

Alaska, Yukon, and British Columbia Non-ferrous Metal and Petrochemical Freight
Forecasts for the Alaska Canada Rail Link

By
Paul Metz

Executive Summary

A probabilistic analysis of the non-ferrous mineral resources of east-central Alaska, Yukon Territory, and northern British Columbia indicates that base metals and ferro-alloys could contribute at least an initial 4 million tonnes of southeast bound freight for the Alaska Canada Rail Link. The southeast bound freight load could increase to six million tonnes per year within ten years of construction of the rail link. The forecasts are based on the analysis of 588 mineral resource data files for east-central Alaska, over 2,700 mine-files for Yukon Territory and over 4,400 mine-files for British Columbia as well as mineral import and total consumption data for the U.S. for the period 1970 to present. Thirty-four mineral deposit models developed by the U.S. Geological Survey were used as a basis for tonnage and grade estimates.

Currently the U.S. annually imports approximately one million tonnes of metallic copper, 250,000 tonnes of metallic lead, and 1.2 million tonnes of metallic zinc. Total annual imports of the three base metals over the past five years has been as high as 3 million tonnes however the thirty year trend has resulted in a four fold increase in the reliance on imports to meet annual consumption. This trend is expected to continue as domestic mine production in the contiguous states continues to decline. Total current U.S. annual consumption of the three metals exceeds 6 million tonnes.

The basic assumptions for the analysis include a ten year expected time line for permitting, final design and construction for the rail link; a ten year expected period for new mine development; expected mine lives of thirty years; probabilities of the development of mid-sized and large size mineral deposits ranging from 1/1000 to 1/10 depending on deposit geology, expected tonnage and grade, and deposit location.

The expected metallic mineral production from the 588 known mineral occurrences in the 200 km wide transportation corridor in east-central Alaska is estimated to range between 30 to 150 million tonnes of refined metal (assuming local application of electrowinning technologies which will reduce concentrate tonnages on the average by one third) or one to five million tonnes per year assuming a 30 year production period. The expected tonnage of refined non-ferrous metals in the Yukon ranges from 2.5 to 45 million tonnes. Assuming a 30 year production period, the expected annual freight to the Chicago Hub from the Territory could potentially range from 83,000 to 1.5 million tonnes. The expected tonnage of refined non-ferrous metals in northern British Columbia ranges from 58 to 197 million tonnes. Assuming a 30 year production period, the expected annual freight to the Chicago Hub from the Province could potentially range from 1.9 to 6.6 million tonnes. Thus the potential combined freight estimate for the non-ferrous metals ranges 2.98 to 13.1 million tonnes. However, the total non-ferrous metal supply from Alaska, Yukon, and British Columbia in excess of the U.S. and Canada demand will be exported to the Pacific Rim and will not impact the freight forecasts for the rail link except for the freight load along the shortest distance between the rail link and a tidewater port.

The expected gross metal values are based on 2006 metal prices. Based on the expected gross metal values the estimated ranges of economic benefits that will accrue to the communities along the rail link are estimated as follows: (a) Alaska – \$4 to \$41 billion, (b) Yukon - \$ 12 to \$265 billion, (c) British Columbia - \$15 to \$115 billion.

In-state processing of the natural gas liquids from the Alaska North Slope at a pipeline capacity of 4.5 Bcf/day, would result in an estimated 13 million tonnes of solid and liquid petrochemical production in Alaska per year. For the first ten years of production which would commence with the construction of the natural gas pipeline, the products are expected to be transported to tidewater and on to markets in the Pacific Rim. Due to diminishing natural gas liquids in the Gulf of Mexico, at least 50% of the future production is expected to be consumed in the industrial center of the U.S. It is also assumed that the rail link would be constructed in the same time frame as the Alaska Natural Gas Pipeline. Thus 6.5 million tonnes of petrochemicals are expected to be transported to the Chicago Hub from the 10th year of the operation of the rail link. The proposed natural gas pipeline is predicated on 35 Tcf of proven reserves and with ultimate natural gas resources on the North Slope estimated at 200 Tcf, the petrochemical production is expected to continue for nearly 100 years.