NORTHERN PIPELINE AGENCY
ANNUAL REPORT
1980-1981

Canada

Northern Pipeline Agency Canada

Administration du pipe-line du Nord Canada

ANNUAL REPORT

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Vancouver Sun, Vancouver, British Columbia.
Whitehorse Star, Whitehorse, Yukon.

Ottawa, Ontario.
December 31, 1981.

Dear Sir:

I present herewith the Annual Report of the Northern Pipeline Agency for the fiscal year ending March 31, 1981, together with the report of the Auditor General on the accounts and financial transactions of the Agency for the same period, for submission by you to Parliament as provided for under Section 13 of the Northern Pipeline Act.

Yours sincerely,

Mitchell Sharp,
Commissioner,
Northern Pipeline Agency.

Senator The Honourable H.A. (Bud) Olson, P.C., M.P.,
Minister responsible for the
Northern Pipeline Agency,
Ottawa, Ontario.

Table of Contents

ALASKA HIGHWAY
NATURAL GAS PIPELINE PROJECT

See Project Description for imperial measurements

Major Developments in Canada and the United States Involving the Alaska Highway Gas Pipeline Project

Overview

Significant progress in moving forward with the Alaska Highway Gas Pipeline Project was made across a broad front during the 1980-81 fiscal year, the foremost development being commencement of first-stage construction of the 2,992-kilometre (1,858-mile) southern segments in Canada and the United States.

Extensive planning, research and field studies on socio-economic, environmental, archeological and engineering matters involved in the building of the remaining northern segment in Canada by Foothills Pipe Lines (Yukon) Ltd. and of the Alaskan pipeline and gas conditioning plant by the U.S. project sponsor and gas producers continued throughout the year. Considerable strides were also made in dealing with outstanding regulatory issues in both countries.

A major advance occurred in June, 1980, when the pipeline sponsor in Alaska—Alaskan Northwest—and the three leading owners of natural gas reserves at Prudhoe Bay—Exxon, Sohio and Atlantic Richfield—arrived at an agreement to share expenditures of some $500 million or more to complete final design and engineering of both the pipeline and gas conditioning plant in the state.

At the same time, the pipeline sponsor and producers also stated their intention of working together to develop a plan aimed at meeting the single greatest challenge facing the entire project—raising the immense amount of private investment capital required to finance construction of the costly Alaskan portion of the system. (The pipeline sponsor and the three gas producers reached agreement in May, 1981, on the concepts underlying a plan to finance the Alaskan segment of the pipeline and the gas conditioning plant at Prudhoe Bay. Under this plan, the producers would put up 30 per cent of the equity capital required for the Alaskan system and the pipeline sponsor would be responsible for raising the remainder, while both would have a responsibility for arranging the additional debt capital required to finance the project.)

The Statement of Intention issued in June of 1980 by the Alaskan pipeline sponsor and the producers was one of three major elements that led the Canadian government in mid-July to authorize first-stage construction of the Western and Eastern Legs of the system in southern Canada for the initial purpose of transporting surplus Canadian gas to markets in the mid-western and western United States. Secondly, in response to the assurances sought from the United States that construction of the entire system would proceed expeditiously, the Senate and the House of Representatives unanimously adopted a supporting joint resolution in late June and early July 1980. The third element behind the decision by the Government of Canada was a letter from President Jimmy Carter to the Prime Minister in mid-July expressing the confidence of the United States' government that the U.S. portion of the project would be completed on a timely basis.

On February 6, 1981, shortly after the new Administration of President Ronald Reagan assumed office, Secretary of Energy James B. Edwards wrote to Senator the Hon. H.A. (Bud) Olson, Minister responsible for

Canada's Northern Pipeline Agency, to renew the firm commitment of the Government of the United States to the completion of the Alaska Highway Gas Pipeline Project in line with the agreement between the two countries. Secretary Edwards' position was reiterated by President Reagan in his Address to both Houses of Parliament on March 11, 1981. "I am happy to say that in the recent past we have made progress on matters of great mutual importance," the President stated. "Our governments have already discussed one of the largest joint private projects ever undertaken by two nations—the pipeline to bring Alaskan gas to the continental United States. We strongly favour prompt completion of the project based on private financing."

By year's end, construction of the Western Leg in Canada had been virtually completed, while work in the United States was continuing with the goal of commencing the first flow of gas to California markets by October, 1981. Plans were also being completed for a start on construction in both countries of the Eastern Leg of the project over a two-year period.

Flat cars, loaded with 914 mm (36 in.) diameter pipe for Western Leg construction, pass through the Calgary rail yards.

During the year, work continued on the final design and engineering of the gas conditioning plant at Prudhoe Bay and the northern segment of the pipeline system stretching from the North Slope of Alaska through southern Yukon, northeastern British Columbia to James River in central Alberta. Further extensive testing was undertaken of soil and terrain conditions along the proposed route and continuing study devoted to potential socio-economic, environmental and archeological impacts of the project. In particular, major new test facilities built by Foothills at Quill Creek in Yukon and complementary facilities installed earlier by Northwest Alaskan enable intensive research to be conducted on the most feasible means of overcoming the difficult technological problem of frost heave and thaw settlement of pipe installed through areas of discontinuous permafrost—a problem that is dealt with in more detail later in this report.

The project sponsors and governments in both Canada and the United States were aiming at a target for completion of the entire project by late 1985. There were growing indications by the end of the fiscal year, however, that the completion date could be set back to 1986 because of delays in finalizing plans for private funding of the Alaskan portion of the system and subsequently securing amendments to U.S. legislation by Congress that were essential to the successful financing of both the Alaskan segment and the mainline in Canada.

The Agreement between Canada and the United States of September, 1977, governing the Alaska Highway Gas Pipeline declared the intention of the two governments that the project should be utilized to advance the national economic and energy interests and to maximize the related industrial benefits to each country, while at the same time ensuring that procurement for the project was undertaken on generally competitive terms. In June, 1980, an exchange of notes between the two governments established procedures designed to ensure the achievement of those objectives.

Major U.S. Developments

The Mainline Project

As already indicated, one of the major developments with respect to the U.S. portion of the project was the Joint Statement of Intention issued by the pipeline sponsor and the three producers in Alaska on June 19, 1980, with regard to the completion of final design and engineering for the Alaskan pipeline and conditioning plant and the financing of their construction.

The agreement was the outcome of a long and intense series of negotiations initiated 11 months previously by President Carter, under the aegis of the

Secretary of Energy, to end the stalemate that had existed up to that time. Alaskan Northwest and the producers undertook to share the expenditure of some $500 million to complete the final design and engineering work required to undertake construction of the pipeline and gas conditioning plant in Alaska and to arrive at a final estimate of their total cost, both of which were a prerequisite for the completion of a plan for financing the system. In that connection, the producers further stated that, along with their advisers, they would "work with Alaskan Northwest in an effort to develop its financing plan in such time and manner so that necessary governmental approvals may be obtained and construction commenced and completed as scheduled by Alaskan Northwest".

In late August, 1980, the consortium of gas shipping companies sponsoring the 1,200 km (743 mi.) Alaskan section of the pipeline was further strengthened by the addition of four more member companies, bringing the total to 11 (subsequently reduced to 10 with the withdrawal of one of the additional U.S. companies). One of the four was TransCanada PipeLines Ltd., which operates the largest natural gas transportation system in Canada and which has played a leading role in the Northern Border Pipeline Co., sponsor of the Eastern Leg of the Alaska Highway Gas Pipeline system in the United States.

In line with the agreement reached in June, 1980, between the producers and pipeline sponsor in Alaska, contracts were let later in the fiscal year to Fluor Engineering and Construction, Inc. to complete the final design and engineering of the pipeline, and a similar contract was awarded to the Ralph M. Parsons Co. with respect to the gas conditioning plant.

A further significant step forward was taken in December, 1980, when the then U.S. Secretary of the Interior, Cecil Andrus, signed the grant providing a 30-year right-of-way for the pipeline across some 690 km (430 mi.) of federal lands in Alaska. The right-of-way grant contained a number of conditions, including the routing of the pipeline through the state and the separation of the gas line from the existing oil pipeline over the route from Prudhoe Bay to Fairbanks, Alaska. Applications filed for the grant of right-of-way for the pipeline through land owned by the State of Alaska and for the leasing from the state of the proposed site of the gas conditioning plant at Prudhoe Bay were still under consideration at the end of the fiscal year.

First-Stage Construction of the Western and Eastern Legs

During the fiscal year, as already noted, U.S. regulatory agencies granted all necessary approvals for first-stage construction in the United States of the Western and Eastern Legs of the project and importation of gas through these pipelines which previously had been authorized for export by the Canadian government.

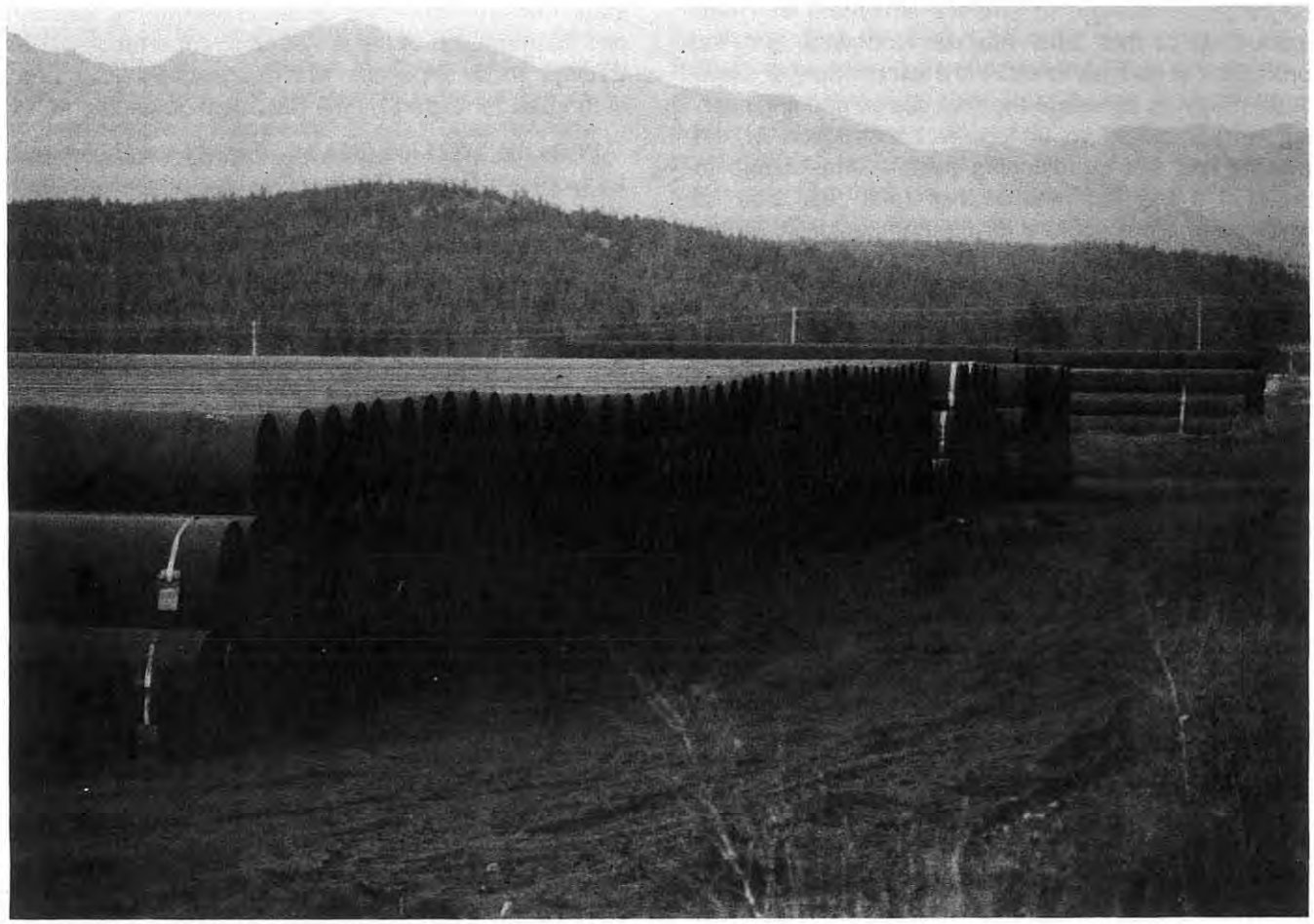
While the 1,321 km (821 mi.) Eastern Leg being built by Northern Border Pipeline Co. was originally scheduled to be started and completed in 1981, it was eventually decided to spread construction of this segment in both Canada and the United States over a two-year period. The extended construction period was the result of a decision by the North Dakota Public Service Commission to reject, on environmental grounds, the route of the pipeline through the state approved earlier by the Federal Energy Regulatory Commission. Subsequently, U.S. federal regulatory agencies and Northern Border challenged the ruling in the courts on constitutional grounds, arguing that federal authority to determine routing issues should prevail. (The federal position was upheld by a judicial decision handed down in April, 1981.)

