CONSULTING

Alaska Canada Rail Link

Traffic Data Development for Resource Projects

Work Package: A-1 (B)

January 30, 2006

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

Subject: Work Package A1 (b) – Traffic Data Development for 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:

- Development of a detailed baseline of current and / or potential transportation activity inbound to the Yukon and Northeastern British Columbia to support mineral resource and oil and gas activities;
- Quantification of existing or potential flows by industry sector, geographic corridor and transportation mode; and
- Identification of current market place transportation rates for the movement of these commodities within the defined corridors.

Recognizing the low current level of active mining and petroleum extraction within these regions we have completed this assignment using modeling techniques designed to estimate the potential freight volumes that may be achievable in the longer term should the key resource projects presently under consideration move forward to commercialization.

Our market research has yielded limited publicly available information with respect to freight movements and volumes within these sectors for the selected geographic regions. We have conducted a thorough review of publicly available data sources and have supplemented these efforts with direct discussions with industry representatives, in particular for the development of our mineral resources freight estimation model. The specific methodologies utilized in developing the estimated freight volumes are fully documented in Section 3.0 of the attached report. These freight estimates including volumes, timing, and feasibility along with the information to be provided by UAF personnel for Alaska, will be validated during the course of the next phase of this assignment.

Sincerely,

Milt Poirier
Partner
QGI Consulting Ltd.

1.0 ESTIMATED FREIGHT VOLUMES

Freight volumes associated with the development and operation of mineral resources and oil and gas activities in the Yukon and Northeast British Columbia have been estimated using modeling techniques described in Section 3.0 of this report. Freight volumes have been calculated for three cases: construction of mining operations, ongoing operational support of mining operations, and support for oil and gas exploration activities.

1.1 Mineral Resources

Gartner Lee, as part of its research to identify the potential export freight volumes associated with Yukon and Northeastern British Columbia mineral resources for the Alaska Canada Rail Link project, has identified a preliminary listing of forty-two (42) priority mineral deposits within these jurisdictions. Gartner Lee has also estimated the mineable resources, total shippable quantities, and estimated mine life associated with each of these deposits. Our analysis to identify the base maximum potential freight volumes for inbound goods to support mineral resource development and operations in the Yukon and Northeast British Columbia has been developed using the results of this preliminary analysis. The deposits by region and commodity type are summarized in Table 8 of Section 3.0 of this report.

1.1.1 Mineral Resource Construction

Our analytical model estimates a total potential of 1.594 million tonnes of freight associated with the construction of **all** identified priority mineral resource deposits. For this assignment we have not identified the timing associated with resource development or the estimated duration of the construction phase of these developments. Fuel and surface / pit equipment account for 48% of the total estimated freight volumes while structural steel and mechanical equipment and supplies account for 24% of total volumes. The estimated volumes for individual resource developments are included in Appendix A of this report.

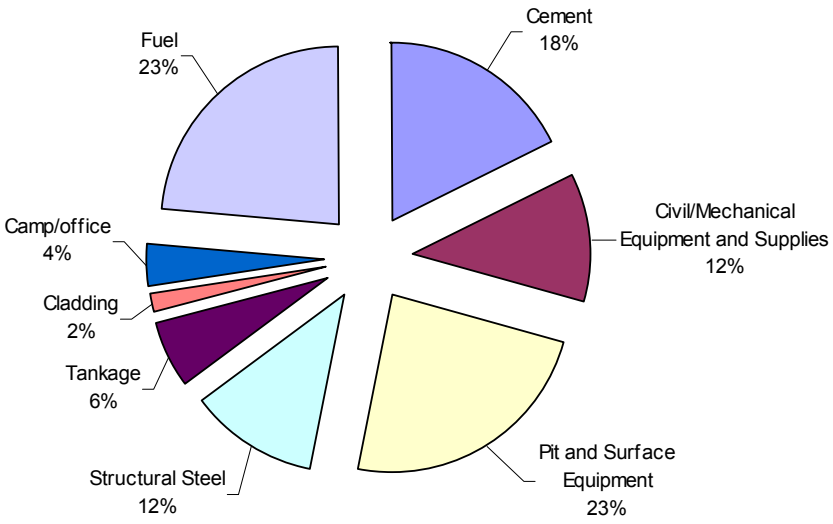


Figure 1 – Inbound Freight for Mineral Resource Development

1.1.2 Mineral Resource Operational Support

Estimating the freight volumes associated with ongoing support of mining operations has also been done using the identified priority deposits. Our analysis estimates total potential annual freight volumes of 4.56 million tonnes to support ongoing operations for **all** the identified deposits. Base metal deposits account for 82% of estimated freight tonnages with coal accounting for the remaining 18%. This is roughly proportional with the relative number of each deposit type and their estimated shippable quantities. Base metal deposits account for 64% and 73% of identified deposits and shippable quantities respectively. Inbound freight is further weighted towards base metal operations as it is estimated that these operations would consume approximately 0.015 tonnes of freight per tonne of production as opposed to coal mines that would consume approximately 13% less or 0.013 tonnes per tonne of production.

