Alaska Canada Rail Link

Logistics Evaluation Resource Projects

Work Package: A-1 (e)

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To: Kells Boland – Project Manager - Alaska-Canada Rail Link

Subject: Work Package A1 (e) – Logistics Evaluation Resource Projects

Attached is the report of QGI Consulting for the above noted work package within the market analysis phase of the ongoing feasibility study for the proposed Alaska-Canada Rail Link. Our principal objectives, as outlined in the work package terms of reference, for this assignment included:

- assess the market for rail transport from the contiguous lower 48 United States, southern Canada or Alaska/BC Ports for equipment and supplies for mining projects or oil and gas field development in Alaska, Yukon, NWT and BC.
- determine rail rate levels required for competitive cost positioning relative to existing transportation capability.
- estimate rail traffic flows and revenue streams and construct rail traffic and revenue forecasts

The analysis and forecast traffic flows and revenue streams contained in this submission have been developed using the data tables and analysis developed by QGI and other consultants engaged by the Alaska Canada Rail Link Study in the completion of two preceding work packages.

The specific methodologies utilized in developing the forecast volume and revenue scenarios are summarized in this report and documented in greater detail in the individual consulting reports prepared in support of this report.

Sincerely,

Milt Poirier
Partner
QGI Consulting Ltd.

1.0 METHODOLOGY

Freight traffic related to resource activities can be segmented into the following categories:

- Industrial products related to the construction and development of mining operations;
- Industrial products related to the ongoing operations of mining operations;
- Industrial products related to the future development of oil and gas production
- Industrial products related to the ongoing support of oil and gas development and production

The information contained in this forecast has been constructed using information developed by QGI Consulting and Lockheed Martin in the completion of work packages WP A-1 (b)[1]. Each consultant employed its own independent methodology for the development of base traffic data for these industry segments. In Canada, recognizing the significantly limited level of both mining and oil and gas exploration within the study region QGI developed its data based principally on modeling techniques that sought to estimate the level of potential traffic based on assumed levels of industry activity. Lockheed Martin, in its examination of the Alaska market, one with significantly higher ongoing operations specifically in the oil and gas sector, focused more appropriately on direct discussions with industry representatives and the examination of publicly available transportation statistics.

1.0 Mineral Resources

QGI's determination of potential freight volumes to support mineral resource development and operations has relied on base research undertaken by Gartner Lee in the completion of its analysis of mineral deposits within the context of Work Package A2 (a). The objective of this work package was to identify the potential volumes of export ore and concentrate traffic that could accrue to the Alaska Canada Rail Link assuming the viable development of existing mineral deposits in the Yukon and Northern British Columbia.

Gartner Lee provided QGI Consulting with base data including a preliminary listing of known mineral deposits, estimated mineable resources, shippable quantities, and estimated mine life. This information was subsequently used by QGI Consulting to derive, based on mine production models, the level of potential freight volumes that could move into the Yukon[2] to support both the construction and ongoing operations of these mines.

[1] QGI Consulting developed data for Canada while Lockheed Martin working in conjunction with the University of Alaska developed data for operations within the State of Alaska.
[2] QGI at the request of the project manager included in its initial analysis the freight requirements associated with mineral resource development in Alaska.

We would note that Gartner Lee's initial methodology for determining the viability of specific mineral deposits, which has a direct impact on related inbound freight related to such operations was altered on two fronts:

- The specific mineral deposits deemed viable for development, and consequently that would require inbound freight for construction and operations support was changed through the adoption of a net concentrate shipped methodology versus Gartner Lee's original net ore mined valuation methodology;
- The timing associated with inbound freight for these operations was altered based on the staggering of mine development in accordance with the current status of individual mines and the reflection of traffic consistent with the expected mine life as opposed to the presentation of volumes on a 30 year annualized basis.

Gartner Lee's base data was applied against purpose built models designed by a geological engineer experienced in the construction of northern mining operations. Two separate models were constructed to address the differences in material inputs and production characteristics of base metal and coal operations and to address the differences in requirements for mine construction as compared to ongoing mine operations. The models employed in the development of freight estimates are more fully documented in QGI's previously submitted report for Work Package A1 (b) – Traffic Data Development for Resource Projects.