First-stage construction of the Western Leg of the pipeline system in the United States, which began in December, 1980, involved installation of 258 km (160.5 mi.) of loops to the Pacific Gas Transmission pipeline from the Canadian border point at Kingsgate, B.C., to Stanfield, Oregon. For purposes of transmission of Alaskan gas to California markets, the Pacific Gas Transmission and Pacific Gas and Electric systems eventually will be extended over a distance of some 1,464 km (911 mi.). For the initial transmission of Canadian gas to western U.S. states, however, the Federal Energy Regulatory Commission authorized the establishment of what was designated as the Western Delivery System, which involved the addition of around 565 km (361 mi.) of loops to the existing systems of Northwest Pipelines and El Paso Natural Gas. Installation of these loops commenced in September, 1980.

Major Canadian Developments

The Mainline System

The main focus of attention by the Canadian participants in the project during the year was on first-stage construction of the southern segments of the system to allow for the export of surplus Alberta gas to the United States. At the same time, however, the Foothills Group of Companies continued to develop many of their engineering, socio-economic and environmental plans for the design and construction of the mainline portions of the pipeline. In addition, the National Energy Board and the Northern Pipeline Agency con-



Pipe is stockpiled in the Flathead Ridge area in southeastern British Columbia for use in Western Leg construction during 1980.

sidered a number of issues of concern to the entire system.

The Board resumed public hearings in May, 1980, on the outstanding tariff and financing matters relating to the overall project. While the timing of construction of the northern segments in Canada and the United States was to be co-ordinated as closely as possible, Foothills (Yukon) insisted on several occasions that it be authorized to obtain reimbursement for its full cost of service when the Canadian section was completed and leave-to-open had been granted by the Board. In its Reasons for Decision of May 9, 1980, the Board modified its earlier position and accepted the company's case that a full cost-of-service tariff be allowed for the mainline when leave-to-open was granted in Canada even if Alaskan gas were not yet flowing.

The National Energy Board's Decision also included revisions to the Incentive Rate of Return Scheme for the mainline to bring it into line with that authorized for the southern segments, approval of several other tariff matters, and approval of preliminary expenditures of Foothills for 1979. In addition, the Board stated its intention of seeking approval by the Governor in Council of regulations it had previously proposed for adjusting the amount of depreciation of the pre-built sections of the line after Alaskan gas deliveries commenced.

In a related decision in June, 1980, the Board reduced the project risk premium component of the Incentive Rate of Return mechanism for the mainline segments of the system. The slight modification was made as a result of the Board's earlier decision to allow for commencement of the full cost-of-service tariff following leave-to-open of the mainline in Canada.

In fiscal year 1980-81, the Northern Pipeline Agency completed the extensive process of formulating the socio-economic and environmental terms and conditions to govern the planning, construction and initial operation of all segments of the pipeline in Canada and submitted them to the Governor in Council for approval. Following the government's decision in July, 1980, to proceed with construction of Phase I, the terms and conditions for Alberta and southern British Columbia were adopted and in January, 1981, the Governor in Council approved the terms and conditions for all remaining segments of the pipeline other than Yukon. Consideration of the Yukon terms and

conditions was deferred pending a review of the possible implications of the mobility rights' provision included in the proposed Canadian Charter of Rights and Freedoms. The terms and conditions developed by the Northern Pipeline Agency provide for the preferential hiring of Yukon and Mackenzie District residents and the hiring of other individuals only in southern centres as a means of controlling in-migration.

Parliamentary Surveillance

The House of Commons Standing Committee on Northern Pipelines was established by Parliament in April, 1978, to oversee the implementation of the *Northern Pipeline Act* and to maintain surveillance on the operations of the Agency throughout the course of the pipeline project. In June of the same year, the Senate took a similar step and set up a Special Committee on the Northern Pipeline.

During the fiscal year, both committees met several times to hear evidence on the status of the Alaska Highway Gas Pipeline from the responsible Minister and Agency officials, members of the National Energy Board, and senior officers of the Foothills Group of Companies.

First-Stage Construction of the Western and Eastern Legs

In its report to the federal government of July, 1977, on the northern pipeline project, the National Energy Board proposed that the southern segments of the Alaska Highway Gas Pipeline in Canada and the United States be "pre-built" somewhat in advance of the northern section of the line for the initial purpose of exporting what it considered to be a relatively small surplus of Canadian natural gas to U.S. markets in the West and Mid-West. Subsequently, the concept was endorsed in principle by President Carter in the Decision and Report that he submitted to Congress a few months later.

During the intervening period, however, there were two fundamental changes in circumstances that had major implications for the pre-build proposal. The first such change involved the scheduled completion date for the entire project, which by the beginning of the fiscal year under review had been set back from the original target of January, 1983, provided for in the Canada-U.S. Agreement to late 1985 as a result of a number of delaying factors. The second change involved the National Energy Board's calculation of the amount of surplus Canadian gas available for export to the United States from an initial estimate of some 22.54 billion cubic metres (800 billion cubic feet [bcf]) to around 126.78 billion cubic metres (4.5 trillion cubic feet [tcf]).

Pre-building had always been regarded from the outset as providing a significant advantage in easing the economic pressure that might be imposed on manpower and productive facilities in both countries if the whole project were to proceed at once. As a result of the delays which had been encountered, however, pre-building also came to assume even greater importance as a means of facilitating completion of the entire system by maintaining the momentum of the project and by the provision of a cash flow from the pre-build segments with which to help finance the heavy costs of the northern sections of the pipeline. The substantial increase in the available surplus gas determined by the National Energy Board over that originally estimated also had the potential to yield much greater economic benefits to Canada from gas exports through the Western and Eastern Legs of the system.

At the same time, however, the setback in the scheduled date for completion of the project of almost three years created a serious dilemma for Canada. As previously indicated, it had initially been assumed that pre-building of the southern segments would be undertaken only moderately in advance of construction of the remaining parts of the system in northern Canada and Alaska. This assumption was reflected in what was designated as Condition 12 in Schedule III of the *Northern Pipeline Act*. This provision required Foothills to satisfy both the Minister responsible for the Northern Pipeline Agency and the National Energy Board that financing had been obtained for the entire Canadian project before commencing construction.

Because of the delays encountered in plans for proceeding with construction of the northern segment, which resulted mainly from the lack of resolution of issues relating to the financing of the project in Alaska, it became impossible for Foothills to obtain assured financing for the whole of the system in Canada by the time construction of the southern segments was due to proceed. On April 2, 1980, the National Energy Board issued an order under the provisions of the *Northern Pipeline Act* amending Condition 12 of the legislation, subject to the approval of the Governor in Council. The effect of the amendment was to require Foothills to establish to the satisfaction of the Minister and the Board that funds *had been obtained* for construction of the Western and Eastern Legs of the pipeline in southern Canada and *could be obtained* for the remaining northern section in this country.

In a letter of the same date, the Minister responsible for the Northern Pipeline Agency, Senator Olson,

Drilling the ditch through the bed-rock of the Bow River, west of Calgary, in preparation for the installation of the pipe.

requested the Board to hold public hearings in order to determine whether Foothills could meet this revised condition. At the same time, the Minister advised the Board that the government intended to defer consideration of the proposed amendment to Condition 12 until it could simultaneously consider two other closely related matters. One was the then pending recommendation from the Board on the application for permission to increase the volume of surplus Canadian gas designated for export through the pre-built segments. The other concerned the expression of views by the Government of the United States, in keeping with the Canada-U.S. Agreement, on the financing of the U.S. portion of the pipeline and the assurance of its timely completion.

Meanwhile, over a period of several months prior to this time, Foothills had identified a number of issues requiring resolution before it considered that financing would be forthcoming for the building of the southern sections in Canada. Foremost among them was the volume of gas available for export through the pre-built segment. In a decision in December, 1979, the National Energy Board recommended to the federal government that it authorize the export to the United States of 105.65 billion cubic metres (3.75 tcf) out of a total surplus estimated to amount to 126.78 billion cubic metres (4.5 tcf). Out of the volume subsequently approved by the government for export in line with the NEB recommendation, a total of 50.71 billion cubic metres (1.8 tcf) was allocated to Pan-Alberta Gas Ltd., an affiliate of Foothills, for transmission through the Western and Eastern Legs over a seven-year period. Both the Canadian and U.S. sponsors of the pipeline contended this volume was insufficient to permit the pre-build segment in both countries to be financed.

Throughout the late winter and spring, the National Energy Board conducted further rounds of public hearings to consider this and a variety of other issues which Foothills sought to have resolved in order to clear the way for commencement of first-stage construction of the project. The Board in particular recommended that some 14.09 billion cubic metres (500 bcf) of the previously identified surplus which remained unallocated be earmarked for export by Pan-Alberta. It proposed in addition that some 12.68 billion cubic metres (450 bcf) of gas previously designated for transmission via the TransCanada PipeLines System by two other producer groups be transmitted instead through the Eastern Leg of the Alaska Highway Gas Pipeline. The Board also resolved a number of other outstanding issues related to the pre-build in Canada, including approval of accelerated depreciation on a provisional basis in order to facilitate financing of the project and the establishment of the approved final design cost estimates as the yardstick against which to measure actual construction costs, which in turn would determine the Incentive Rate of Return to be earned by Foothills on its equity investment.

On May 9, 1980, the NEB directed its attention to more fundamental problems involving both the pre-build and the mainline segments of the project in Canada. In a statement on the outcome of the hearings it conducted at the request of Senator Olson in relation to the proposed amendment in the financing provisions of Condition 12, the Board asserted that the early pre-building of the southern segment in Canada was in keeping with the legislation, forming part of a fully integrated, two-stage project. At the same time, however, the Board concluded that certain prerequisites for the successful financing of both the pre-build and the mainline project in Canada had not been fulfilled up to that point—all of them being dependent on favourable supporting action being taken in the United States.

In Reasons for Decision that it issued at the same time as its statement, the Board authorized a tariff system as an alternative to that which it had approved earlier. This alternative tariff scheme would enable Foothills to begin recovering its full cost of service, including a return on and of equity, as soon as the mainline project had been completed and leave to open the system granted by the Canadian regulatory authority. The report noted that the company had categorically refused to commit equity capital to the project in the absence of such a tariff system. In the accompanying statement, however, the Board pointed out that the implementation of this approach was contingent on its approval by U.S. authorities and on their approval of a parallel system which would permit the full cost of service of the Canadian company to be

At the Quill Creek test facility, undertaken by Foothills (South Yukon) Ltd. to determine the feasibility of constructing and operating a pipeline in areas of discontinuous permafrost, pipe is installed in embankments that measure approximately 3.3 metres (10 feet) above the ground. The embankment mode consists of a gravel pad on which an insulation bed and pipe are laid and then covered with gravel. For the purposes of testing thaw settlement, pipe is also buried in the conventional manner.

