

## TRANSPORTING NORTH SLOPE GAS TO MARKET

*This month's "Trends" examines problems involved in getting natural gas produced at Prudhoe Bay on Alaska's North Slope to consumers in the continental United States. Background material for the article, which was written by Labor Market Analyst John F. Schlichting, came primarily from two sources. The first was an article by Bill Schultz entitled "Moving Alaska's Gas" which appeared in the October 1973 edition of Alaska Construction and Oil Magazine. The second was a paper by Tim Bradner entitled "Oil and Gas Conservation Regulation in Alaska" which appeared in the July 1973 issue of Alaska Review of Business and Economic Conditions published by the University of Alaska's Institute of Social Economic and Government Research.*

With a start of work on the Trans-Alaska Pipeline now close at hand, more and more attention is being given to the task of transporting natural gas from Alaska's North Slope to markets in the "lower forty-eight." Accordingly, there are presently two proposals for accomplishing this which hold center stage. The first, by a consortium of U. S. and Canadian oil interests, calls for construction of a pipeline from Prudhoe Bay down Canada's Mackenzie Valley to the midwest. The second, by Houston based El Paso Natural Gas Company, would pipe the gas along the route of Trans-Alaska Oil Pipeline to a deep water port in Southcentral Alaska. Because of the vastly differing impacts each of these two schemes would have upon Alaska's economy, manpower planners in both the public and private sectors are vitally concerned with which one will ultimately be adopted. Accordingly, the purpose of this article is to examine some of the factors affecting the feasibility of each project. From these we will attempt to draw some conclusions with respect to which line will ultimately be built and how this is likely to effect economic planning in both the public and private sectors.

In examining the problem perhaps the first question that should be asked: what do the oil companies themselves want? The answer to this appears to lie in the fact that the major stockholders in Arctic Gas System; the consortium which supports the Canadian alternative, are also holders of the lion's share of the Prudhoe Bay Gas reserves. There are several reasons why North Slope gas holders would prefer the Canadian line. One is that when the project was first conceived five years ago, liquefied natural gas from the North Slope was not economically competitive with natural gas from other sources. While this situation has since changed radically, \$34 million has already been spent on feasibility studies and planning for a Canadian line. As a result the oil companies

may understandably be reluctant to abandon the Canadian route.

More importantly, however, are proven gas reserves in Canada's Mackenzie Delta. These, which amount to around three trillion cubic feet (compared with 26 trillion for Prudhoe Bay) do not by themselves justify economically the construction of a pipeline south to potential markets. However, gas from these deposits if tapped into Trans-Canada Pipeline carrying Alaska gas, in addition to being profitable itself, would tend to enhance the profitability of North Slope gas shipped by this route. This increased profitability would be obtained by stretching out the period over which pipeline construction costs would be amortized.

With respect to these cost factors, as things now stand, initial costs are considerably greater for the Trans-Canada alternative than for the proposed Alaska pipeline and associated gas liquefaction facility. Currently, it is estimated that it would cost \$5.7 billion to build a gas pipeline through Canada. Similar figures for El Paso's Trans-Alaska line are \$3.3 billion. However over the long term, by virtue of higher operating costs for the Alaskan alternative, the Trans-Canada line has the edge. Indeed this probably represents the strongest argument against the Trans-Alaska line.

Also causing the oil companies to favor a trans-Canada line over one through Alaska are political factors relating to the trans-Alaska oil Pipeline. Important to the compromise which resulted in passage by the U. S. Congress of the legislation enabling construction of this line were promises by the petroleum industry to congressmen from the midwest that North Slope gas would be delivered directly to that area via a Canadian pipeline. If the industry were now to welsh on this agreement

by supporting a gas line across Alaska, they would alienate powerful forces in the Congress at a time when, particularly as a result of the energy crisis, much critical oil related legislation is likely to be introduced there.

But if pure economics and domestic politics seem to favor the Trans-Canada pipeline, there are several other factors which could tip the balance in the opposite direction. The first of these relates to environmental considerations. On balance a gas pipeline, whether through Alaska or Canada, is going to arouse considerably less hue and cry than has the Trans-Alaska Pipeline. However, it would be asking too much to expect environmentalists to let pass without comment tentative plans by Arctic Gas to run the Alaska portion of their line through the Arctic Wildlife Range. Obviously any protest resulting from such a routing could be easily quieted by running the line south of the Wildlife Refuge. But, a pipeline through this area, in addition to being longer, would be more expensive to construct because of the mountainous terrain in the area to be traversed, than would be one through the flat Arctic coastal lowlands of the Wildlife Refuge. Whether or not the increased costs of running the Alaskan portion of a Trans-Canada line south of the wildlife refuge are sufficient to offset the overall cost disadvantages of the all Alaska route of the El Paso proposal is unclear. Nonetheless, environmental factors represent an element that must be weighed in the equation when comparing the two proposals.

