A REPORT OF THE NORTHERN PIPELINE AGENCY March 198

PIPELINE

Canol - A Northern Pipeline 35 Years Later

The Northern ecosystem can respond on its own and in some ways be enhanced as a result of development, says Peter Kershaw, a biogeographer from the University of Alberta in Edmonton.

Kershaw, 30, has conducted extensive research for his doctorate thesis on the environmental effects of Canol #1, a 4-inch diameter oil pipeline buit for the U.S. army during World War II to ensure a secure supply of inland fuel along the Alaska Highway. The line ran 924 km (574 mi.) from the producing oilfields at Norman Wells in the Northwest Territories, west over Macmillan Pass into the Yukon, south to Johnsons Crossing and then north to the refinery in Whitehorse. Built, operated and abandoned in a span of three years from 1942 to 1945, Canol was likely the most hurried, shortlived project of its scale ever undertaken in the north. Unlike pipeline projects today, little effort was made to protect the environment.

Kershaw has concentrated his studies on a 120 km (75 mi.) segment of the Canol located above timberline in the Northwest Territories because the area has remained virtually untouched since abandoned 35 years ago. Revegetation and associated recovery in this tundra section of the project have been natural.

"I love that kind of country, although there are no trees to climb when a grizzly comes by," grins Kershaw. "But in terms of research, with all these types of distrubances associated with the pipeline corridor such as construction camps, gravel pits, access roads, vehicle traffic, bulldozed tracks and bladed trails, it has so many implications for what we're wanting to do in the north today. There is nothing with 35 years of natural recovery that can compare."

Remnants of Pump Station No. 4, 180 km (112 mi.) southwest of Norman Wells. The camp yard which was originally denuded of vegetation now has a dense willow shrub cover.

photos courtesy of Peter Kershaw

Kershaw's work provides insight to possible long-term environmental effects of other northern energy developments such as the proposed Norman Wells oil pipeline and the Alaska Highway gas pipeline. Canol was a 4-inch diameter oil line laid on the surface of the ground, whereas the Alaska Highway pipeline will be a buried, large diameter line carrying natural gas. Impacts such as the pipeline right-of-way, access roads, communications networks and construction activity could be similar. However, measures will be taken to prevent adverse environmental and socio-economic effects from construction of the Alaska Highway pipeline.

Assisted by his wife Linda, a botanist, Kershaw spent three summers and two winters in the field, comparing plant groups and wildlife responses in untouched areas with areas disturbed by Canol activity. He estimates in total they covered over 2,900 km (1,800 mi.) on foot, skiis, and snowshoes, and at least 700 km (435 mi.) by snowmobile. He also studied Canol progress reports to determine the season of construction in certain locations, as well as to learn more about on-site conditions.

Kershaw presented his findings to the Northern Pipeline Agency staff members in February. He demonstrated with colour slides how the "pre-Canol" plant life in distrubed areas has been replaced. Colonizers such as willow shrubs and a variety of flowering plants now flourish along roadsides and in cleared sites. The result, says Kershaw, can be enhancement of forage for wildlife. Ground squirrels have made burrows in well-drained mounds where gravel was once dumped; weasels and swallows have taken advantage of abandoned buildings and bridge abutments for habitation. Large mammals such as moose and wolves seem to prefer the roadbed, which permits easier movement than brush-covered terrain.

Kershaw identifies oil spills which occurred during the 13-month operational phase of the Canol pipeline as the most

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negative impact in terms of irreversible change and sterilization of the affected area. Today we know that the addition of fertilizer and scarification, that is breaking up the soil surface, can improve recovery substantially. His studies reveal that as much as 14.6 percent (169,132 barrels) of the oil put in the line could have been spilled because it was never accounted for. When Canol was abandoned in June 1945, 9.4 percent of the oil was left in the line, and much of this was drained onto the terrain during the salvage operation. Some of the remaining 5.2 percent may have been burned as fuel, but a least 46,108 barrels has definitely been accounted for in known oil spills.

Kershaw has found adverse impacts to be site-specific rather than on an overall scale. Nothing grows in certain gravel pits, he notes, because the organic material and fine silt needed to retain moisture and nutrients was entirely removed.