"tracked" by U.S. shippers of Alaskan gas (that is, passed through virtually automatically to U.S. shippers and then to their customers).

In addition, the statement raised concerns that the volume of assured throughput of gas to be transported via the Western and Eastern Legs might be insufficient to support financing of the project. In part, this was because one of the Canadian gas producers, ProGas Ltd., had not yet made a commitment to ship a portion of its approved exports through the pre-build system.

Within a few days following the release of the National Energy Board's report, the pace of activity on the diplomatic front began to quicken. On May 12, 1980, Senator Olson met in Washington with U.S. Energy Secretary Charles Duncan and other U.S. authorities. At the Summit Meeting of western leaders in Venice, Italy, in the latter part of June, the Prime Minister discussed the pipeline issue with President Carter and the Hon. Marc Lalonde, Minister of Energy, Mines and Resources, pursued the subject further with Energy Secretary Duncan. On June 27, Senator Olson again went to Washington, meeting with Vice-President Walter Mondale, Secretary Duncan, and a number of congressional leaders.

On the same day as the Minister's trip to Washington, the U.S. Senate unanimously approved the resolution referred to earlier, which asserted the sense of Congress that the Alaska Highway Gas Pipeline "remains an essential part of securing this nation's energy future and, as such, enjoys the highest level of Congressional support for its expeditious construction and completion by the end of 1985". On July 1, the House of Representatives unanimously concurred in the resolution. The action by the U.S. Congress followed the Statement of Intention issued on June 19, 1980, by the Alaskan pipeline sponsor and the Prudhoe Bay producers with respect to the completion of final design and engineering of the system in the state and the joint development of a financing plan.

In response to a request from the National Energy Board for Foothills' views on the concerns which the NEB had raised in its statement of early May, the Canadian pipeline sponsor replied by letter on July 7 that because of subsequent developments in the United States the company was confident that all of these issues either had been, or would be, satisfactorily resolved.

The culmination of the protracted political and regulatory process leading to the point of decision on the issue came on July 17, 1980, with the announcement in the Senate by the Minister responsible for the Northern Pipeline Agency that the government had approved in principle the commencement in Canada of the Western and Eastern Legs as the first stage in construction of the Alaska Highway Gas Pipeline Project. A similar announcement was made in the House of Commons by the Minister of Energy, Mines and Resources. The decision by the government followed receipt of a letter that day from President Carter to Prime Minister Trudeau expressing the confidence of the U.S. government that the entire pipeline system would be completed. "The United States' energy requirements and the current unacceptable level of dependence on oil imports require that the project be completed without delay," the President stated.

In announcing the decision, Senator Olson said that the Canadian government "has accepted United

States' assurances on timely completion of the whole project". While acknowledging that the decision was not without risks, the Minister said that such risks had to be weighed against the substantial benefits of pre-building the southern segment of the system for the initial purpose of exporting surplus Canadian gas.

The Senator noted that the early undertaking of the first stage of construction would facilitate completion of the entire project and help to ensure a high Canadian input by easing the strain that might otherwise develop on the supply of manpower, goods, and services. He referred to estimates that the building of the southern segments would result in direct capital expenditures in Canada of some $1.6 billion both on the pipeline itself and on investment in facilities for the production, gathering and conditioning of Canadian gas to be exported to the United States. Senator Olson also recalled that the National Energy Board had calculated that the building of the southern segment of the pipeline and the sale of gas allocated for export through the system would generate a net national economic benefit for Canada over a seven-year period of around $4.5 billion.

While all necessary regulatory approvals had by this time been granted in the United States for commencement of construction of the Western and Eastern Legs, a few steps remained to be completed in Canada. On July 21, the National Energy Board issued a report which concluded that the financing requirements of Condition 12 of the Northern Pipeline Act, as amended by the Board and subsequently approved by the Governor in Council, had been met by Foothills. The following day, Senator Olson announced that he was also satisfied the financing requirements had been met by the company. On July 25, Senator Olson announced that the Governor in Council had approved the socio-economic and environmental terms and conditions with which Foothills would be required to comply in undertaking first-stage construction of the pipeline in Alberta and southern British Columbia. On August 5, the Minister issued an order providing Foothills with "leave-to-proceed" on construction of the first section of the Western Leg, that across the mountainous Flathead Ridge in southeastern British Columbia.

At a ceremony sponsored by Foothills to commemorate the start-up of construction on the Western Leg, Senator H.A. (Bud) Olson, Minister responsible for the Northern Pipeline Agency, reviews the events leading up to the government's approval of "pre-build". Standing behind the Minister, from left to right, are: Robert Blair, Chairman, Foothills Pipe-Lines (Yukon) Ltd.; Robert Pierce, President and Chief Executive Officer, Foothills Pipe-Lines (Yukon) Ltd.,; Edwin Phillips, Chairman and Chief Executive Officer, Westcoast Transmission Co., Ltd.; John McMillian, Chairman and Chief Executive Officer, Northwest Alaskan Pipeline Co. Ltd.; John Rhett, U.S. Federal Inspector; John Anderson, President, Westcoast Transmission Co. Ltd.

Operations of the Northern Pipeline Agency

Agency Activities

During the year under review, the activities of the Northern Pipeline Agency increased substantially as a result of the decision by the federal government in July, 1980, to authorize the building of the Western and Eastern Legs as part of the first-stage construction of the Alaska Highway Gas Pipeline Project. To meet the schedule for the commencement of construction in southern British Columbia, southwestern and southeastern Alberta and southwestern Saskatchewan, the Foothills Group of Companies submitted a number of studies, reports and applications to the Agency for approval. These submissions were required under the socio-economic and environmental terms and conditions and technical orders prior to the granting of permission to proceed with construction along the Western and Eastern Legs. In addition to the activities relating to the Western and Eastern Legs, the Agency was also involved in a number of matters relating to the project as a whole. Over the year, the Agency processed a total of 446 individual submissions, including approvals of engineering specifications, pipeline route locations and crossings of navigable waters, highways, railways and major utilities.

During the fiscal year, the Minister responsible for the Agency, Senator Olson, and the Designated Officer, Mr. William Scotland, also approved plans submitted by Foothills with respect to such matters as environmental protection, employment opportunities for native people and women, and procurement opportunities for local businesses. In July, 1980, the Minister approved the company's Manpower Plan for the Western Leg only, and the following month he approved the company's Procurement Plan for the supply of goods and services for the whole of the project in Canada.

Pre-heaters warm the pipe, ahead of the wrapping and lowering-in crews in Southeastern B.C. Styrofoam supports in the ditch protect the pipe from rocks in the trench.

Land use and quarry permits were issued by the Agency for geotechnical work and test-site preparation in Yukon, and notices sent to landowners and other affected parties with respect to possible objections to the proposed pipeline route.

As the Foothills Group of Companies moved to the field to put their first-stage building plans into effect, the focus of the Agency's activities shifted in tandem to the construction sites. Agency surveillance teams

oversaw all work on the right-of-way, from the clearing stages through construction to clean-up and reclamation. In southern British Columbia, a five-member team monitored the building of the four loops, or sections of line, paralleling the existing line of Alberta Natural Gas Co. In total, 89 km (56 mi.) of 914 mm diameter (36 in.) pipe were installed between August, 1980, and March, 1981.

A three-man team oversaw construction of three sections of line, paralleling the existing line of Nova, An Alberta Corporation (previously the Alberta Gas Trunk Line Co. Ltd.), which covered a distance of 124.1 km (75 mi.). The rolling terrain of the foothills posed little problem for the contractor and construction was completed in February, 1981. Agency staff based at the operational headquarters in Calgary and the regional office in Vancouver visited the right-of-way frequently to assist the surveillance teams and to check specific concerns.

Terms and Conditions

The socio-economic and environmental terms and conditions for construction and operation of the pipeline in southern British Columbia and Alberta were finalized and approved by the Governor in Council in July, 1980, prior to the start of work on the Western Leg in August. Those for northern B.C., Swift River, B.C., and Saskatchewan were approved in January, 1981, by the Governor in Council.

The terms and conditions, prepared by the Agency in consultation with the Governments of British Columbia, Alberta and Saskatchewan, specify the requirements that must be met by the segment Foothills' companies operating in these areas. These include provisions for training native people, job and business opportunities, equal access to pipeline employment for women, compensation to landholders for property damage, plans to minimize adverse environmental impact, and protection of traditional native harvesting and cultural areas.

As noted earlier, the Governor in Council deferred approval of the terms and conditions for the Yukon segment of the project pending a review of a potential conflict with the mobility provisions of the proposed Canadian Charter of Rights and Freedoms. The socio-economic conditions proposed by the Northern Pipeline Agency provide for the preferential hiring of Yukon and Mackenzie Valley residents, with all other workers being hired in southern centres only as a means of controlling in-migration.

Plan Review and Approval

Before construction of any portion of the pipeline can begin in Canada, the Minister and the Designated Officer must be satisfied that each Foothills' segment company has met all the necessary regulatory requirements. These requirements include the development of plans outlining steps the company proposes to take to comply with the socio-economic and environmental terms and conditions developed by the Agency and approved by the Governor in Council.

Agency staff participated in an extensive review of draft plans prepared by the respective Foothills companies prior to construction of the Western and Eastern Legs. The review was undertaken by the Agency and company in consultation with the respective provincial governments and with native and other interest groups. Comments received from these bodies were taken into account in the finalization of the company's plans.

During the spring and early summer of 1980, the final versions of the Manpower Plan and the socio-economic and environmental plans for southeastern British Columbia and Alberta were submitted to the Agency for review and approval. Following a period of public review, the plans were approved by the Minister and the Designated Officer in late July and early August.

In late 1980 and early 1981, the final socio-economic and environmental plans for Eastern Leg construction in Saskatchewan, as well as the environmental plan for Alberta, were submitted to the Agency and reviewed. In February, 1981, socio-economic plans for Saskatchewan with respect to business opportunities, public information and employee orientation were approved by the Designated Officer with the concurrence of the Minister.

By the end of the fiscal year, the Agency had received the schedules for submission of socio-economic plans for northeastern British Columbia and the short section of the line in the area of Swift River, British Columbia.

The environmental group within the Agency began discussions with the British Columbia government concerning the route of the pipeline through the northeastern corner of the province, specifically in the areas of the Trutch Escarpment and in the Liard River Valley where B.C. Hydro had requested a realignment of the pipeline to avoid the proposed Liard Hydro Reservoir.

Environmental Assessment and Review Panel for Yukon

In early winter of 1981, the federal Environmental Assessment and Review Panel resumed its examination of the environmental implications of building the Alaska Highway Gas Pipeline through Yukon. The Panel had submitted an interim report to the Minister of the Environment in September, 1979, outlining what it considered to be certain deficiencies in the Environmental Impact Statement submitted earlier by Foothills Pipe Lines (South Yukon) Ltd. The report concluded that further information was required on certain route alternatives, major water crossings, and potential technical problems that could be created by the heaving of pipe due to frost or settlement of the pipe due to erosion in areas of discontinuous permafrost.

At the urging of the Yukon Advisory Council and the Yukon Territorial Government, the company decided in July, 1980, to withdraw its original proposal to route the pipeline away from the Alaska Highway corridor and through the Mount Michie-Squanga area east of Whitehorse.

During meetings between the Panel, the company and the Northern Pipeline Agency in August and September, 1980, the Panel specified the nature of the further information it required to complete the review process. It was agreed the company would submit to the Panel separate packages of additional information with cross-references to previous information contained in the original impact statement as they became available. The first addendum, dealing with route alternatives in the Ibex Pass area west and south of Whitehorse, was submitted in February, 1981.

