise

There would be seven compressor stations in the Yukon portion and two in the Saskatchewan portion of the pipeline. These stations would each consist of a single unit, 29,000 H.P. gas turbine compressor and would require some eight acres of land for developing each site.

The Applicant stated that noise originating from gas and propane piping would vary with the velocity of the gases. If low-velocity flows are designed, noise from the piping would be at a low level. Where necessary, the piping would be insulated or buried to further reduce the noise.

In its critique of the environmental work of Foothills (Yukon), CAGPL pointed out the need to study the effects upon wildlife of noise from compressor stations. In its application, Foothills (Yukon) had acknowledged that no detailed site-specific field assessment of the effects of noise from compressor stations had been made. In order to establish the measures to be taken for noise abatement, it would be necessary to make a detailed survey of noise at each station. The Applicant's design would include the sound attenuation measure necessary to limit noise emission levels at station fence lines to 80 dBA.

The Applicant stated that noise from compressor stations would have no adverse effects on the public due to their distance from settlements or other regions of high population density.

Archaeology

The Applicant provided evidence on the environmental setting, on impact prediction and on environmental concerns and protection measures with reference to archaeological resources along the proposed pipeline right-of-way. The Applicant's archaeological considerations included prehistoric and historic native sites, historic sites, palaeontological sites and other related matters.

The Applicant's preliminary study included a review of published information, searches of archaeological site files held

by the Archaeological Survey of Canada and the Saskatchewan Museum of Natural History, discussions with government archaeologists, and an aerial reconnaissance. Known archaeological sites occurred within the pipeline corridor, and in about fifteen cases, they were located immediately adjacent to the designated route and would, therefore, be subject to some impact during the course of pipeline construction. These known sites had been identified and mapped in the environmental atlas. An inventory of graveyards through the area had not been prepared, but historic graveyards, which were of concern to the native peoples, were marked in most instances by gravehouses or other markers.

The Applicant said that the southern Yukon corridor is potentially significant in terms of its archaeological heritage and of its importance as one of the early routes of migration of people from Asia into the Americas. Archaeological resource sites of the southern Tutchone, Tagish, Inland Tlinget and earlier native peoples were identified along the corridor, particularly in the southwestern Yukon section. No palaeontological sites were identified in the Yukon.

In the Saskatchewan section, prehistoric sites such as a medicine wheel, teepee rings, cairns and bison kills were identified along the proposed pipeline right-of-way. The Applicant stated that it would make the necessary route changes to avoid these and other archaeologically significant features immediately adjacent to the pipeline right-of-way at mileposts 115, 120 and 131.

The Applicant indicated that there was a potential for the occurrence of palaeontological materials of upper Cretaceous saurians or Pleistocene mammals at Bates Creek and the Frenchman River in Saskatchewan where fossiliferous formations would be crossed.

The value of those archaeological sites whose significance is presently unknown in zones of direct or indirect impact, could only be assessed by ground surveys of the sites in order to determine whether the right-of-way should be relocated to avoid such sites. Foothills (Yukon) stated that it had developed a detailed program of archeological reconnaissance, evaluation and excavation to cope with the contingencies of pipeline development. The program was divided into six phases and each phase would consist of ground reconnaissance and inventory, site evaluation, pre-construction site salvage excavations, archaeological inspection of pipeline construction, post-construction excavation, and cooperation with government agencies.

The pre-construction program would begin within the next two years, after the right-of-way had been cleared and prior to construction commencing. A general outline had been established for the assessment of the value of archaeological resources, based on stratigraphic excavations at key sites. The value of historic sites would also be determined by including archival data and personal interviews as part of the evaluation process. Archaeological sites of sufficient value would be excavated prior to construction, if it were not possible to avoid them by minor re-alignments. Foothills (Yukon) said that it would not be

possible to identify all archaeological sites during the ground survey because deeply buried sites would be discovered only during construction.

During construction in highly sensitive archaeological areas, such as river crossings and glacial lakes where deeply buried remains might occur, the Applicant said that a professional archaeologist would be available on-site to inspect the ditch walls and the spoil piles. Materials discovered during ditching would be evaluated and the information would be recorded. If the uncovered material required excavation operations, then the areas would be marked for further work to be done after the completion of construction.

In the event that archaeological materials of significance were identified, the construction program would be temporarily stopped or rescheduled to proceed with a different phase, so as to avoid the site until the archaeological recovery work had been completed.

Foothills (Yukon) stated that the implementation of these mitigative procedures would reduce the impact on archaeological resources to acceptable levels.

Other Environmental Concerns

Foothills (Yukon) confirmed that its general philosophy and approach towards maintaining an aesthetically pleasing environment along the proposed pipeline route were similar to its proposals for the Foothills Project. There would be more areas of concern in the Foothills (Yukon) Project as compared with the Foothills Project. The Applicant evaluated the aesthetic

environmental concerns and the visual impact of the Foothills (Yukon) Project.

The pipeline corridor was divided into zones having common visual characteristics of terrain conditions such as vegetation, land forms, water forms and landmark features. Fourteen visual zones were defined for the Yukon section and seven for the Saskatchewan section.

Three levels of ratings were established in the assessment of the relative significance of each of the twenty-one zones along the entire right-of-way. The three levels of rating were: high quality scenic zone with a diversity of vegetation, water and land forms, and landmark features; medium or moderate scenic quality; and low scenic quality. Large-scale features that served as landmarks to both the traveller and the resident were designated as "regional features", and high quality smaller scale points of interest were identified as "local features".

Based on these defined visual zones and features, the Applicant classified the visual impact of the pipeline right-of-way into high, moderate or low impact zones. The Applicant recommended appropriate mitigative measures such as route alignment changes and revegetation to overcome the aesthetic impact on these areas.

The Applicant's assessment of the aesthetic appeal along the pipeline right-of-way recognized the linear view of the right-of-way as being in contrast to most natural physical forms in the environment. The pipeline route would parallel the Alaska Highway for much of its length in the Yukon, and open views of the right-of-way from the highway at crossings, or in the

immediate parallel sections, would be of aesthetic concern. Areas of significant visual concern, such as at highway crossings and recreational areas would be revegetated to reduce the contrast between treed areas and the right-of-way.

The Applicant would minimize the number of crossings of the Alaska Highway. The right-of-way would be at an angle, as nearly perpendicular to the highway as possible, where crossings of the highway could not be avoided.

Foothills (Yukon) stated that adequate buffer zones of vegetation would be provided between the pipeline right-of-way and areas such as recreation sites and scenic viewpoints, and that natural vegetation strips at least 300 feet wide would be retained between parallel sections of the highway and pipeline route wherever possible. The Applicant would use the existing Haines, Alaska military pipeline right-of-way as much as it could so as to minimize additional tree removal.

With respect to scenic values along the Alaska Highway, the Applicant's consultant had informed the Applicant of all areas where the pipeline construction would have adverse scenic effects. He had identified some areas along the highway where adequate vegetative buffer zones could not be provided. The compressor stations that would be located close to the highway would be readily visible from the roadway. It could not be confirmed whether adequate vegetative buffer zones could be provided between compressor stations and roadways.

The Applicant's consultant stated that future areas for recreational development had been identified in consultation with the Territorial Government and Parks Canada. The Applicant would

provide sufficient vegetative buffer zones in these areas to maintain an aesthetically pleasing view.

From the recreation and aesthetic viewpoints, the Applicant's consultant had some concern regarding the location of a compressor station in the Ibex Mountain area. Alternatives for relocating the compressor station were being considered by the Applicant.

The Applicant provided evidence on the setting, project impact, and mitigative measures with respect to recreational use and potential along the proposed pipeline alignment.

The development of a cleared right-of-way and access roads would preclude future recreational use in some areas through loss of tree cover. However, they would provide greater accessibility to a variety of remote areas. The impact of providing greater access by right-of-way clearing could be either positive or negative depending on the recreational carrying capacity of the area.

The proposed pipeline would traverse or pass near a significant number of existing wayside parks, campsites, and potential recreation areas. The concerns related to these sites were the possible short-term physical disruption by construction crews and equipment, the long-term physical alteration of the local environment, and the potential loss of recreational opportunity by decreasing accessibility to future campsites.

The Applicant would conduct site-specific surveys to verify potential pipeline alignment conflicts with existing and potential recreational areas. Adequate buffers of undisturbed terrain would be provided for existing or potential campsites to

allow continuation of the present use and to provide flexibility in site development of new campsites or upgrading of existing campsites. The Applicant would continue its consultations with appropriate government agencies and private individuals involved in recreational development along the proposed pipeline route in order to identify and protect existing and potential recreational areas.

Foothills (Yukon) said that it had not used the Canada Land Inventory classification criteria in identifying recreational areas. The Applicant's initial studies had considered existing and potential recreational sites.

In the Yukon section, the impact of the proposed construction on recreation would be, for the most part, short-term in nature. During the actual construction phase, there would be some inconvenience to the local and tourist traffic, and some disruption to the enjoyment of recreational pursuits at specific recreational sites.

Specific archaeological and historic sites of recreational and human interest value might be identified and made accessible to Yukon residents and visitors. Specific sites might be marked as roadside points of interest, and trails for recreational exploration might be developed.

The Applicant stated that the Yukon Department of Tourism and Information had placed a marketing priority on increasing package tours, to increase the percentage of vehicles of a non-recreational nature, to extend the tourist season from May through September, and to encourage tourists to visit all parts of the Territory.

The Applicant stated that a recreational land use plan had not been developed for the Yukon and therefore, it would be difficult for it to predict pipeline impacts on recreation.

With respect to areas of recreational priority along the Alaska Highway, the Applicant stated that it would conduct a field program during the summer of 1977 to gather more information, to examine the existing recreational use along the pipeline corrider close to the highway, and to identify areas where the right-of-way would have to be diverted from the Alaska Highway to prevent its impact on existing recreational uses. The summer survey would be carried out in co-operation with the Territorial parks authority.

The evidence indicated that accessibility to recreational areas was an important factor and that the areas adjacent to the Alaska Highway were most widely used.

The Applicant had not assessed in economic terms the recreational uses or potential in the Ibex Mountain area. The Applicant was considering measures to minimize the impact of the proposal on the biological and recreational environments of this mountain range. One of the alternatives considered was to reroute the pipeline to avoid this area. The Applicant would also investigate other mitigative measures to overcome the environmental concerns in the Ibex Mountain area.

In the Saskatchewan section, the area to be traversed by the pipeline is basically a sparsely populated agricultural region, without potential for tourism. Therefore, no impact of the pipeline on recreation was anticipated.

6.3.1.2 Environmental Inspection and Supervision Education/Briefing

Foothills (Yukon) stated that it would implement an enviornmental orientation program for all personnel involved in the project, which would provide a clarification of the environmental issues together with an explanation of relevant legislative requirements, guidelines and protective measures. The program would emphasize the need to exercise care when handling fuel, methanol, chemicals or other potentially harmful materials. All personnel involved with the Saskatchewan portion of the project would be informed of the implications of prairie fires.

The specific choice and scope of orientation materials to be presented, and the length of briefing sessions would vary with personnel category according to its potential for effecting an impact on the environment. The orientation program would be conducted by the Applicant's environmental inspection staff. They would be trained by specialists who would also prepare the program materials. The field environmental inspection staff would also evaluate the effectiveness of the orientation programs during construction.

Changes to the program resulting from the evaluation would be communicated to project personnel during construction and also incorporated into the orientation programs for future construction seasons. The environmental inspection staff would have a training program to familiarize them with the project area, relevant environmental legislation, government conditions

and guidelines, and various construction operations and techniques.

Program Organization

Foothills (Yukon) stated that its environmental inspectors would be present in the field during all major pre-construction and construction activities. The Applicant could not state the exact number of environmental inspectors it would have but visualized a small team on each spread. The proposed duties of the environmental inspectors were described. One member of the team would have overall responsibility for the spread and would report to a district chief who would supervise and co-ordinate environmental inspection within a district of two or more spreads. The district chief would report to Foothills (Yukon)'s head office.

Specialists would be available to provide guidance on short notice to the environmental inspectors. There would be one inspector, who would have some archaeological knowledge, on each spread at all times to monitor the open ditch in areas not designated as archaeologically sensitive. Professional archaeologists would be available for site investigation immediately prior to and during ditching operations in areas of high archaeological potential.

Foothills (Yukon) envisioned hiring, as environmental inspectors, persons with a background in either the biological or physical sciences and preferably with previous pipeline construction experience, and training them in construction on an active pipeline spread before assignment to their duties.

Environmental manuals would be prepared which would contain information required by the environmental inspection personnel to carry out their assignments properly. The manuals would be supplemented by aerial photographs, environmental maps and reports.

With respect to environmental inspection and monitoring by government agencies, Foothills (Yukon) stated that it was not yet ready to discuss this matter with government authorities, but wished to be involved at an early stage in discussions on the establishment of any government environmental monitoring agency. Foothills (Yukon) did not expect that it would take two years to develop such an agency, nor did it want to have an agency similar to the Joint Fish and Wildlife Advisory Team which was established to monitor the Alyeska oil pipeline in Alaska. Foothills (Yukon) felt that government environmental inspectors should have qualifications similar to those which Foothills (Yukon) proposed for its own inspectors.