Another factor that could alter the gas pipeline picture are territorial claims by Canada's Native people. This issue has been simmering since before Alaska's Natives fought and won the battle for settlement of their aboriginal claims. It could very well be driven into the spotlight if Canadian Natives, following the example set by their Alaskan brethren with the oil pipeline, use the gas pipeline project as a tool to extract from the Canadian government a favorable settlement of their aboriginal claims. Such a move has the potential to cause years of delay and would thereby greatly enhance the attractiveness to the oil companies of a pipeline through Alaska.

Also having a potentially important bearing on the problem, is the timing involved in producing gas from the Prudhoe Bay field. Gas production can not begin until after oil production has been in progress for a period of time. This is because gas both in solution

and in cap above the oil, by virtue of the pressure it exerts upon the reservoir, is slated to be the principal driving force that will bring the oil to the surface. Therefore during initial production, plans call for gas that comes to the surface with the oil to be reinjected to maintain reservoir pressure. At some point, however, maybe five years after production begins, reinjection of this casinghead gas will begin to damage the reservoir. Therefore gas production must begin during a time frame of not less than roughly two to five years after the beginning of oil production. Or put another way, if oil pipeline construction begins this spring, it will be 1979 or 1980 at a minimum before gas production from Prudhoe Bay can begin. This enforced time interval would seem to favor the Trans-Canada line since it makes irrelevant the shorter period required for construction of a gasline across Alaska.

However, gas pressure may not be the only driving force present in the Prudhoe Bay field. There are indications that the oil layer in the reservoir may over lie a layer of water. This water, if present in sufficient quantities, would exert pressure upon the oil from below and could be used instead of gas pressure, as the driving force to get the oil to the surface. Use of such a "water drive" mechanism could therefore eliminate the need to hold off producing gas at Prudhoe Bay. Under these circumstances, it would be possible for the oil companies to begin producing gas from Prudhoe Bay at the same time that oil production begins. In such a situation the shorter construction period of the Trans-Alaska gasline might greatly enhance its feasibility, especially when one considers the nation's steadily worsening energy problems.

Given some relative advantages of the two proposals the question that next arises is which seems most likely to be adopted. A possible answer to this lies in the character of the arguments used to justify each of them. Basically it seems that those favoring the Canadian alternative, such as lower operational costs and the ability to tap Mackenzie Delta gas reserves, are based on known factors. On the other hand, justifications for the Trans-Alaska line, such as environmental and land claim related factors, together with suppositions about the dynamics of the Prudhoe Bay reservoir, are more speculation than hard facts. In the oil business, as elsewhere, the smart money goes where the most hard data is. Hence the Trans-Canada line at this time looks like the one that will be built.

Why then is El Paso making such a strong effort towards building a gasline across Alaska? Perhaps they are gambling that one or more of the "soft" facts listed above will turn hard and tip the balance in their favor. Given the scramble presently going on among the major utility companies to line up supplies of increasingly scarce hydro-carbon fuel, such a gamble falls well within the realm of possibility.

What seems more likely, however, is that El Paso anticipates that sufficient gas reserves will eventually be proven on the North Slope to justify construction of lines through both Alaska and Canada. Indeed most experts in the petroleum sector believe additional reserves will eventually be located there. When this occurs, El Paso having already done its homework for construction of a gas pipeline across Alaska, will be in an excellent position to cash in on these future discoveries.

In conclusion then, where does all of this leave planners in general, and manpower planners in particular? First and foremost it seems to indicate that while a gas pipeline across Alaska such as that envisioned by El Paso Natural Gas may eventually be built, construction is not likely to begin directly following completion of the oil pipeline. This is quite significant since it means that there will be no major project to bail the State out of the short term economic slowdown that is expected to follow on the heels of Trans-Alaska oil pipeline construction. As a result, this problem, which many Alaskans feel has been banished by El Paso Natural Gas Company's announced intention to build a gas pipeline across Alaska, seems still to be very much with us.

