THE PROPOSED NORMAN WELLS TO ZAMA OIL PIPELINE:

LITERATURE REVIEW

AND

CRITIQUE OF ENVIRONMENTAL IMPACT STATEMENT

by

Lorraine Allison

Salix Enterprises Ltd.

August 1980

MANUSCRIPT REPORT

for

Northwest Territories Wildlife Service

TABLE OF CONTENTS

1. INTRODUCTION

In July, 1980, the Northwest Territories Wildlife Service commissioned Salix Enterprises Ltd. to review material submitted to the Environmental Assessment and Review Panel in support of the application of Inter-Provincial Pipelines Ltd. to build an oil pipeline from Norman Wells, N.W.T. to Zama, Alberta.

Terms of reference for the contract included a review of outside literature relevant to the project and a critique of the proponent's environmental impact assessment. These were to be completed by August 7, 1980.

2. LITERATURE REVIEW

2.1 INTRODUCTION

Principal literature sources searched included previous reports of consultants to companies proposing to build natural gas pipelines up the Mackenzie Valley; reports of the Environmental and Social Committee, Northern Pipelines; the final report, summaries of evidence and transcripts of the Mackenzie Valley Pipeline Inquiry; consultants' reports dealing with such special projects as the Mackenzie Highway, or Mackenzie River dredging; and information collected by the Northwest Territories Wildlife Service.

2.2 MOOSE

2.2.1 Distribution and Background Biology

Moose occur throughout the boreal forest in the Northwest Territories except in parts of the Mackenzie Mountains where they are prevented from ranging by deep snow (Kelsall and Telfer 1974). Seasonal distribution of moose varies with seasonal requirements for food shelter and protection from predators.

In the past, moose populations of the Northwest Territories have fluctuated widely in response to the frequency and distribution of burns, predation by wolves, habitat change, overhunting and changes in snow cover (Dickinson and Herman 1979).

Burns may support high densities of moose year round or seasonally, depending on a variety of factors such as age of the burn, successional stage, plant species composition, extent of the burn, and proximity to mature conifer stands (Dickinson and Herman 1979). Riparian habitats which are maintained by flooding are particularly important and may act as reservoirs from which moose will disperse into habitat newly created by fire (LeResche et al 1974).

Except for fall and spring movements which are inferred to occur along Oscar Creek, Carcajou, Mountain, Redstone, and Keele Rivers (Walton-Rankin 1977) as moose move to and from winter ranges on Mackenzie River islands, migration routes in the Northwest Territories are unknown (Dickinson and Herman 1979).

Mackenzie River islands are "extremely important moose winter range" (Walton-Rankin 1977). In 1975, moose changed from a greater use of upland areas in the Mackenzie Valley region in December to lesser use in February with a corresponding large increase in the use of river valleys (Wooley and Wooley 1976). The implication is that moose use a variety of upland habitats in summer and fall, but that these are not important winter range.

Although Mackenzie River islands are considered most important moose winter range, some areas have greater potential to support moose than others. Populations in the Fort Simpson area are generally relatively low (Wooley and Wooley

1976). In the stretches of the river near Fort Simpson, islands are well above river flood stages and most have steep, unvegetated banks. They are not flooded by high water in most years and support stands of mature spruce and poplar with little willow (Walton-Rankin 1977). In the Norman Wells area, islands do not rise as sharply above river levels. Perimeters of the islands are regularly flooded in spring. This constant regeneration allows quantities of willow to grow in the peripheral vegetation. Centers of islands are above usual spring flood levels and support mature poplar stands which provide cover for moose (Walton-Rankin 1977). Wooley and Wooley (1976) remarked that moose near Fort Simpson are never found in densities as high as those in the vicinity of Wrigley, Fort Norman, Norman Wells and further north.

Renewable Resources Consulting Services Ltd. (1978) commented that the use of islands by moose may change because of hunting or industrial activity. Prescott et al (1973) reported "moose vacuums" around Norman Wells and Fort Norman where moose have been eliminated from excellent island habitat presumably by overhunting. Walton-Rankin (1977) confirmed the absence of moose in the vicinity of settlements. Her maps show such an area including all the islands from Norman Wells south past Fort Norman to the Little Birch River. Wooley and Wooley (1976) stated that concentrations of moose reported by Slaney (1974) on McGern Island were not present

in 1975. They state that this may be associated with ease of access from and activity on the Mackenzie Highway, or may be associated with fires on the adjacent mainland in 1975.

Movement patterns of moose in travelling to and from winter ranges may be directly relevant to the effect that a given linear development has on moose populations. Unfortunately, the evidence for migration routes is not definitive. Walton-Rankin (1977) remarked that islands proximal to tributary rivers seem most important. Moose were frequently observed in tributary valleys and "it is believed they use them as movement corridors between the Mackenzie Valley and the uplands". Slaney (1974) reported that most tracks recorded between islands and mainland came from the river's west bank. If this is correct, the main concern for travelling moose in the vicinity of the proposed pipeline would be in the Oscar Creek area.

Donaldson and Fleck (1980) investigated moose populations in the Liard River valley. They made the first approximations of recruitment. From very small sample sizes they identified 13% calves in February. Although their population estimates were relatively crude, their concern that populations of moose may currently be overharvested is worthy of note. Using data from reported harvests of moose in the Northwest Territories, Dickinson and Herman (1979) reached the same tentative conclusion.

2.2.2 Effects of Pipelines and Other Activities on Moose

Wooley and Wooley (1976) stated that most mammals are stressed in winter by cold temperatures, and reduced supply, quality and availability of food. Entire populations tend to concentrate in relatively small areas and may be vulnerable to disturbance or destruction of habitat. The greatest potential for harm to moose populations is in the valleys of large creeks and rivers. They list possible effects of a natural gas pipeline on moose:

a) direct mortality from collision with vehicles;

b) increased hunting pressure because of increased access; and

c) increased stress by harassment and disturbance of animals in winter when energy requirements are high and accessibility and quality of food are low.

Envirocon Ltd. (1976) reported that habitat alteration on Mackenzie River islands could have serious consequences for moose. It must be remembered that all predictions of impact of pipelines in northern Canada prior to the current application were for natural gas lines. Virtually all witnesses before the Mackenzie Valley Pipeline Inquiry in the biological field agreed that their assessment of effects of a pipeline dealt with a natural gas pipeline only. They were not necessarily relevant to an oil pipeline, but that effects of an oil pipeline were considered greater than those of a gas line.

The Special Interagency Task Force (1979) identified a number of concerns for moose populations affected by the Trans-Alaska Pipeline System which were not considered by their Canadian colleagues. They stated that disturbances during or following birth can result in a substantial decrease in the survival of new-born young moose. The effects of above-ground portions of the line on movements of moose could not be anticipated, but it was thought that the pipeline as a barrier could reduce the effeciency of use of habitat or even isolate essential components of the range.

Although the literature recognizes islands of the Mackenzie River as moose habitat, it rarely mentions riparian habitats along shorelines which are also important. In my opinion, the importance of these areas to moose is understated. It is the best quality moose habitat in the Northwest Territories. Thanks to the action of the river, it is also permanent habitat from which moose can quickly populate new areas or to which populations may retreat when other areas are unavailable.

Measures to mitigate effects of a natural gas pipeline were not proposed in any of the literature cited.

2.3 WOODLAND CARIBOU

Woodland caribou are a species about which little is known in the Northwest Territories. Critical or important areas have not been defined (Wooley and Wooley 1976). They are known to range in the Mackenzie Mountains west of the

river and upland plateaux such as the Redknife Hills. Historical and potential range has been outlined, but current ranges, populations, etc., are unknown.

2.4 BEAVER AND MUSKRAT

2.4.1 Distribution

In the area to be crossed by the oil pipeline, Ruttan and Wooley (1974) reported beaver present but sparsely distributed except in the Hanna River area, Brackett Lake, and south of Great Bear River near Fort Norman. Near Fort Norman much of the beaver habitat is muskeg in which the chief tree and shrub species are black spruce, white birch, larch, alder, willow, and bog birch. Ruttan and Wooley (1974) also reported the Kakisa River drainage to support the largest populations (densities) of beaver in the Northwest Territories. They stated that it may be overpopulated as numbers of abandoned lodges were seen. (One advantage of the Norman Wells-Zama pipeline which the proponent failed to mention is that it avoids the Kakisa drainage).