The Mair Report

Public hearings on the proposed socio-economic and environmental terms and conditions for northeastern British Columbia were held in communities in this region in November and December, 1979. Mr. W. Winston Mair, an independent consultant retained by the Commissioner of the Agency to serve as Presiding Officer for the hearings, also held a one-day hearing on the terms and conditions for southeastern British Columbia in Grasmere, B.C., during this same period. In May, 1980, the Northern Pipeline Agency released the report of Mr. Mair's findings. Entitled *Forgotten Land, Forgotten People*, the report put forward eight major recommendations for dealing with concerns of natives and other residents in areas through which the pipeline will pass.

A coating and wrapping machine cleans the pipe, coats it with tar, and wraps it with polyethylene tape to protect the pipe from corrosion.

The central recommendation of the report involved the creation of a comprehensive land-use and socio-economic development plan to identify pipeline-related job and business opportunities for local residents in the affected area of northern British Columbia and to prevent further erosion of the land base that is a source of livelihood for many native people. Mr. Mair suggested that the Agency should act as co-ordinator of the activities of other provincial and federal agencies or government departments in the development and implementation of the land-use plan. Other recommendations concerned pipeline routing, municipal services, public information and education, and compensation. While many of Mr. Mair's recommendations involved matters that went beyond the responsibility and authority of the Northern Pipeline Agency, Agency officials held several meetings with other federal departments concerned to explore ways in which they might be implemented.

Federal-Provincial Co-ordination

As provided for under the terms of the *Northern Pipeline Act*, the Federal-Provincial-Territorial Consulta-

tive Council (FPTCC), continued to meet on a quarterly basis during the fiscal year under review. The Council, which consists of senior officials of the Agency and representatives of the Governments of British Columbia, Alberta, Saskatchewan and Yukon, was established in 1978 to ensure the co-ordination of pipeline-related activities.

During the year, the federal government concluded Memoranda of Agreement with the Governments of Alberta and Saskatchewan. The agreements relate to such matters as non-discriminatory taxation and general co-operation on the pipeline project. A similar agreement was signed by the federal and Yukon Territorial governments in September, 1979.

At the September, 1980, meeting of the FPTCC in Whitehorse, the Governments of Canada and Alberta signed a Memorandum of Understanding with respect to consultation and administrative co-operation on matters relating to the planning, construction and operation of the pipeline in the province. These include the development and review of socio-economic and environmental terms and conditions, plans to be submitted by Foothills as required under those terms and conditions, final routing, and surveillance of construction of the pipeline.

The Governments of Canada and British Columbia signed a similar agreement in October, 1980. At year's end, the Agency was continuing discussions with Saskatchewan and Yukon with respect to these administrative arrangements.

At the close of the fiscal year, Canada and Alberta signed a further Memorandum of Understanding relating specifically to environmental surveillance of construction of the Alberta section of the pipeline. The province agreed to provide personnel to undertake environmental field surveillance along with the Agency's staff.

The members of the Northern British Columbia Advisory Council were appointed by the Governor in Council for a two-year term in September, 1980. Shown here, from left to right, are: Leo Rutledge, Don Edwards, George Miller (Vice-Chairman), Jack Hannan, Eleanor Summer, Mel Burke and Jim Voight. Missing from the photo are Patrick Walsh (Chairman), Amy Gautier, and Jed Woolley.

Advisory Councils

In September, 1980, the Minister responsible for the Northern Pipeline Agency announced that the Governor in Council had approved the establishment of the Northern British Columbia Advisory Council in accordance with the provisions of the *Northern Pipeline Act*. Like its counterpart in Yukon, the Council is to advise the Minister on all matters relating to the planning and construction of the pipeline.

Patrick Walsh, then Mayor of Fort St. John, B.C., and a lawyer, was appointed Chairman of the Council, and George Miller, a board member of the United Native Nations and an active community leader in Lower Post, B.C., was named Vice-Chairman. The other members appointed to the Council were: Mel Burke, Kamloops; Don Edwards, Fort Nelson; Amy Gautier, Chetwynd; Jack Hannan, Dawson Creek; Leo Rutledge, Hudson Hope; Eleanor Summer, Fort Nelson; Jim Voight, Summit Lake Lodge; and Jed Woolley, Fort St. John. (Mr. Walsh subsequently resigned from the Council in September, 1981, following his appointment as Commissioner and Chief Executive Officer of the new District of Tumbler Ridge, B.C.)

Since their appointment, Council members have worked to define their role as an advisory body and to acquire a knowledge of the potential impact of the pipeline project on northeastern B.C. The Minister responsible for the Agency met with the Council at its first session in Fort St. John in September, 1980. Council members subsequently also met with Frank Oberle, Member of Parliament for Prince George, provincial government officials, union representatives, and Agency staff. On November 17, 1980, the Council travelled to Whitehorse to meet members of the Yukon Advisory Council and to discuss the manner in which that body had functioned since its establishment in February, 1979.

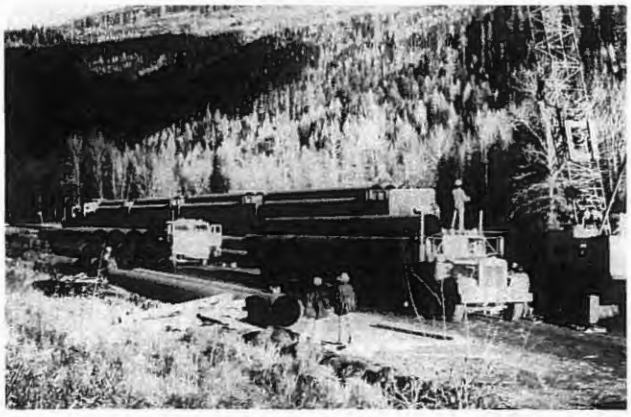
Throughout 1980-81, the Yukon Advisory Council continued its review of the pipeline project. The Council held regular meetings in Whitehorse, as well as other communities along the proposed pipeline route, and heard presentations from representatives of Foothills (Yukon), the Yukon Territorial Government, the Northern Pipeline Agency, and a variety of interest groups. In September, 1980, Senator Olson had an opportunity to meet with the Council in Whitehorse.

Some of the areas of concern reviewed by the Council during the fiscal year included the provision of natural gas to communities in Yukon, pipeline-related employment and training opportunities, environmental protection, and the establishment in Whitehorse of a public information centre on pipeline impacts. In April, 1980, the Yukon Advisory Council recommended that the pipeline route continue to follow the Alaska Highway corridor, rather than cross the wilderness area around Mount Michie and Squanga Lake. Foothills subsequently agreed to this change in the proposed routing, which was also supported by the Yukon Territorial Government.

The Council recommended to the Minister responsible for the Northern Pipeline Agency and the Yukon Territorial Government that a permanent sanctuary or park be established to limit access to the environmentally sensitive Ibex Valley through which Foothills proposed to route the pipeline around Whitehorse.

One of the highlights of the Yukon Advisory Council's activities during the fiscal year was a four-day trip to Alaska in July, 1980, where members met with directors of the Fairbanks Impact and Community Information Centre, officers from Northwest Alaskan Pipeline Co., the staff of the Office of the Federal Inspector, and the officials of the State of Alaska. Field trips included tours of Northwest Alaskan's frost heave test site at Fairbanks, Atlantic Richfield's Prudhoe Bay facilities, and the oil tanker loading facilities of the Trans-Alaska Pipeline System at the Port of Valdez.

During the year, the Council elected Donald Roberts to serve as Chairman and Raymond Jackson as Vice-Chairman. Other members of the Council were: Cliff Geddes, Joanne Linzey, Wayne Palmer, Dale Stokes, Robert Stubenberg, and Charles Taylor. (In April, 1981, the Governor in Council approved the reappointment of five original members and the appointment of two new members to two-year terms on the Council. The new members were: Paul Birckel, Chief of the Champagne/Aishihik Band, and Hector MacKenzie, a wilderness guide from Tagish, Yukon. Cliff Geddes, Donald Roberts, Dale Stokes, Robert Stubenberg and Charles Taylor were reappointed.)



The pipe off-loading contract in southeastern B.C. was carried out by a joint venture of Northern Native Development Corporation and RPA Contracting Ltd. The entire crew for the job was recruited from the Kootenay Indian Area Council, based in Cranbrook, B.C.

Native Relations

Job opportunities and small business contracts for native people resulted from construction on the Western Leg of the pipeline in southeastern British Columbia and southwestern Alberta. Native employment on the project averaged approximately 7.95 per cent of employed workers in Alberta and 7.1 per cent in British Columbia.

Native contractors were involved in project-related activities such as right-of-way clearing and grubbing and the off-loading of pipe at storage areas. The Kootenay Indian Area Council, which represents five Kootenay bands in southeastern British Columbia, participated with the Northern Native Development Corporation and RPA Contracting Ltd., both based in Kamloops, in securing contracts from Foothills Pipe Lines (South B.C.) Ltd. for clearing and grubbing, pipe off-loading, and small bridge construction. About 45 local natives were employed over a four-month period through these contracts with the co-operation of the four pipeline unions involved. As a result of this contract, 27 native people gained union membership, including several women.

In Alberta, two firms established by native groups—Seggow Construction and Clearing Ltd. of High Prairie and Whipline Crane Services Ltd. of Sylvan Lake—received contracts for clearing of the pipeline right-of-way and the off-loading of pipe.

In Yukon, during December, 1980, and January, 1981, the Kluane Tribal Brotherhood and the Champagne/Aishihik Band participated in survey work and clearing related to the Quill Creek test facility, located 300 km (186 mi.) northwest of Whitehorse. At the peak of activity, the participation of native people accounted for approximately 12.5 per cent of the total work-force.

Throughout the fiscal year, the Agency maintained close contact with native groups in the vicinity of the pipeline route in British Columbia, Alberta, Saskatchewan and Yukon. In connection with the construction of the Western and Eastern Legs, Indian bands and Métis organizations were given the opportunity to review the Agency's socio-economic terms and conditions and the company's manpower, opportunity measures, and

business opportunities plans. In addition, Foothills' inventory of traditional harvesting and cultural areas was provided to native organizations for their review and comment.

Throughout the construction period in South B.C., the Agency's field representative consulted regularly with members of the Kootenay Indian Area Council regarding local native concerns.

The Council for Yukon Indians adhered to its previously stated position of opposition to construction of the pipeline prior to the settlement of native land claims, on which negotiations continued throughout the year. But the Council entered into a mapping contract with the Agency to identify all areas in the vicinity of the proposed pipeline route of concern to native people because of their cultural significance or traditional use for purposes of hunting, fishing or trapping. The project was completed and the final report presented to the Agency's Whitehorse office in mid-December, with a copy being sent also to the Department of Indian Affairs and Northern Development for its consideration.

By the end of the fiscal year, negotiations were underway for the Union of British Columbia Indian Chiefs to conduct research and consultations at the local community level regarding the concerns of Indian people with respect to the general route alignment of the pipeline through northeastern British Columbia.

Sidearm tractor manoeuvering pipe at the Foothills' Quill Creek test project near Kluane Lake, Yukon.

Other Public Consultations

With the start-up of construction in southeastern British Columbia, the Northern Pipeline Agency appointed a field representative responsible for community liaison, communications and the monitoring of socio-economic issues in relation to the project. The B.C. Administrator, based in Vancouver, also took an active role in the field and met frequently with interested native and community groups.

Socio-economic staff from the Agency's Calgary headquarters made regular visits to communities within the vicinity of the Western Leg route in Alberta to deal with local concerns regarding the project. In anticipation of 1981-82 Eastern Leg construction in Alberta and Saskatchewan, contact was also established with the various communities that would be affected. In addition, Agency personnel attended an industry briefing session held in November, 1980, in Regina, Saskatchewan, by Foothills Pipe Lines (Sask.) Ltd. to inform the business community of opportunities resulting from construction of the pipeline in the province.