Dr. Tony Yarranton, manager of the Northern Pipeline Agency's environmental group, says Kershaw's research is unique because he has documented environmental impacts in an area over a long period of time. "Time is a great healer. After 35 years many of the adverse effects have been modified or reduced. The most severe effects which has persisted is that of oil spills, and we won't have that problem with the gas pipeline."

Yarranton observes that most of the permanent changes, like improved drainage in certain areas and alterations in vegetation type, are not adverse effects from the point of view of wildlife habitat, but probably advantageous.

By looking at the impact of the Canol #1 pipeline 35 years later, Kershaw hopes to develop prediction models for areas of similar terrain undergoing major development. His research will apply to the proposed Dempster Lateral of the Alaska Highway gas pipeline, which will tap the gas reserves in the Mackenzie Delta/Beaufort Sea.

"If the system can do this well without any amending, mulching or re-seeding, think of what it could have done if rehabilitative measures had been taken. The system is capable of bouncing back," Kershaw concludes.

photo courtesy of National Museums of Canada

photo courtesy of Peter Kershaw

photo courtesy of Richard S. Finnie, April,

Excavation of gravel pit (top) during 1944 construction of the Canol Road. Viewed 36 years l (centre), shrubs cover the pit and the road ditch is also revegetated. This section of the Canol Road, open since 1969, has been resurfaced and graded.

(Bottom) Canol Camp, the eastern supply depot for the Canol pipeline, housed several thousand workers and processed much of the freight and equipment necessary for the project.

Pipeline Right-of-Way and Compensation Procedures Set

The new pipeline legislation approved by the House of Commons March 6 and given second reading by the Senate March 17 incorporates one of the provisions of the *Northern Pipeline Act,* which applies to the planning and construction of the Alaska Highway gas pipeline.

Bill C-60, an Act to Amend the National Energy Board Act, establishes revised procedures for acquiring lands for pipeline purposes, determining the pipeline route, obtaining right of entry and determining compensation where negotiations fail. The new rules pertaining to the acquisition of land replace procedures as set out in the *Railway Act* of 1919 and later incorporated by the *National Energy Board Act.*

Route Information Provided to Landowner

The similarity between the new Act d the *Northern Pipeline Act* is the requirement for the company to provide the landowner with routing information, detailing the proposed pipeline route on the owner's land. Bill C-60 also gives landowners objecting to the pipeline route the opportunity to make representation to the National Energy Board (NEB) at a public hearing. While the NEB has in some cases followed such a procedure in the past few years, notes Doug Fox, Right-of-Way Manager for the Northern Pipeline Agency, the *Northern Pipeline Act* was the first statute to make the procedure mandatory.

Fox has 18 years experience in right-of-way planning, mainly in Western Canada. He explains that under the present legislation all matters concerning the expropriation of land rights are dealt with by an arbitrator under certain sections of the *Railway Act.* Whereas the new Act separates the duties: the NEB is empowered to grant right of entry, while an arbitration committee determines compensation. Under Bill C-60, the owner may opt for payment in lump sum, annual or periodic form. Annual or periodic payments are subject to review every five years.

Bill C-60 states the company is liable for damage to or loss of land, livestock or other personal property resulting from pipeline activity. The new Act also restricts a company's use of a right-of-way to one pipeline or related facility, unless the landowner has consented to any proposed future use.

Another change, Fox says, is that the new legislation repeals the section of the *National Energy Board Act* which sets right-of-way width at 18.3 metres (60 ft.), and the section under which additional widths of right-of-way may be obtained. "Present thinking is that right-of-way width will be considered at the route determination hearing," comments Fox. Under existing law, route determination and applications for lands in excess of 18.3 metres are dealt with at two separate hearings.

Bill C-60 has been referred to the Special Senate Committee on the Northern Pipeline for further study. Sen. H.A. (Bud) Olson, Minister responsible for the Northern Pipeline Agency, said in the Senate debates March 12 that representatives of Foothills Pipe Lines (Yukon) Ltd. have assured him adjustments would be made to reflect the new approach to compensation for lands acquired for construction of the Alaska Highway gas pipeline, once the new legislation is proclaimed.