Wooley (1974) conducted fall beaver surveys when food caches were present - about September 20 in the southern Mackenzie valley. There were many colonies in wetlands near Fort Norman. Northeast of Camsell Bend is a very small, but highly productive, area. Wooley (1974) thought that his data confirmed those of Novakowski (1965) who stated that bogs are preferred by beaver over deltas or mountain streams.

Water in bogs is slow moving and can be easily controlled. Bog areas have greater edaphic stability. However, beaver are more abundant in streams than lakes because northern streams provide better growing conditions for food species such as willow (Wooley 1974).

Wooley and Wooley (1976) identified the best beaver habitat in the Fort Simpson area as small, slow moving rivers and streams and lowland marsh habitats. Larger rivers and lakes are relatively unimportant. Muskrat are sparse.

Renewable Resources Consulting Services Ltd. (1978) stated that beaver may use the Mackenzie River mainstream for travel in winter and during spring dispersal.

Kucera (1974) remarked that populations of muskrats are more widespread than beaver.

2.4.2 Effects of Pipeline Developments

Kucera (1974) said that fuel spills are to be expected. With aquatic mammals, fuels will cause a loss in insulating capacity and buoyancy. Beaver in particular will be affected by control or removal when their building activities conflict with pipeline facilities.

Envirocon Ltd. (1976) also mentioned fuel spills but added drainage alteration as an influence the pipeline may have on aquatic furbearers. Drainage alteration, they said, would affect only local populations of aquatic furbearers. However, the significance of spills of fuels (and toxic fluids) would depend on the extent of spills and the success

of contingency actions (as well as the amount of damage done during clean up).

Bruce Stephenson (pers. comm.) pointed out that aquatic furbearers include otter and mink. Although they occur in lower densities, they might be expected to suffer similar effects as beaver and muskrat.

Neither the investigators mentioned above, nor the proponent, mentioned muskrat in any major way in the area traversed by the proposed line. Muskrats tend to be most important in concentrated areas of habitat - such as the Brackett Lake wetland and the major deltas, none of which is close to the proposed line, although the Mackenzie delta is downstream of it.

Again, mitigation procedures were not outlined, nor were contingency plans suggested. No assessment of the success of contingency measures used in other developments was provided in the above literature or by the proponent.

2.5 TERRESTRIAL FURBEARERS

2.5.1 Distribution and Abundance

Terrestrial furbearers are usually reported as present or absent, or personal communications are relied upon to provide an indication of where populations may be most dense. They are generally considered to suffer reasonably little damage from developments which do not remove large areas of habitat.

Ruttan and Wooley (1974) stated that the best furbearer habitat in the Mackenzie valley is in the river valleys and at the edge of the forest adjacent to valleys. They also stated that the Redknife and Cameron Hills are reportedly "good marten country".

Wooley and Wooley (1976) made the only attempt I have seen to sample various habitat types for furbearers. Their technique involved calculating number of tracks per kilometer per day after snowfall for each species. For instance, if it had been 17 days since a snowfall in the area, they would walk a pre-determined course through various habitats and divide the number of tracks of each species encountered per km by 17.

Marten was the most frequently encountered furbearer, followed by ermine and red squirrel. Snowshoe hare were relatively common, but coloured fox, wolverine, lynx, and wolf were low. (The suggestion here, although it was not stated outright, is that in some way relative, abundance between species can be compared. Direct comparison of abundance between species would require an assumption that each species has similar activity patterns. Such an assumption is not justified. However, it does seem legitimate to assume that for each species the technique can provide an index to relative use of various habitat types.)

Wooley and Wooley (1976) found no significant difference among use of various vegetation types for marten and

ermine, but more squirrels in mixed forest than in fen, and more hares in black spruce and riparian areas than fens. However, they remarked that in some areas prime marten habitat seemed to be mature upland coniferous-dominated mixed forest and they quote Banfield (1974) as stating that mink prefer riparian habitats.

2.5.2 Effects of Pipeline Developments

Ruttan and Wooley (1974) compared small mammal use of seismic lines and adjacent undisturbed areas by trapping. They were unable to demonstrate any significant effect of seismic lines on species composition or density. They noted that fox, lynx, wolf, and wolverine travel along seismic lines; marten and weasel apparently (from tracks) cross without hesitation. On the seismic line, tracks indicated considerable mouse activity. Open areas were favoured by ptarmigan when recent willow growth was present.

Wooley and Wooley (1976) stated that furbearers were not expected to suffer severe effects from a natural gas pipeline. Their generally low population densities, and scattered rather than concentrated distribution would reduce the chance of the project interacting with a large number of animals. The small body size of many species would allow them to find cover in many disturbed areas.

Impacts of a natural gas pipeline on furbearers were considered to be (Wooley and Wooley 1976):

a) direct mortality from collision with vehicles;

b) some animals (e.g. wolverine) may exhibit avoidance;

c) project-related forest fires may alter habitat to the detriment of species such as marten;

d) increased access to trappers could result in heavier harvests in some areas; and

e) revegetation should create good habitat for meadow voles and may attract marten and ermine.

Envirocon (1976) listed potential effects of a natural gas pipeline on furbearers which include habitat loss from drainage alteration and fires, increased access to trappers, and direct mortality from oil spills. Fisher, which occur only in the south, are at risk if fire destroys the forests; lynx might be affected by increased trapping as a result of improved access; marten are vulnerable to increased trapping from improved access and oil spills.

Bruce Stephenson (pers. comm.) discussed the vulnerability of marten to habitat change. Marten are territorial, and both males and females have defined home ranges. Habitat changes probably cannot increase resident densities, but an increased supply of prey may result in better survival of dispersing young in July and August. He commented that large areas of marten habitat in the Northwest Territories are not now being trapped. Most of the fires in 1980 and 1979 were not in the main marten ranges, so habitat loss is not now a major concern.

None of the literature reviewed discussed the problem

of attraction of carnivores to camps and dumps which was a major problem on the TAPS line.

2.6 RAPTORS

The species of concern included in the general term raptor in the southern Mackenzie district include peregrine falcon, bald eagle, golden eagle, and osprey.

Renewable Resources Consulting Services (1978) stated that raptors are sensitive to a variety of disturbances, particularly near nest sites. Disturbances may range from aircraft to hikers. Fyfe and Kemper (1975) identified a 1.6 km radius around a nest site as critical where no disturbance should be allowed; a 3.2 km radius is sensitive and disturbance should be minimized for the period of concern, April 15 to September 15.

2.7 FOREST FIRES

Maps of forest fires of the last 10 years (including 1979 but excluding 1980) were made available by the Northwest Territories Wildlife Service. The proposed oil pipeline passed through or near only six fires:

FS 22-67	3 200 ha
FS 17-79	14 000 ha
FS 14-75	62 139 ha
FN 2-67	23 994 ha
FS 6-77	711 ha
FS 15-71	7 734 ha

If fires had been very severe along the proposed oil pipeline

route, concern might be raised that increases in fires could damage populations of marten and other furbearers. However, incidence of fire along the route has not been severe enough to lead to concern for later-succession wildlife species.

2.8 RESOURCE USE

This section is largely a series of comments from the literature about some of the effects a natural gas pipeline might have on resource use and resource users.

2.8.1 Although the extent of trapping has declined since its peak in the 1920's to 1940's, the implications of trapping touch upon most aspects of the economy of the region and involve many people (Ruttan and Wooley 1974).

2.8.2 Where the pipeline route passes close to settlements, it may affect trapping opportunities for old men, weekend trappers and some women who trap near settlements (Ruttan and Wooley 1974).

2.8.3 Assessment by a trapper of the value of a specific area for fur includes the availability of game resources as food (Ruttan and Wooley 1974).