The models assume a limited number of goods or "consumables" quantities applied against a range of estimated annual production volumes as identified in the Gartner Lee analysis. Principal goods used in the construction and support of such operations include: cement, civil and mechanical equipment and supplies, pit and surface equipment, structural steel, fuel tank materials, camp and office materials, and fuel. Using these models the estimated level of freight volumes for both mine construction and operation were developed for the twenty-one (21) mineral deposits deemed viable through the net concentrate value analysis.

With base estimated freight volumes in place the final analytical step entailed the determination of logical rail routing and rail rates applicable to the traffic for movement from origin to the specific destinations on the ALCAN railway.

Transportation Parameters

The principal assumptions used in the development of transportation forecasts for these commodities and the corresponding revenues that would accrue to the Alaska Canada Rail Link include:

Linkage to Export Minerals

Forecast inbound freight for both mine construction and operations are restricted to those potential mining operations deemed commercially viable for development and movement of export ores and concentrates.

Source Origins

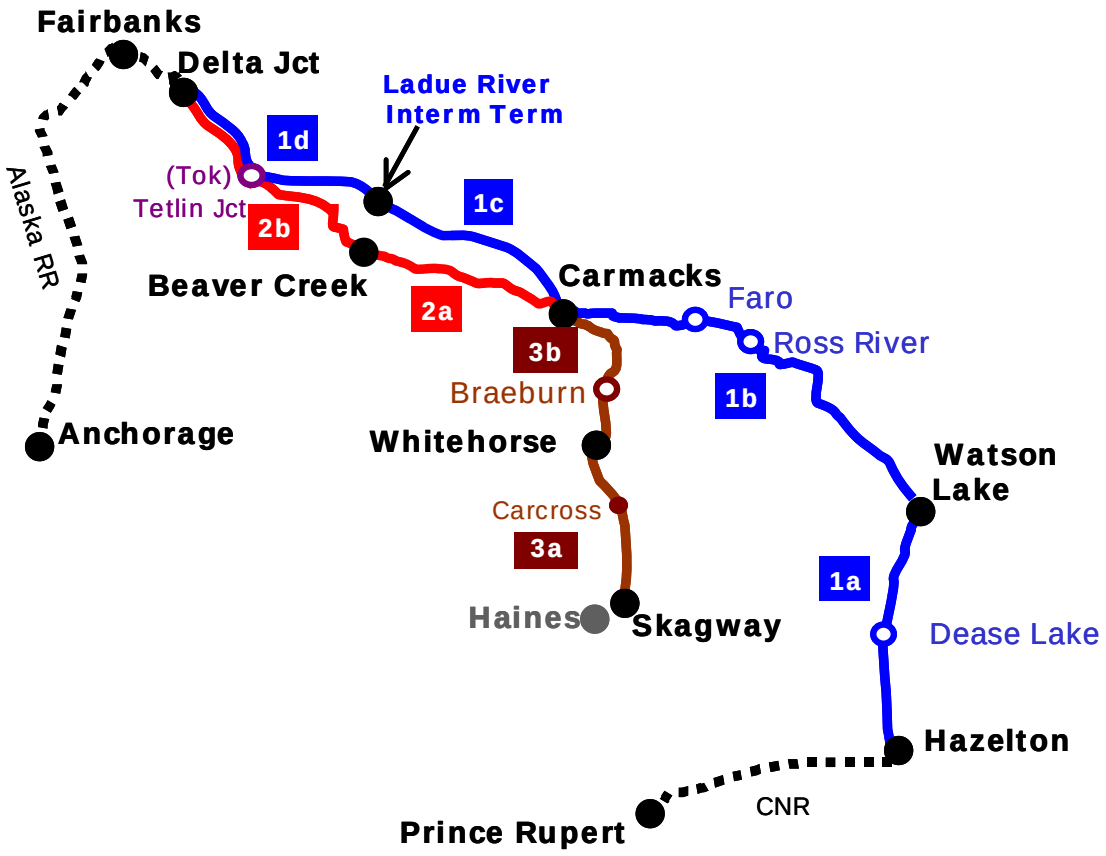
All traffic is assumed to originate from Alberta principally the Edmonton region. The types of commodities required are relatively generic in nature and the Edmonton region possesses a significant manufacturing sector experienced in supporting resource development making it a logical sourcing point. Additionally Edmonton is home to some of Canada's largest oil refineries and this combined with the existing distribution network into northern British Columbia makes this region a logical source for the significant volumes of diesel fuel required to support these projects.