Authority and Responsibility

Foothills (Yukon) stated that the senior environmental inspector on a spread would have the authority to shut down construction operations which might not be conforming to established standards or which could result in a significant and unnecessary environmental impact. The district chief would have the authority to maintain the shut-down for one day to allow resolution of the problem. If the problem could not be resolved in the field within one day then it would be referred to Foothills (Yukon)'s head office for a decision.

Upon cross-examination about the Joint Fish and Wildlife Advisory Team of the Alyeska oil pipeline in Alaska, serving as a model for Canada, Foothills (Yukon) stated that a disadvantage had been that individuals, who had no idea of the consequences that the team's power could have on construction, had been provided with construction shut-down authority. The Applicant expressed its desire that government inspectors have a balanced understanding of both environmental concerns and construction constraints.

Environmental Emergencies

Foothills (Yukon) stated that a basic contingency plan for toxic liquids spill prevention, containment, clean-up, disposal and restoration would be developed as part of final design. Each construction spread would be staffed with a fully operable spill contingency team. The team leader would have the responsibility for adapting the basic plan to site characteristics. He would inspect all fuel structures and storage areas and would ensure that contingency plans were kept up-to-date. The contingency teams would be aligned with local industrial and government contingency teams and would co-operate in the Yukon with the Yukon Disaster Committee and local contingency co-operatives. The teams would be trained with mock-up spills which would also be used to refine the contingency plans. Contingency equipment lists would be incorporated in the National Emergency Equipment Locator System program.

Foothills (Yukon) stated that the contingency team leader would ensure that accurate records of spill situations were kept.

In the Yukon, all spills would be reported to the Yukon Disaster Committee and, where applicable, to the Department of Indian Affairs and Northern Development and the Yukon Water Board.

Foothills (Yukon) identified a potential for project-induced wildfires during all phases of the project, and stated that stringent fire safety regulations would be enforced. The Applicant would co-operate with local authorities in developing contingency plans for fires and would maintain fire suppression equipment at all construction sites. The Squanga Lake area from milepost 310 to 320 and the Saskatchewan prairie were identified as environmentally sensitive areas for which site-specific contingency plans for fire suppression would be required, because the Squanga Lake area is an important part of the winter range for woodland caribou, and because the destruction of the prairie sagebrush by fire would deprive antelope of winter browse.

With respect to the operating phase of the pipeline, Foothills (Yukon) identified the most probable environmental emergencies as being a pipeline rupture, a major right-of-way washout or slope movement, and fire. Contingency plans for pipeline ruptures would be developed before the system was put into operation. Foothills stated that the foremost concern would be to restore service, but that environmental damage would be reduced as much as possible. Advice and approval would be sought from local wildlife authorities for contingency activities in environmentally sensitive areas, and the utmost consideration would be given to protecting the productivity of local natural resource harvests. Damage to the terrain would be repaired. Similar contingency plans would be implemented for terrain

failures affecting the security of the pipeline, the environment or public safety.

Foothills (Yukon) stated that it would store fire suppression equipment at all area offices and compressor stations, would employ all its resources to control fires on the right-of-way and would provide assistance to local fire-fighting forces during fires on lands adjacent to the right-of-way. Environmentally sensitive terrain, if damaged by fire, would be given immediate protection and restoration.

Post-Construction Monitoring and Surveillance

Foothills (Yukon) stated that post-construction surveillance would be implemented with the objective of early detection and remedying of problems on the right-of-way before excessive environmental damage could occur. The conventional inspection would be by visual reconnaissance from line patrol aircraft, which might be augmented with aerial photography. Where there was a possibility of disturbing wildlife by aircraft patrols, or a need to confirm aerial observations, the patrol program would be supplemented by ground patrol by at least two specially trained persons, either on foot or in a small vehicle suitable to the terrain.

Inspection patrols would be most frequent in the initial interval following construction, and especially during sensitive periods such as spring runoff. The Operations Superintendent would ensure that the frequency and method of the patrols would reflect any known environmental concerns. The status of revegetation would be monitored by trained observers in the line

patrol aircraft. Geotechnical specialists would participate in early line inspections. In some cases monitoring devices would be installed to assist in the detection of unsatisfactory performance of slopes, and of drainage and erosion control facilities. Foothills (Yukon) would expect farmers to monitor the productivity on the right-of-way through their lands and to inform it of any problems.

Foothills (Yukon) would co-opperate in the development and implementation of environmental monitoring programs with appropriate government agencies. The objective for Foothills (Yukon) would be to identify long-term detrimental effects which could be mitigated. The Applicant assumed that various government agencies would be interested in gathering data to assist in the planning and assessment of future developments in the project area. Foothills (Yukon) had not yet determined subject and site-specific details for a monitoring program, but anticipated that the methods used would be generally those which had previously been employed for similar purposes and that remote sensing techniques would also be considered.

Cost of Environmental Protection Program

Foothills (Yukon) estimated that it would spend approximately $1.0 million for environmental programs up to the end of 1977. During the entire pre-operations period, the cost of the environmental programs would total approximately $4.5 million, not including approximately $1.0 million for salaries and other associated costs of environmental personnel. These cost estimates did not include expenditures for revegetation, and for

erosion and drainage control, which were included in the estimated budget for engineering and construction. The environmental cost estimates were based on the assumption that the Foothills (Yukon) project would be constructed independent of the Foothills project.

Concerning provision for compensation for damages which might be incurred during construction, Foothills (Yukon) stated that the estimated 1976 cost of damages to commercial timber was $92,000, escalating to $113,000 in 1981. This did not include the cost of construction insurance and public liability and property damage insurance which would be carried under estimates for head office and pre-operational costs and which would cover extraordinary claims which might develop.

6.3.1.3 Views of the Board

The Board has carefully considered the environmental evidence of the Applicant. The Board accepts the Applicant's undertaking to do further environmental work, including field programs, and would condition a certificate to require such further environmental work prior to the commencement of construction. The areas to be covered by the additional studies are referred to later in this section.

The Board notes the Applicant's policy that its environmental review process would proceed through to the final design and construction phases of the pipeline. The Board would require the Applicant to submit for approval, prior to final design, a complete report on the results of the further environmental

studies, and all mitigative measures proposed for avoiding or reducing potentially adverse effects of the pipeline on the environment.

The Board notes the Applicant's references in its environmental statement to consideration of alternative routing, to refinement of the route, and to relocating compressor stations as means to avoid potentially serious environmental effects of the pipeline. Among the matters to be considered by the Applicant are:

a) relocation of the right-of-way between mileposts 312 and 320 in the Mount Michie - Squanga Lake area with respect to protection of the woodland caribou herds;

b) avoiding prime denning sites of wolves, grizzly and black bears, and foxes, in the surficial deposits near Squanga Lake;

c) alternative routing near Bigstick and Crane Lakes in the Sand Hills area of Saskatchewan with respect to protecting the mule deer habitat;

d) maintaining a minimum separation, where possible, of 2 miles between the pipeline alignment and rare and/or endangered raptor nest sites;

e) route refinements to avoid critical salmon habitats and rainbow and cutthroat trout; and

f) relocation of the right-of-way with respect to protecting archaeological sites of significance to be determined on the basis of further field surveys.

The Board would require the Applicant to submit the results of studies of these matters and to submit, for the Board's approval,

the details of proposed special protective measures at locations where re-routing is not possible.

Although not formally proposed as a possible route change, the feasibility and merits of a realignment of the route from Boundary, Alaska, through Dawson and Pelly Crossing to Whitehorse along the Klondike Highway in the Yukon, rejoining the Alaska Highway at Whitehorse, was discussed by the Applicant, having in mind the future possibility of connecting Delta reserves to the Alaska Highway line via a "Dempster link". The Board would condition any certificate it might issue to require that the Applicant study the environmental aspects of a "Dawson" realignment and submit the results to the Board.

For an application for certification of a "Dempster link," environmental studies should be initiated.

Returning to the present application, the Board accepts the Applicant's undertakings to conduct field surveys and field studies:

a) to verify conflicts with existing and potential recreational areas;

b) to document the use by fish of the streams within the pipeline corridor;

c) to make the site-specific field assessment of the effects of noise from compressor stations upon wildlife and the public; and

d) to identify archaeological sites in order to determine the value of these sites in the zones of direct and indirect impact.

These surveys and studies would be required as a condition of a certificate.

With respect to noise emission from compressor stations, the Board does not at this time accept the Applicant's proposed limit of 80 dBA at the station fence lines, particularly since the precise locations of the compressor stations has yet to be finalized. In the view of the Board, the noise limits at the station fence lines should be evaluated in relation to the field assessment of the effects of noise from the compressor stations. The Board would require the Applicant, as a condition of a certificate, to make such evaluation and assessment, and to submit a report on the results and proposed action to reduce noise, to the Board for its approval during final design.

Further, with respect to noise emissions from compressor stations, the Board would require the Applicant to measure and report the noise levels at the station fence lines within six months and at 18 months after leave to open is issued for each station, and to report upon any adverse effects of the noise emissions on the public and on wildlife; any further noise abatement measures considered necessary by the Applicant should be submitted to the Board for approval at the times indicated.

The Board accepts the Applicant's undertakings to consult with concerned government agencies and individuals in regard to:

a) protection of recreational areas, and rare or endangered raptor nest sites;

b) planning corridors and altitudes for aircraft flights to minimize disturbance to wildlife; and

c) scheduling construction to avoid any conflict with commercial or domestic fishing operations.

The Board would require the Applicant to submit to the Board, during final design, a report on the extent to which the final design would obviate the concerns of the agencies expressed during such consultations, including the nature of the proposed mitigative measures, and if the concerns could not be obviated, why the impasse arose.

The Board accepts the Applicant's undertaking to consult with individual landowners with respect to protection of agricultural lands and livestock during construction and to restoration of the affected agricultural areas after construction. As a condition of a certificate, the Board would require the Applicant to discuss with each farmer as to whether, when and the manner by which the topsoil and the subsoil would be separated and the right-of-way restored, and the manner by which the soil and crop productivity on the right-of-way would be restored after construction.

With respect to protecting beaver and muskrat populations, the Board accepts the Applicant's proposals to prevent the degradation of their aquatic habitats by maintaining the existing surface and subsurface drainage patterns and by controlling erosion to prevent siltation of the aquatic habitats. In the view of the Board, these protection measures should be implemented, and any certificate would be so conditioned.

In the view of the Board, the waterfowl habitats and populations would be protected from major impacts of the pipeline

if the Applicant implements its proposed measures; any certificate would be conditioned to require that implementation.

The Board is concerned about disturbance to certain wildlife species, particularly ungulates and raptors, by operational line-patrol flights along the right-of-way. As a condition of a certificate, the Board would require the Applicant to submit for Board approval prior to application for leave to open, its plans for its line-patrol flights, indicating where scheduling and modifications to the method of patrolling would be used to minimize disturbance to the important ungulate, waterfowl and raptor species during critical periods of their life cycles.

With respect to the effects of siltation on fish habitats, the Board's view is that the Applicant's proposed measures to minimize the potential degradation of these habitats must be confirmed, supplemented or revised on the basis of further fisheries studies. The Board would require the Applicant to submit a report on siltation control measures and the specific locations where the measures would be implemented; this would be required as a condition of a certificate.

The Board is concerned with the Applicant's biological program for erosion control. As a condition of a certificate, the Board would require the Applicant to implement a revegetation program for erosion control after construction and to submit, during final design, to the Board for its approval, a report including plans and schedules for implementing the revegetation program, evidence respecting the effectiveness of the program for control of erosion, and the criteria and schedule for evaluating the effectiveness of the revegetation program.

Further, with respect to the revegetation program, the Board would require the Applicant to submit to the Board for its approval prior to application for leave to open, the plans for revegetating the stockpile sites, borrow areas, abandoned construction camps and land adjacent to compressor stations.

The Board notes that the Applicant's proposals for sewage treatment and disposal are the same as those proposed by Foothills for the Mackenzie Valley pipeline. The Board has noted with concern the problems experienced by others in operating package sewage treatment plants at work camps in Arctic and Sub-Arctic North America. The Board does not accept Foothills (Yukon)'s conclusion that an effluent biochemical oxygen demand of 75 milligrams per litre obtainable in 75 per cent of the effluent samples would be a reasonable standard to meet. If a certificate were granted, the Board would require the Applicant to ensure that at least 90 per cent of the effluent samples taken during any consecutive 30-day period would have not greater than 20 milligrams per litre biochemical oxygen demand.

With respect to other effluent quality factors, the Board would require the applicant, as a condition of a certificate, to meet the recommended limits set out in "Guidelines for Effluent Quality and Wastewater Treatment for Federal Establishments" issued by the federal Environmental Protection Service. For any cases where the Applicant is unable to meet these, the Applicant may apply to the Board for review of this condition.