2.8.4 In general, in the Northwest Territories, all furbearers are under-exploited because all areas are not used. Accessible areas, particularly near communities, are over-harvested. Once a road goes into an area, that area becomes over-trapped because there is no control over who goes where. This is not generally detrimental to furbearer populations because of

adjacent untrapped populations. If every area were trapped in the same way, serious overharvesting would result (B. Stephenson, pers. comm.).

2.8.5 For food, people along the river hunt moose, woodland caribou and black bear (Renewable Resources Consulting Services Ltd. 1978).

2.8.6 Resident non-native hunting is concentrated along the Mackenzie River system (Renewable Resources Consulting Services Ltd. 1978).

2.8.7 The muskrat is more important to native use than might be thought from its ranking in fur returns. Its significance is that its clumped distribution and high density allow trappers a guaranteed income for sustained effort over a short time period (Novakowski 1975).

2.8.8 The summer native moose harvest is largely opportunistic and occurs often along rivers where people are travelling. This harvest may be influenced by the pipeline if moose avoid the river because of increased traffic on river and highway (personal observation).

2.8.9 Concerns related to the Mackenzie Valley Pipeline Inquiry from native communities along the river:

2.8.9.1 The Mackenzie River and its tributaries are travel routes both summer and winter. During summer, while travelling families camp, hunt, and fish along the rivers.

2.8.9.2 People were concerned about pollution, wildlife disturbance, activities which would inhibit hunting and trapping, about illegal hunting by in-migrants. Projects should proceed only with local consent.

2.8.9.3 Concern was expressed about fuels, oil, sewage or garbage fouling town or camp drinking water or making fish unpalatable. Garbage left from camps might hurt wildlife. Past situations in which problems have occurred were cited.

2.8.9.4 Noise might cause animals to move away from pipeline locations and might make hunting more difficult. If wildlife abandon local hunting and trapping areas, many people might have to turn to welfare for their livelihood.

2.8.9.5 Concern for wildlife includes both areas currently exploited and areas not used which are identified as refugia.

2.8.9.6 Concern was expressed that any industrial activity will harm wildlife.

2.8.9.7 Seismic exploration is considered particularly damaging to beaver, muskrat, and fish.

2.8.9.8 Destruction or loss of traps or trapped animals was described and was anticipated to increase.

2.9 FISH AND WILDLIFE MANAGEMENT

The increased responsibilities of fish and wildlife managers in relation to the Trans Alaska Pipeline System hot oil line were anticipated by the Special Interagency Task

Force (1972). They listed 7 additional responsibilities wildlife specialists or game managers would have to undertake;

a) to assure final design specifications to minimize impacts of the development on fish and wildlife habitats and life cycles;

b) to deal with increased game law infractions;

c) to produce detailed wildlife management plans and land use plans;

d) to increase research in connection with the development;

e) to monitor effects of the development;

f) to be involved in development of oil spill contingency plans; and

g) to develop plans for disposition of wildlife which would otherwise be destroyed (a nest in the ditchline for instance).

Beyond the issues listed is the requirement for surveillance of the project. Wildlife expertise (from Northwest Territories Wildlife Service or seconded from elsewhere) would have to be available on the Norman Wells pipeline for:

- development of special environmental regulations or codes;
- preliminary and final design review (1 or 2 people?);
- surveillance (1 person/spread?);
- increased enforcement load including problem

carnivores (2 extra officers?);

- monitoring effects (1 extra biologist?);
- development of moose and furbearer management plans (2 extra biologists?);
- development of oil spill contingency plans (1 person?); and
- administration (1 senior, 1 junior).

If the project is approved, almost all the work will be concurrent, so it seems unlikely that overlap between jobs could reduce the manpower requirements.

2.10 PROJECT CONTROL

Cowan (1975) stated that a natural gas pipeline up the Mackenzie River can be built with acceptable environmental impact, but the question is, will it? Ensuring that it is requires not only specific regulations, but a committment from those charged with enforcing them.

Templeton Engineering Co. (1976) reviewed the process involved in setting up a single agency to regulate a project. Many of its concerns apply regardless of how a project is regulated once it is agreed that it can proceed. Beginning with surveillance and proceeding in reverse, Templeton Engineering Co. (1976) stated that trained inspectors are required for inspection of mainline activities. This must be preceeded both by initial review and approval of preliminary designs, plans, etc., and final review and approval of final design, specifications, tender documents, etc.

All the procedures above must be preceeded by the preparation of guidelines, stipulations and codes for the pipeline company to produce a defined base against which review can occur. The pipeline company should know what information it must submit and what standards are to be met in preliminary design.

Inspection must begin with the first on-site work because much damage can be done by early committment of land to specified uses or access routes. Because of the early need for inspectors, their training must be concurrent with design review.

If a super-agency is to be used, the first tasks are to establish its goal and to ensure that it includes all agencies of various levels of government which have an interest in the project.

Mair (1980) conducted hearings in a situation in which the Northern Pipeline Agency has already been established, and a decision has been made to proceed with the project. However, he made some comments which might be useful to the present project.

The Agency (Mair 1980) must assume a broad commission. Such a major project cannot be undertaken "in a social and environmental vacuum in isolation from complex activities across which it cuts".

The company can negate the intent of government direction if confusion between governments or agencies is apparent.

Terms and conditions will not be effective without surveillance. Even if the company is acting in good faith, time and cost constraints will pressure them into shortcutting regulations.

Mair (1980) stated that it is not possible to know whether the best route has been chosen. He recommended detailed mapping of environmental and socio-economic factors for a 16 km wide corridor in which an optimum route could be chosen.

2.11 NOTE

Templeton Engineering Co. (1976) stated that CAGSL planned to build snow roads only north of 65°N (about the latitude of Fort Norman). The proponent plans to build them north of Fort Simpson without offering reasons why he can.

REFERENCES:

Banfield, A.W.F. 1974. The Mammals of Canada. University of Toronto Press. 438 p.

Cowan, I. McT. 1975. Testimony before the Mackenzie Valley Pipeline Inquiry. M.V.P.I. transcripts. Vol. 47, pp. 6195-6225.

Dickinson, D.M., and T. Herman. 1979. Management of some terrestrial mammals in the Northwest Territories for sustained yields. Prepared for Science Advisory Board of the Northwest Territories. Rept. No. 4. 71 p.

Donaldson, J.L., and S. Fleck. 1980. An assessment of potential effects of the Liard Highway on moose and other wildlife populations in the lower Liard valley. Prepared by Tundra Environmental Consulting Services for Northwest Territories Wildlife Service. Contract rept. No. 2. 35 p.

Envirocon Ltd. 1976. Mackenzie Valley Pipeline Inquiry review. Prepared for Environmental Protection Service. Edmonton, Alberta.

Kelsall, J.P., and E.S. Telfer. 1974. Biogeography of moose with particular reference to western North America. Le Naturaliste Canadien 101;117-130.

Kucera, E. 1974. Potential effects of the Canadian arctic gas pipeline project on the mammals of the western arctic. in Environment Protection Board. Environmental impact assessment of the portion of the Mackenzie gas pipeline from Alaska to Alberta. Vol. IV Research Repts.

LeResche, R.E., R.H. Bishop, and J.W. Coady. 1974. Distribution and habits of moose in Alaska. Le Naturaliste Canadien 101;143-178.

Mair, W.W. 1980. Forgotten Land, Forgotten People. Northern Pipeline Agency. Calgary. Whitehorse.

Novakowski, N. 1975. Testimony before the Mackenzie Valley Pipeline Inquiry. M.V.P.I. transcripts. Vol. 102, p. 15624-15626.

Prescott, W.H., G.L. Erickson, L.E. Walton, and D.G. Smith. 1973. Atlas of wildlife habitat inventory maps. Moose. Environmental-Social Committee Northern Pipelines. Task Force on Northern Oil Development, Ottawa.

Renewable Resources Consulting Services Ltd. 1978. Environmental review and assessment, proposed Mackenzie River dredging project. Prepared for Department of Public Works of Canada. Marine Western Region. 3 vols.