Bill C-60 is similar to Bill S-12 which was introduced by Sen. Olson, former chairman of the Senate Committee on the Northern Pipeline, and passed by the Senate in 1979. Bill S-12 did not receive approval by the House of Commons before the dissolution of Parliament for the May, 1979 general election and, as a result, died on the order paper.

News In Brief

A public hearing held by the Agency February 17 in Shaunavon, Saskatchewan on Foothills Pipe Lines (Sask.) Ltd.'s applications for additional lands along the 258 km (160 mi.) Saskatchewan segment of the Eastern Leg adjourned after two hours. One landowner, represented by his lawyer, raised concern over the proximity of the pipeline route to a small stream where he has a permit to place a dam for domestic water use. After assurances from the company that the pipeline would not interfere with his plans, the objection was withdrawn.

The hearing reconvened in Regina on Monday, March 23, because it was not advertised three weeks in advance in the Regina newspaper, The Leader Post.

On behalf of the National Energy Board, the Agency's Designated Officer William A. Scotland, issued 23 orders of approval February 27 granting Foothills Pipe Lines (Alta.) Ltd. leave to take additional lands along the first 54 km of the Eastern Leg of the pipeline in Alberta. The company's applications were made at a public hearing in Olds, Alberta January 29.

On March 11, the Designated Officer issued 23 additional orders of approval for Foothills (Alta.) to take extra lands along two other Alberta segments of the Eastern Leg scheduled for 1981 construction. The decision on these lands, a total distance of approximately 117 km (70 mi.), was based on a hearing held in Brooks, Alberta, February 5.

The 635 km (394 mi.) Eastern Leg runs southeast from James River Bridge to a point near Empress, Alberta and continues southeasterly to the Canada-United States border near Monchy, Saskatchewan. Construction is to begin in May.

Foothills Pipe Lines (Sask.) Ltd.'s inventory of traditional harvesting and native cultural areas in the vicinity of the Alaska Highway gas pipeline route in Saskatchewan, submitted to the Agency in March, has been reviewed and found satisfactory.

The study concludes that adverse impacts from pipeline construction will be negligible on areas of traditional use and cultural importance to Indian, Metis and non-status Indians. Traditional harvest-

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Quill Creek Construction Complete

After a burst of activity in February, construction is complete at Foothills Pipe Lines (South Yukon) Ltd.,'s Quill Creek test facility for pipeline design and installation procedures in discontinuous permafrost. By the end of the month experiments in ditch preparation and drilling and blasting were completed at the test site - a five km (three mi.) stretch along the Haines-Fairbanks right-of-way between Quill and Burwash Creeks, 300 km (186 mi.) northwest of Whitehorse.

Pipe has been buried in conventional underground ditches as well as in experimental embankments about 3.3 m (10 ft.) above ground. The embankment mode consists of a gravel pad on which an insulation bed, and then the pipe is laid and covered with gravel. Hot air will be circulated in the pipe and instruments called thermistors will register the effects of heat transfer to the surrounding soil and changes in ground temperature due to seasonal variation.

Backhoe covers pipe in embankment with gravel at Quill Creek test site

In mid-February a load of three lengths of 24.4 m (80 ft.) long, 1,219 mm (48 in.) diameter pipe arrived safely from Edmonton on an experimental tractor-trailer unit capable of tracking automatically from the back. The drive was conducted to test the new vehicle's ability to carry long joints of pipe around sharp corners such as those along the Alaska Highway.

An experiment in using ice for building a protective roadbed over permafrost was also carried out. Ice chips harvested from nearby Kluane Lake were spread in varying thicknesses over the permafrost. Heavy equipment and vehicles were run over the roadbed to test the effectiveness of the ice layer to protect the permafrost.

Tests in erosion control techniques are also part of the $15 million Quill Creek test program. Part of a hillside was cut away at different angles to expose the underlying ice-rich soil, which was then covered with layers of gravel, peat and filter cloth. Electronic instruments have been installed to monitor slumping activity.