Throughout the year, staff from the Agency's regional offices in Vancouver and Whitehorse continued to consult with and provide project information to government departments involved and to native, business and other interest groups. This work involved numerous trips to communities along the route as well as meetings with regional and local officials.

Senior Agency officials also participated as guest speakers at various functions and met periodically with regional and local organizations, institutions and individuals. In September, 1980, Senator Olson toured Yukon and northeastern British Columbia, where he met with the Northern British Columbia and Yukon Advisory Councils, members of the Yukon Territorial Government, and business and community leaders in Fort Nelson, B.C.

To mark the start of Western Leg construction, Foothills held a commemorative weld ceremony in September, 1980, at Burton Creek, Alberta. The Minister, together with John T. Rhett, Federal Inspector for the project in the United States, spoke on behalf of their respective governments. In February, 1981, a similar event was undertaken by Pacific Gas Transmission Co. in Spokane, Washington, to mark the commencement of construction of the Western Leg in the United States.

Bilateral meetings were held between representatives of the Agency and its U.S. counterpart, the Office of the Federal Inspector, in Calgary in October, 1980, and in Washington, D.C., in January, 1981. These meetings were in addition to the continuing contact maintained between the two regulatory bodies throughout the year.

Manpower Planning

During the fiscal year, Foothills (Yukon) requested approval of Section 1 and Appendices I, II and III of the Manpower Plan—covering all construction activities south of 60° North—as required under the *Northern Pipeline Act*.

The document is designed to ensure the maximum use of Canadian labour in the planning, construction and operation of the pipeline. Foothills (Yukon) estimated 150,000 person-years of work would be generated directly and indirectly in the Canadian economy as a result of the project. Two additional volumes of the Manpower Plan, covering construction of the Yukon section of the line and the operations phase of the entire project, were to be submitted by the company at a later date.

Since opportunity measures plans for all segments of the project south of 60° North were not yet developed and approved prior to the company's request, the approval by the Minister in July, 1980, was limited to the Western Leg segments only. (Approval of Section 1 and the appendices for the balance of the construction phase south of 60° North was subsequently given by the Minister in May, 1981. Foothills' Manpower Mobility Plan and its update to Appendix III—Manpower Requirements—were also approved at that time.)

In addition, opportunity measures plans for Western Leg construction in southern British Columbia and Alberta were approved in July, 1980. The plans outlined the special steps which were to be taken by the company to give native people and women living along or near the pipeline route access to pipeline-related jobs.

The preparation of an occupational handbook was undertaken by Agency and Canada Employment and Immigration Commission personnel during the fiscal year, but the translation and printing of the finished product remained to be completed. The handbook will provide information on qualifications required for a wide variety of jobs on the project and should prove a useful tool to employment counsellors and various public interest groups.

Backfilling the trench in the Flathead Ridge area of Southern B.C.

Industrial Benefits

During the year 1980-81, Foothills' procurement planning began to be translated into reality with the placement of the first orders for line pipe materials. The most significant contracts entered into were those between Foothills (Yukon) and Stelco Inc. (formerly the Steel Company of Canada Ltd.) of Hamilton, Ontario, and the Interprovincial Steel and Pipe Corporation Ltd. (IPSCO) of Regina, Saskatchewan, for the supply of 1.4 million tonnes of line pipe at an approximate cost of $2 billion. These contracts, which account for 80 per cent of the total pipe requirements for the Canadian segment of the pipeline, were approved by the Minister on May 2, 1980. The remaining 20 per cent will be allocated at a later date based on the companies' cost and delivery performance.

With the decision to proceed with the southern portions of the Canadian segment, ministerial approval was granted in July, 1980, for contracts covering the supply of $2.3 million worth of large ball valves for 1980-81 construction. The approved contracts were between Foothills (Yukon) and Cameron Iron Works Ltd. of Houston, Texas, and the Grove Valve and Regulator Company of Oakland, California.

In August, 1980, the Minister approved the Procurement Plan submitted by Foothills, as required under the *Northern Pipeline Act*. The Plan is intended to ensure that Canadians have a fair and competitive opportunity to participate in the supply of goods and services for the pipeline, that maximum advantage is taken of opportunities to establish and expand suppliers in Canada who can make a long-term contribution to the Canadian industrial base, and to foster Canadian research and technological development.

Among other things, the Plan covered the major components for which Foothills must obtain approval from the Designated Officer prior to procurement. These "designated" items include line pipe of 914 mm (36 in.) diameter and larger, turbo-compressors, and valves and pipe fittings of 508 mm (20 in.) and larger in diameter. In accordance with this procedure, the Designated Officer approved a $2 million contract for the supply of fittings for the 1980-81 construction phase. These contracts included three Canadian suppliers, Uniracor Ltd. of Bécancour, Quebec, EPG Taylor Forge Division of Hamilton, Ontario, Steel-Flo Industries of Turner Valley, Alberta, and one U.S. supplier, ITT Grinnell of Princeton, Kentucky. Contracts valued at $20 million were also approved between Foothills Pipe Lines (Yukon) Ltd. and Westinghouse Canada Inc. of Hamilton, Ontario, and Cooper Rolls Corporation of Mississauga, Ontario, in November, 1980, for the supply of turbine-compressor units required for 1981-82 construction of the Eastern Leg in Alberta and Saskatchewan.

Under the terms of the Canada-U.S. Pipeline Agreement, the project is aimed at advancing "the national economic and energy interests and to maximize related industrial benefits of each country", while at the same time providing for the procurement of goods and services for the pipeline on generally competitive terms. Reciprocal procedures governing the procurement of designated items were established through an exchange of diplomatic notes between the Canadian and U.S. governments in June, 1980. The procedures provide for the exchange of information, from the specification stage through to recommendation-to-purchase, between the Northern Pipeline Agency in Canada and the Office of the Federal Inspector in the United States. Prior to the exchange of notes, the two regulatory bodies essentially followed these procedures on an informal basis.

In March, 1981, Foothills submitted to the Agency the first of a series of reports on the industrial benefits and Canadian content aspects of its procurement activities. This report indicated that an overall Canadian content of 90 per cent had been achieved for procurement of goods and services up to January 31, 1981.

Transportation and Logistics

The year's activities with respect to the logistics of moving of personnel, equipment and material from a wide variety of centres in Canada to project sites encompassed not only planning, as in the past, but also regulation of company activities associated with actual construction and overseeing field tests of particular transportation systems and equipment.

Pipe for construction of the Western Leg was delivered by rail to Shantz, Cochrane, Aldersyde, Cowley and Sentinel in Alberta and then trucked to stockpile sites along the right-of-way. In southern British Columbia, Morrissey, Cranbrook, McGillivray, Yahk and Ryan were used as railhead delivery points, from which pipe was transported to stockpile sites along the pipeline route.

A plan for transportation of field construction workers to and from job sites in northern Alberta, northern British Columbia and Yukon was filed with the Agency in February, 1981, as indicated previously. The Manpower Mobility Plan completed the Manpower Plan requirements and partially fulfilled requirements under the proposed socio-economic terms and conditions for Yukon.

The Agency also monitored tests of transportation routes and equipment undertaken by Foothills. In February, 1981, Foothills (South Yukon) conducted two test drives of vehicles which carried pipe from Edmonton to the Quill Creek test facility in Yukon using a newly developed self-steering trailer unit. Three lengths of 24.4 m (80 ft.) long, 1,219 mm (48 in.) diameter pipe were hauled on the experimental vehicle, the rear-wheel assembly of which is capable of tracking automatically the path of the front assembly. The tests were conducted to determine both the safety and reliability of the self-steering unit in transporting pipe over long distances and the adequacy of various sections of the Alaska Highway, particularly to determine if upgrading was required to reduce blind corners and to improve road safety. The demonstration project involved participants from the Foothills Group of Companies, the Agency, transport carriers, the Alberta and British Columbia governments, the Yukon Territorial Government, Public Works Canada, the State of Alaska, the National Research Council, and the Northwest Alaskan Pipeline Co.

At year's end, Foothills was near completion of plans for a test haul of three joints of 24.4 m (80 ft.) long, 1,422 mm (56 in.) diameter pipe over the White Pass and Yukon Railway line from the Port of Skagway, Alaska, to Whitehorse. (The pipe lengths, weighing 11 tonnes, were strapped to a specially prepared flatcar and overhung on two adjoining cars. The test, conducted in April, 1981, indicated that the narrow gauge railway had ample clearance for loads of this length and width.)

As in past years, Foothills' logistics plans were reviewed by the Agency on an ongoing basis. Consultations were carried out with federal, provincial and territorial officials and with operating companies on the capabilities of all elements of the existing transportation system and their capacity to handle pipeline transportation requirements.

On a successful test drive from Edmonton, a specially designed tractor-trailer unit, which is capable of tracking automatically from the rear, arrives at the Quill Creek test facility in Yukon. The trip was made to test the new vehicle's ability to carry long joints of pipe around sharp corners such as those along the Alaska Highway.

Project Scheduling and Cost-Control Procedures

Prior to gaining the Northern Pipeline Agency's approval in July, 1980, of the 1980 construction schedules and procedures, Foothills Pipe Lines (Alta.) Ltd. and Foothills (South B.C.) were each required to develop plans and procedures to ensure that:

- the company was in constant receipt of detailed information from the field to adequately control all progress and cost-factors associated with the project;
- the Agency would be provided with monthly reports to allow a thorough analysis of the company's progress and related cost performance.

Towards the end of the fiscal year, Foothills' (Alta.) and Foothills' (Sask.) schedules and cost-control procedures with respect to construction of the Eastern Leg were received and being reviewed by the Agency.

Incentive Rate of Return and Final Design Cost Estimates

Agency staff worked with the National Energy Board during the year analysing the validity of the final design cost estimates submitted by Foothills (Yukon) for the Phase I portion of the pipeline. These estimates were required by the Board to establish a basis for measuring the company's performance in controlling project costs under the Incentive Rate of Return (IROR) scheme. In keeping with the 1977 Canada-United States Pipeline Agreement and the *Northern Pipeline Act,* the scheme is designed to provide the companies owning the line in each country with an incentive to hold down expenditures to the extent consistent with sound engineering and operating practices. The IROR allows the companies a higher rate of return on their equity investment if actual costs are lower than the final design cost estimates approved by the Board and a reduced rate of return if costs exceed those estimates.

The National Energy Board retains all powers related to the regulation of tolls and tariffs to be charged on Canadian sections of the pipeline. During 1979 and 1980, Foothills (Yukon) appeared before the National Energy Board at a hearing held in four phases concerning these matters, as well as financing. As a result of Phase IV(a) of the hearings, the scheme was

amended in March, 1980, with respect to its application to initial construction of the Western and Eastern Leg facilities in southeastern British Columbia, Alberta and southwestern Saskatchewan. This decision was extended in May, 1980, based on Phase IV(b) of the hearing to include the mainline sections in Alberta, northern British Columbia and Yukon.

The amendment of the IROR scheme changed the basis of comparison for measuring cost performance from the 1976 filed capital costs to cost estimates based on final design. The report on the Phase IV(a) hearing also made provision for modifications in the final design costs to take into account any scope changes directed by the Northern Pipeline Agency after construction was underway.

During 1980, Agency staff prepared briefing material to assist the National Energy Board staff in preparing for hearings beginning on March 31, 1981, with respect to the tolls to be charged by Foothills (Yukon) in the operation of the Western Leg and on the final design cost estimates for both the Western and Eastern Leg facilities in Canada.

Western Leg Construction—Cost Performance

The contract for construction of the Alberta portion of the Western Leg between Alberta Gas Trunk Line Co. Ltd. (now Nova, An Alberta Corporation), in its capacity as agent for Foothills (Alta.), and Banister Pipelines of Edmonton was based on the "total package bid price" in view of the relatively straightforward nature of the pipelaying involved. Under this contract, a fixed price was set for most of the pipe installed. In addition, however, variable costs were applied in those areas where special procedures were required. These included such activities as drilling and blasting through rock, and ditch padding, which necessitates the placement of sand or other fill material in the open trench prior to lowering-in of the pipe.