Ruttan, R.A., and D.R. Wooley. 1974. A study of furbearers associated with proposed pipeline routes in the Yukon Territory and Mackenzie River valley, 1971. C.A.C.S.L. Biological Report Series. Vol. 8.

Slaney, F.F. and Co. Ltd. Wildlife study 1972-73. Base data vol. 2. Mackenzie Highway mile 300-500. Department of Public Works, Edmonton. (not read).

Special Interagency Task Force for the Federal Task Force on Alaskan Oil Development. 1972. United States Department of the Interior. Final environmental impact statement. Trans-Alaska Pipeline. Vol. 4. Evaluation of environmental impact. 635 p.

Templeton Engineering Co. 1976. Assessment of environmental activities on the Mackenzie valley gas pipeline project. Prepared for Environmental Protection Service. Report EPS-2-NW-76-1.

Walton-Rankin, L. 1977. An inventory of moose habitat of the Mackenzie valley and northern Yukon. Canadian Wildlife Service Mackenzie Valley Pipeline Investigations. 39 p.

Wooley, D.R. 1974. Beaver (Castor canadensis) studies in the Mackenzie valley, 1972. in R.A. Ruttan and D.R. Wooley, eds. Studies of furbearers associated with proposed pipeline routes in the Yukon and Northwest Territories. C.A.G.S.L. Biological Report Series. Vol. 9.

Wooley, D.R., and R.L. Wooley. 1976. Surveys of moose, woodland caribou, and furbearers along the Fort Simpson realignment of the proposed arctic gas pipeline in R.D. Jackimchuk, ed. Studies of mammals along the proposed Mackenzie valley gas pipeline route, 1975. C.A.G.S.L. Biological Report Series. Vol. 36.

3. THE ALASKAN PIPELINE: LESSONS RELATED TO WILDLIFE PROTECTION IN THE NORTHWEST TERRITORIES

3.1 USE OF MATERIAL BY INTERPROVINCIAL PIPELINES LTD.

The proponent in his Environmental Impact Statement made no attempt to use the only other pipeline ever built north of 60°N in North America - also an oil line - to show how the pipeline industry has learned from that experience. He did not attempt to say that it is not relevant, but simply ignored it.

3.2 SOURCES OF INFORMATION

Although I had time for only a cursory search, relevant material was found at the Boreal Institute, University of Alberta, and in the proceedings of the Mackenzie Valley Pipeline Inquiry. The 30th Alaska Science Conference had a paper on revegetation (which I did not see) and I understand from Mrs. Cooke, librarian at the Boreal Institute, that more material could be available from Mrs. Barbara Sokolov, Arctic Environmental Information and Data Center, 707 A Street, Anchorage, Alaska 99507.

3.3 SUBJECT AREAS

The material available to me dealt primarily with oil spills and with problems arising from non-compliance with

environmental stipulations. Regulations were in place to deal with most problems, but were either unenforced or unenforceable.

3.4 OIL SPILLS DURING CONSTRUCTION

Zemansky (1976) discussed the handling and mishandling of oil in pipeline construction. He listed 13 applicable regulations from relevant state and federal legislation and from stipulations of the right-of-way agreement with Alyeska which prohibit spillage and outline requirements for storage. Zemansky (1976) stated "you might logically speculate that the one thing oil companies would know how to do is handle oil. It would also be logical to assume that it was in the best interests of all concerned to prevent spills . . . . The record . . . doesn't substantiate logic." Zemansky (1976) outlined three major spills from storage at pipeline camps. Two were from small diameter distribution lines buried in gravel pads and the other was a deteriorated seam on a bladder tank. In all cases, the amount of oil spilled was unknown because fuel was not guaged going into and out of storage areas. In all cases, Alyeska's estimate of amount of fuel spilled was low: in two cases Alyeska originally estimated around 100 gallons while the final estimates of the regulatory authorities were "somewhere between 5 000 and 20 000 gallons" and 60 000 or even 100 000 gallons respectively. Oil was still being observed in 1976 after massive cleanup measures downstream

of three camps - that is, four, one, and one-half years after the initial reports of oil entering the water (Zemansky 1976). Effects of these spills were mentioned only briefly by Zemansky (1976), and I did not come across any report of them being extensively monitored.

3.5 OIL SPILLS DURING OPERATION

Construction of Alyeska's line has been completed, but problems with spills are still occurring. The Fairbanks Daily News-Miner of June 11, 12, 16, 18, 28, July 13, 21, and August 22, 1979, reported cracks in buried sections of the pipeline where the pipe had wrinkled. The leaks were undetected by the company's leak detection system as was an earlier 638 000 gallon spill caused by an explosion in 1978. The 1978 spill was apparently the result of sabotage. Volume of the 1979 leaks, thought by pipeline officials to be small, could not be accurately estimated. Leaks seemed to be caused by the pipe buckling when previously undetected permafrost thawed.

3.6 SEWAGE AND EROSION

Zemansky (1976) discussed other problems with Alyeska's failure to abide by written stipulations which are not as directly relevant to wildlife concerns. Improper disposal of sewage was a constant problem. Erosion control, rehabilitation and revegetation were not implemented as outlined by Alyeska in their design.

3.7 SOLID WASTE DISPOSAL

Construction of the Alyeska pipeline resulted in a major problem with scavenging animals which could not be controlled. Lent (1976), Norton (1976), and Milke (1977) all emphasized the problems of attraction of furbearers to the camps, dumps, and food stores along the pipeline. In spite of regulations stating that camp garbage should be incinerated daily, garbage continued to be left unburned. Construction workers persisted in deliberate feeding of wolves, foxes, and bears, and no effective way of discouraging it was found. Dismissal of an employee from one camp was quickly followed by re-hiring at another. Milke's (1977) summary of the problem is instructive:

> An evaluation of Alyeska's anti-feeding program reveals that it was unsuccessful. Edible garbage could be found in many construction camps, along roads, in garbage dumps (when incinerators failed to operate properly) and, particularly, at construction sites, where garbage was piled up, strewn around, or left lying about in plastic garbage bags . . . . Animals were enticed into camps, construction sites, and toward vehicles with food to facilitate close-up photography and observation. Workmen and administrators made virtual pets of some animals. Ravens and ground squirrels were fed out of hand, foxes were taught to jump up and snatch hand-held food and to run to parked vehicles at the sound of a horn, bears were hand-fed, petted, slapped and taught to roll over and beg for food, and many wolves lost all natural wariness (one young female reportedly became so tame that she allowed her belly to be scratched). In some construction camps bears were frequently seen inside the barracks, office buildings, warehouses, and mess halls, and bears and foxes commonly slept under buildings; an arctic fox raised a litter of pups under a building in a northern camp. Bears occasionally climbed upon or into vehicles and many bears and wolves

waited to be fed along the roads. Workers were bitten by wolves, bears, and foxes, and some of the injured required hospitalization and rabies shots. Finally, vehicles and buildings were damaged and considerable time and money were spent in attempts to curb the problem.

3.8 PERMAFROST AND PROBLEMS WITH AN ELEVATED LINE

The lack of concern which the Interprovincial Pipelines Ltd. seems to exhibit for permafrost along the route of the proposed oil pipeline may be justified: i.e. there may be no problem. However, lack of concern about permafrost problems or special measures to deal with them suggests the prospect of need for portions of the line to be elevated. The Trans Alaska Pipeline System (TAPS) is 1.2 m in diameter and much of it is elevated. Passage for big game animals is provided by special crossings where a specified minimum distance between pipe and ground is maintained. Moose in forested regions where the pipeline crossed ranges of a given population were usually able to cross the line, although they might have to try repeatedly. Clearance required was about 2 to 2.6 m (Van Ballenberghe 1977).

One presumes that if it were necessary to elevate a .3 m line, it would be low enough that mature animals could see over and jump it. However, the pipeline must be crossed by some groups of moose twice annually on movements between summer and winter ranges. In southern areas even a 4-strand backed wire fence can sometimes block movement of young moose (personal observation). Final design, if parts of the line

are elevated, must ensure free passage of large mammals over the line and small mammals under it. If an elevated berm is used, other criteria may apply.