The Board accepts the Applicant's commitments to dispose of other wastes and toxic materials in accordance with existing legislation and guidelines, and to store fuels and toxic

materials within impermeable dykes and away from critical aquatic habitats. The Board notes that only small quantities of methanol would be used by the Applicant for pipeline rinsing. However, the Board's view is that the Applicant should not discharge methanol into the environment and, therefore, the Board would require the Applicant to establish a safe procedure for rendering this substance harmless after the pipeline is rinsed.

The Board is concerned about the emissions of nitrogen oxides from the compressor turbines. The Board's view is that the Applicant's preparations for final design should include site-specific analyses to ensure that the ambient atmospheric concentrations of nitrogen oxides measured as nitrogen dioxide would meet the Ambient Air Quality Objectives, under the Federal Clean Air Act, in the Yukon, and the applicable provincial air quality regulations in Saskatchewan. The Board would condition a certificate to require the Applicant to monitor the emissions from the compressor turbines, and the ground-level concentrations of nitrogen oxides at appropriate locations in the vicinity of the compressor stations, periodically during the first year after leave to open had been granted, and to submit the results to the Board.

The Board acknowledges that ice fog from compressor stations would be inevitable. The Board would expect the Applicant to select, to the extent possible, locations for the compressor stations so as to minimize any potential traffic hazards due to ice fogs on the Alaska Highway. The Board would require the Applicant, as a condition of a certificate, to monitor ice fog formations on the Highway in the vicinity of the compressor

stations and to report to the Board on the results of such monitoring on any resultant traffic hazards and on mitigative measures which may be warranted.

In the opinion of the Board, the archaeological resources along the right-of-way would be adequately protected if the Applicant implements its archaeological protection program as proposed in the evidence, and any certificate granted would be so conditioned.

Concerning the aesthetic and recreational aspects, the Board accepts in principle the Applicant's proposals to provide protective, vegetative buffer zones between the right-of-way and scenic viewpoints and recreational sites, and to revegetate areas of significant visual concern at highway crossings. While the Board recognizes that the Applicant is considering relocation of certain segments of the pipeline route, the Board's view is that the Applicant's proposed measure to protect scenic and recreational areas must be regarded as tentative. The Board would require the Applicant, as a condition of a certificate, to submit during final design its plans for leaving vegetative buffer zones and for revegetation in the vicinity of highways and compressor stations.

The Board is pleased that the Applicant has undertaken to prepare environmentally based contingency plans. These plans would relate to containment, cleanup, disposal, and restoration in the event of spills of toxic substances, to detection and suppression of prairie and forest fires, to the protection of wildlife during contingency activities in environmentally sensitive areas, and to public safety and environmental

protection in the event of terrain failures. As a condition of a certificate, the Board would require the Applicant to develop and submit for Board approval such contingency plans prior to aplication for leave to open.

The Board is pleased that the Applicant has undertaken to implement an environmental orientation and briefing program for all project personnel, and to implement an environmental inspection program during construction. The Applicant would be required, as a condition of a certificate, to implement these undertakings and to submit, prior to commencement of construction for Board approval, the plans and programs for environmental supervision and inspection during construction. The Board would expect the Applicant to provide copies of its environmental inspection manuals to the Board prior to commencement of construction.

The Board is also pleased to note that the Applicant would conduct a post-construction program of monitoring the effects upon the environment resulting from the construction and operation of the proposed facilities. In the Board's opinion, the environmental effects of both construction and operation should be monitored periodically and appropriate mitigative measures implemented in order to ensure protection of the environment. The Board would require the Applicant to submit for Board approval, prior to application for leave to open, its plans for monitoring of the post-construction environmental effects.

With respect to agricultural lands, the Board notes the Applicant's statement that it would expect farmers to monitor the crop productivity on the right-of-way through their lands and to

inform the Applicant of any problems. The Board would encourage farmers to do so. The Board, however, does not accept that farmers should bear the sole responsibility to monitor the crop productivity on the right-of-way. The Board would require the Applicant, as a condition of a certificate, to monitor and evaluate, after construction, the soil and crop productivity on the right-of-way through agricultural lands, and would require such surveillance to continue as part of the post-construction environmental program.

6.3.2 WESTCOAST

The Westcoast proposed pipeline was in two parts, one part, about 439 miles long, in northern British Columbia and the other part, approximately 106 miles long, in Southern British Columbia.

In northern British Columbia, a 48-inch diameter pipeline would enter the province on the Yukon border near Watson Lake, and would proceed to the Toad River. From this river the route would proceed southeastward, leaving British Columbia near Boundary Lake east of Fort St. John. Five compressor stations were proposed along this route.

Westcoast's environmental consultant stated in his report that a detailed study of the northern British Columbia part was required, and identified the areas of concern warranting additional information. Westcoast testified that there was ample time to complete the studies,

and to incorporate the consultant's recommendations into its environmental protection program, prior to construction.

In southern British Columbia, a 36-inch diameter pipeline was proposed to link with the Trunk Line (Canada) system in the Crow's Nest Pass region. The route would proceed southwestward to Kingsgate, British Columbia. No compressor stations were proposed for this line.

The consultant stated in his covering letter to Westcoast that the environmental review of the southern proposal was a preliminary impression based almost entirely on previous studies made by other consultants on the environment along the adjacent ANG right-of-way.

Upon cross-examination Westcoast acknowledged it still had some additional work to do respecting the southern proposal and its consultant estimated that a study could be done within two months to check previous data in the field, to verify interpretations of previous work, and to acquire further information.

Westcoast stated that, for both northern and southern parts of the proposed pipeline, it would follow the recommendations contained in any final environmental impact assessment prepared for it by its environmental consultant, and that construction of the pipelines would also be subject to the constraints and contingency plans included in the environmental section of the contract documents for the construction of the proposed pipeline.

6.3.2.1 Environmental Impact and Mitigative Measures

Terrain

In northern British Columbia, the erosion potential of the banks at river crossings, and of surficial deposits, was assessed by the Applicant. The areas that were found to be sensitive to erosion were river crossings and escarpments, and these areas were identified in the environmental report. The Lower Liard and the Toad River crossings were both noted to be highly sensitive and were described as having steep river sides which contain extensive areas of slope failure. The predominant deposits at these two crossings are lacustrine, colluvium and shattered bedrock. The consultant acknowledged that similar problems could occur south of the Toad River in the Dunedin Valley about Jacknife Creek and the Prophet River, and that some residual problems with slumping colluvium might occur in slopes about the Muskwa and Trutch Escarpment, especially if the groundwater seepage pattern were greatly modified.

With respect to these identified areas of sensitive terrain that would be affected by pipeline construction, the Applicant recommended that more work be done in nearly all areas in order to finalize the route, and to determine the best means of ensuring the stability of the slopes. Specific recommendations were made with respect to the Laird and Toad River crossings for the careful construction of berms and for revegetation, in order to prevent surface gullying.

With respect to permafrost, the application contained a map showing the known locations of permafrost situated along the route, based on a brief overview of the region west of the Toad River and on a literature search. Only five permafrost sites were noted to be close to this route. Two of these sites were situated near the Yukon-British Columbia boundary, and the other three were situated in the Alberta plateau near the Beatton River close to the southern end of the line. No estimates of the thicknesses of permafrost in these sites were given.

In a theoretical study, an attempt was made to relate air temperatures, elevations and vegetative cover to the distrubution of permafrost. This study showed that no areas of continuous permafrost would be expected along the route. Also, it outlined the regions where permafrost might be expected in most types of materials. These regions included the Brimstone Divide, the Maule Divide and the Tatisno Mountain, the divides between Trutch Creek and Prophet River, and between Tenaka and Akue Creeks. Within these areas, permafrost would most likely occur in areas of north-facing slopes, heavy vegetative cover, peat deposits or in areas of low snow accumulation.

The same method was applied to determine the occurrence of permafrost in peatlands and peatbogs, and it was determined that all peat areas between Doig and Toad Rivers had a high potential for permafrost occurrance. Actual field investigation in this area showed depths greater than 15-20 feet of ice-rich material, which the consultant ack-

nowledged was surprisingly thick for the Alberta Plateau, and therefore, warranted further field study.

Based on his experience with some of the other pipelines in the Fort Nelson area, Westcoast's consultant stated that subsidence due to ground ice degradation would occur and that it could occur over extensive distances depending on the terrain type. However, he did not identify any permafrost condition that he would consider to be of major environmental concern.

Westcoast described its general procedure for pipeline construction in the permafrost areas of northeastern British Columbia. Generally, it would excavate the total depth of ground ice and lay the pipe on the material below the ground ice. In cases where it could not excavate the total depth of the ground ice, its procedure would be to weight the pipe for zero buoyancy, so it would neither rise nor sink. This technique had been used for a number of years and had worked well where the ground ice was in the form of lenses that were not very wide (i.e. less than 100 feet across).

Under cross-examination, the Applicant stated that over the years techniques were developed for containing this impact of thaw settlement, and that these techniques were becoming increasingly effective. Examples of the techniques were putting a high berm over the buried pipe and allowing it to settle, and installing ditch breakers at the downslope portions of the right-of-way to control drainage in the trench.

Westcoast's consultant recommended further studies on the occurrence and nature of permafrost, especially in the areas of sloping terrain and at river crossings.

With respect to the impact of roads, camps, borrow pits and other supporting facilities on terrain, the consultant recommended that studies be carried out prior to construction so that mitigative measures could be incorporated into the final design.

The proposed route in southern British Columbia would cross the Rocky Mountains in a southerly direction to Elko; from there the route would run across Kootenay River valley and westward across the McGillivary and Yahk ranges to Aldridge, where it would follow the narrow Moyie River Valley, parallel to the highway, in a southwesterly direction to Kingsgate.

The consultant stated in the report that future development in some of the narrow valleys traversed by the proposed pipeline could result in some conflicts, especially with possible upgrading of roads.

Westcoast proposed a completely new right-of-way which would cross that of ANG at about 20 locations. As the proposed right-of-way was envisioned, the distance between the two rights-of-way would vary from having adjoining boundaries up to a half mile. The Applicant stated that, while a new right-of-way was proposed, the pipeline would encroach on the Dominion Coal Block and other mining leases. Westcoast's environmental consultant recommended

that another right-of-way should not be created through the Dominion Coal Block.

The consultant stated that significant environmental advantages would be realized by locating the pipeline on the existing ANG right-of-way and he strongly recommended that this course be followed wherever possible. Westcoast acknowledged that it still had some additional environmental work to do, particularly with respect to diversions from the ANG right-of-way.

The witness for Westcoast admitted that environmental consideration had not been given to the location of the proposed right-of-way in a steep valley between mileposts 34 and 36, where the ANG right-of-way was located along a narrow bench on a steep slope.

Land Use

In a preliminary environmental overview, the Applicant's consultant described the parks and their facilities in the vicinity of the proposed pipeline in northern British Columbia. Only the Liard River Hotsprings Provincial Park would be directly affected as the proposed pipeline route would pass through the park. He recommended that construction activities in this area should be strictly controlled through close supervision.

The preliminary environmental overview by the Applicant's consultant involved a description of the existing agricultural land-use and an estimation of the land capability for the development of agriculture in the

area to be traversed by the proposed pipeline. He expressed the opinion that neither short-term use nor the long-term productivity of agricultural land would be affected by the proposed pipeline.

In southern British Columbia the proposed pipeline would cross two parks, namely Crow's Nest Provincial Park and Ryan Provincial Park. The consultant for Westcoast stated that, whereas both parks had been crossed by other utilities including the existing 36-inch pipeline of ANG, further reductions in usable park area could be serious. The proposed pipeline would also cross two park reserves, namely Yahk Park Reserve and the Plumbob Park Reserve. The witness for Westcoast stated that, based on discussions with the environmental land use committee and the Lands Branch of the British Columbia government, the provincial government was not receptive to granting another right-of-way through provincial lands in southern British Columbia, and that the right-of-way had not been negotiated.

He reported that no major concerns with respect to agriculture had been identified for the southern British Columbia section of the proposed pipeline. It was stated, however, that it was Westcoast's practice to leave plugs in the ditch in farmlands or grazing areas so that livestock could cross the ditch during the construction period.

Wildlife

The preliminary environmental overview by the Applicant's consultant described the existing biological setting in northern British Columbia. This was based on literature reviews, personal communications, and on field studies consisting of aerial surveys and ground checks along the portion of the route from the British Columbia-Yukon border to Toad River. Because of the short time given for preparing the environmental overview, no field studies were done for the proposed pipeline route from Toad River to the British Columbia-Alberta border. Under cross-examination Westcoast stated that additional studies would have to be done to bring the Toad River to the provincial border portion of the proposed pipeline at least to the same level of detail as the environmental report which had been prepared for the originally proposed 42-inch diameter system.