ALCAN Network Definition

The initial terms of reference for the Alaska Canada Rail Link project included the assessment of four potential rail routes. Subsequently two additional routes were added that contemplated a rail connection with Canadian National Railways (CN) at New Hazelton as opposed to the previously determined interchange points at either Minaret or Fort Nelson, British Columbia. The inclusion of the Hazelton route options was spurred directly by discussions with the mineral resources industry. It was subsequently decided by the project management team that the analysis should limit its focus to a single route option. The selected route connects with Canadian National Railways' (CN) main line at New Hazelton, British Columbia in the south, moves northeastward through Watson Lake, YT, on to Carmacks, YT and connects at its most northerly point with the Alaska Railroad (ARR) at Delta Junction, AK. Additionally route segments extending southwest from Carmacks to Whitehorse, YT and on to the Port of Skagway are included in the proposed network design.

This network consists of 1,508 total route miles including the route segments between Carmacks – Whitehorse – Skagway. The core north-south route that bridges the existing CN and ARR railways is 1,295 miles long, comparable in length to the other five route options examined. The network option used in the development of these forecasts and the corresponding revenues for the ALCAN railway is shown in Figure 1 below.

Figure 1 – Alaska Canada Rail Link Network Definition



Destinations

Our analysis assumes that destinations for inbound freight for construction and support of mining operations will be the same as the origins for the outbound movement of mineral exports. Generally speaking these mineral deposits are located in remote areas of each of these three regions. They do not they have direct access to existing rail services, are not located immediately adjacent to the proposed ALCAN rail alignment, and in many instances do not have access to existing road infrastructure. The rail movements are thus assumed to terminate at the nearest point of rail connection with the movement to final mine destination assumed to be by truck.

Distance from mine site to railhead (rail connection point) assumes a straight-line distance from the deposit to the point of nearest connection for each of the proposed rail alignments. Where appropriate, distances are measured incorporating the use of existing road infrastructure and where necessary assumptions of new access road construction have been made. Highway distances and rail connection points have been calculated and supplied by

Gartner Lee. No consideration has been given to the capital investment requirements for creating access to the mines for either road or rail infrastructure.

Transportation Cost Development

As noted above it is assumed that all traffic will be sourced from the Edmonton region and as such each rail movement will involve the Alaska Canada Rail Link in conjunction with CN with ALCAN being the terminating carrier in all instances. Transportation costs have been estimated using a railway-pricing model that incorporates total distance from origin to destination, length of haul for each carrier, average cent per ton-mile revenues as published by CN Rail for similar commodities, and cent per ton-mile values obtained from CN rail for the movement of specific commodities.

It is not uncommon in the railway industry for an originating or terminating carrier to command a share of total revenue larger than its share of the total rail haul reflecting the market leverage it may possess by virtue of its control to rail access at the origin or destination. In this analysis no such premium has been allocated to any carrier as each route involves only two carriers – one serving the origin and one serving the destination. While it could be argued that ALCAN as the terminating carrier holds some degree of market leverage this competitive element has not been recognized in the revenue allocation model. While movement of such commodities by truck from origin would be significantly more expensive it is without a doubt logistically feasible thus providing a competitive presence to the proposed rail movement.

1.2 Oil and Gas

In Canada, estimation of freight volumes for oil and gas activities has been limited to activities ongoing and forecasted for Northeastern British Columbia. Current activity in this sector in the Yukon is very limited and no information, either in the public domain or through industry contacts, has yielded meaningful data, regarding forecast oil and gas exploration and drilling in the Yukon. Only three wells have been drilled in the Yukon since 1979 and only a total of seventy-one wells since 1957. While it is thought the Yukon may hold significant gas deposits ongoing exploration activity is nominal and the freight volumes associated with drilling activity in this region are insignificant within the scope of the overall analysis. As such the traffic forecast presented herein does not include any volumes or revenues associated with the rail movement of industrial commodities to support this industry sector in the Yukon.