## ALASKA'S ECONOMY IN OCTOBER

**Employment — Unemployment:** The seasonal slackening of activity in Alaska's economy continued during October as total estimated employment fell by 4,900 from September's figure. Major declines came in construction, manufacturing, services, and government. Over-the-year employment was ahead by 4,200. As in previous months this growth was paced by advances in the trade, services, and government sectors. Reflecting the continued departure from the work force of persons laid off by seasonal economic declines, total unemployment was down by 1,100 from September's figure of 10,800. Over-the-year total employment was up by 700.

**Mining:** Marginal gains in the petroleum sector, which

ESTIMATED CIVILIAN WORKFORCE IN ALASKA October 1973 <sup>1/</sup>					
INDUSTRY	Changes From:				
	10/73	9-73	10-72	9-73	10-72
CIVILIAN WORKFORCE.....	137,500	143,900	132,600	-6,400	4,900
INVOLVED IN WORK STOPPAGES.....	0	400	0	- 400	0
TOTAL UNEMPLOYMENT.....	10,800	11,900	10,100	-1,100	700
Percent of Workforce.....	7.9	8.3	7.6	-	-
TOTAL EMPLOYMENT 2/.....	126,700	131,600	122,500	-4,900	4,200
Nonagricultural Wage & Salary 3/.....	112,200	116,600	108,800	-4,400	3,400
Mining.....	2,000	2,000	1,900	0	100
Construction.....	10,200	11,100	10,000	- 900	200
Manufacturing.....	8,800	9,900	7,900	-1,100	900
Durable Goods.....	3,500	3,600	2,700	- 100	800
Lumber, Wood Products.....	2,700	2,800	2,100	- 100	600
Other Durable Goods.....	800	800	600	0	200
Non Durable Goods.....	5,300	6,300	5,200	-1,000	100
Food Processing.....	3,300	4,400	3,200	-1,100	100
Other Non Durable Goods.....	2,000	1,900	2,000	100	0
Transp.-Comm. & Utilities.....	10,600	10,900	10,400	- 300	200
Trucking & Warehousing.....	1,600	1,800	1,500	- 200	100
Water Transportation.....	1,000	1,100	1,000	- 100	0
Air Transportation.....	3,200	3,200	3,100	0	100
Other Transp.-Comm. & Utilities.....	4,800	4,800	4,800	0	0
Trade.....	18,600	18,600	17,700	0	900
Wholesale Trade.....	3,400	3,500	3,400	- 100	0
Retail Trade.....	15,200	15,100	14,300	100	900
General Merchandise & Appar.....	3,900	3,800	3,800	100	100
Food Stores.....	2,100	2,100	1,700	0	400
Eating & Drinking Places.....	3,700	3,700	3,400	0	300
Other Retail Trade.....	5,500	5,500	5,400	0	100
Finance-Insurance & Real Estate.....	4,200	4,300	4,100	- 100	100
Service & Miscellaneous.....	15,800	16,800	15,300	-1,000	500
Government 4/.....	42,000	43,000	41,500	-1,000	500
Federal.....	17,200	17,200	17,400	0	-200
State.....	14,000	14,900	13,500	- 900	500
Local.....	10,800	10,900	10,600	- 100	200

<sup>1/</sup> Estimated in accordance with techniques recommended by U. S. Bureau of Labor Statistics.

<sup>2/</sup> Includes domestics, nonagricultural self employed and unpaid family workers, and agricultural workers.

<sup>3/</sup> Prepared in cooperation with the U. S. Bureau of Labor Statistics.

<sup>4/</sup> Includes teachers in primary and secondary schools, and personnel employed by the University of Alaska.

offset small seasonal declines in other areas of the industry, caused mining employment to be unchanged over the month. Compared with a year ago, employment in the industry was up by 100, spurred by an improving pipeline outlook. With the Trans-Alaska pipeline legislation now law, the coming months should see an upsurge in petroleum exploration. This will come as oil companies, now certain of a means of getting the oil to market, move to locate new deposits in the State's oil-rich far North.

**Construction:** Seasonal factors were largely responsible for an over-the-month decline of 900 in construction employment. Over-the-year employment was ahead by 200 as activity in the industry continued to exceed last year's levels. This condition should continue through November, however, December and January may see construction employment dip below that noted for a year ago if shortages of heating oil force a curtailment of much inside work presently slated for the period.