The report listed the mammalian species and habitats found along the proposed pipeline corridor and estimated their sensitivity to pipeline construction. The major concerns with respect to the effect of pipeline construction on mammals that were cited in the report were:

habitat denial, including the destruction of denning sites of carnivores in the Kloye to Trepanier Creek and Aline Lake areas;

reduction of mountain sheep home range in the Dunedin River Valley;

disturbance of wildlife during critical periods of the

year, for example, overwintering moose at the Upper Liard River crossing, Dunedin River Valley, west of Steamboat Mountain, west of Prophet River Crossing, and Beatton River Valley, overwintering elk in the Nordquist Lake Area and west of Steamboat Mountain, overwintering stone sheep in the Dunedin River Valley, overwintering caribou west of the Prophet River and overwintering deer west of Steamboat Mountain; and

increased harvest of mammals resulting from improved public access due to the proposed all-weather road to the compressor station at Nordquist Lake.

The environmental consultant for Westcoast recommended that surveys of denning areas be conducted to locate denning sites and said that minor changes in alignment might be required to ensure that active dens were not disturbed. Scheduling construction activities for early winter and strictly confining activity to the right-of-way were recommended to minimize adverse impact on overwintering ungulates. Access to the all-weather road should be controlled to minimize its impact on ungulates in the Nordquist Lake area. The elk herd in the Nordquist Lake area should be studied in greater detail, especially during the winter, and the process of revegetation in the winter range should also be assessed.

The preliminary environmental overview contained a description of bird habitats along the proposed pipeline corridor including a list of bird species which were known to occupy those habitats. Areas of bird habitat

found along the portion of the proposed pipeline from the Yukon-British Columbia border to Toad River which might be sensitive to pipeline construction activities were listed as: Portage Brule, Smith River and Toad Valley raptor nesting habitat and waterfowl nesting areas at Leo and McKinney Lakes, Clem, Jim and Dan Lakes, McNab Lake, Tsinitla and Tatzille Valleys and Nordquist and Aline Lakes.

The consultant for Westcoast said that for the portion of the pipeline from Toad River to the British Columbia-Alberta Border he had not identified sensitive bird habitat in sufficient detail to tell the Board whether any route relocations would be required.

Disturbance of raptors and waterfowl during critical periods was said to be the major concern with respect to the effect the proposed pipeline construction would have on these birds.

Disturbance of raptors would lead to avoidance or desertion of nesting sites resulting in a decline in raptor population.

Westcoast's consultant recommended that aircraft corridors should be established to minimize air traffic over the nesting habitats of peregrine falcon, golden eagle, bald eagle and osprey between 1 March and 1 September, and that all ground activity within a two-mile buffer zone around the nesting habitats of peregrine falcon, golden eagle, bald eagle and osprey should be avoided. He also recommended a field program to determine the species and

numbers of raptors using the identified sensitive cliff areas and to more accurately delineate the sensitive areas and mitigation procedures.

In order to minimize disturbance to waterfowl nesting areas, the consultant for Westcoast recommended that between 1 April and 31 July, minimum flight elevations over water should be 1000 feet and direct human disturbance of nesting areas at ground level should be prohibited; crew and vehicle movements should be strictly limited to the right-of-way. Under cross-examination he indicated that his approach was to recommend relocation of the pipeline right-of-way and ancillary facilities away from raptor habitat or waterfowl habitat. This would reduce the demand for long-term studies to arrive at mitigative measures. However, the importance of the waterfowl nesting habitats identified in the study area, particularly in the southern section of the northern route, should be determined by inspection during the nesting season.

In the preliminary environmental overview, the fish species occurring in the waters in the section of the proposed pipeline route from the Yukon-British Columbia border to Toad River were determined from published distribution records, from information obtained from local residents, from guides operating in the region, and from consultations with British Columbia Government personnel. Field work of the consultant consisted of inspections by helicopter conducted in September and October 1976 at the proposed pipeline water crossing sites. Where possible,

various parameters of fish habitat including fish presence were recorded.

For the Toad River to the British Columbia-Alberta border section of the proposed pipeline, the description of fish species potentially occurring in this area was obtained from the same published sources as were used for the other pipeline section; however, due to the short time available for producing the environmental assessment on this section of the proposed pipeline, no field studies were undertaken. Spawning, rearing and overwintering habitat was inferred by the environmental consultant from map examination and by analogy with watercourses in similar terrain and drainage areas along the other section of the proposed route. The consultant recommended that the location and importance of fish overwintering sites should be determined by site-by-site investigation, especially along the southern section of the northern route. This information was needed to mitigate impacts.

Under cross-examination, Westcoast's consultant said that additional studies remained to be done to fill information gaps which exist with respect to fisheries along the proposed route. Studies should also be done to determine fish overwintering areas at the proposed stream crossing sites where construction was to take place in the winter, and to obtain information on the timing of migration, spawning and fry emergence of Arctic Grayling in the streams between the Dease River and Tatisno Creek which would be crossed by the proposed pipeline.

Types of sensitive aquatic habitats along the proposed pipeline were listed as:

small watercourses where fish require unobstructed passage to make the best use of available spawning and rearing habitat;

clean gravel spawning habitat which support fish species, the eggs and fry of which are dependent upon continuous movement of water through the gravel for survival and where sediment deposition would cause smothering;

overwintering habitat and pools which maintain fish populations when the remainder of the stream is frozen; and

watercourses with bedrock substrate where intense shock waves generated during blasting operations could destroy fish.

Sensitive fish habitats were identified for the portion of the proposed pipeline route from the British Columbia - Yukon border to Toad River, and a rating of the probable impact of the proposed pipeline construction on those aquatic habitats was determined. For the portion of the proposed pipeline route from Toad River to the British Columbia-Alberta border, Westcoast's consultant did not rate the impact that the proposed pipeline construction would have on aquatic habitats in this area.

He said that field investigations to determine the possible impact of the proposed pipeline construction on the fishery potential of the watercourses in this area were necessary. The consultant recommended that

there should be strict compliance with the environmental protection measures cited in Westcoast's procedure manual.

With respect to mammals in southern British Columbia, Westcoast's environmental consultant stated that there were two areas of concern: Flathead Ridge, milepost 30, and the Wigwam River Valley, milepost 35 to 40. Flathead Ridge is the summer range for moose, elk, deer, mountain sheep and mountain goats. Moose calving and deer fawning occurs about June and construction activities planned for June would cause temporary displacement of animals and upset calving and fawning. The evidence also showed that nursery bands of mountain sheep remained in the Wigwam River Valley until July and were very sensitive to movements and noise during this period. Westcoast's consultant recommended that the Applicant should consider constructing the proposed pipeline from west to east rather than from east to west as had been planned, so as to delay construction activities in the Wigwam River Valley and Flathead Ridge areas until late summer which would be a less sensitive period.

River crossings in the Elk River areas would be scheduled for late fall to avoid wintering ungulates. A number of mineral licks were identified along the route particularly in the area of Michel Creek, the Wigwam River Flats and Teepee Creek. Westcoast's consultant recommended that the mineral licks be avoided during pipeline construction to prevent alteration of the habitat and destruction

of the mineral licks. The precise location of the mineral licks was not yet defined in relation to the right-of-way.

In the southern British Columbia portion of the pipeline route, the view of Westcoast's environmental consultant was that waterfowl, raptors and tree nesting bird species would be disturbed by pipeline construction. Wetlands in the pipeline study area had generally moderate to low capability for waterfowl production and, since there were few wetland areas in this region of the East Kootenays, it was important to retain as many of these as possible; therefore, Westcoast's consultant recommended avoidance of these wetland areas. It was pointed out that osprey, an endangered species, was known to nest near the existing pipeline right-of-way at Kikomun Creek, milepost 48.3. The consultant was concerned that construction between April and July would result in nest abandonment. The impact on tree nesting birds as a result of additional clearing would not be significant.

With regard to the impact of pipeline construction on fish populations in the southern British Columbia area, Westcoast's Consultant said that disturbance or destruction of spawning habitat, rearing habitat or both by proposed construction activity within the stream channel or by increased siltation, would result in increased mortality to fish eggs and a reduction in the productivity of a fish population.

To minimize the disturbance to fish populations, Westcoast's consultant recommended strict adherence to

Westcoast's environmental construction specifications for stream crossings especially during spring migration and spawning period from mid-April through June and the fall period September through November. For the proposed stream crossings currently scheduled for winter construction, he recommended that assessments of fish populations in the stream in the vicinity of the proposed crossing should be done in the winter prior to the year of construction and special mitigative measures should be developed, if required.

Vegetation

Studies of vegetal communities along the proposed route in northern British Columbia were based upon aerial photo interpretation, field studies and literature survey, and the types of vegetal communities were summarized in tabular form in the environmental report of the Applicant's consultant.

In the section of the northern route between the Yukon border and Toad River, three unusual ecosystems of particularly high sensitivity were identified by the consultant. They were the Portage Brule Hotsprings at milepost 79, Liard River Hotsprings at milepost 113 to 114, and Deer River Hotsprings at milepost 125.

At Portage Brule Hotsprings, three localized herb and grass communities were found near the hotsprings, and the consultant explained that heavy use of the area by construction personnel could easily destroy the limited

occurrence of these unusual communities. He recommended that these hotsprings be out of bounds to construction personnel in order not to degrade this sensitive site.

At the Liard Hotsprings, the proposed pipeline route approaches within one kilometre of the hotsprings. According to the consultant, it is possible that the drainage of the hotsprings might be disturbed by the installation of the pipe to the south of the park, resulting in possible changes in the floral distribution. The consultant recommended protection of the drainage pattern from the hotsprings at milepost 113, further studies to determine mitigative measures associated with protection of the drainage patterns, and control of activities to protect the unique ecosystem. It was further recommended that arrangements should be made with the Park Warden at the Liard River Hotsprings Provincial Park for the use of park facilities by construction personnel in order to avoid overuse and possible degradation of the hotspring pools and associated sensitive sites.

At the Deer River Hotsprings, the unique, luxuriant vegetation would be highly sensitive to damage by trampling. The consultant recommended that these hotsprings, about eight kilometres south of the proposed route, should be out-of-bounds to construction personnel.

In the section of the northern route between Toad River and the Alberta border, three areas of ecological interest were noted in the environmental report, which stated that none of them would be expected to be affected by pipe-

line activities because of their distance of nine to 18 kilometres from the proposed line.

With respect to restoring the right-of-way, the consultant recommended that recontouring and revegetation of visual scars should be undertaken, especially in areas of high scenic potential, where erosion control is important in maintaining surface stability, or where the natural re-establishment of vegetative surface cover would be slow. Westcoast stated that its criteria for artificial revegetation included the employment of recontouring and revegetation where natural revegetation was insufficient or too slow for the control of surface erosion. It was generally expected that artificial revegation would be required on severe slopes to assist other erosion control methods such as water breakers and sand bags.

Westcoast stated that it had successfully revegetated portions of its pipeline system where seeding and fertilizing was applied as part of winter work, or as part of a normal summer or fall construction and maintenance program. According to the procedures manual submitted to the Board, a standard environmental protection procedure was that areas would be indicated on the construction alignment sheets where the right-of-way would require revegetation for reasons of either soil stability, aesthetic or wildlife support, or at the request of the landowner or tenant or appropriate government agency. The procedure specified that Westcoast would be responsible for providing appropriate seed mixtures and planting schedules.

Along the proposed route in southern British Columbia, the environmental consultant reported that no unusual ecosystems were identified, although some vegetal community types were of limited distribution and should be preserved if possible.

Water Supplies, Pollution, Toxic Materials

Westcoast stated that all sewage facilities would meet the requirements of provincial legislation which was summarized in an environmental procedures manual submitted to the Board. The manual also included procedures with respect to the control of air pollution, the disposal of construction debris and solid waste, and the handling, storage and disposal of toxic materials. Westcoast stated that it had used lagoons for construction camps, and both septic tanks with leaching fields and a package sewage treatment plant at compressor stations. Specifications were included in the environmental procedures manual, which defined those responsibilities which the contractor would assume for pollution control, and which would be part of the contract documents.

Noise

In northern British Columbia five compressor stations would be required, each having a capacity of 48,000 H.P. The Applicant stated that it expected the noise levels of these compressor stations to range between 60 - 65 dBA at the fence line. Westcoast proposed to use exhaust and

intake silencers, and said that the above ground pipe would be wrapped with lead loaded vinyl in order to eliminate the very high frequency noise levels coming from the pipe. Westcoast stated that, for two of these compressor stations that would be situated close to the highway, the effect and the overall significance of the noise at these sites would have to be evaluated.

The effect of the noise levels upon wildlife at Stations 1, 2 and 3 could require mitigative measures in addition to the standard, special silencers to lessen the noise.

Archaeology

Westcoast provided a description of the locations of potential sites of archaeological significance along the portion of the route in northern British Columbia. Current locations of archaeological resources could only be guessed at and no known archaeological or historical sites were expected to be affected by construction activities. Westcoast recommended that the Archaeological Sites Advisory Board be notified prior to construction so that appropriate surveys and monitoring could be undertaken.

Westcoast recognized that some degree of impact on archaeological sites would be inevitable and that some damage would occur. Westcoast's consultant recommended that detailed field studies of identified sensitive archaeological and historic sites should be conducted to confirm or modify impact predictions.