Personnel on the project peaked at 104 during the third week of February, including 42 Yukon residents, 13 native people and nine women, three of whom are also native. Many of the non-Yukon resident personnel are permanent employees of the contractors and Foothill (South Yukon), performing scientifi and supervisory roles in connection wit the test facility. Yukon businesses wer involved in surveying, clearing, slash ing, drilling, environmental monitorinç aircraft charter and vehicle leasin contracts.

The electronic monitoring instru ments will be connected in April and th testing will begin, to take in several su mer and winter seasons. Results of th Quill Creek tests will help to determin how the northern mainline sections c the Alaska Highway gas pipeline ar built.

News in Brief continued...

ing activities include hunting, fishing, and trapping. Areas of cultural significance are defined as burial grounds, religious sites, and meeting places of cultural or historical importance. The company says standard practices will be followed for minimizing impact during pipeline construction, as required by the Agency's terms and conditions.

The inventory is available for public review in the library of the Northern Pipeline Agency offices in Calgary and Ottawa, and in the main public libraries in Regina, Saskatoon, Burstall, Tompkins, Climax and Shaunavon.

Pipe for the Eastern Leg began rolling in early February at plants in Camrose, Alberta, Regina, Saskatchewan, and Welland, Ontario. Delivery of total requirements for 1981-82 construction of 435,350 m (1,428,314 ft.) of 1,067 mm (42-inch) diameter pipe is expected by August. The Stelco Inc. mill at Camrose is producing 265,300 m (870,407 ft.) of longitudinal-seamed pipe; Interprovincial Steel and Pipe Corporation Ltd. (IPSCO) of Regina and Stelco Inc.'s Stelform mill in Welland are supplying 155,390 m (509,810 ft.) and 18,820 m (61, 745 ft.) respectively of spiral-seamed pipe.

Foothills Pipe Lines (Yukon) Ltd. will conduct its seventh burst test the week of March 30 at the Northern Alberta Burst Test Site near Rainbow Lake. A 1,219 mm (48-in.) diameter, 106.7 m (350 ft.) length of buried pipeline filled with gas at 1,180 pounds per square inch, will be fractured with shaped explosive charge which will cu a narrow .61-m (2 ft.) long notch in th pipe. Instruments along the pipe will re cord fracture speeds, gas decompres sion behaviour and deflection of th steel as the pipe bursts. This is one of series of tests to determine how effec tively pipe of a certain design an strength, and under certain temperatur conditions will stop a fracture.

The National Energy Board holds hearing beginning March 31 in Ottaw to examine Foothills Pipe Lines (Yuk Ltd.'s final design cost estimates fc both the Eastern and Western Legs The company estimates costs for th Western Leg at $167,379,000, an $653,942,000 for the Eastern Leg.

Officials Celebrate U.S. Construction Start

Political will and dedicated, competent work on both sides of the border have made the Alaska Highway gas pipeline project a reality, says Sen. H.A. (Bud) Olson, Minister responsible for the Northern Pipeline Agency.

Sen. Olson and the Hon. Mitchell Sharp, Commissioner of the Agency, were among Canadian government and industry officials who attended the inaugural ceremony on February 9 in Spokane, Washington, to mark the start of construction in the United States of the Western Leg of the international pipeline. The ceremony was sponsored by Pacific Gas Transmission Company.

In his brief remarks, the Minister recalled a breakfast meeting he had attended in Washington, D.C. last June with key Congressional and Administration members to discuss the assurances being sought by Canada for completion of the entire line. The Americans present at the meeting agreed that Canada's requests were reasonable and justifiable. The same afternoon the U.S. Senate passed a unanimous resolution declaring "the highest level of congressional support" for the construction and completion of the Alaska Highway Gas Pipeline. A few days later the same resolution was passed unanimously by the House of Representatives.

Sen. Olson concluded by saying he was confident that the Canadian Government had made the right decision in proceeding with the construction of the southern segments of the pipeline. He added that not only is the U.S. "meeting our expectations of increased activity but indeed exceeding them."

The Hon. Mitchell Sharp underlined the strong commitment of the two countries in achieving energy self-sufficiency in his address to the large gathering of about 350 government and industry officials.