For construction through the mountainous countryside comprising much of the southeastern British Columbia portion of the Western Leg, the contract between Alberta Natural Gas Co. Ltd., as agent for Foothills (South B.C.), with Marine Pipeline Construction of Canada Ltd., Calgary, was on a "target price with fee" basis—the contractor's estimate of total costs plus a fixed fee.

Due to the type of contract and an unknown amount of construction obstacles such as poor weather and rough terrain, the difficulty of controlling costs in southeastern British Columbia was substantially greater than on the Alberta section. It was, therefore, necessary for Foothills (South B.C.) to have a cost-performance audit crew to determine daily the number of pieces of equipment and crew members actually engaged in the on-site work. The Agency conducted several field tests with company personnel to ensure that an effective audit process was being maintained.

Plans, Profiles and Books of Reference

The Agency reviewed and approved the Plans, Profiles and Books of Reference required for 1980-81 construction of the Western Leg in Alberta and southeastern British Columbia.

The Plans give a bird's-eye view of the right-of-way. They include the particular portion and area dimensions of land to be taken in each parcel, the numbers of the parcels, the names of the owners and occupants, and other relevant information such as pipeline engineering design data. The Profiles show a cross-sectional view of the land surface along the centre line of the pipeline. The Books of Reference note details of land ownership as shown on the Plans and provide additional information with respect to the pipeline crossings of major utilities.

The Plans, Profiles and Books of Reference required for the 1981 construction program on the Eastern Leg were under review by the Agency at the end of the fiscal year.

Route Selections

Under the terms of the *Northern Pipeline Act*, property holders whose lands may be affected by construction of the Alaska Highway Gas Pipeline have the right to make representations to the Agency concerning the route proposed by Foothills' segment companies. Initially, the company serves the landowner with a Landowner's Information Booklet to acquaint him or her with the pipeline project and to indicate the proposed location of the pipeline on the property. If the landowner does not agree with the location proposed by the company, he or she has 30 days from receipt of the Information Booklet to make representations to the Designated Officer of the Agency. In early 1980, a procedure was developed for handling route objections and for hearings to be held by the Designated Officer.

Route hearings were held in Calgary in April and May, 1980, to deal with objections to the pipeline route proposed for the Alberta section of the Western Leg. As a result of this hearing, the Designated Officer issued five orders generally in favour of Foothills' recommended route, but two required Foothills to make modifications to the proposed right-of-way con-

A flume is installed across the TeePee Creek in southern B.C. before the pipe is installed.
Fluming procedures are designed to divert water from the stream-bed trench being excavated for installation of a pipeline as one means of reducing siltation downstream of construction in order to minimize damage to fish life.

figuration. In November, a similar hearing was held in Calgary with respect to the company's Eastern Leg route in Alberta, at which time four objections were heard. The Designated Officer accepted the company's proposed route in three instances. In the fourth case, he endorsed the modification in the route that had been agreed upon earlier by the landowner and the company.

No route objections were received by the Agency with respect to the Western Leg in southeastern British Columbia or the Eastern Leg in Saskatchewan.

Leave to Take Additional Lands

In accordance with the provisions of the *National Energy Board Act*, Foothills applied during the year to the Designated Officer for leave to take land for the right-of-way of the Western Leg in Alberta and the Eastern Leg in Alberta and Saskatchewan in addition to that normally made available under the legislation.

The legislation permits the pipeline company to expropriate a right-of-way of up to 18.3 m (60 ft.) in width. If the company seeks additional lands, a hearing must be held to determine the need for these lands and to consider any representations from the property holders concerned.

As a result of applications for wider rights-of-way and extra working space by Foothills (Alta.), the Designated Officer held three hearings in June, 1980, in Cochrane, Sundre and Claresholm, Alberta, dealing with right-of-way requirements for 1980-81 construction of the Western Leg in the province. Four hearings concerning 1981-82 work on the Eastern Leg in Alberta and Saskatchewan were held in Olds and Brooks, Alberta, and Shaunavon and Regina, Saskatchewan, in early 1981. In each instance, the Designated Officer found the company's reasons for requiring additional lands valid. No lands, in addition to the 18.3 m (60 ft.) right-of-way, were required in southeastern British Columbia.

Exercise of Other Federal Regulatory Powers Transferred to the Northern Pipeline Agency

In keeping with the provisions of the *Northern Pipeline Act*, authority to exercise certain federal regulatory powers applicable to the pipeline project were transferred to the Minister responsible for the Northern Pipeline Agency on August 27, 1980, on the order of the Governor in Council. The Agency took over responsibility for pipeline-related provisions under the *Northern Inland Waters Act* and the *Territorial Lands Act* from the Department of Indian Affairs and Northern Development; the *Migratory Birds Act*, the *Clean Air Act*, the *Environmental Contaminants Act*, and the *Canada Wildlife Act* from the Department of Environment; and the *Fisheries Act* from the Department of Fisheries and Oceans. The Minister responsible for the Agency subsequently designated certain Agency officials to administer the statutes and to issue necessary leases, permits, authorizations and approvals.

During the year 1980-81, eight land-use permits and one quarry permit were issued in Yukon to Foothills (South Yukon) in respect of centre-line surveys, geotechnical investigations, frost-heave investigation sites and the establishment of a facility at Quill Creek to test different construction and pipe-burial methods in continuous and discontinuous permafrost. An Agency official based in Whitehorse administered the permits and

authorizations issued in Yukon and carried out routine field inspections to ensure compliance with the provisions governing these activities.

In connection with Phase I construction in 1980 of segments in southeastern British Columbia and southwestern Alberta, the Agency co-ordinated the granting of a number of approvals by other federal departments and agencies required for pipeline crossings. The *National Energy Board Act* sets out the provisions governing pipeline crossings of navigable waters, highways, railways, irrigation ditches, power lines, buried cables, drainage systems, dikes and sewers. During the course of 1980-81, Agency staff reviewed Foothills' drawings and applications for crossings. A total of 27 Crossing Orders, as well as six Amending Orders were issued as a result. Crossing Orders for navigable waters and railway crossings were issued by the Ministry of Transport and the Railway Transport Committee of the Canadian Transport Commission, while the remainder were granted by the Agency's Designated Officer on behalf of the National Energy Board. The Agency's role in co-ordinating these approvals is in line with the 'single window' concept under which the Agency exercises most of the federal authority applicable to the project and follows arrangements made earlier between the Agency and the Ministry of Transport and the Railway Transport Committee of the Canadian Transport Commission.

Field Surveillance

With approval in July, 1980, of first-stage construction in Canada of the southern segment of the project, the Agency moved rapidly to execute plans for field surveillance of construction activities. The plans called for daily on-site supervision by Agency personnel qualified in environmental matters relating to pipeline construction to ensure compliance with the terms and conditions by the Foothills Group of Companies and its contractors.

Surveillance staff was fully recruited by the end of July and by mid-August two teams were operating in the field, each headed by a Senior Surveillance Officer under direction from the Designated Officer and senior Agency officials. Prior to beginning work in the field, the surveillance teams underwent a two-week orientation program conducted by Agency personnel in Calgary.

One team of five surveillance officers was responsible for activities in southeastern British Columbia. Initially based in Fernie, they transferred to Cranbrook towards the end of October as construction moved to this area. The second group, consisting of three officers, supervised work in southwestern Alberta, with headquarters first in Claresholm and later in Cochrane.

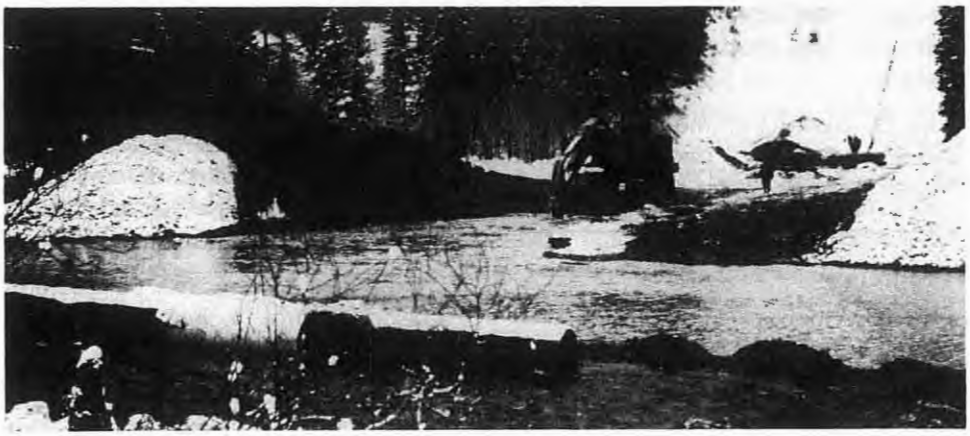
Throughout the course of construction, socio-economic matters relating to the project were supervised in southeastern B.C. by an Agency field representative based in Cranbrook. In southwestern Alberta, socio-economic staff from the Agency's Calgary office visited communities along or near the pipeline route on a regular basis.

In view of provincial government interest in the project and their responsibilities for certain environmental matters, co-operative administrative agreements covering this area were entered into between the Agency and Alberta and British Columbia. In British Columbia, the province provided a field co-ordinator to facilitate direct liaison between Agency and provincial field personnel. In Alberta, the province had one full-time environmental surveillance officer in the field, supplemented by a number of specialists on a part-time basis.

The Agency's Senior Surveillance Officers maintained direct contact with the Foothills' senior field representative and staff and communicated verbally initial concerns over the company's compliance with terms and conditions. Particular surveillance concerns were further identified by written field memoranda and a Report of Non-Compliance submitted in cases where the company failed to meet concerns raised by the Senior Surveillance Officers.

During the 1980-81 construction period, three Reports of Non-Compliance were submitted by a Senior Surveillance Officer, one of which led to an order by the Designated Officer directing Foothills to take certain action. Two reports dealt with the inadequacy of protection provided for an archaeological site and the leakage of a small amount of diesel fuel from a storage tank near a watercourse. The third report culminated in a formal notice and directing order which required that ditching in southern British Columbia be halted temporarily because an excessive length of open trench was barring the movements of large mammals, as well as increasing the potential for ditch erosion.

A major environmental concern that developed in southeastern British Columbia involved proper methods of carrying out construction of the pipeline across three areas of the Moyie River and one across Hawkins Creek in order to minimize siltation, which can be harmful to fish and their habitat. On November 28, 1980, the Supreme Court of British Columbia issued a temporary injunction, at the request of the British Columbia Attorney General, prohibiting construction of the pipeline across these watercourses because the



Trenching of the Moyie river-bed at the first of three crossing points of the Moyie River in southeastern British Columbia.

in-stream construction method proposed did not comply with the fluming requirements established by British Columbia officials under the province's *Water Act.* Foothills (South B.C.), its agent, Alberta Natural Gas Company Ltd., the contractor, Marine Pipeline Construction of Canada Ltd., and the Northern Pipeline Agency were all named in the court order.

After extensive discussions between officials of the Agency and the British Columbia Ministry of the Environment, it was agreed that crossings of the Lower Moyie River and Hawkins Creek should be undertaken by employing conventional "in-stream" pipe-installation techniques. It was also agreed that the middle crossing of the Moyie would be undertaken by installing "flumes" or culverts to divert water from the streambed trench in an effort to reduce siltation downstream. The results of that test would have determined the manner of undertaking the crossing of the upper section of the river. In the end, however, exceptionally high water flows led the B.C. Ministry to conclude that both the middle and upper Moyie River crossings should be constructed "in-stream".