Westcoast stated in its procedures manual that it would comply with the British Columbia Archaeological and Historical Sites Protection Act 1972.

Upon cross-examination, Westcoast indicated that an archeological survey would be conducted with the assistance of the British Columbia Provincial Archaeologist in certain areas after the completion of clearing and grading operations, and that, prior to the commencement of construction, detailed field investigations would be carried out to refine the results of the initial survey. Sites of archaeological significance identified during construction would be flagged for detailed investigation by the Provincial Archaeologist. Westcoast also confirmed its policy to retain an archaeologist on site if areas having high archaeoligical potential were identified during construction, so that the necessary salvage operations and identification of sites for future investigations would be properly done.

With respect to the route in southern British Columbia, Westcoast indicated that prehistoric and historic sites of known or potential significance had been identified and these sites would be protected against further impact if the provincial archaeological requirements were complied with.

Other Environmental Concerns

With respect to visual impact of the route in northern British Columbia, Westcoast's consultant recommended that clearing techniques which minimize linear

views be employed, and that clearing and grading in areas of good recreational potential be kept to a minimum.

It was recommended by the Applicant's consultant that after completion of construction activities the recreational areas be regraded to blend with the surrounding landscape.

Westcoast stated that vegetative buffer zones would be provided in all areas where the right-of-way was in close proximity to the highway and recreational areas. Two specific areas were identified by Westcoast as locations where it might not be possible to leave vegetative buffer zones to reduce visual impact. The first location was from milepost 0 to 57 where a long stretch of the right-of-way would be visible from the highway. Westcoast said that some changes to the landscape would eventually be made when construction of the proposed dams by B.C. Hydro were completed.

The second location was between the upper crossing on the Liard at milepost 57 and the Liard River at milepost 115, where the right-of-way would be closest to the highway. The Applicant said that further work to resolve the visual impact at certain locations where long stretches of the right-of-way would be visible were being considered and stated that there would be situations that would require implementation of other measures to maintain an aesthetically pleasing view, such as revegetation or landscaping and that maximum use of such procedures would be included in the construction specifications.

With respect to visual impact of the route in southern British Columbia, Westcoast indicated that if revegetation were employed, the visual impact would be minimized. Westcoast also stated that it did not anticipate any impact on recreational activities due to pipeline construction.

6.3.2.2 Environmental Inspection and Supervision Program Organization

The Westcoast environmental procedures manual described a program of environmental inspection and supervision with the objectives of ensuring that the environmental procedures described in the manual and in the construction specifications were properly implemented in the field, and of providing advice and direction for handling unforeseen environmental problems which would arise during construction.

Westcoast would have one environmental inspector on site for each spread at all times to report to Westcoast management on the implementation of environmental protection procedures and on the environmental effects of construction activities. Concurrent with construction, a program of assessing the effectiveness of the adopted mitigative measures, and of monitoring the impacts identified in the environmental impact assessment would be carried out by Westcoast personnel with the requisite expertise, or by consultants hired for that purpose. This program would provide a basis for improving or developing new mitigative

measures. It was also stated in evidence that Westcoast proposed to coordinate with the Provincial Special Services Division and the Federal Environmental Protection Service regarding environmental matters during the construction of the proposed project.

Authority and Responsibility

The Westcoast environmental procedures manual included standard environmental protection specifications for pipeline construction which defined the contractor's responsibilities. The specifications stated that Westcoast would retain the right to shut down the contractor's operation if final clean-up of the right-of-way was not proceeding on schedule.

The contractor would be required to inform Westcoast immediately if the pipe trench intersected any historic, archaeological, or palaeontological sites; Westcoast would immediately advise the contractor how to proceed and would inform the appropriate provincial authorities. The environmental supervisor of Westcoast would also have the authority to alter the construction methods or schedule, if environmental or cultural values were to be adversely affected.

Environmental Emergencies

The Westcoast standard environmental protection specifications defined the contractor's responsibilities with respect to environmental emergencies. According to

the specifications, the contractor would be required to conform to all relevant legislation on fire control and suppression, and in particular to the British Columbia Regulations for Forest Fire Prevention. In the event of an environmental emergency, it would be the contractor's responsibility to act immediately to contain any damage and neutralize the emergency, and to inform Westcoast who would direct clean-up and restoration of any damaged areas.

Post-Construction Monitoring and Surveillance

Westcoast proposed that the regular pipeline patrol program would also monitor environmental concerns and take maintenance action where necessary. Westcoast said that particular problem areas might have their own monitoring programs designed according to need and undertaken by either Westcoast personnel or consultants engaged for that purpose. It was stated that the preferred methods of right-of-way inspection, in order of decreasing preference, were by foot, all-terrain vehicle, and low-flying aircraft. Aircraft patrols would maintain a minimum elevation of 1000 feet above ground where close ground inspection was not required or in areas of wildlife concentration.

6.3.2.3 Views of the Board

With respect to the proposed route in northern British Columbia, Westcoast did not describe the environmental mitigative measures in detail for the portion of the

route between Toad River and the Alberta border. However, Westcoast's consultant has adequately pointed out the environmental work that remains to be done. The Board accepts Westcoast's testimony that there will be sufficient time to complete the environmental work and to incorporate the consultant's recommendations into the environmental protection program prior to construction. If this work is completed and incorporated into the construction specifications, the environmental effects of the proposed project would be adequately controlled.

The Board notes Westcoast's statement in the application that partial environmental impact assessments were prepared for this proposed pipeline in northern British Columbia. The Board recognizes that the environmental aspects of the part of the route between Toad River and the Alberta border received a brief study, as compared to the detailed study which was made of the part of the route between the Yukon border and Toad River in connection with the withdrawn 42-inch diameter pipeline proposal. If a certificate were issued, the Board would require the Applicant to submit for approval prior to final design of the facilities, a complete and balanced environmental report. Such a report should include the further environmental studies recommended by the consultant in its report, and all environmental mitigative measures relevant to the proposed route in northern British Columbia.

The Board would include as a condition of any certificate a requirement that Westcoast implement the re-

commendations that would be contained in any final environmental impact assessment report prepared by its consultant.

With respect to locating the permafrost areas along the northern route, and determining the thickness of permafrost in those areas, considerably more assessment work is required. The theoretical study is preliminary and provides only a useful starting point for determining the location of permafrost conditions.

The Board is cognizant of the fact that the Applicant has 12 to 15 years of experience in constructing and operating pipelines in this area of northern British Columbia which fringes on the discontinuous permafrost zone, and that over this period the Applicant has acquired considerable experience in mitigating the effects of thermal degradation of these shallow ground ice deposits. Should a certificate be granted, the Board would expect the Applicant to apply all those procedures it has developed in the past to ameliorate such effects.

The Board notes the Applicant's intention to acquire more definitive data on the soil and fertilizer requirements for revegatation at the Lower Liard, Toad, and Prophet River crossings, and that Westcoast anticipates that artificial revegetation may be a very desirable measure to mitigate surface erosion at these locations.

The Board notes that the Applicant's procedure manual outlines, in the contractor's specifications, that the topsoil shall be removed and kept separate from the subsoil, and that the topsoil shall be returned to its

original state in the clean-up operation. If a certificate were issued, the Board would require the Applicant to come to an agreement with each farmer as to whether, when, and the manner by which the topsoil and the subsoil would be separated and restored.

With respect to noise emmissions from the proposed new compressor stations on the northern part of the proposed route, the Board would require Westcoast, as a condition in a certificate, to measure and report to the Board the noise levels at the compressor station fence lines, and to report on any adverse noise effects upon the public and wildlife from the compressor stations close to the highway and to the ungulate winter range in the Nordquist and Aline Lakes area.

With respect to the proposed pipeline in northern British Columbia, as a condition of a certificate, the Board would require that Westcoast submit, for Board approval, its plans for environmental inspection and supervision during construction, including the locations and protective measures for the areas of specific environmental concern, its plans for monitoring and surveillance of post-construction effects upon the environment, and its contingency plans for dealing with environmental emergencies.

Concerning the pipeline proposal for southern British Columbia, the environmental report describes inadequately the environmental impact of the proposal and the mitigative measures that would be necessary to avoid or lessen potentially adverse impact.

The environmental reports prepared for a nearby pipeline right-of-way, and relied upon by Westcoast's consultant, cannot be considered to be fully relevant to all of the environmental aspects of this application, and on this basis, the environmental report submitted by Westcoast is not satisfactory to the Board.

The environmental problems associated with developing a new right-of-way, such as clearing of the land, ensuring slope stability at the river crossings, and minimizing erosion of the terrain, have not been studied in sufficient detail by the Applicant.

Having considered Westcoast's evidence concerning the multiple use of the narrow valleys along this route and the possible transportation uses that could be developed in the future, as well as the environmental considerations of a new right-of-way along the whole route, the Board concludes that it would not be desirable to develop a new right-of-way.

The Board notes the consultant's statement that it submitted only a preliminary environmental assessment of the southern British Columbia section of this project. If a certificate were issued, the Board would require the Applicant to submit a new, detailed environmental impact assessment of the proposed construction and operation of the pipeline, including all relevant measures to mitigate potentially adverse effects.

Further, upon examination and approval of such a report, the Board would issue orders requiring the implementation of appropriate environmental protection measures.

6.3.3 TRUNK LINE (CANADA)

Trunk Line (Canada)'s proposal consists of approximately 806 miles of 48-inch, 42-inch and 36-inch diameter pipelines, and eight compressor and three metering stations.

The Applicant provided evidence on the environmental setting along the proposed route, the environmental impact of pipeline construction and operation, and the measures to mitigate the impact. The Applicant had modified its construction, operation and maintenance procedures, so as to implement the environmental and archaeological mitigative measures which were recommended by its consultant. The Applicant would also implement the consultant's recommendations which would be made during the construction and operation of the proposed pipeline.

The Applicant believed that the proposed pipeline could be constructed and operated without any significant environmental effect.

6.3.3.1 Environmental Impacts and Mitigative Measures

Terrain

The Applicant stated that the terrain was evaluated in part by an analysis of aerial photographs and in part by field work. The major terrain concerns would be slope instability on major sections in river valleys and upland areas, erosion on steep

slopes, and scour at river crossings. The Applicant identified the sites along the route where these problems would be encountered.

River crossing locations were selected to avoid steep banks as much as possible. However, at the Peace, Smoky and Simonette Rivers steep valley walls would be present, and significant landslide activity had taken place in the past in these areas. Since the magnitude of the earth movements was fairly massive, regrading would not be practical. The Applicant's consultant acknowledged that considerably more work would have to be done to prevent such terrain problems in these areas.

Both the clearing of the right-of-way and construction in sensitive areas would take place in winter. Mitigative measures to control erosion and to maintain the stability of slopes would include the placement of slash on side hills in order to minimize cross slope drainage, and the installation of flow breaker berms on steep slopes to prevent drainage along the alignment of the pipe trench. In areas of steep gradients, the organic soils would be replaced to facilitate regeneration of vegetation, and ponding of water on or above slope sections would be prevented through appropriate grading to prevent the potential build-up of water pressures within slope soils.

The proposed pipeline route in southern Alberta would cross short sections of stabilized sand dunes, and revegetation in this area would be considered for minimizing wind erosion.
With respect to hydrology, river bottom scour would be an environmental concern, especially in the Smoky River. In general, a minimum embedment depth of about five feet to the top

of the pipe was considered by the Applicant to be adequate at all crossings except the major rivers. The Applicant acknowledged the importance of restoring the granular pavement lining of all the river beds to their natural state after laying the pipeline.

The Applicant realized that the Smoky River crossing could have a potential for significant bottom scour and said that there would be ample time prior to construction to do the additional work necessary to estimate the extent of scour.

Other environmental concerns relating to hydrology involved development of new drainage channels, and the effect of possible river bank and bed erosion. The environmental effects of these changes would be minimized by appropriate modifications to construction procedures.

Land Use

Trunk Line (Canada) provided a list of the parks in the vicinity of the proposed route including the locations, facilities and the name of the agency holding administrative responsibility over the parks. The proposed pipeline right-of-way would not cross any public recreation area.

The Applicant submitted a summary of the percentage distribution of land use along the proposed right-of-way, as follows: woodlands and brush - 38, pasture and rangeland - 38, cultivated lands - 20, swamp and muskeg - 2, rivers - 1, and roads - 1.

In cultivated areas, the proposed pipeline would utilize an existing right-of-way which would be widened. Trunk Line (Canada) would compensate farmers for any loss or reduction of

net income as a result of pipeline construction. Trunk Line (Canada) described the procedure that would be used for stripping topsoil on agricultural lands prior to trenching, for stockpiling it, and for returning it to the trench crown after pipe installations.

Wildlife

Trunk Line (Canada) described the biotic regions through which the proposed pipeline right-of-way would pass, and the mammal species inhabiting these regions. Wildlife habitats would be surveyed prior to construction which would be scheduled so as to avoid disturbance to ungulates during their most sensitive periods.

The survey would be done allowing adequate time to incorporate any changes resulting from the findings into the construction scheduling. Trunk Line (Canada)'s schedule would be flexible enough to avoid late winter construction in sensitive areas.