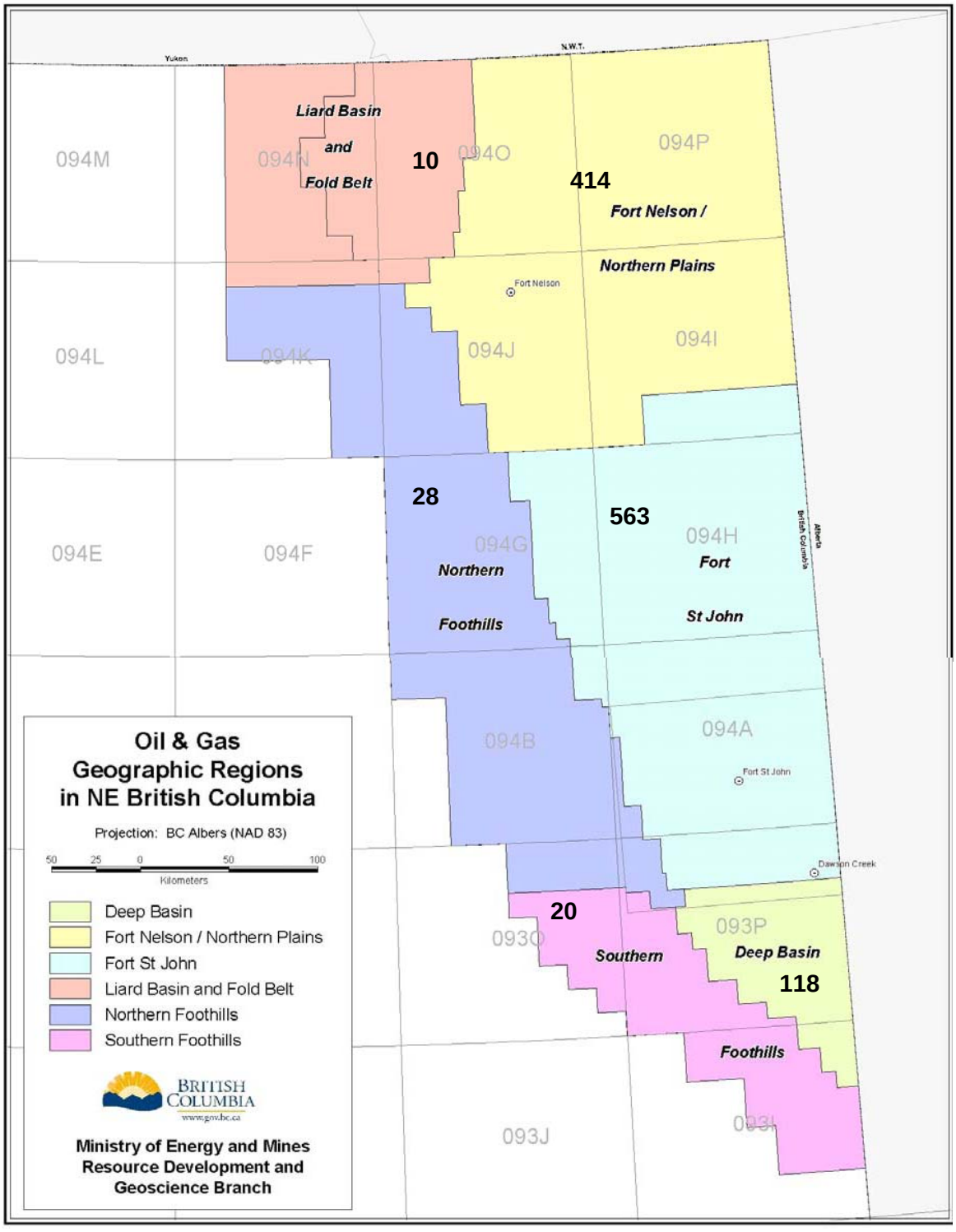
Oil and gas exploration activity in Northeastern British Columbia is significantly more active and it is estimated that some 850,000 tons of industrial freight associated with re-supply was transported into this region in 2004. Of this roughly 27% on a volume basis is assumed to be diesel fuel with the remainder accounted for by other supplies including drilling mud, tubular

products, and other consumables. These freight estimates do not include the movement of the rigs themselves as this equipment is not deemed conducive to rail transportation. The majority of the drilling and exploration activity has been centered in the Fort Nelson / Northern Plains / Fort St. John region.

Forecasting future drilling activity, and future freight volumes, for the Northeastern B.C. region is difficult as it is dependant on the exploration and development priorities of the individual resource exploration companies. While the resource companies provide summary statements of their intentions within the public domain they do not release detailed information regarding such plans. It is reasonable to assume that drilling activity will continue at historical levels within the short to medium term given the magnitude of known gas reserves within this area, the growing global demand for such commodities, and the elevated market prices for both oil and natural gas. Whether or not this level of activity would still be underway in the timeframe of an operational Alaska-Canada Rail Link is unknown.