3.9 PIPELINE SURVEILLANCE

Morehouse, Childers and Leask (1979) assessed the effectiveness of fish and wildlife protection on the Trans Alaska Oil Pipeline. Their conclusions were that J.F.W.A.T.'s[1] effectiveness was reduced by:

a) government policy giving priority to assuring pipeline integrity and quickly completing the project;

b) Alyeska's failure to establish an effective environmental quality control program during construction, placing an unanticipated burden on small government monitoring staffs;

c) lack of training, inexperience of biologists in monitoring large projects, and unwillingness of government engineers to accept biologists' assessments of the significance and urgency of situations affecting fish and wildlife; and

d) a general lack of understanding of each other's professions among biologists and engineers.

---

[1] J.F.W.A.T. Joint (state and federal) Fish and Wildlife Advisory Team: a surveillance group formed for the period of pipeline construction.

Norton (1976) stated that the J.F.W.A.T. team also did not get started early enough. Morehouse et al (1979) recommended that future surveillance teams be organized along the same lines as J.F.W.A.T. but that their jurisdiction be expanded to cover all related environmental protection functions. The teams should include engineers, hydrologists, and members of other appropriate disciplines.

REFERENCES:

Lent, P. 1976. Evidence presented to the Mackenzie Valley Pipeline Inquiry. Transcript vol. 106.

Milke, G. 1977. Animal feeding: problems and solutions. Joint State/Federal Fish and Wildlife Advisory Team, special report No. 14, Anchorage. (not read)

Morehouse, T.A., R.A. Childers, and L.E. Leask. 1979. Fish and wildlife protection in the planning and construction of the Trans Alaska Oil Pipeline. Prepared by Institute of Social and Economic Research for U.S. Fish and Wildlife Service. (not read)

Norton, D. 1976. Evidence presented to the Mackenzie Valley Pipeline Inquiry. Transcript vols. 138, 139.

Van Ballenberghe, V. 1977. Second interim report on the effects of the Trans Alaska Pipeline on moose movements. Joint State/Federal Fish and Wildlife Advisory Team, special report No. 10, Anchorage. (not read)

Zemansky, G.M. 1976. Environmental non-compliance and the public interest. Paper presented at the 27th Alaska Science Conference Resource Development: processes and problems. Paper also presented as evidence to the Mackenzie Valley Pipeline Inquiry. Transcript vol. 199.

4. REVIEW OF ENVIRONMENTAL IMPACT ASSESSMENT: NORMAL WELLS TO ZAMA OIL PIPELINE

4.1 INTRODUCTION

The review was based on material included in volumes 1, 3A, 3B, 3C, 4, and Environmental and Resource Land Use Map Supplements of the Environmental Impact Statements and Regional Socio-Economic Assessment submitted to the Environmental Assessment and Review Panel by Esso Resources Canada Limited and Interprovincial Pipeline (NW) Ltd. dated March 1980.

The review is organized first as a set of notes including a reference to the location in the text, a quotation or approximation of what was said, and a response. Second, a general reaction to the E.I.S. is provided. Finally, I compared the Environmental Atlas with maps available in the literature.

4.2 ORGANIZATION

The Environmental Impact Assessment provided by the proponent is very repetitive, with the same paragraph being repeated word for word in as many as three locations. The editors seemed to assume that several pages of volume 3 were particularly important as they were repeated although the numbering advanced. One assumes that one failed to receive the material which should have been on the duplicated pages.

4.3 DETAILED NOTES

Volume 3A, page 1-2 (alternatives):

Alternative methods considered for transporting the fuel from Norman Wells were barging and a pipeline route following the highway south of Fort Simpson. Barging was rejected because of problems in transporting natural gas liquids. The assessment did not present any detailed discussion or analysis of environmental or social effects of alternatives and, in fact, failed to treat alternatives seriously. It was simply stated that an alternate route along the Mackenzie Highway south of Fort Simpson "was not considered substantially different from the route applied for". The matter of new access between Simpson and Zama was not discussed, and there is no comparison with the amount of new access which would be created along the alternate route or any comparative discussion of resource values along each route. More important, basic alternatives were not even considered: east side of the river versus west side, buried line versus elevated line, possibility of need for an elevated line. There may also be other alternatives which should have been subject to analysis.

Volume 3A, page 1-6 (lack of project-specific guidelines):

The proponent states that he believes the submission to comply with federal guidelines for environmental impact assessment issued by F.E.A.R.O. Although it is probably not

the fault of the proponent, the submission suffers from not having some project-specific guidelines.

Volume 3A, page 1-6 (requirement for continuing input):

The proponent states that additional information with respect to site specific considerations will be submitted in an orderly fashion. This will require continuing input from the N.W.T.W.S. and other agencies.

Volume 3A, page 1-7 (land use planning):

The proponent fails to recognize any connection of his project with land use planning or with land claims. The connection will have to be established by some other agency.

Volume 3A, page 1-13 (future development):

The proponent states that the pipeline has no FORMAL link with any other pipeline proposal since it is incapable of carrying the large quantities of liquids required from the arctic. Although there may be no formal link, the proposed Norman Wells pipeline would probably make a Mackenzie valley pipeline for other products more likely and encourage development along a corridor defined by the first project. The proponent does say that the line could promote further exploration in the Mackenzie valley and that the line could service additional small fields.

Volume 3A, page 2-2 (construction in discontinuous permafrost):

The proponent says that conventional construction methods can be used for installation of small diameter pipe

in areas of discontinuous permafrost. Bedding or padding may be required to reduce pipe strain in some areas. I am not qualified to judge this statement, although the facts that oil would flow through areas of varying soil temperatures and of course would take some time to change temperature suggest that frost bulb or thaw settlement problems could occur. I understand that segments of the Trans Alaska Pipeline (heated oil) which were originally planned to be buried had to be elevated. The proponent should at least have included a reasoned disucssion of why an elevated line will not be necessary, with references, and at best should have included some assessment of effects of an elevated line if that proves to be necessary. The E.P.S. review was critical of the proponent's handling of the permafrost problem, as was Carson Templeton (pers. comm.).

Volume 3A, page 2-3 (extent of access):

The proponent states that after crossing the highway south of Fort Simpson the proposed line crosses areas through most of which there is now no access. After reading the entire document the extent and type of new access which would be provided by this project is still unclear to me.[2]

Volume 3A, page 2-16 (timing of construction):

The proponent plans to stockpile all necessary material

---

[2]September 1980. After listening to the proceedings of the Environmental Assessment and Review Panel, I still have the same problem.

in one year to take advantage of the particular winter, stating that, in favourable circumstances, the entire line might be built in one year. The proponent then opens up the temptation to push things hard and extend construction into the thaw period. He offers no estimate of lead time required either for start up or shut down, or any evidence that some weather parameter either can or should be used to determine shut down times while being sure of enough time to remove equipment on snow and ice roads. The proponent offers no background material or climatic information to support his contention about the length of the work season.

Volume 3A, page 2-34 (gravel deposits-waste disposal):

The proponent points out that the best granular borrow is available as sand and gravel in glacio fluvial and alluvial deposits.

The proponent suggests that camp garbage be disposed of in active borrow sites - being placed in worked sections of the gravel pit and covered with spoil. They do not mention fencing or incinerating.

Volume 3A, page 2-49 (drilling and blasting in water):

Like many other aspects of the proposal, the proponent is vague about where drilling and blasting would be required in water bodies, what time of year it would occur, and the effects it could have on local populations of furbearers or fish.

Volume 3A, page 2-51 (pipe testing):

Pipe would be tested with water and air. The proponent provided no site specific detail on water sources he will use and effects of water use, such as winter flows, presence or absence of fish or furbearer populations, extent of drawdown (of lakes) anticipated, or effects of water use, or disposal of used water.