In order to minimize the impact of pipeline construction on antelope and elk, construction would take place in the summer, fall and early winter especially between the Peace and North Saskatchewan Rivers and in the eastern prairies. This construction schedule would prevent stress during the critical periods of pronghorn antelope. Late winter construction would take place only through muskeg areas. The Applicant would survey antelope, moose and elk wintering areas in river valleys, prior to construction to determine the number of ungulates likely to be present during their critical periods. Construction would be

scheduled so as to avoid disturbance to these ungulates during their critical periods. Disturbance due to aircraft would be minimized by adhering to consistent flight paths and by flying at maximum feasible altitudes. Deliberate harassment and irresponsible use of ground vehicles, such as snowmobiles, would be prohibited.

The Applicant's descriptions of the three ecological regions to be crossed by the proposed pipeline included listing of the reported species of birds. Bird fauna within the ecological regions of the boreal and the sub-alpine forests had not been well documented in the literature. Data on specific locations of raptor habitats were lacking. The pipeline right-of-way would be surveyed in detail prior to construction to identify raptor nesting sites and any identified sites would be avoided during the nesting season.

Waterfowl would be protected by minimizing pipeline activities in the vicinity of designated areas of importance, during the time of their staging and breeding. Trunk Line (Canada) would carry out studies to determine the periods of greatest sensitivity to waterfowl of pipeline-related disturbance and to develop suitable mitigative measures. Compressor stations would be located two miles away from raptor and waterfowl nesting areas to minimize their impact on these birds.

The proposed pipeline would cross aquatic systems in the Peace, Smoky, Athabasca, North Saskatchewan, Red Deer, Bow and Oldman River basins. Trunk Line (Canada) stated that there was little information on the distribution, relative abundance, critical spawning and nursery areas, migration routes and

overwintering areas of fish (particularly as they relate to the proposed pipeline crossing sites). The Applicant's consultant stated that each pipeline crossing site would have to be examined to determine when spawning fish would be present, before making recommendations to Trunk Line (Canada) with respect to construction scheduling.

Trunk Line (Canada) stated that streams and rivers containing spring-spawning fish species would be crossed in the winter. The crossings would be completed prior to the spawning runs in late April and May. In the case of streams and rivers containing fall-spawning fish species, pipeline crossings would be built in summer and completed prior to the spawning runs in October and early November.

The impacts of pipeline construction on aquatic habitats would be increases in silt load, removal of river substrate, blockage of streams to migrating fish, accidental spills of toxic substances, and effect of blasting and hydrostatic testing. Siltation would be minimized by curtailing in-stream vehicular activity, by clearing vegetation from river banks just prior to construction, by terminating pipeline trenching at least 300 feet from any stream crossing until the actual crossing was to be initiated, by using dykes, ditches and settling ponds in areas of excessive erosion, by stabilizing all river banks, and by maintaining a 300-foot strip of undisturbed land where possible along all aquatic systems paralleled by the pipeline corridor. To minimize the impact on aquatic habitat of river substrate removal, the proposed pipeline would be covered with material

similar to the river substrate. Removal of material from river gravel beds for construction purposes would be avoided.

To prevent blockage of spawning or nursery areas in streams crossed by access roads, culverts would be installed to permit uninterrupted water flow at volumes which would not injure or restrict fish movement. The culverts would be installed at the level of the stream substrate.

Storage sites for fuels and chemicals would be so chosen as to avoid accidental spills into waterbodies. Machinery would not be fueled in areas where any possible spills would reach watercourses. Domestic sewage would be handled so as not to contribute to the pollution of surrounding waterbodies. Any blasting and all hydrostatic testing would be conducted so as to minimize impacts on fish populations. Pipeline construction would proceed with all due consideration to protecting existing fishery practices in the area. The Applicant would comply with all applicable government regulations related to fisheries.

Vegetation

Trunk Line (Canada) described the vegetal communities along the proposed pipeline route. These communities were boreal mixed-wood, spruce, pine, poplar, subalpine forest and prairie grasses, as well as the agricultural lands.

The Applicant expressed concern with the removal of the vegetal mat, particularly on fine soils on slopes susceptible to erosion, and on sand and gravel deposits susceptible to wind erosion. Vegetation on areas such as steep slopes and river

banks would be hand-cleared where machanical methods would be harmful to the vegetal mat.

The Applicant would revegetate all disturbed areas, except in cultivated lands, to control erosion, thermokarsting, slumping, and other forms of terrain damage. Prairie soils, which are susceptible to wind erosion and to "blow-outs", would receive particular attention.

On crown lands, revegetation would be carried out according to the specifications of the Alberta Department of Lands and Forests. Native and agronomic grasses would be used to revegetate the pipeline crown, borrow sites and other disturbed areas, except the cultivated lands. Fertilizers would be added where warranted.

A three-year revegetation study was commissioned in 1976 specifically to determine the optimum reclamation procedures for the right-of-way in the discontinuous permafrost zones and on potentially erodible slopes. Trunk Line (Canada) stated that there would be sufficient time to incorporate the results of these studies into the construction specifications.

Vegetation on the right-of-way in forested areas would be controlled during operation by mulching or by using the herbicide 2,4-D. The evidence was that further research was being conducted on this problem.

Wildfire in the vegetal communities was recognized in the environmental report as an environmental concern, and Trunk Line (Canada) stated that it was important that fires be prevented during pipeline construction.

Water Supplies, Pollution, Toxic Materials

With respect to waste disposal from compressor stations, Trunk Line (Canada) would use established methods and would comply with the Alberta standards for sewage effluents and receiving water quality to minimize pollution. Machinery would be fueled, and fuels and chemicals stored, so as to prevent any spillage from entering a water course.

Trunk Line (Canada) presented evidence on the emission of air pollutants from compressor station turbine exhausts. The natural gas used would contain not more than one gain of sulphur per hundred cubic feet of gas so that concentrations of sulphur dioxide emissions would be low. The exhaust gases would contain 13 ppm of carbon monoxide, about 5 ppm of unburned hydrocarbons mainly methane, and 209 ppm of nitrogen oxides. The Applicant stated that the planned compressor stations would have very short stacks, and that during high winds, the dispersion of the air contaminants would be reduced accordingly. The Applicant used the Pasquill dispersion method to calculate theoretical ambient air concentrations of nitrogen oxides resulting from the emissions. The maximum concentrations obtained by this method were 0.2157 ppm for a flat treeless area and 0.8008 ppm assuming a tree height of 40 feet. These concentrations occurred within a radius of 2000 feet of the stack and with high wind speeds causing plume downwash. The Applicant claimed that nitrogen dioxide would not exceed 20 per cent of the total oxides of nitrogen with the remainder being largely nitric oxide, so that nitrogen dioxide levels would remain within the acceptable federal ambient air quality objectives. Upon cross-examination,

Trunk Line (Canada) stated that it would meet the Alberta requirements for air pollution control.

Noise

The Applicant proposed to construct eight compressor stations, seven of which would be 32,700 H.P. each, and one would be 4,000 H.P. Four of these compressor stations would be installed by 1981 and the remaining four would be installed by 1983.

The noise sources which would be controlled at each compressor station were the gas turbine inlet and exhaust, the turbine and compressor casing noise inside the building, the external oil coolers, bleeds and vents, the aerial cooler fans and the yard piping. The building structure including walls, ventilators, doors and windows would be designed so as to limit the transmission of noise from inside the building. The externally-mounted coolers and vents would be provided with low speed fans, mufflers and/or silencers to limit their noise contribution. With these control measures, all noise sources operating simultaneously would produce a maximum level of 60 dBA measured at the station fence line.

Although the specific compressor station sites had not been identified, the Applicant would not build any station within 500 feet of an existing private residence. In an urban location, all noise would be muffled to the extent that no measurable changes in the existing noise environment would occur.

Archaeology

Trunk Line (Canada) provided evidence on the environmental setting, on environmental concerns and mitigative procedures with respect to archaeological resources along the proposed pipeline right-of-way. The proposed pipeline route would parallel an existing Trunk Line pipeline and in many areas would be adjacent to archaeological sites. Some archaeological sites had been directly affected by the existing Trunk Line pipeline, and further impact on a large number of prehistoric sites was expected to occur during the course of actual construction of the proposed pipeline. It was anticipated that other potential prehistoric and historic sites would be discovered during the course of pipeline construction. Historic sites in the area of the proposed pipeline construction might relate to the fur trade, agricultural use or other resource extraction activities or logging.

In the northern sector, there was a high potential for prehistoric sites at the crossing of the Peace and Smoky Rivers. A single historic site on the northern side of the Peace River would be affected by the construction of the proposed pipeline. During the aerial survey of the northern sector, two historic sites consisting of abandoned buildings were noted adjacent to the proposed route. Depending upon the final alignment of the proposed route, these sites could be affected.

A large number of prehistoric sites in the southwestern section were directly affected by the existing pipeline and further impact would result through inclusion of the proposed

pipeline on the existing right-of-way, and along the additional right-of-way that would be required.

The value of known prehistoric sites in the southwestern section of the proposed pipeline varied considerablly. Sites were located in this area on valley bottoms, valley sides and tops, stream terraces, hill tops and mountain tops and sides. A generally high potential for the occurrence of prehistoric sites existed along the southwestern section of the proposed pipeline route. Specific areas of the existing pipeline in the southeastern section also had a high potential for containing prehistoric sites.

Trunk Line (Canada) stated that its archaeological surveillance proposals were the same as those for its portion of the Foothills Project. A complete archaeological survey along the proposed route had not been done. The archaeological program so far had been based upon studies of existing literature. A further program of archival and library research, field studies and monitoring of the pipeline ditch and sidewalls by a professional archaeologist, along selected portions of the pipeline, where long depositional history was indicated, has been recommended. The implementation of these proposed mitigative measures would reduce disturbance to these non-renewable resources and, in some cases, reduce the destruction resulting from pipeline construction activities.

Other Environmental Concerns

The Applicant provided evidence on the setting and concerns respecting public recreational areas, and on aesthetics.

Those public recreational areas that were within a six mile wide corridor centred on the pipeline, and parks situated less than one mile from the pipeline, were identified.

The Oldman River and Crow's Nest Pass areas, and the mountain sections to the north, had the greatest recreational potential among the areas to be crossed by the proposed pipeline. Much of the recreational potential was under the categories of general wilderness camping, hiking, nature studies, hunting, fishing, or whitewater boating.

The impact of pipeline construction on the recreational areas would be short-term in nature, such as noise disturbance and possible traffic congestion during the time of actual construction.

With respect to aesthetics, the visual impact of the completed line would be minor as the line would be buried and the surface vegetation of the right-of-way restored.

6.3.3.2 Environmental Inspection and Supervision

Trunk Line (Canada) stated that a contractor training program would be conducted to ensure that fires and other environmental disturbances were not caused by carelessness or ignorance. The Applicant's archaeological consultant recommended a program to educate pipeline field workers so as to enable them to recognize potential archaeological sites in areas not selected for monitoring by professional archaeologists.

Trunk Line would maintain control over construction on behalf of the Applicant. Full-time representatives of Trunk Line (Canada) would be assigned to each inspection crew to monitor

environmental concerns and to ensure compliance with Trunk Line's construction specifications and with all applicable laws and regulations. The environmental representative would have the authority to stop work if in his opinion it became necessary. Trunk Line would apply its existing contingency plans with respect to oil spills. At least one spray-nozzle-equipped tank truck would be kept on standby for fire suppression during any "hot" operations in prairie grasslands. In forested areas, large fire extinguishers would be maintained on welding trucks and a water truck would be on hand during dry periods to arrest the spread of any ground fire.

With respect to post-construction surveillance, Trunk Line would patrol the right-of-way each month on behalf of the Applicant. The patrol would be by fixed-wing aircraft, except that, after spring break-up, and at other times when it would be desirable to land and inspect ground and soil conditions, a helicopter would be used. Trunk Line would also monitor wind speed, direction and air temperature and ground level concentrations of nitrogen oxides to ensure compliance with exhaust emission standards at compressor stations.

6.3.3.3 Views of the Board

In the view of the Board, the environmental effects of construction and operation of the proposed pipeline could be adequately controlled if the Applicant implements its environmental program as submitted in evidence.

The Board's opinion is that the environmental impact on the terrain along this route would be mitigated if the construction

procedures and precautions outlined by the Applicant are implemented.

With respect to impact of the pipeline on agricultural lands, the Board notes Trunk Line (Canada)'s program of compensatory payments to farmers for losses of crop productivity or for reduction in net income, due to pipeline construction, and would expect the Applicant to make such payments where necessary. The Board notes the Applicant's procedures for stripping, stockpiling and returning the topsoil to the right-of-way. The Board would require the Applicant, as a condition of a certificate, to confirm with each land owner whose lands might be affected by the proposed pipeline, the soil conservation and restoration procedures that would be implemented on his or her farm. The Board would also require the Applicant, as a condition of a certificate, to monitor the soil and crop productivity on the right-of-way after construction and to report to the Board the results of the monitoring, including any further soil restoration measures that might be warranted.