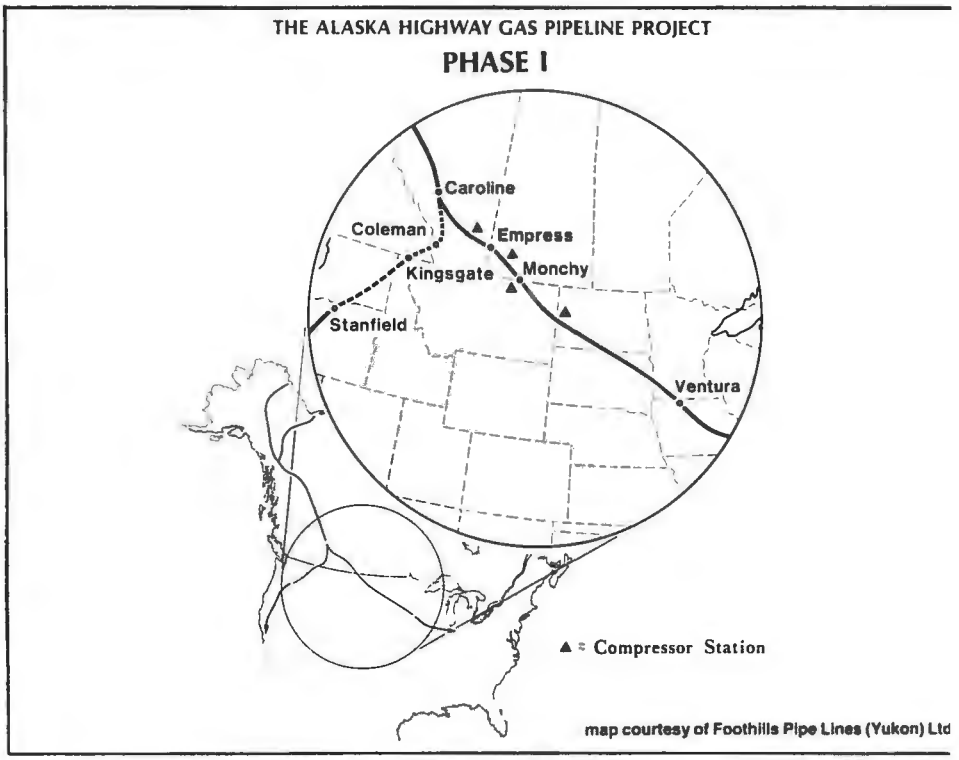
Sharp said Canada-United States relations reached a milestone in 1977 with the agreement to facilitate the building of a pipeline to carry natural gas from Alaska through Canada to the lower 48 states. "Our two countries had of course signed many other agreements and treaties. Never before, however, had we reached an agreement to co-operate in a joint cross-border project composed of several pipelines, separately owned, separately financed, separately regulated, joined together to form a single integrated system and to carry a vital supply of energy."

Sharp described the pipeline project as a prime example of Canada's willingness to co-operate with the United States in meeting the energy challenge. "Why, I am sometimes asked, wa Canada prepared to co-operate in builc ing a pipeline across Canada, which, i the first instance at least, will carry onl Alaska gas? Was it the employment an the stimulus to pipeline technology tha would result? Was it the improved ac cess to Canadian Arctic gas? Was it t avoid increased tanker traffic down th Pacific Coast?" he said.

While all these considerations ir fluenced Canada's decision, explaine Sharp, a far mor important considera tion was the desirability of helping th U.S. to gain access to its largest prove source of additional energy, the 736 b lion cubic metres (26 trillion cubic fee of Alaskan natural gas. "Canada wan the U.S. to be free from dependence c uncertain supplies of importe petroleum as quickly as possible," sa the Commissioner. "As a friendly neigl bour, our biggest trading partner and a ally, we want the United States to b strong and secure."

In conclusion, Sharp expressed con dence the change in the American A ministration has not diminished the U. commitment. "We have a long way to g in reaching our respective energy goal The completion of the Alaska Highwa natural gas pipeline will help us to me those goals. The work has started."

The Hon. Mitchell Sharp, Commissioner of the Northern Pipeline Agency, views U.S. Western Leg construction near Sandpoint, Idaho.