Other concerns identified during 1980-81 construction activities in southeastern British Columbia included surface erosion caused while emptying the water from sections of pipe following hydrostatic testing, improper identification of pipe welds, and inadequate support of pipe in the bottom of the ditch.

Construction activities terminated in Alberta and British Columbia in February and March, 1981, respectively. Surveillance teams left the field at that time to write their final reports and prepare for the 1981 construction season.

Engineering Activities

By August 13, 1980, Foothills (Alta.) and Foothills (South B.C.) had received all engineering approvals from the Designated Officer for construction of the Western Leg, as required under the Technical Orders which were issued in January, 1979. These orders direct that, prior to construction, each of the Foothills' segment companies must obtain approval from the Designated Officer of the detailed engineering designs and construction specifications of the pipeline. The companies must also provide information in support of their designs, including field test reports. In addition, the orders define the construction and inspection procedures to be followed by the companies.

Numerous meetings were held during the year between Agency and Foothills personnel to clearly define and satisfactorily complete the requirements of the Technical Orders as they related to Western Leg construction. Approximately 90 drawings for southern British Columbia and 160 drawings for Alberta, as well as numerous reports detailing specific design criteria, were reviewed by the Agency's engineering staff prior to their approval.

Agency staff continued to work closely with the company to determine the most feasible means of controlling frost heave and thaw settlement in unstable soils and arresting fractures along the length of the pipe. The orders issued by the Designated Officer and regulations of the National Energy Board require Foothills to conduct extensive testing in order to develop means of dealing with these problems.

Agency staff also reviewed numerous general engineering design principles and activities during the year in addition to the specific design activities related to the frost heave, thaw settlement, and pipe-fracture control research programs. Some of the major activities included:

- the system design report for the Canadian segments of the Alaska Highway Gas Pipeline Project;

- revisions to the major material specifications related to the line pipe for the southern segments of the pipeline system;
- design criteria for the crossing on the Western Leg of rivers or streams that have beds which are liable to be scoured by heavy water flows.

Quill Creek Test Program

In late 1980 and early 1981, Foothills (South Yukon) undertook the construction of field test facilities at Quill Creek, Yukon, 300 km (186 mi.) northwest of Whitehorse, to demonstrate the feasibility of constructing and operating a pipeline in discontinuous permafrost. The company selected the five-km (three-mi.) segment for its test program because it is in the area of discontinuous permafrost at the point where it is proposed that the change from chilled to unchilled gas will be made when the pipeline is built.

In areas of discontinuous permafrost where the surrounding soil is excessively moist, two kinds of problems threatening the stability of a pipeline can be created. Chilled gas running through a pipeline in an area where the ground is not permanently frozen can cause the build-up of a "frost bulb" around the pipe, causing it to be heaved upward. Conversely, the flow of warm gas in a pipeline buried in an area of permafrost can cause the surrounding ground to melt, which in turn may lead to erosion of earth and settlement of the pipe. The tests at the Quill Creek site are aimed at determining the most effective and economic means of dealing with the latter problem of thaw settlement. The sponsor of the pipeline segment in Alaska continued to undertake tests involving the problem of frost heave.

In view of the fact that the terms and conditions for the Yukon segment had not been approved by the Governor in Council, the activity at the test site was regulated by means of a land-use permit which the Agency issued to the company in December, 1980. Among the conditions attached to the permit were the appropriate sections of the proposed socio-economic and environmental terms and conditions. The company submitted environmental and socio-economic plans to the Agency, which were approved by the Designated Officer in January, 1981. Construction commenced following Agency approval of the company's design specifications on February 16. The Agency's land-use officer, based in Whitehorse, inspected the site and monitored progress on a weekly basis.

Pipe at the Quill Creek test site was buried in conventional underground ditches and also installed in above-ground embankments. Once in place, warm air was circulated throughout the pipe to simulate the movement of natural gas. The soil surrounding the pipe was instrumented with thermistors, which register the effects of heat transfer from the pipe and seasonal changes in ground temperature. Foothills plans to compare recorded temperatures with those predicted in simulation models to determine to what extent ice-rich soils may be adversely affected by various pipeline designs and modes of installation.

Experiments were also conducted at Quill Creek in erosion control techniques, ditch preparation, the effects of drilling and blasting, and the use of ice for building a protective road-bed over permafrost.

The testing is planned to extend over several summer and winter seasons. Results of the Quill Creek test program will help to determine how the northern sections of the Alaska Highway Gas Pipeline will be designed and built.

As part of the Quill Creek test program, an experiment was carried out using ice as a protective road-bed over permafrost. Shown above, a large roto-tiller attached to a farm tractor harvests ice chips from Kluane Lake for use in access road construction.

Geotechnical Drilling Program

Since 1977, Foothills (South Yukon) has been conducting a geotechnical drilling program in Yukon to study soil conditions along the proposed pipeline route and prospective compressor station sites, particularly to delineate permafrost areas. This research will be used by the company in determining final routing of the pipeline, its design, and the manner of construction.

During the fiscal year, boreholes were drilled to confirm the location of continuous and discontinuous permafrost, the ice content of frozen soils, and the potential for frost heave and thaw settlement. Water crossing areas were also tested to determine whether the approach slopes contained permafrost and if soils susceptible to frost heave or thaw settlement existed on lake and river bottoms.

Foothills' geotechnical program also focussed on designing and locating facilities—such as compressor stations, stockpile sites and construction camps—according to soil conditions. Compressor stations must be situated on ground sufficiently strong to support a concrete foundation. For campsites, soil information is necessary to design shallow foundations, waste disposal sites, and water supply systems. In addition to the field and laboratory testing of soil properties and conditions, the company has installed instruments to monitor ground temperature, frost heave, thaw settlement, and ground water conditions at many locations along the proposed pipeline route and at related facilities.

Since the program began, Agency engineering and environmental staff have continued to monitor Foothills' drilling activities. Based on the information collected to date, special construction designs are being developed and tested. Certain realignments of the pipeline route were also under consideration as a result of the data gathered on soil conditions.

Pipe-Fracture Control

In 1980-81, a further series of burst tests on large-diameter pipe was undertaken by Foothills at its newly installed burst-test facility near Rainbow Lake in northwestern Alberta, which is one of the most advanced in the world. Seven tests had been conducted up to the end of the fiscal year to determine how effectively large-diameter pipe will stop a fracture under a variety of conditions. These factors include the toughness and strength of the pipe and the temperature, pressure and composition of gas. Strength refers to the amount of pressure the pipe can handle, whereas toughness relates to the pipe's ability to accommodate strain before finally bursting and subsequently containing the length of fracture.

Members of the Agency's engineering group have overseen the development of the program and have been on site for each test. As the first of its kind in Canada, the burst-test program has included experiments with pipe containing gas under pressure at temperatures both above and below the freezing point. Under warm, or normal discharge conditions from the compressor stations, gas is approximately 20°C (68°F). The cold mode, to be used for the most northerly section of the pipeline in Yukon (and all of Alaska) in order to prevent melting of permafrost soils, involves chilling the gas to between 0° and −5°C (32° and 23°F).

The two tests conducted during 1980-81 in the warm mode on both 1,422 mm (56 in.) and 1,219 mm diameter (48 in.) pipe and the two tests on 1,219 mm (48 in.) diameter pipe operating in the cold mode, appeared to conform with on-site observations of similar tests undertaken previously. These tend to confirm the self-arrest capability of pipe of the prescribed strength and toughness under the test conditions provided for with respect to temperature, pressure and gas composition.

These tests are required by the National Energy Board prior to its approval of line pipe specifications and fracture-control methodology for the northern segments of the pipeline in Alberta, British Columbia and Yukon.

Sideboom tractors are used to submerge the first sections of pipe into the river trench during the crossing of the Bow River in Alberta. A bulldozer anchored on the opposite shore is used to haul the pipe through the water with cables.

Finance, Personnel and Official Languages

Finance and Personnel

Section 12 of the *Northern Pipeline Act* provides for an annual audit of the accounts and financial transactions of the Agency by the Auditor General of Canada and for a report thereon to be made to the Minister. Section 13 of the Act requires the Auditor General's report to be laid before Parliament, together with the Minister's annual report on the operations of the Agency. To comply with these requirements, the report of the Auditor General on the accounts and financial transactions of the Agency for the year ended March 31, 1981, is reproduced as Appendix B to this report.

Estimates for 1980-81 provided $8.2 million for the operation of the Agency. Actual expenditure was $5.7 million, almost $2.5 million less than the amount approved by Parliament. The number of person-years authorized for 1980-81 amounted to 129, of which only 89 were used. Notwithstanding the Agency's extensive involvement in overseeing first-stage construction of the Western Leg and the development of plans for building of the Eastern Leg, both the spending and manpower of the Agency were below approved levels because of further set-backs in the schedule for second-stage construction of the northern segments of the Alaska Highway Gas Pipeline Project.

Section 29 of the Act provides for recovery of the costs of the Agency from the company constructing the pipeline in accordance with regulations made under subsection 46.1(2) of the *National Energy Board Act.* These regulations were approved by the Governor in Council on April 24, 1978. During the year, recoveries totalling $5.3 million were made, representing the unrecovered balance from the previous year and part of 1980-81 expenditure. Recoveries were credited to the Consolidated Revenue Fund. The balance of 1980-81 expenditure, amounting to $2 million, is due to be recovered in fiscal year 1981-82.

Official Languages Plan

In accordance with the provisions of the *Official Languages Act,* the Agency provides service to the public in both official languages. Enquiries of the Agency are answered in the language chosen by the enquirer and public documents are available in both languages.

The Agency has also undertaken to conform with the intent of government language policy for the Public Service. Employees in Ottawa, 30 per cent of whom have French as their first language, may work and receive service in the official language of their choice. Every reasonable attempt is made to balance the participation of both official language communities at all levels. The working language of the Calgary office is English, but it is the policy of the Agency to ensure that a minimum of two employees, one officer and one member of support staff, are qualified and available to provide service to the public in the French language.

These policies are contained in the Agency's Official Languages Plan, which has been approved by the Treasury Board. Compliance with the Plan is monitored each year.

There is a small but steady demand for services in the French language in the Ottawa office of the Agency, but little or no demand in the Calgary office or its two regional offices in Vancouver and Whitehorse. There have been no complaints from the public on the service being provided.

As the Agency is very small and is planned to exist for only a limited time, it has not established second-language training programs for its employees.

The Role of the Northern Pipeline Agency

The Northern Pipeline Agency was established with the proclamation of the *Northern Pipeline Act* on April 13, 1978, for the purpose of overseeing the planning and construction of the Canadian portion of the Alaska Highway Gas Pipeline to provide access to the substantial Arctic natural gas reserves of both Canada and the United States.

In addition to creating the Agency, the Act provides the legislative authority required to implement the bilateral agreement between the two nations of September 20, 1977, which governs the joint undertaking of the 9,000 km (5,500 mi.) system. A brief description of this system can be found in Appendix C.

The Agency was created as the principal instrument for carrying out the objects of the legislation approved by Parliament. The Agency's mandate is twofold. It is required to regulate the project and to facilitate the efficient and expeditious planning and construction of the system in Canada by the Foothills Group of Companies. It is also required to ensure that the project is carried forward in a way that will yield the maximum economic, energy and industrial benefits for Canadians with the least possible social and environmental disruption. In particular, the Agency is directed by the Act to take account of the local and regional interests of residents, especially native residents, in areas affected by the undertaking.

In an unprecedented step, the House of Commons in April, 1978, agreed to the establishment of a Standing Committee on Northern Pipelines to maintain continuing surveillance over the implementation of the *Northern Pipeline Act* and the operations of the Northern Pipeline Agency. The Committee has since conducted several meetings following its formation in June of that same year to hear testimony from senior officers of the Agency and of the Canadian and United States project companies, as well as others.