Wild ungulate populations would be protected if the Applicant implements the measures described in the evidence, namely to survey the habitats prior to construction and to schedule the construction activities so as to avoid the most sensitive periods in the life cycles of the ungulates, and the Board would so condition any certificate.

The Board accepts the Applicant's commitment to survey the proposed right-of-way to identify possible nesting sites of raptors, and to avoid any such sites during the nesting season. The Board would condition any certificate, requiring the

Applicant to implement this commitment and to submit, prior to commencement of construction, to the Board the results of the survey and the plans describing how the raptor nesting sites would be avoided.

The Board also accepts the Applicant's commitment to minimize adverse effects on waterfowl during breeding and staging periods by designating the locations where and when the construction activities would be limited. The Board's opinion is that, if such measures are implemented, the waterfowl populations would be protected. The Board would require the Applicant, as a condition of a certificate, to submit to the Board for approval, its final design measures to protect the waterfowl, before commencement of construction.

The Board agrees that aquatic habitats described in the evidence should be protected, and would condition a certificate, requiring the Applicant to implement its proposed measures for controlling erosion and siltation to protect the fish habitats.

The Board also accepts the Applicant's undertaking to install culverts in streams crossed by access roads to allow for the passage of migrating or spawning fish. Further, with regard to protection of fish populations, the Board accepts the Applicant's undertaking to schedule the construction activities for winter in the rivers with spring-spawning fish, and for late summer in the rivers with fall-spawning fish. The Board would condition a certificate requiring the Applicant to implement these undertakings.

The Board notes the statement of the Applicant's consultant that the spawning period of fish would have to be assessed at

each river crossing in order for him to recommend appropriate construction scheduling so as to protect the fish. The Board would require the Applicant, as a condition of a certificate, to make this assessment prior to final design, and to submit to the Board for approval, the measures for protection of fish populations, and to include such approved measures in the construction specifications.

The Board accepts the Applicant's undertaking to implement a revegetation program, using native and agronomic grasses to control erosion, thermokarsting and slumping. The Board would require the Applicant, as a certificate condition, to submit to the Board for approval, the specifications for the revegetation program that would be included in the construction specifications, prior to commencement of construction. With regard to revegetating grazing lands, the Applicant should consult with the owners or users concerning the species of forage plants to be used for reseeding and such consultations would also be required as a condition of a certificate.

As regards water pollution from sewage effluents, the Board accepts the Applicant's undertaking to comply with the standards of the Alberta Government for sewage effluents and for quality of the receiving water. As regards air pollution, the Board is concerned about the emissions of nitrogen oxides from the compressor turbines, particularly with respect to the rapid conversion of nitric oxide to nitrogen dioxide in the atmosphere. In the opinion of the Board, the maximum concentrations of nitrogen dioxide in the ambient air for the atmospheric, design and operating conditions assumed by the Applicant could exceed

the amibient air quality standards set out in the Alberta Clean Air Regulations. The Board would require the Applicant, as a condition of a certificate, to design the compressor stations on a site-specific basis so as to ensure that the total oxides of nitrogen, measured as nitrogen dioxide, would be within the Alberta ambient air quality standards for nitrogen dioxide.

The Board notes the Applicant's undertaking to keep noise levels at the fence lines of compressor stations below 60 dBA. The Board also notes that, although the Applicant would not build compressor stations within 500 feet of an existing private residence, the specific compressor sites have not been identified. The Board would expect the Applicant not to construct compressor stations within 500 feet of existing private residences. The Board would require the Applicant, as a condition of a certificate, to measure the noise levels at the fence lines of all compressor stations, at six months and at 18 months after leave to open is issued for each station, and to study any adverse effects of the noise emissions upon the public and wildlife and to report the study results together with any further noise abatement measures that may be warranted.

The Applicant would adequately protect the archaeological resources along the proposed right-of-way, if it implements its archaeological protection program submitted in evidence. The Board notes that further field studies would be carried out prior to construction to complete the archaeological survey, and that a archaeologist would monitor the pipeline trench in the locations as recommended in the evidence. The Board would require the Applicant, as a condition of a certificate, to implement its

proposed archaeological protection program including the further field studies.

The Board is pleased that the Applicant has undertaken to inspect and supervise the implementation of the environmental protection measures during construction. As a condition of a certificate, the Applicant would be required to implement this undertaking and to submit to the Board for approval, prior to commencement of construction, the plans and programs for environmental inspection and supervision during construction.

The Board agrees with the Applicant that the contingency plans with regard to oil spills, prairie fires and forest fires, should be developed and implemented. The Board would require the Applicant, as a condition of a certificate, to develop and submit for approval these contingency plans prior to application for leave to open.

The Board notes that the Applicant has undertaken to monitor the ground and soil conditions on the right-of-way after construction, and the ground-level concentrations of nitrogen oxides at appropriate locations in the vicinity of each compressor station. The Board would require the Applicant, as a condition of a certificate, to monitor after construction the effects of the construction of the proposed facilities upon the farmlands and the environment and to submit to the Board the results of the monitoring program together with actions taken or which should be taken to prevent or mitigate any long-term effects of construction.

6.4 INTERVENORS

This section summarizes only the environmentally related evidence of Intervenors.

Canadian Wildlife Federation

The Canadian Wildlife Federation (CWF) submitted four major requirements for continued maintenance of the wildlife population in Northern Canada: first, the continued availability of the traditional habitats which are utilized by various species, and which are critical for rearing their young; second, the continued availability of traditionally disturbance-free habitats utilized during the nesting and rearing of young; third, the continued provision of unimpeded and harassment-free access to often widely separated habitat areas attained by seasonal migrations; and fourth, the provision for expanding wildlife management and research in the Yukon and Northwest Territories.

It was the opinion of the CWF that the bulk of the wildlife studies which had been done by the Applicants had been designed to facilitate an understanding of the demography of the various species and that, since there were still some critical information gaps, a prediction of the consequences of disturbance to wildlife populations could not be made.

The CWF believed that it would be difficult to obtain liaison between the various interested government agencies to provide the necessary supervision over the construction of a Mackenzie Valley gas pipeline. The Intervenor pointed out that over forty different laws and regulations might apply to the project, and that the operlapping authorities would interfere unduly with the

project development, without accomplishing the envisaged protection of environmental values. The CWF was of the opinion that the existing authroities had little or no power to enforce the implementation of environmental "stipulations". The Applicants' own environmental "stipulations" might not be implemented within the Applicants' time and economic constraints. The CWF concluded that the successful implementation of environmental protection measures was unlikely under the existing government administrative apparatus for the Territories.

In order that government control of the project not be fragmented, the CWF proposed that a single agency should be formed to bring together all government interests north of the 60th parallel into one organization. This single agency or authority should be given a mandate based on the National Energy Board Gas Pipeline Regulations, together with the authority and responsibility to enforce all existing federal, territorial and local statutes. The agency would be as independent as possible from the normal administrative channels of the government, in order to avoid hold-ups in decision-making. The agency would be a temporary organization for the purpose of managing the proposed Mackenzie Valley gas pipeline, and would be disbanded when construction of the pipeline was completed. After construction, the normal government administrative system would be restored.

The CWF urged the early establishment of such an agency and briefly described a proposed organizational structure. The Intervenor emphasized that the key to the successful implementation of environmental protection measures was to ensure, through thorough design review, that the measures had

been fully incorporated into planning and design and had been incorporated into the specifications, plans and other contract documents. The CWF said that it would be impractical to expect field inspectors to be able to enforce environmental protection measures not included in the contract documents and that government interference during the execution of the contract should be kept to an absolute minimum.

Council for Yukon Indians

The Council for Yukon Indians (CYI) was opposed to any pipeline across the northern Yukon and argued that a pipeline would cause major environmental damage.

The CYI also argued that the environmental evidence submitted by Foothills (Yukon) did not provided sufficient information nor analysis to permit the Board to adequately assess the probable environmental impact of the construction of a gas pipeline along the Alaska Highway. The CYI stated that, with such incomplete baseline data, measures to mitigate possible impacts could not be developed. The CYI further argued that the Board could not condition a certificate requiring the Applicant to develop and implement environmental mitigative measures since the probable environmental impacts could not be assessed.

Mr. Tom Butters

Mr. Tom Butters argued that there was insufficient evidence to conclude that a gas pipeline on the Coastal Plain would have a serious, adverse effect upon the Porcupine caribou herd.

Yukon Conservation Society

Yukon Conservation Society (YCS) contended that Foothills (Yukon)'s environmental statement did not contain the necessary information for the Board or for any other group of experts to make a sound judgment on the environmental impact of the proposed project. YCS pointed out several examples of omissions and inconsistencies in the Applicant's environmental statement.

YCS recommended that Foothills (Yukon) should rewrite the Environmental Statement adressing the environmental problems resulting from divergence of the proposed pipeline route from the right-of-way of the Alaska Highway, and providing environmental information on a site-specific basis.

YCS stated that the recreational potential of the area along the proposed pipeline route in the Yukon Territory had not been adequately dealt with by Foothills (Yukon). The intervenor outlined areas which had recreational potential, based on information given by four Whitehorse citizens, two of whom were members of the Yukon Conservation Society. YCS did not submit any evidence to show that any of these areas were proposed for recreational development by any government agency.

YCS suggested that Foothills (Yukon) provide a complete and updated list of areas of recreational potential along the proposed pipeline route, and that the proposed pipeline route be realigned to follow the Alaska Highway as closely as possible thereby avoiding the Kluane Game Sanctuary, proposed Yukon Territorial Parks, International Biological Program sites and other areas of recreational value or potential.

YCS moved that consideration of the applications of Foothills (Yukon), Westcoast, and of Trunk Line (Canada) be deferred until sufficient environmental and socio-economic information was filed by the Applicants. This motion was based upon the view of YCS that these applications did not contain sufficient information on environmental and socio-economic impacts of the proposed pipelines, for the Board or for any interested party to assess the applications properly. After careful consideration of all the relevant facts and arguments, the Board denied the YCS motion.

Government of the Yukon Territory

The Government of the Yukon Territory (GYT) stated that the attitude of the people of the Yukon towards progress and development in the Yukon was positive. This attitude was carefully balanced with a concern that demanded orderly and controlled development contributing to the social well-being of Yukoners and having due regard for protection of the natural environment.

GYT pointed out that one of the great advantages of the Foothills (Yukon) Project within the Yukon would be that the route would generally follow an already "impacted" corridor, as opposed to the Yukon north coast route and its delicate tundra ecosystem that the CAGPL Prime Route would follow.

The GYT's view was that the Prime and Interior Routes of CAGPL would have considerable social and environmental impacts upon the people of Old Crow, and that the ecological balance of the tundra ecosystem along the Prime Route would be easily altered. The wildlife and their habitats were very sensitive to

disturbances by man and machine. The Old Crow Flats adjacent to the Interior Route was an area of particular concern, and because of its broad environmental sensitivity, the Flats should be left inviolate from pipeline development. Pipeline-related activities in the northern Yukon could have a great effect on the traditional behavioural patterns of the Porcupine caribou herd. Also Dall's sheep, peregrine falcons, bald eagles, grizzly bears, wolves and many other important wildlife species which form a wildlife heritage in the region, must be preserved.

With respect to pipeline impact on migration routes and calving grounds of the Porcupine caribou herd, GYT stated that generally the herd calved on the Arctic coast, mostly in Alaska, but in certain years entirely in Canada. In an "average" year, it moved into four wintering areas, two in the Yukon in the Ogilvie Mountains and two in Alsaka, but in some years, such as the winter of 1975-76, the herd stayed almost entirely north of the Porcupine River and some caribou wintered on the Arctic coast.

GYT stated that there was historic evidence that intrusion into normal migration routes of caribou by industrial activity, or by even human settlement, would eventually disrupt their normal, or what one would consider to be their normal, and historic migration patterns.

GYT ranked the various alternative pipeline routes in the Yukon, from the least environmental impact to the most, in the following order; the Foothills (Yukon) route, the Fort Yukon route, the Interior Route and the coastal route.

GYT was most concerned about the pipeline construction phase which would have a direct impact, and also about "carry-over"

effects which must be monitored carefully, particularly from a wildlife standpoint. The Yukon Government would insist upon comprehensive safeguards, precautions and monitoring, all funded by the Applicant as part of the responsibiility of the company to the government for wildlife and habitat protection.

GYT stated that the timing of construction must be such that the disruption of wildlife would be avoided to the greatest extent possible, that studies to increase the present rather sketchy knowledge of the habits of Yukon wildlife, including the effects of access and the operation of compressor stations on habitat resources, must be a necessary prerequisite to pipeline construction. The Yukon Game Branch had particular concerns with regard to the Pickhandle Lake, Ibex River and Squanga Lake sections of the pipeline, and GYT said that more research was necessary in these areas.

