

# Canada's bid for Arctic oil

Canadian oil and pipeline companies are making plans to transport oil via their own Mackenzie Valley pipeline

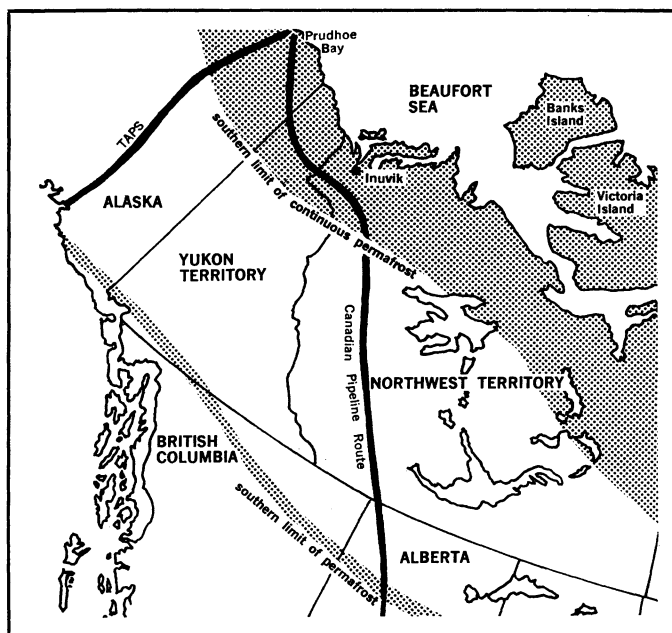
by Warren Kornberg

There is only one place in the Western Hemisphere where anybody has laid a section of 48-inch pipe on frozen tundra and run hot oil through it just to see what would happen.

It is not, as might be expected, in Alaska, where an international consortium of corporations appears eager to run such a pipe over hundreds of miles of permafrost on the way from the Prudhoe Bay oil fields to the ice-free port of Valdez (SN: 4/18, p. 389). It is rather 400 miles east, at Inuvik in the heart of the delta of the Mackenzie River on the Beaufort Sea in the northwestern corner of Canada's Northwest Territories.

Since early March there, engineers of the Bechtel Corp., operating for a consortium of Canadian oil and pipeline companies under a \$2 million contract, have been running 7,000 barrels of heated oil in an endless loop through 850 feet of 48-inch insulated steel pipe. Half of the pipe burrows through an experimental perm or mound of earth and gravel; the other half completes the loop back to the storage tanks suspended above the snow-covered tundra between wooden piles driven deep into the permafrost. The loop is constantly monitored for temperatures in the oil and the ground below, as well as for vibration, flow rates and strains on the pipe itself.

Beneath the pipe is 18 inches to three feet of the permafrost's active layer, the region of silt and ice that thaws and freezes with air temperatures that average 14 degrees F. and can hit a summer high in the 50's. Below that, perhaps for 1,000 feet, is the permafrost: the permanently frozen deposits prevented by an insulating surface mat of a lichen



Robert Trotter

*Two rival pipelines in the continental energy talks.*

The Canadian Arctic sits atop the same kind of geological deposits that brought oil in at Alberta and on the Alaskan North Slope. One Arctic well has already been brought in; others are expected momentarily, and Canada is planning a massive, hot-oil pipe across the permafrost, twice the length of the controversial Trans-Alaska Pipeline System, to

bring oil to the markets of the Eastern and Midwestern United States. In this and succeeding articles, Warren Kornberg, editor of Science News, reports on the results of a trip in the Canadian Arctic, the developmental prospects and the environmental and geopolitical problems that are simmering and promise shortly to come to a boil.

called taiga from ever going above about 27 degrees.

Destroy the mat or reduce the insulating quality of the active layer, and the permafrost begins to melt to whatever depths the temperatures demand.

None of the Bechtel test pipe is buried in the permafrost. It was originally intended to run a second loop, perhaps with part buried. But the effect of buried pipe carrying oil at some 160 degrees F. is a foregone conclusion. It would melt the kind of ice and silt permafrost that underlies the Mackenzie Delta and the Alaskan sedimentary basin as well, not only creating a massive bulb-shaped sump but endangering the support of the pipeline itself.

The test loop of the Mackenzie Valley Pipeline Research Group has been operating only a fraction of the 6 to 12 months it is scheduled to run. But some results are already in, and a preliminary report has gone out to the backers.

As might have been expected—privately oilmen are calling the experiments an exercise in public relations, a demonstration of sincerity or a kind of engineered self-fulfilling prophecy—no serious effects on the environment

within the limits of the tests have been detected; the test's designers intended to demonstrate the feasibility of the project.

Predictably, the pipe in the gravel perm gave up more of its heat to the frozen ground two to five feet below than did the suspended pipe. And some thaw temperatures as far down as the permafrost layer have been recorded.

But by and large, Bechtel is reported to have informed its sponsors, one way or another, there doesn't seem to be any reason why they can't go ahead and do what they want.

What they want is to build their own pipeline: a string of 48-inch steel pipe from the Mackenzie Delta 1,600 miles—twice the length of the proposed Trans-Alaska Pipeline System—down the relatively gentle Valley of the Mackenzie to Edmonton in Alberta, for transport south into the oil-and-gas-hungry United States markets in the East and Midwest. Almost all of the route is over Canadian permafrost.