American Update

In an address to the Canadian Parliament on March 11, President Reagan confirmed his administration's commitment to completion of the Alaska Highway gas pipeline based on private financing. This commitment was emphasized earlier in a letter dated February 6 from U.S. Energy Secretary James Edwards to Sen. H.A. (Bud) Olson, Minister responsible for the Northern Pipeline Agency. Agreement on a tentative financing plan for the project is expected soon between U.S. sponsors and producers, Mr. Edwards said.

Oral argument concerning the route of the Eastern Leg through North Dakota was heard March 9 in Bismarck by the state's District Court. Last fall, the North Dakota Public Service Commission (PSC) ordered the 444 km (276 mi.) route previously selected by the President and Congress be changed. PSC's proposed longer alternative route would go north and east of the Missouri River to avoid crossing the river and travelling through badland areas and the Killdeer Mountains further south.

In a joint suit, the Office of the Federal Inspector (OFI) and the Federal Energy Regulatory Commission (FERC) charged the PSC's authorization as unconstitutional. Northern Border Pipeline Company, sponsors of the U.S. Eastern Leg, filed a separate suit on similar grounds.

A decision based on the March 9 court presenations by the OFI, FERC and the PSC is expected in April.

The U.S. Department of Energy recommended in January to FERC that pipe on the remaining 528 km (328 mi.) segment of the U.S. Western Leg be increased to 1,067 mm (42-in.) diameter from the originally planned 914 mm (36-in.) width. The larger size will increase pipeline capacity and substantially cut down fuel consumption per unit of gas transported, Energy Department officials said. Western Leg sponsor, Pacific Gas Transmission Company, plans to apply for a certificate for second phase construction in the spring.

A plan detailing goals for employment and business participation of minority groups and women in construction of the U.S. Western Leg was approved in February by the OFI.

The plan, which applies to the sponsor Pacific Gas Transmission Company, sets goals for minority employment at 5.9 percent, and 3.8 percent for women of the approximate 463 jobs available. The company aims for ten percent or $2.8 million (U.S.) participation by minority businesses, and one percent or $.3 million (U.S.) for female firms.

Construction of the 953 km (592 mi.) U.S. Western Leg began December 10 in Idaho, and will start this month in Oregon and Washington.

A $300 million (U.S.) engineering contract for design work and field programs in surveying and testing on the 1,196 km (743 mi.) Alaska segment of the pipeline was finalized in February between Northwest Alaskan Pipeline Co. and a southern California division of Fluor Corp.

Fund to Protect Native Interests

A $1 million fund to assist native groups affected by major resource developments was established in February by the federal government.

The fund applies to one project in Ontario and 13 in the four western provinces, including the Alaska Highway gas pipeline. It will help natives affected by these projects to mitigate potential adverse social, economic and environmental impacts on their way of life.

In British Columbia a total of $130,000 has been allocated to the Union of British Columbia Indian Chiefs to deal with impacts from pipeline activity on hunting, trapping and fishing territory on 12 Indian bands. These groups include the Blueberry, Fort Nelson, Prophet River, Doig, Halfway River, Saulteau, West Moberly, Columbia Lake, St. Mary's, Shuswap, Lower Kootenay and Tobacco Plains Indian Bands. The funds will also assist the bands to prepare for possible inflation to plan for participation in construction, maintenance and operation phases of the pipeline project.

In Alberta, a sum of $50,000 has been set aside for the Horse Lake, Sturgeon Lake, Sunchild - O'Chiese, Stoney, Blackfoot, Peigan and Sarcee Bands. The band members are seeking to obtain employment, training and business opportunities resulting from the gas pipeline project.

Broader Strategy Planned

The Hon. John Munro, Minister of Indian and Northern Affairs, and Sen. H.A. (Bud) Olson, Minister of State for Economic Development and Minister responsible for the Northern Pipeline Agency, announced the fund as an initial step towards a broader strategy to ensure native people share in lasting benefits from major resource developments. The government has identified at least 126 such projects as potential sources of impact on Indian and Inuit communities.

Pipeline

The Northern Pipeline Agency was created by Parliament in April, 1978 to oversee the planning and construction of the Alaska Highway gas pipeline project in Canada. Inquiries or suggestions regarding the Agency's publication "Pipeline" may be directed to:

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