With respect to further environmental information required to adequately assess the impact of the project upon the Yukon Territory, GYT said that it had made a start on developing an environmental base-line inventory. With respect to the concerns that the Yukon Government was in the process of studying, its position would be that, whatever were the findings, they should be included as a condition in the certificate issued by the Board, or as a condition for granting the right-of-way.

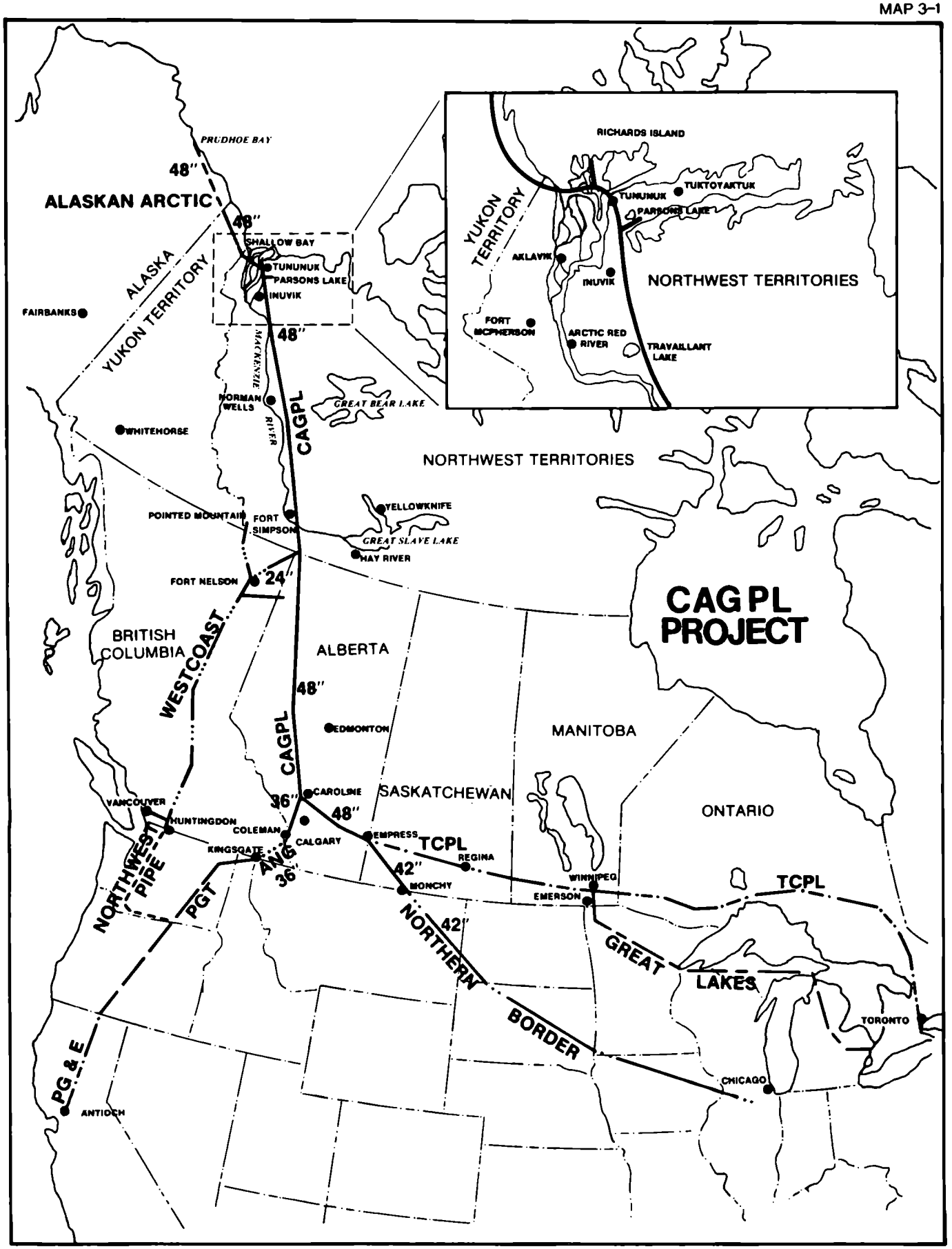
With respect to further measures to protect the environment from pipeline damage, when full information was not available, GYT suggested that a fairly sizeable bond be posted by the Applicant, through which costs of environmental mitigation could be met.

Another condition that GYT considered important was to protect the territory from environmental damage by setting up a monitoring process and by making provision for compensation.

GYT would insist on having representation on any pipeline regulatory authority that would co-ordinate government work during the construction phase.

Views of the Board

The Board has carefully considered the environmental evidence and arguments submitted by intervenors, and has taken them into account in rendering its decision.


CAG PL PROJECT
ALASKAN ARCTIC
PRUDHOE BAY
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YUKON TERRITORY
FAIRBANKS
SHALLOW BAY
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PARSONS LAKE
INUVIK
MACKENZIE RIVER
NORMAN WELLS
GREAT BEAR LAKE
WHITEHORSE
CAGPL
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POINTED MOUNTAIN
FORT SIMPSON
YELLOWKNIFE
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MAY RIVER
FORT NELSON
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EDMONTON
CAROLINE
SASKATCHEWAN
MANITOBA
ONTARIO
VANCOUVER
HUNTINGDON
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FORT MCPHERSON
ARCTIC RED RIVER
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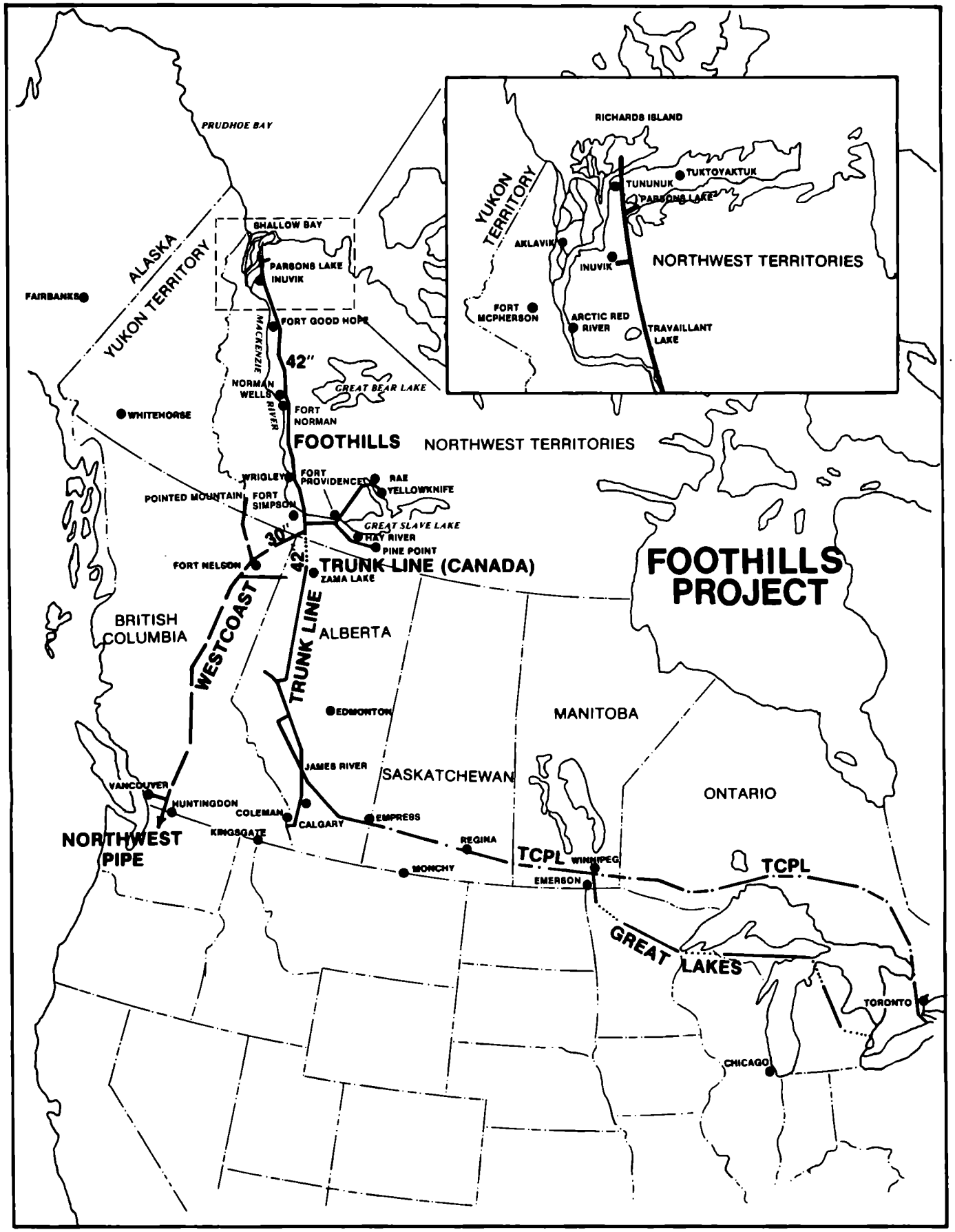
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FOOTHILLS PROJECT
BRITISH COLUMBIA
WESTCOAST
TRUNK LINE
ALBERTA
EDMONTON
MANITOBA
JAMES RIVER
SASKATCHEWAN
ONTARIO
VANCOUVER
HUNTINGDON
COLEMAN
CALGARY
EMPRESS
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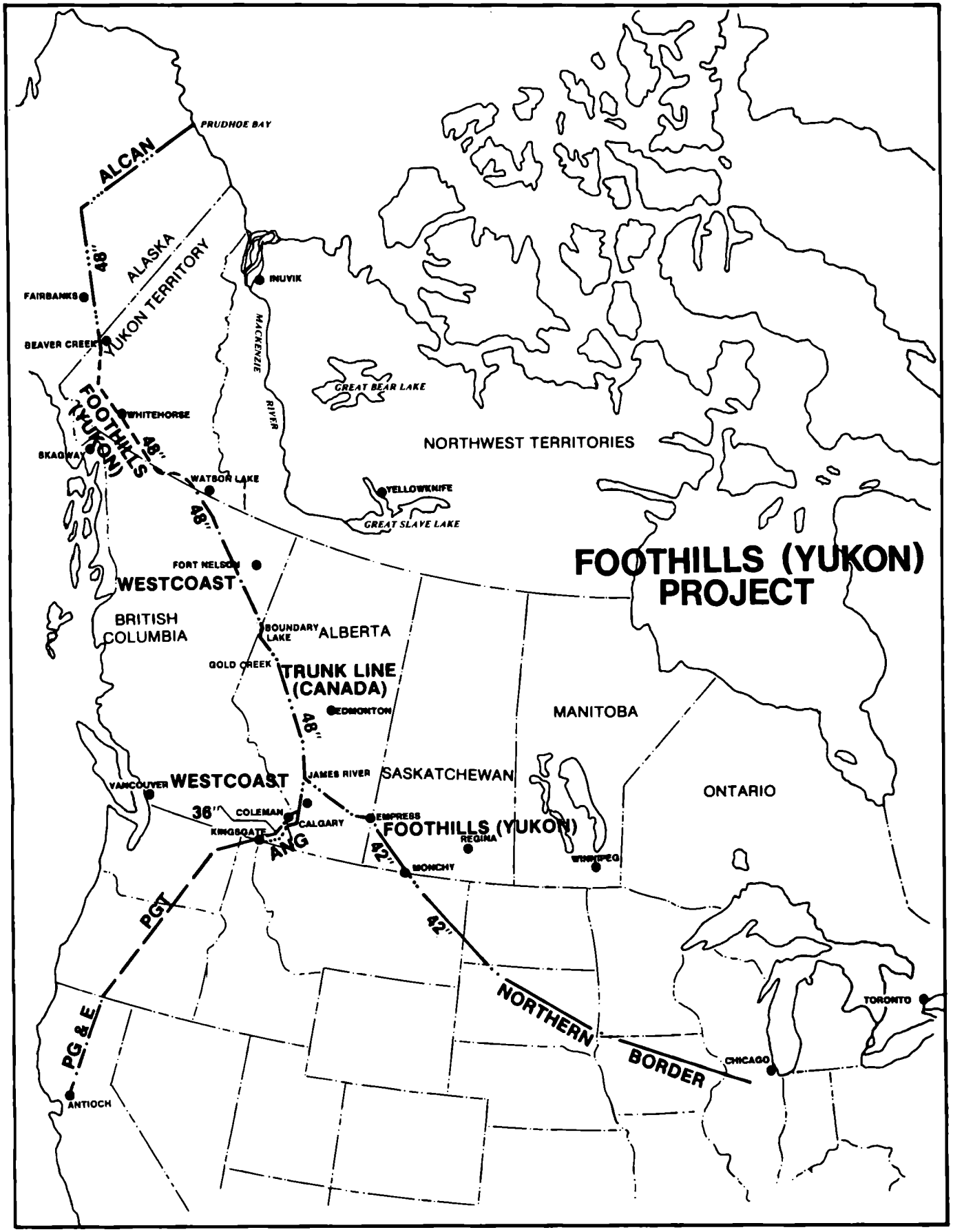
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