More importantly the location of the oil and gas exploration activity in northern British Columbia relative to the proposed rail alignment makes it unlikely that this traffic would travel far enough north to generate traffic and revenues for the ALCAN railway. As Figure 2 below shows the majority of exploration and production activity is occurring at locations near or south of Fort Nelson. Each exploration and development region on the map below reflects the number of wells rig released during 2004. North of Fort Nelson, the so-called Liard Basin region is currently one of the smaller producing areas. Given the selected rail alignment that extends several hundred miles west of this region it is unlikely the Alaska Canada Rail Link would benefit from such traffic. As such no inbound freight associated with these operations have been included in the forecast.

Figure 2 – Northern British Columbia Gas Exploration Activity



For the Alaska market the consultant engaged to review these issues has focused on the oil and gas sector and more specifically the construction of the Alaska Gas Pipeline, existing North Slope oil field operations, and potential future North Slope operations.

The assessment of the Alaska market for this type of traffic has yielded limited information or data for incorporation into the forecasts presented in this report. It is estimated that current volumes of chemicals, and tubular products are in the order of 65 – 100,000 tons annually and that these commodities move to Alaska from the lower 48 U.S. States using a rail-barge-rail supply chain through the Alaska Rail Belt Marine system through the ports of Seattle and Whittier. These volumes have been captured in the regional re-supply analysis, Work Packages A1 (a) and (d), and to avoid duplication have not been identified separately within this report. The analysis conducted on the Alaska market has yielded no forecast of future traffic and as such no future traffic in this regard, beyond a continuation of current volumes as shown within the regional re-supply category, has been included in this forecast.

2.0 TRAFFIC FORECAST

As noted earlier the estimated freight tonnages for resource projects are limited to the mineral deposits identified as being viable for development and export of ores and concentrates. Individual mine volumes have been calculated using the resource construction and operations freight model developed by a geological engineer experienced in the construction and operation of northern mines. Revenues are based on the movement of railcars via the connection with CN at New Hazelton northward to the point of nearest rail connection for each of the mines.

Figure 3 – Summary Estimated Freight Tonnages

Activity	Commodity	Units	Tons		Revenues
Mine Construction	Fuel	2,461	196,900	$	2,845,641
	Cement	1,846	147,675	$	3,538,427
	Equipment	5,925	444,400	$	17,736,946
	All Other	647	48,510	$	1,049,647
	Sub-total	**10,879**	**837,485**		**25,170,662**
Mine Operations	Fuel	307,302	24,584,169	$	216,436,132
	All Other	177,303	14,184,222	$	188,380,616
	Sub-total	**484,605**	**38,768,390**		**404,816,748**

As shown in Figure 3 above the total estimated freight for construction and operation of these mines is estimated to be in the order of 38 million tons over the course of the thirty-year planning horizon. Of this approximately 837,000 tons or about 2% of the traffic is related to the initial construction of the mines and consists of four principal commodities – fuel, cement, machinery and equipment, and miscellaneous products including cladding, sheet steel and camp supplies. This traffic is forecast to move in the initial three years of railway operations and will pre-date the movement of export minerals at any given mine. Based on the staggered outlook for mine construction, as defined by the financial analysts, construction of all twenty-one mines would occur over a five-year period. This represents an average freight volume of approximately 167,400 tons per year and slightly less than 40,000 ton of materials associated with each mine project.

The ongoing volumes associated with long-term mining operations are significantly larger than those associated with mine construction. Volumes associated with the support of individual mines can vary significantly across mines based on the scope of operations that range from annual production of 1.3 million tons at Division Mountain coal to less than 10,000 tons at the Logtung

tungsten mine. The volumes of inbound freight are driven by the ore mining rates and strip ratios as these work measures more directly than shippable tons drive materials consumption.

It is estimated that over the thirty year planning period that this traffic will be in the order of 38 million tons generating $404 million in railway revenues. Over the course of the 30 year planning horizon this traffic represents approximately 1.2 million tons per year although as with export minerals shipments there is a peak period in the initial 20 years of railway operations when shipments are heavier with significant tailing off of traffic in the final ten years of the planning horizon to less than 400,000 tons per year. This reflects the expiration of individual mine operations over the course of the planning period.

Detailed forecasts are provided in the complimentary worksheet submitted with this report.

3.0 RISKS TO FORECAST

As with all such analyses there are risks associated with the estimated volumes and revenues due to unknown market, competitive, and external forces that may result in either positive or negative impacts on the projected volumes.