Volume 3A, appendix 13 (access south of Fort Simpson):

Access and access roads: the proponent said that he will require winter access roads along the right-of-way north of Fort Simpson, to the right-of-way from existing permanent access, and to service gravel pits, camps, and stockpile sites. I was unable to locate any reference to what they propose to do SOUTH of Fort Simpson. Will permanent access be required?

Volume 3B, pages 4-83, 4-87:

The proponent correctly lists possible negative effects of the project on raptors, but then seems to assume that none of his activities will have these effects. The proponent lists areas of concern as the Norman Range, isolated mountains north of the Range, and Bear Rock. He mentions Mt. Gaudet as a potential nest site. Comments from C.W.S. also mention Kee Scarp. According to Fyfe, both Kee Scarp and Bear Rock support active nests of peregrine falcons which are less than 1.6 km from the pipeline. If possible all facilities, activities,

and the line itself should be more than 1.6 km from peregrine sites to avoid conflict throughout its life.[3]

Volume 3B, page 4-92 (moose and furbearers):

In discussing moose and furbearers, the proponent described the situation correctly and succinctly, then in more detail when discussing the individual spreads. He seemed to identify correctly areas of important habitat (comparisons of maps will ensure that none has been missed) and stated that islands in the Mackenzie River where flooding and ice action maintain the vegetation in early successional stages are the best year round habitat available for moose, and are particularly important in winter.

I believe that the importance of alluvial habitats to moose has been consistently understated. Moose are animals of disturbed habitats, relying generally on succession following fire to produce temporary acceptable habitats. Because of constant disturbance from ice and water, alluvial moose habitats are essentially permanent. As permanent habitat, such areas provide refugia from which moose populations can expand to invade new habitats and into which such populations can contract when moose habitat declines. No emphasis is placed on disturbance or loss of such habitat in the E.I.S. Factors such as gravel mining, oil spills, and disturbance would be of concern.

---

[3]September 1980. I understand McCourt Management Ltd. completed surveys for raptors in August. As a result, they will be recommending some changes.

Volume 3B, page 5-2 (future use of Mackenzie Highway development area):

Although no reference is cited to support his contention, the proponent states that it is "likely that the location of future transportation routes for oil and gas will be encouraged in this development area" (centering on the Mackenzie Highway and 12.8 km wide).

Volume 3B, section 6 (lists of impacts):

Section 6 lists various impacts of the project. Most of them are understated in my opinion. Gravel pits will leave long term but negligible local visual impact. That may be true, but depends on many unstated conditions - avoiding certain areas, pit planning, etc.

Volume 3B, page 6-13 (disturbance from aircraft):

Exposure of wildlife to aircraft travel has probably resulted in some habituation in all species. Impact of increased air traffic is considered negligible. The proponent assumes he will have no trouble controlling use of vehicles so harassment will simply not be a problem.

Volume 3B, page 6-15 (collisions):

Impact of collisions between animals and land vehicles will be minor. The possibility of animals being attracted to an easy travelling surface or some other feature of the facility is not discussed, nor are the dangers of trapping an animal in headlights or with unbroken high snowbanks.

Volume 3B, page 6-16 (waste disposal):

Waste disposal is not a problem. The proponent stated that garbage dumps do attract scavengers from a local area. Bears in particular become a nuisance and animals may have to be selectively removed because of the danger they pose to people, but the population change is minor. Waste disposal and attraction of wildlife to pipeline facilities was a major problem on the Alaska pipeline. At the very least the problems of the TAPS should have been discussed with reasons given as to why the problem is not expected to be difficult to handle on the proposed line.

Volume 3B, page 6-18 (problems created by access):

The proponent sidestepped a major problem by saying that increased access and activity are often considered to be associated with a corresponding decline in ungulate and furbearer populations. The proponent stated that the impact is project related but mitigative measures are beyond the scope and jurisdiction of the project. He conceded that local interference with winter hunting and trapping activities might occur, but considered that countered by the possibility that previously unavailable areas might be opened up to such activity.

(Summary of impacts and mitigation measures):

In summary, spills of fuel, oil, and hazardous products were considered to have potentially major effects. Mitigative measures outlined for this and other impacts are simply

general lists which say workers and impacts will be controlled. Problems with waste disposal, will be countered by "standard project measures", Page 7-3; an "integrated environmental protection plan will be developed for all phases of the project. Environmental policies will be binding on all employees and will be urged on all contractors and subcontractors". Such statements are simply not adequate. An assurance that something will be controlled or prevented must be accompanied by a discussion of how it will be done which can give us some reason to believe that this proponent has a chance of achieving goals which previous proponents have not achieved.

Volume 4, pages 264-265 (sale of fish and wild meat):

The proponent listed potential local business opportunities related to the development and included among them the provision of fish and wild meat on a commercial basis. The Northwest Territories Wildlife Service should comment.

Volume 4, pages 272-273 (responsibility of proponent for social impact):

On the social side the proponent recognizes a responsibility to work with governments, local communities, native groups, and other appropriate interest groups "to deal with social impacts including effects of the line on hunting and trapping areas. Elsewhere in the submission they also recognize a need to establish a basis for compensation (in concert with other interested parties) if claims of damage to trapping

areas, etc., arise out of the project.

Volume 4, page 280 (land claims):

The proponent recognized the land claims issue and the statement that he "will co-operate fully with both the letter and the spirit of any land claims settlement" is the extent of his treatment of the issue.

4.4 GENERAL COMMENTS

It is my opinion that the proponent has reviewed all the available wildlife literature, even if he has failed to adequately reference the document. He has failed to state the assumptions upon which his assessments of impact rest, and generally seems to have simply defined most impacts as minor or negligible. He has failed to deal in any realistic or detailed way with experience on the TAPS. Some published information is available, but it would surely also be possible to contact some people there on a personal basis and make an effort to avoid the problems encountered there. There is no evidence that the consultant recommended any changes to the proponent, or in fact that the proponent would even consider changes. The E.I.S. seems to stand as a necessary but unimportant and relatively irrelevant part of the application.

4.5 ENVIRONMENTAL ATLASES: A COMPARISON OF INFORMATION PROVIDED ON THE NORMAN WELLS TO ZAMA PIPELINE WITH OTHER AVAILABLE MATERIAL

As a supplement to Volume 3C of the Environmental

Impact Statement, the proponent provided an atlas. The atlas contained geotechnical maps and environmental and resource land use maps at a scale of 1:50,000. Information provided was compared with other available material listed as references. Apart from general comments made here, I have also made specific comments and additions on the map sheets where appropriate.

4.5.1 Format

The environmental and resource land use maps suffer disadvantages in format which limit their utility severely. The main stem of the pipeline is the only facility shown. Locations or extent of campsites, gravel mines, solid and liquid waste disposal sites, stockpile sites, access roads, and other facilities which are an integral part of the proposal are not shown.

I found no major errors in the environmental and resource use material, but the method of presenting it would lead one to under-rate the importance of wildlife and its use. Much of the material could have been presented on the map face without resulting in a cluttered map. No method of referencing is used, so sources of individual pieces of information cannot be traced. No list of references is provided.

Hunting and trapping areas provide an example of the manner in which information seems to be presented to understate concerns while providing necessary information. On the face of the map, a hunting or trapping area appears as a number

surrounded by a small broken circle. The hunting or trapping legend identifies each number by the community the trappers come from and the species taken. No indication of size of area used is given.

4.5.2 Content

Comparison of the map set with information provided by D.O.E. (1976) on hunting and trapping suggests that the proponent understated the value of the area to resource users. Use of the Mackenzie River as an important travel route, winter and summer, was not mentioned. Other comments and additions have been made on the face of the maps themselves. Prescott et al (1973) seems to have been used for the assessment of moose habitat. They described the best moose range in the Northwest Territories as "good". On the proponent's maps I have substituted "top quality" in the descriptions of moose habitat for "good".