In October, 1978, the Senate also adopted a motion for the establishment of a Special Committee on the Northern Pipeline with authority to "inquire into all matters relating to the planning and construction of the pipeline for the transmission of natural gas from Alaska and Northern Canada...". The Senate Committee also has held a number of hearings related to the project since its formation.

The Northern Pipeline Agency was established to provide a 'single window' for the conduct of virtually all dealings at the federal level with the Foothills Group of Companies, which was authorized under the Act to undertake the project in Canada. In keeping with the provisions of the legislation, many of the regulatory powers of other federal departments and agencies relating to the planning, construction and operation of the Canadian system have been transferred to the Northern Pipeline Agency. The principal exception involves responsibilities reserved exclusively to the National Energy Board or shared between the Board and the Agency. In addition, the Agency is responsible for facilitating the co-ordination of activities bearing on the project that involve other arms of the federal government, other levels of government in Canada, and U.S. departments and agencies.

The management and direction of the Agency come under the authority of a Minister designated for this purpose by the Governor in Council. A Commissioner appointed by Order in Council serves under the Minister as his deputy in charge of the Agency. The Commissioner is based at the head office in Ottawa. The main operational office is located in Calgary and functions under the direction of an Administrator appointed by Order in Council, who is also responsible for the day-to-day direction of regional offices located in Vancouver, British Columbia, and Whitehorse, Yukon Territory. As provided for under the Act, a member of the National Energy Board serves as its Designated Officer, and as a Deputy Administrator of the Agency, exercising the powers of the Board that were delegated by it on July 27, 1978. A listing of the senior officers of the Agency as of the end of the fiscal year and the location of Agency Offices can be found in Appendix D on page 31.

AUDITOR GENERAL OF CANADA VÉRIFICATEUR GÉNÉRAL DU CANADA

Senator the Honourable H. A. (Bud) Olson, P.C.
Minister responsible for Northern Pipeline Agency
Ottawa, Ontario

I have examined the statement of expenditure and recovery of costs of the Northern Pipeline Agency for the year ended March 31, 1981. My examination was made in accordance with generally accepted auditing standards, and accordingly included such tests and other procedures as I considered necessary in the circumstances.

In my opinion, this financial statement presents fairly the results of the operations of the Agency for the year ended March 31, 1981 in accordance with the accounting policies set out in Note 2 applied on a basis consistent with that of the preceding year.

Auditor General of Canada

Ottawa, Ontario
August 13, 1981

NORTHERN PIPELINE AGENCY

(Established by the Northern Pipeline Act)

Statement of Expenditure and Recovery of Costs
for the year ended March 31, 1981

	1981	1980
Expenditures		
Salaries and employee benefits	$ 3,357,938	$ 2,274,002
Travel and communications	735,112	570,066
Rentals	655,340	532,551
Professional and special services	618,215	602,317
Materials and supplies	160,525	70,628
Furniture and equipment	102,317	113,927
Information	82,478	101,331
Other	42,207	13,072
	$ 5,754,132	$ 4,277,894
Expenditure provided by:		
Privy Council Vote 25	$ 5,219,132	$ 3,963,894
Statutory—Contributions to employee benefit plans	535,000	314,000
	$ 5,754,132	$ 4,277,894
Recovery of costs of the Agency:		
Expenditure for the year	$5,754,132	$4,277,894
Less: Recoveries credited directly to Consolidated Revenue Fund	2,960	1,950
Amount recoverable from Foothills Pipe Lines (Yukon) Ltd.	5,751,172	4,275,944
Less: Portion of current expenditure to be recovered in the following year	1,957,215	1,487,531
	3,793,957	2,788,413
Add: Portion of prior year expenditure recovered in the current year	1,487,531	1,454,009
Payments received from Foothills during the year and credited to Consolidated Revenue Fund	$ 5,281,488	$ 4,242,422

The accompanying notes are an integral part of the financial statement.

Commissioner

Chief Financial Officer

NORTHERN PIPELINE AGENCY
Notes to Financial Statement
March 31, 1981

1. Objective

The Agency was established on April 13, 1978 to facilitate the efficient and expeditious planning and construction of the Alaska Highway Gas Pipeline in a manner consistent with the best interests of Canada as defined in the Northern Pipeline Act, 1977-78, c.20.

2. Significant accounting policies

(a) Cost-recovery

Agency costs are recoverable from Foothills Pipe Lines (Yukon) Ltd. based on quarterly billings. The resulting payments are credited to the Government of Canada Consolidated Revenue Fund in the period received.

(b) Expenditure

Expenditure for the year includes amounts relating to work performed, goods received and services rendered to March 31, 1981. Capital acquisitions are charged to expenditure in the year of purchase. All expenditure is financed by the parliamentary appropriations provided for that purpose.

Expenditure also includes all actual costs incurred on behalf of the Agency by other government departments, except for contributions to employee benefit plans which are based on budgeted employee strength.

3. Employees' contingency plan

Senior and certain other key employees who remain with the Agency until completion of their responsibilities and whose service exceeds two years, are entitled to a termination allowance of 13% of accumulated salary received. These costs will be charged to expenditure when paid. Based on employees on strength at year end who may become entitled to this benefit in the future, unrecorded costs are estimated at $463,000. These costs would be recoverable as outlined in Note 2(a).

Project Description

The Alaska Highway Gas Pipeline Project is a large diameter system that will initially transport natural gas from the North Slope of Alaska across Canada to the lower 48 states. It will also provide access through the Dempster Lateral to Canada's own reserves in the Mackenzie Delta-Beaufort Sea area of the Northwest Territories as and when they are required.

In the fiscal year under review, Canadian and U.S. authorities approved the early construction of the Western and Eastern Legs that make up the southern portions of the system initially to permit the export of surplus Canadian gas to U.S. markets. A brief outline of this first-stage construction is given below.

Foothills Pipe Lines (Yukon) Ltd. of Calgary, Alberta, is the parent company responsible for the Canadian portion of the project. It is owned equally by the Alberta Gas Trunk Line Company Limited of Calgary, Alberta (now known as Nova, An Alberta Corporation), and Westcoast Transmission Company Limited, Vancouver, British Columbia.

The mainline system in Canada is to be built in five segments by the following subsidiary companies:

Foothills Pipe Lines (South Yukon) Ltd.

Foothills Pipe Lines (North B.C.) Ltd.

Foothills Pipe Lines (Alta.) Ltd.

Foothills Pipe Lines (South B.C.) Ltd.

Foothills Pipe Lines (Sask.) Ltd.

A sixth subsidiary, Foothills Pipe Lines (North Yukon) Ltd. will build the Dempster Lateral if and when it is approved by the National Energy Board.

In the United States, the Alaskan segment will be built and operated by the Northwest Alaskan Pipeline Company on behalf of the Alaskan Northwest Natural Gas Transportation Company. South of the 49th parallel, Northern Border Pipeline Company, a consortium of U.S. transmission companies and a subsidiary of TransCanada PipeLines Ltd., will construct the Eastern Leg of the system. Two California companies, Pacific Gas Transmission Company and its parent corporation, Pacific Gas and Electric Company, will construct the Western Leg.

The mainline project will comprise almost 7,720 km of pipe in the two countries. The diameter of the pipe will be of 1,422, 1,219, 1,067 and 914 mm. A total of approximately 3,270 km will be in Canada, 1,180 km in Alaska and 3,270 km in the United States south of the 49th parallel.[1] An additional 1,200 km of 860 mm pipe will be laid when and if the Dempster Lateral is approved.

The mainline through Canada will consist of the following lengths and diameters.[2]

Yukon	375 km of 1,219 mm 443 km of 1,422 mm
B.C. (North)	715 km of 1,422 mm
Alberta	634 km of 1,422 mm 377 km of 1,067 mm 301 km of 914 mm
Saskatchewan	258 km of 1,067 mm
B.C. (South)	171 km of 914 mm

The pipeline in Alaska will be approximately 1,180 km of 1,219 mm pipe. In the lower 48 states, the Eastern Leg will consist of almost 1,800 km of 1,067 mm pipe and the Western Leg will involve about 1,470 km of 1,067 mm line.[3]

The system is designed so that when fully powered it would be able to carry 68 million cubic metres per day (2.4 billion cubic feet per day) of Alaskan gas and, if the Dempster Lateral is approved, an additional 34 million cubic metres per day (1.2 billion cubic feet per day) of Canadian Mackenzie Delta-Beaufort Sea gas.

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[1] The total project will comprise almost 4,790 miles of 56, 48, 42 and 36-inch pipe. Approximately 2,030 miles will be in Canada, 730 miles in Alaska and 2,030 miles south of the 49th parallel. The Dempster Lateral would comprise approximately 746 miles of 34-inch pipe.

[2]

Yukon	233 mi. of 48″ 275 mi. of 56″	Saskatchewan	160 mi. of 42″
		B.C. (South)	106 mi. of 36″
B.C. (North)	444 mi. of 56″		
Alberta	334 mi. of 56″ 234 mi. of 42″ 187 mi. of 36″		

[3] The pipeline in Alaska will be approximately 730 miles of 48-inch pipe. In the lower 48 states, the Eastern Leg will consist of almost 1,120 miles of 42-inch pipe and the Western Leg will involve about 911 miles of 42-inch line.

The capital cost for the entire system, excluding that for the Dempster Lateral from the Mackenzie Delta, was originally estimated to be $10.7 billion (Cdn.). This reflected a cost of $4.3 billion for the Canadian segments and $6.4 billion for the American segments. In April, 1980, Foothills Pipe Lines (Yukon) Ltd. filed with the National Energy Board revised cost estimates for the entire Canadian section of $8.4 billion (Cdn.).

In January, 1981, the U.S. sponsors submitted a revised cost estimate of $13.7 billion (Cdn.) to the Federal Energy Regulatory Commission for the American sections of the system.

The Canada-U.S. Agreement established January 1, 1983, as the target date for completion of the entire project. The current target date for completion has now been set back to late 1986 due to delays in the United States.

The map found on page vi provides a description of the proposed pipeline route.

First-Stage Plan for Construction of the Southern Sections

The first-stage plan provides for construction in Canada and the United States of all or part of the proposed Western and Eastern Legs of the system from the point where they branch off from the trunk line 105 km (63 mi.) north of Calgary, Alberta.

This first-stage program involves the laying of some 2,992 km (1,858 mi.) of pipe in Canada and the United States at an estimated cost of $2.4 billion (Cdn.), of which 850 km (526 mi.) are in Canada. The system would be capable of transporting some 32.11 million cubic metres (1.14 billion cubic feet) of Alberta gas a day to U.S. markets, rising to a possible peak flow between 1983 and 1986 of 38.03 million cubic metres (1.35 billion cubic feet).

Construction of the Western Leg in Canada, which began in August, 1980, involved the installation of seven loops over a distance of 215 km (132 mi.) of pipe, 914 mm (36 in.) in diameter. (Work on this section was completed in the spring of 1981.)

Construction of the U.S. Western Leg, which began in December, 1980, involved the installation of 258 km (160.5 mi.) of loops to the Pacific Gas Transmission pipeline from the Canadian border point at Kingsgate, B.C., to Stanfield, Oregon. From Stanfield, the Canadian gas is being transported to southern California through the addition of some 565 km (361 mi.) of loops to Northwest Pipelines and El Paso Natural Gas, which has been designated the Western Delivery System. For purposes of transmission of Alaskan gas on the Western Leg, the Pacific Gas Transmission and Pacific Gas and Electric systems will be further extended from Stanfield to Antioch, California, which is close to San Francisco. (On October 1, 1981, gas began to flow through the Western Leg to U.S. markets.)

The Eastern Leg, in Canada and the United States, will be comprised of 1,956 km (1,215 mi.) of 1,067 mm (42 in.) pipe. (Construction began in both countries in May, 1981, and will be completed over a two-year construction period.)

Northern Pipeline Agency

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Mr. William A. Scotland, Deputy Administrator and
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