

Granular Resource Requirements for Proposed Mackenzie Valley Pipelines:

Technical Papers and Workshop Proceedings

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Northern Oil and Gas Action Program (NOGAP) Project A4:
Granular Resources Inventory and Management**

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SECTION 8.

DISCUSSION PANEL "B"

**POTENTIAL CONSTRAINTS TO
BORROW DEVELOPMENT**

POTENTIAL ENVIRONMENTAL IMPACTS: BIOPHYSICAL

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This paper provides an overview perspective of some of the scientific activities currently being conducted in the Mackenzie Delta. Presented below are issues and biophysical constraints that may greatly affect your industry and in fact, all development in the NWT. Before presenting these issues, I will provide a brief review of who we are and where we are going.

The Inuvik Research Centre has been operating since the early 1960s to provide logistical support for research in the western Arctic. The logistical research support includes laboratories, accommodation, library facilities, offices and secretaries for researchers working in the western Arctic. The researchers are from government, both territorial and federal, university professors and students, as well as industry researchers. In 1992, the Centre supported nine projects and approximately 300 researchers involved in those projects. They range from research on archaeology and geology, to sociology and anthropology. The people who have used our centre come from across Canada and from around the world. The Science Institute also has a research centre in Igloolik and another one in Iqaluit.

This workshop is concentrated on establishing what granular reserves are along the corridor of the Mackenzie Valley, where potential granular reserves are, pipeline and highway transportation systems and other factors in the borrow industry. This paper is a brief presentation on the physical constraints that might affect your industry.

You've probably all heard through the media something about the topic of climate change. Many of the researchers that I have talked to in the different sciences simply cannot be certain that global climate is changing. They don't know if it is changing and if so, is it only a regional phenomenon. But they'd like to know because obviously if climate change is occurring, it is going to have a dramatic effect on the north. For example, it will affect the boundary of the continuous and discontinuous permafrost zones, as well as the ice regime. With warming, the polar caps are going to melt and sea levels are going to be raised.

This has happened throughout time. It is likely to affect slope stability in corridors like the Mackenzie Valley where more slumping would occur and that, of course, would be a hazard to pipeline development. It would also affect flood cycles in places like the Mackenzie Delta and it's going to affect the regional ecology as well. If the temperatures are warming up, new species of plants would be found, particularly in any disturbed areas where there have been forest fires. So climate change could have a dramatic effect on your industry. If there is climate change, certainly pipelines would have to be designed differently and that policy will effect your plans.

At the Inuvik Research Centre, we support the research community and recognize that climate change should be looked at. Last year we had 19 projects set up by different government agencies and the university researchers to address global climate change. I'd like to list a few of them. You'll recognize that they'll have implications for your industry.

When we think of research, many of us who are physical scientists, we think of geology and engineering but there are some social research studies that are looking at oral history of flooding events, by talking to the native elders and other people in the region. Scientists are also investigating ground ice developments in sediments in the Mackenzie Delta; particularly frost heave in small lakes. The construction of future pipelines through parts of the Delta have to cross some of these lakes and this work pertains to that. Dr. Stewart Cohen, with Environment Canada, is part of a group called the *Mackenzie Basin Impact Study* and they are looking at the Mackenzie Basin as a whole and this would include parts of the territories, Alberta, northeastern British Columbia and parts of the Yukon. This group is doing quite a bit of modelling of climate change and potential climate change scenarios. These models will assist the pipeline industries in predicting what will happen at certain temperature changes.

The Geological Survey of Canada (GSC) has also been very active in the western Arctic. Some of the

projects are quite important in better understanding climate change. Currently, the GSC is monitoring landslide mechanisms along the Mackenzie River between Norman Wells and the head of the Mackenzie Delta; looking at past slides, recording their frequencies and documenting just what slides have occurred. Mark Nixon of the GSC is monitoring the permafrost active layer from Richards Island in the Delta all the way down to the Alberta border. He has set up monitoring stations to quantify the amount of permafrost thaw in the active layer.

There are also biological studies, and studies of time change, not just the geophysical sciences. The University of Alberta's, Dr. Ross Wein, and some of his graduate students are studying vegetation changes along the tree line and they are specifically looking for new species. They feel that if there is a climate change, new species of plants will appear in burn areas. Those are just a few of the projects that have been set up to address this concept of global climate change. However, research projects take time and many of these projects that are being set up are long-

term projects. They have to be long term, in order to obtain a more accurate documentation of what is happening. This author feels that this information gathered in the field when applied in models, can certainly assist pipeline, transportation and shipping companies in the north and can help companies adapt to a changing environment, if in fact, global change does happen.

A lot of research concerning weather is also being conducted in the Mackenzie Delta. In fact, in 1994 Environment Canada is proposing a project called *Arctic Storms* to study storms in the Arctic through the September-November period. They expect to have an international team of Japanese, Germans, other Europeans and Canadians, of course, to study Arctic storms and how these storms are generated and what effects they have. The reason they have picked the Beaufort Sea is because of its potential for future hydrocarbon development. I think that will be a very interesting project. Global and regional climate change will have a profound impact on the construction industry.

Note: The text of this presentation has been transcribed from an audio-tape recording of the workshop presentations. If necessary, we would suggest that the reader verify the accuracy of these comments with the presenter.