Ostensibly the Canadians have an eye on the Prudhoe Bay oil. They don't believe the Trans-Alaska pipeline will ever be built. If the tundra, permafrost, Eskimos, caribou, conservationists and



Gene Brush

*Oil temperatures are constantly monitored in the pipeline and below ground.*

the U.S. Department of Interior don't stop it, they feel, the mountain ranges between Prudhoe Bay and Valdez surely will. Or the plan will come apart against the costs of building TAPS, transshipping to tankers at Valdez and building another massive pipe east across the western United States to move the oil to market.

"The Mackenzie Valley pipe," says L. A. C. O. Hunt, chief of the northern coordination division of the Canadian Department of Indian Affairs and Northern Development, "has no mountains to cross. There's a natural grade all the way into Edmonton. It's a way to bring competitive oil to the East Coast where it's needed to compete with foreign crude." He and his countrymen are proposing a short link of pipe from Prudhoe to the delta, and then south in the Canadian pipe.

**Shipping oil** from an American source to an American market via a foreign carrier is currently in violation of American law. "The Jones Act (which protects American carriers) will have to be changed," says Hunt.

This is apparently part of Canadian national policy in the continental energy policy negotiations currently going on between Canada and the United States.

It is echoed not only by Hunt in Ottawa, but by Commodore Owen C. S. Robertson in Montreal and Richard M. Hill, director of the Canadian Government's laboratories at Inuvik. Robertson is an Arctic specialist and consultant on Arctic navigation to both the Canadian and United States Governments; he skippered the first ship through the Northwest Passage, the icebreaker Labrador in 1954, helped plan the cruises of the Nautilus and the

Manhattan, and was in charge of the cruise of the nuclear submarine Seadragon through the Passage under the Arctic ice. Hill is also mayor of Inuvik and, like most Canadian officials concerned with the north, is swept up by the present Arctic oil fever.

**Canada wants** not only American oil in the Mackenzie Valley pipeline, but relaxation of United States barriers to imports of Canadian oil, which President Nixon recently stiffened.

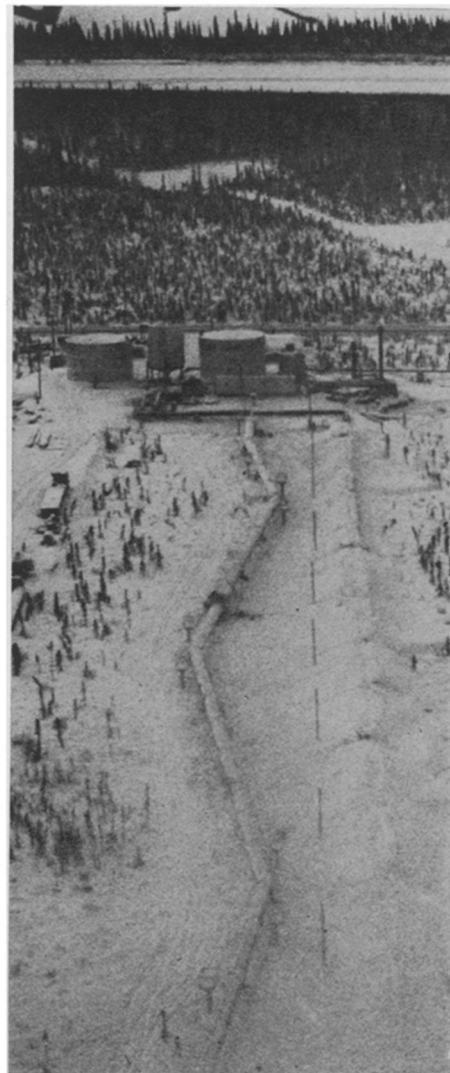
Canada has other aces in the hole. She is claiming jurisdiction, if not sovereignty, over the Northwest Passage and other waterways among her Arctic islands (SN: 4/25, p. 420).

And she believes she has the only protected harbor on the Beaufort Sea, bordering both Alaska's North Slope and the Canadian Arctic: Herschel Island, near the Alaska boundary.

Not only do the Canadians feel that the troubles TAPS is facing (SN: 2/14, p. 177) will force the North Slope oil companies to come through Canada to ship by pipe. But they will have to come through Canada, by way of a Herschel Island oil terminal, to ship by sea as well, whether by surface or submarine tanker.

Commodore Robertson, for instance, from what he knows of wind-driven Arctic ice, virtually defies the Americans to ship oil off the Alaskan littoral. Any port or marine terminal there would be unsheltered from the full force of the wind blowing down across the Beaufort Sea from the Pole.

"It's not current that moves ice," he observes, "it's wind." He anticipates that any effort to build a protected offshore terminal could cost as much as projected \$1.5 billion costs of TAPS



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*Test loop, on and above surface.*

itself, and then might not provide adequate shelter.

The only feasible alternative, as he sees it, is Herschel Island, which is further east and under the lee of the Arctic islands.

"For an oil terminal," says Robertson, "the Americans are going to have to come to us." And Ottawa is sufficiently convinced of the inevitable demand for a sheltered oil terminal that it has committed \$500,000 to a study.

But Herschel Island, like the Mackenzie Delta, is across the Alaskan-Yukon international boundary, in Canada. Any pipeline link to it from Prudhoe would have to cross Canadian soil, on the way to the United States market, in violation of the Jones Act.

"The Jones Act," says Robertson, echoing Hunt, "would have to be changed." And Canada would have to become a full partner in continental energy policy, rather than a source of reserves to be turned on and off at the whim of domestic United States politics. □

*(NEXT: Black ace in a deep hole.)*