The maps mention raptors, beaver, moose, and waterfowl. Species of mammals not mentioned include black bear, lynx, and red squirrel in most wooded areas; marten in mature mixed forest; and mink, otter, and muskrat in some of the same areas as beaver. Wolves, wolverine, coloured fox, weasels, hares and small rodents are scattered through the area, although the proponent may contend that there are no site specific concerns associated with these species. However, their presence should have been indicated.

REFERENCES:

Department of Environment. 1976. Land use information series. Mackenzie River update. Department of Indian Affairs and Northern Development.

Dennington, M.C., B.E. Johnson, and H.A. Stelfox. 1973. Atlas of beaver and muskrat habitat maps: part of a wildlife habitat inventory of the Mackenzie valley and northern Yukon. Canadian Wildlife Service.

Environment Protection Board. 1973. Environmental impact assessment of the portion of the Mackenzie gas pipeline from Alaska to Alberta. Vol. 3 - environmental atlas.

Esso Resources Canada Limited and Interprovincial Pipeline (N.W.) Ltd. 1980. Norman Wells oilfield expansion and pipeline project. Environmental Impact Statement vol. 3 supplement: geotechnical maps, environmental and resource land use maps.

Prescott, W.H., G.L. Erickson, L.E. Walton, and D.G. Smith. 1973. Atlas of moose habitat maps: part of a wildlife habitat inventory of the Mackenzie valley and northern Yukon. Canadian Wildlife Service.

5. RECOMMENDATIONS AND CONSIDERATIONS ARISING FROM OTHER PROCEEDINGS OR OTHER PROJECTS

5.1 MACKENZIE VALLEY PIPELINE INQUIRY (BERGER)

5.1.1 Volume 1 - General

5.1.1.1 A pipeline up the Mackenzie valley would follow a transportation corridor used by native people for centuries and which has been being developed on a technological basis for decades.

5.1.1.2 A pipeline up the Mackenzie valley would threaten no major wildlife populations. It would violate no major wilderness areas.

5.1.1.3 It would require a sensible and comprehensive plan which accounts for and resolves the many land use conflicts apparent in the region now. Such conflicts would increase as development increases. The Mackenzie River is already a pre-eminent natural transportation corridor and therefore the scene of current conflict between wildlife, hunting and trapping activities, and industrial development.

5.1.1.4 The pipeline route cuts across many tributaries of the river. These valleys, a small amount of the land area, are locations of disproportionately high land use, environmental, aesthetic, and recreational values. The locations of compressor stations may be important - if in valleys, they

would be along human and animal travel routes.

5.1.1.5 Wildlife populations inevitably decrease as industrial activity takes over larger and larger portions of the landscape. This process is already underway in the Mackenzie valley and will accelerate as industrial development proceeds.

5.1.1.6 Woodland caribou populations are generally well back from the proposed route.

5.1.1.7 Moose are a resource which is heavily used locally. They range widely over most types of habitat in summer and spring. Although not immediately sensitive to encroachments on its habitat, successive disturbances will cause them to move away. The effect is subtle and gradual. (One should emphasize that populations of moose are <u>not</u> currently undisturbed.)[4]

5.1.1.8 Furbearers are also subject to disturbances which may push them away from a pipeline corridor. Local depletions in number have been felt already.

5.1.1.9 Land use planning is required in the Mackenzie valley.

5.1.1.10 Fur trappers are at the mercy of the market place. There is no organized marketing system for furs, no minimum price, no guaranteed return. It is not supported like either

---

[4] In locations where I have been unable to resist a comment or suggestion of my own, it appears in parenthesis. L.M.A.

the agricultural industry in the south or the non-renewable resource extraction industries in the north.

5.1.1.11 The native economy has always been undervalued and its vitality underestimated.

5.1.2 Volume 2

5.1.2.1 Justice Berger recommended postponment of a pipeline up the Mackenzie valley for ten years, to give time for certain pre-conditions of a line to be met.

5.1.2.2 The renewable resource sector of the northern economy must be strengthened before the pipeline is built. (Has any progress been made in this area? Does Northwest Territories Wildlife Service have any plans which will be helped or hindered by the Norman Wells pipeline?)

5.1.2.3 There is a need to preserve critical habitats for wildlife in perpetuity.

5.1.2.4 Conservation lands should be identified and set aside in advance of construction. (Prior to route selection.)

5.1.2.5 A northern conservation strategy is required which involves native people in management, in inventory, and in the whole conservation lands program.

5.1.2.6 A two mile (3.2 km) restricted hunting zone should be implemented along the pipeline right-of-way, all temporary or permanent access roads and all facilities, exempting traditional use by the native people. (Can such a regulation

effectively protect the resource if it does not also apply to the native hunters?)

5.1.2.7 Communities and government agencies must have input into routing refinements.

5.1.2.8 A regulatory agency must control the actions of the company from the very beginning.

5.1.2.9 Flight corridors, flight ceilings, the regulation of flight schedules (of all aircraft other than scheduled airlines flying in the vicinity of the project) should come under the jurisdiction of a flight control group.

5.1.2.10 Development of renewable resources should occur at the initiative of groups of natives and under native control with government agencies supplying financial and technical assistance in a supporting role. (Berger includes in Volume 2 an extensive and instructive discussion of harvests and harvest data.)

5.1.2.11 Environment and Land

5.1.2.11.1 A pipeline could be built in the Mackenzie valley with acceptable environmental impact if recommendations of M.V.P.I. are followed.

5.1.2.11.2 Priorities for environmental protection must include the values not only of the government and the company, but also native and other northerners and southerners; a public voice is required because land use and environmental protection are closely related.

5.1.2.11.3 On the basis of the value he felt the atlas of the Environment Protection Board had, Justice Berger recommended that a large scale, detailed environmental atlas be prepared jointly by the agency and the company. The atlas would show environmental sensitivity and land use priority and be available to all interested parties for use during the project.

5.1.2.11.4 Environmental quality indices should be established to indicate changes in water and air quality, land and biological components. (C.O.P.E. contended that such indices are culturally based and therefore culturally biased.)

5.1.2.11.5 The pipeline should be designed and located so its effects on the ongoing use of the region are minimized. In this regard, effects of the whole project over its entire life should be considered as well as unrelated projects which may reasonably be expected in its wake.

5.1.2.11.6 Pipeline design may be required to be more conservative than usual in some areas to minimize certain hazards, e.g. summer maintenance and repair.

5.1.2.11.7 Proposals for withdrawal of water shall be required on a site specific basis to ensure against damage with consequences to wildlife.

5.1.2.12 Wildlife

5.1.2.12.1 Concern for wildlife should be focused on critical habitats and critical life stages.

5.1.2.12.2 Improved access will lead to increased moose hunting during and after pipeline construction as it has in Alaska. Disturbances to "critical moose wintering areas, particularly Class 1" should be avoided.

5.1.2.12.3 Barriers to animals on, approaching, or leaving winter ranges must be minimized. This infers a requirement for detailed scheduling in the vicinity of winter ranges.

5.1.2.12.4 All permanent rights-of-way must be designed to permit easy passage to wildlife. Wildlife must not be impeded in winter by long, unbroken lines of snow fence, large, unbroken drifts along the side of the road when roads are cleared, etc.

5.1.2.12.5 Access to rights-of-way must be restricted to project personnel.

5.1.2.12.6 Coloured foxes and wolves will be attracted to the project and disturbed by it. Den locations tend to be well drained sites; in permafrost areas these are exactly the sites which may be destroyed by gravel mining. Avoid all known dens with the right-of-way and pipeline facilities. (This may be more of a problem in northern sections of the valley than southern ones.)

5.1.2.12.7 Prohibit feeding of wildlife. Feeding of bears should be regarded as an act threatening human life and result in dismissal.

5.1.2.12.8 Attractions of wildlife to waste disposal sites should be minimized by regular incineration of combustible

garbage. (Should such sites be fenced, incineration be required daily?, twice daily? Camp garbage should be kept covered and collected daily?, twice daily?)

5.1.2.12.9 After construction, all facilities no longer required by the project (wharves, airstrips, roads, etc.) shall be removed or (in an approved manner) rendered unusable.