The forecast for this traffic is linked directly to the assumptions behind the development and operation of the mining operations that will consume these commodities. Transportation is only one of the factors that will influence the viability of mineral resource development and rail based shipments of these commodities in the long term. Historically development of minerals resources in the north has been constrained by a number of factors of which transportation infrastructure is but one. Other constraints include: commodity prices as influenced by global supply-demand balances, cost of and access to efficient sources of power, and the behaviour of individual resource companies.

Power Generation

Mineral resource operations are energy intensive and require a consistent, reliable, and cost effective source of power. As can be seen in the forecast summary above fuel is estimated to account for more than 60% of total inbound freight. Historically these operations, in the absence of fixed power generation facilities such as coal or gas fired power plants and suitable transmission infrastructure, have relied on site based power generation using diesel fuel powered generators. While the high cost of this power source can serve to constrain development if the economics of resource development can absorb these costs the need to transport significant quantities of diesel fuel into these regions is a positive development for the ALCAN railway.

The risk to the potential freight volumes and revenues available to the ALCAN railway lies in the potential loss of traffic should significant development of fixed power generation and transmission infrastructure take place in the coming decade. Such a development would likely be a double-edged sword for the railway in that access to such cost effective sources of power would likely spur additional resource development activity but would concurrently negate the need for shipment of diesel fuel from southern origins. We are not in a position to estimate the upside potential to the railway of additional resource development in such a scenario and whether or not the gains would outweigh the losses and as such would categorize such a development as a negative impact on the railway.

Based on our research we would suggest that the development of such power generation and transmission infrastructure in the long term is highly likely although the extent of such development and its timing are unknown. The construction of the Alaska pipeline will in the long term provide a significant supply of cost effective power for the State of Alaska and potentially, depending on the corresponding transmission infrastructure built, for the Yukon Territory. Also the decision to proceed with the proposed extension of the power transmission grid north along Highway 37 would impact the resource landscape in northern British Columbia.

Mineral Commodity Prices

Commodity prices and the global supply-demand balances that influence them are a significant determinant of the economic viability of resource operations. While the industry is currently enjoying the top end of the pricing cycle, and the demand for base metals and coal, particularly from the emerging and transitional economies of the Asia Pacific region – more specifically China and India, is strong it is impossible to predict where the industry cycle will be in the 10 – 15 year timeframe that it would take to construct the railway.

Product Sourcing

The types of goods used in the construction and support of mining operations are, for the most part, conducive to rail movement based on commodity characteristics. Determination of appropriate modal or multi-modal logistics for the movement of these commodities will be influenced by numerous factors. Some of the key factors in this regard include:

- relative cost between transportation modes;
- transportation infrastructure in place at both origin and destination to support the modal options available;
- source locations for individual materials;
- preferences of shippers and/or mine development managers regarding specific transportation modes; and
- importance of timeliness and / or speed of transit for individual commodities.

The existing network definition for the Alaska Canada Rail Link does not, at this juncture, contemplate the existence of industrial spurs for servicing mining operations whether on inbound commodities or outbound exports. It is reasonable to assume that these mines would construct rail spurs to gain the transportation efficiencies of direct rail movement to and from the mines although it is not unrealistic to think that these mines could choose to adopt truck – rail transfer operations for the movement of ores and concentrates. If such an approach were taken it would potentially negatively impact the movement of inbound commodities particularly fuel. While other commodities such as machinery, equipment, and general merchandise supplies could be handled in a rail – truck transfer operation without too much difficulty the movement of fuel in this manner

is likely to be more problematic. Without the existence of direct rail access to mine sites the logical approaches for supply of fuel would be direct movement by truck from origin or rail movement to a regional bulk distribution terminal for subsequent delivery by truck. This kind of operation is a principal means for existing fuel distribution activities in the north in locations such as Fort Nelson, British Columbia.

Resource Development Strategies

All other things being equal the behaviour of resource development companies will be the ultimate determinant of the rate and scope of resource development and production in the north. Many of these companies hold commercial interests in mineral deposits around the world presenting them, in a time of positive market conditions, with options as to where to invest their money. While market conditions may dictate that northern deposits are economically viable for development these deposits may not, when compared to other development opportunities, presented to the same companies, provide for the greatest return on investment.

APPENDIX A – TRAFFIC FORECAST

Detailed traffic forecast submitted in the form of Excel Spreadsheet Work Package A1 (E) Data Evaluation Resource Projects.