5.1.2.13 Project Regulation

5.1.2.13.1 Funds for extra management and research are required as the responsible agency (N.W.T.W.S.) is failing to meet its present demands (testimony of Simmons).

5.1.2.13.2 Wildlife specialists are required by the Agency (the Agency refers to a super-group controlling all aspects of pipeline construction; agency is used in the usual sense of the word) at all levels of planning and review.

5.1.2.13.3 A comprehensive short term monitoring program of bird and wildlife populations should be set up by the Agency.

5.1.2.13.4 Long term monitoring must be done by responsible wildlife agencies. It must include harvest monitoring and result in comprehensive management programs.

5.1.2.13.5 Wildlife research should be undertaken before, during, and after pipeline construction to gauge the nature of populations, to develop comprehensive mitigative responses, and to assess the effectiveness of ameliorative measures on a short and long term basis. (Berger commented that concrete

plans for research by responsible government agencies are required to effectively manage wildlife in an area increasingly encroached upon by industrial activities.)

5.1.2.14 Land Use Planning and Conservation

5.1.2.14.1 Comprehensive land use planning is required prior to pipeline construction.

5.1.2.14.2 "A settlement of native land claims is the keystone of land use planning in the north." However, land use planning can be done without prejudicing native claims and may be necessary if claims are not to be prejudiced by industrial development.

5.1.2.14.3 The pipeline route shall avoid wherever possible all areas identified as having natural or cultural significance whether formally withdrawn or not. Where it cannot avoid them, special plans for operation must be formed by the company and approved by the Agency.

5.1.2.15 The Project

5.1.2.15.1 Even after approval, there is a requirement for a review process for resolving conflicts on pipeline routing and location. The review must include local communities, the pipeline company, government agencies and other parties.

5.1.2.15.2 A process of route location refinement is required to prevent the company from going off on its own.

5.1.2.15.3 The company must have contingency plans to deal with delays.

5.1.2.15.4 Blasting will not be permitted within 1000 ft. (300 m) of rivers, lakes, or streams frequented by aquatic mammals without site specific approval. Approval is contingent upon the company demonstrating that it will not adversely affect the populations or the water body.

5.1.2.15.5 Blasting activity (above) "shall be carried out in a manner which assures the continued well being of local populations of aquatic furbearing species and the continued harvest of these populations by native people".

5.1.2.15.6 Blasting which in any way "puts at risk" local land based activity is, a) prohibited, or b) prevented until after compensation is made.

5.1.2.15.7 Gravel mining from river channels is prohibited. (No comment was made about the importance of alluvial ecosystems in river valleys.)

5.1.2.15.8 Water withdrawals shall be regulated to prevent damage to or loss of aquatic furbearer habitat.

5.1.2.15.9 Siting of compressor stations is important to minimize habitat losses. Site specific applications for compressor stations will be required.

5.1.2.15.10 An overall plan for transportation facilities must be developed by the company.

5.1.2.15.11 Disturbances and harassment of wildlife can be a problem in critical areas and at critical seasons (calving,

wintering, staging, etc.). Control of aircraft must operate in relation to all flights to be effective and should be implemented by government.

5.1.2.15.12 Flight corridors and airfields must be located to avoid sensitive areas. Minimum height regulations may need to be established in some areas or at some times of year.

5.1.2.15.13 Pilots who harass wildlife should be subject to prosecution and loss of lisence.

5.2 ALASKA HIGHWAY PIPELINE PANEL - ENVIRONMENTAL AND SOCIO-ECONOMIC CODE FOR THE ALASKA HIGHWAY PIPELINE

5.2.1 General

Since the decision had been made to go ahead with the project, the Alaska Highway Pipeline Panel emphasized management of impacts. The Panel pointed out that management of impacts cannot be successful if government activity which inevitably accompanies such a large project is not also managed.

5.2.2 Detailed Recommendations

There must be no project activity or operating and maintenance activity during the life of the project and facilities must not be located in:

5.2.2.1 Areas within 2 km of sharp-tailed grouse arenas from 01 April to 31 May, or within 500 m of the arena at any time. (Godfrey, W.E. 1966. The Birds of Canada shows the entire route of the proposed Norman Wells pipeline as being within

the range of sharp-tailed grouse. The proponent did not mention any grouse in his E.I.S.)

5.2.2.2 Areas within 3 km of woodland caribou migration routes when caribou are on or approaching such routes.

5.2.2.3 Areas within 3 km of woodland caribou winter range from 01 December to 31 March.

5.2.2.4 Areas within 2 km of bear (grizzly and black?) dens from 01 November to 15 May and within 500 m of such dens at any time.

5.2.2.5 Areas within 2 km of wolf dens from 01 March to 31 August and within 500 m of such dens at any time.

5.2.2.6 Areas within 1 km of moose winter ranges from 01 December to 31 March.

5.2.2.7 Raptor protection zones shall extend 3 km from the nests of peregrine falcons, gyrfalcons, ospreys, golden eagles, and bald eagles in all directions.

5.2.2.8 During the same time periods, blasting provisions are more restrictive. Blasting is not to occur within 3 km of grizzly and wolf dens, 5 km of woodland caribou migration routes and winter ranges, 3 km of moose winter ranges.

5.2.2.9 All problem carnivores will be reported to the appropriate agency (N.W.T.W.S.) and any action taken against them shall only be by that agency except in cases of actual danger of human life. (Is this already covered by regulation in

Northwest Territories? Repeating it in pipeline stipulations might be useful.)

5.2.2.10 Withdrawal and disposal of water from pipe testing shall be on a site specific basis.

5.2.2.11 Where "growth control" is required (i.e. where shrubs and trees must be prevented from establishing or from growing too large), mechanical means shall be used. Herbicides shall not be sprayed along the right-of-way.

5.2.2.12 Plans presented by the company shall deal with construction, operation, and abandonment.

5.2.2.13 Project personnel shall not be permitted to possess firearms on the right-of-way except for designated security staff. Firearms shall be closely controlled and the discharge of any firearm for any purpose shall immediately be reported in writing to the Agency.

5.2.2.14 Plans for development of borrow pits and quarries shall be submitted and approved in two stages:

5.2.2.14.1 An overall plan which can be used to assess both project and non-project requirements. It shall include locations of sources, quantities and grades to be taken from each source, time of year the site will be worked, where material will be used, etc.

5.2.2.14.2 After approval of the overall plan, the company shall be required to submit site specific applications for

the development of each borrow source in detail including a site plan, the timing of all operations, location and design of access between the pit and the site of material use, drainage, erosion, and sedimentation control, and restoration plans.

5.2.2.15 Gravel pits shall not be located in stream beds or on floodplains (does this adequately cover alluvial habitats used by moose as winter ranges?) unless otherwise specifically approved. Requests for gravel pits in restricted areas shall be accompanied by detailed site plans plus an assessment of impact to biological, hydrological, and other environmental components of the area.

5.2.2.16 The company shall submit for approval plans for transport, storage, handling, and disposal of all fuel and hazardous materials to be used during construction and operation of the line. Hazardous materials are defined and requirements for the plan are outlined.

Among other requirements the storage plan must show all water bodies within 2 km of the storage area and any critical wildlife habitat within 5 km.

The plan must also include detailed contingency plans in response to a spill.

5.2.2.17 Storage areas of greater than 3800 ℓ (1000 U.S. gallons) shall be dyked with liquid-tight, fire-proof material. The dyked area shall be 125 percent of the volume of the

tanks and/or bladders plus a .5 m allowance to provide for precipitation and runoff.

REFERENCES:

Alaska Highway Pipeline Panel. 1978. Environmental and socio-economic code for the Yukon portion of the Alaska Highway gas pipeline. Submitted in response to requests from the Northern Pipeline Commissioner for comments on draft terms and conditions.

Berger, T.R. 1977. Northern frontier northern homeland. The report of the Mackenzie Valley Pipeline Inquiry: Vol. I. 213 p.

Berger, T.R. 1977. Northern frontier northern homeland. The report of the Mackenzie Valley Pipeline Inquiry: Vol. II. 268 p.