Table 1 – Estimated Inbound Freight Volumes – Mining Operations Support

	Freight Volumes (Tonnes)			Percent Total Freight		
Consumables	**Base Metal**	**Coal**	**Total**	**Base Metal**	**Coal**	**Total**
Diesel Fuel	2,393,096	168,548	2,561,644	64%	21%	56%
Other Consumables						
(1) Crusher liners(2)	11,890	-	11,890	0.3%	-	0%
(2) Mill Liners	17,835	-	17,835	0.5%	-	0%
(3) Grinding Balls 75mm	433,979	-	433,979	11.6%	-	10%
(4) Lime etc	433,979	-	433,979	11.6%	-	10%
(5) Fluxes	2,170	-	2,170	0.1%	-	0%
(6) Lubricants	2,972	-	2,972	0.1%	-	0%
(7) Misc. Mill & Lab Supplies	2,972	-	2,972	0.1%	-	0%
(8) Other Mine Consumeables	379,732	650,736	1,030,467	10.2%	79.4%	23%
(9) Food	60,757	-	60,757	1.6%	-	1%
Subtotal Other Consumables	**1,346,287**	**650,736**	**1,997,023**	**36%**	**79%**	**44%**
Total Freight	**3,739,383**	**819,283**	**4,558,667**	**82%**	**18%**	**100%**

On the whole fuel is estimated to account for 56% of total freight. The ratio of fuel to other supplies is higher for base metal operations as compared to coal (64% versus 21%). Detailed calculations of inbound freight requirements are provided in Appendix A of this report.

1.1.3 Observations

Estimated freight volumes for both construction and ongoing support of mineral resource operations are estimated values based on the models described in Section 3.0 of this report. While the assumptions for consumption of freight are reasonable and based on industry expertise we would caution that these estimates should not be taken as representative of the “true” freight volumes that may be available to be moved via the proposed Alaska-Canada Rail Link.

The types of goods used in the construction 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.

Furthermore, while the estimated freight volumes are significant these must be viewed within the proper context. Principal issues for consideration in assessing the viability of these volumes for railway movement via the proposed Alaska – Canada Rail Link include:

- estimated volumes presume that all identified mineral deposits will move forward to commercial production
- construction volumes would be expected, for each resource development, to be transported over 1-3 year periods;
- it is not reasonable to assume that the proposed projects would move forward at the same time likely resulting in the dispersal of the aggregate volumes over an extended period of time resulting in lower actual annual volumes when timing of operations and estimated mine life are factored in; and
- the specific location of the proposed projects and the relative volume of freight associated with each will determine the length of haul potentially available to the Alaska-Canada Rail Link and the associated revenues for such movements.

These issues and the relative competitiveness of rail against existing modal choices will be assessed in the ensuing resource projects logistics evaluation work package also to be completed by QGI Consulting.

1.2 Oil and Gas Sector

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.

1.2.1 Yukon

During the period 1957 to 1991 a total of seventy-one (71) wells were drilled in the Yukon. This represents an average of three wells per year although this number is skewed somewhat as a result of relatively significant activity levels during 1971-72 when seventeen (17) or 24% of all wells were drilled. Only three (3) wells have been drilled in this region since 1979.

Table 2 – Volume of Wells Drilled in the Yukon 1957 - 1991

	Region						
Year	**Eagle Plain**	**Kandik Basin**	**Liard Plateau**	**North Coast**	**Other**	**Peel Plateau**	**Total**
1957	1						1
1959	1						1
1960	1						1
1962	1		2				3
1963	2		1				3
1964	4						4
1965	4					3	7
1966						3	3
1967	1				1	4	6
1968	1		1			1	3
1969			1			1	2
1970	1	1	1	1			4
1971	4	1	1	1			7
1972	5	1		1		3	10
1973	4					1	5
1974						2	2
1977			1			1	2
1978	1		1				2
1979			2				2
1984	1						1
1985	1						1
1991			1				1
Total	**33**	**3**	**12**	**3**	**1**	**19**	**71**

Of the seventy-one wells drilled during this period only two wells, operated by Devon XL in the Liard Plateau region, remain active today. The majority of the remaining wells have been abandoned or have suspended operations. (See Table 3 below)

Table 3 – Current Status of Yukon Wells

	Region						
Status	**Eagle Plain**	**Kandik Basin**	**Liard Plateau**	**North Coast**	**Other**	**Peel Plateau**	**Total**
Abandoned	28	3	8	3	1	19	62
Disposal			1				1
Observation	1						1
Production			2				2
Suspended	4		1				5
Total	**33**	**3**	**12**	**3**	**1**	**19**	**71**

In August 2004 the Yukon government announced the issuance of its first drilling license in nearly twenty years. Although it is believed that the Yukon may hold significant gas deposits there is little ongoing activity and the deposits have not been thoroughly explored to assess size and production feasibility. The freight volumes associated with drilling activity in this region are

insignificant within the scope of this analysis and there is no meaningful data available that would allow for the development of a reasonable estimation of future activity and related freight tonnages for this region.

1.2.2 Northeast British Columbia

Oil and gas exploration activity in Northeastern British Columbia occurs in six (6) distinct resource regions: Liard Basin & Fold Belt; Fort Nelson/Northern Plains; Fort St. John; Northern Foothills; Southern Foothills; and the Deep Basin. (See Figure 2)

It is estimated that freight volumes associated with resupply of drilling rigs in 2004 accounted for approximately 775,000 tonnes of freight into Northeastern British Columbia. 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, tubulars, and other consumables.

Table 4 – Rig Resupply Freight Volumes

Commodity	2003	2004	2005
Fuel	178,487	192,362	211,653
All Other	474,613	511,507	562,805
Total	**653,101**	**703,869**	**774,458**

Freight estimates do not include volumes associated with the movement of the rigs themselves as this equipment is not deemed conducive to rail transportation. The majority of recent activity has been centered in the Fort Nelson / Northern Plains / Fort St. John region. As Table 5 below indicates these two areas accounted for 85% of all wells rig released in 2004. Similar levels of activity are estimated to have occurred in 2005 although specific statistics are not yet available from the British Columbia Ministry of Energy Mines and Resources.

Table 5 – Wells Rig Released Northeastern B.C. 2004

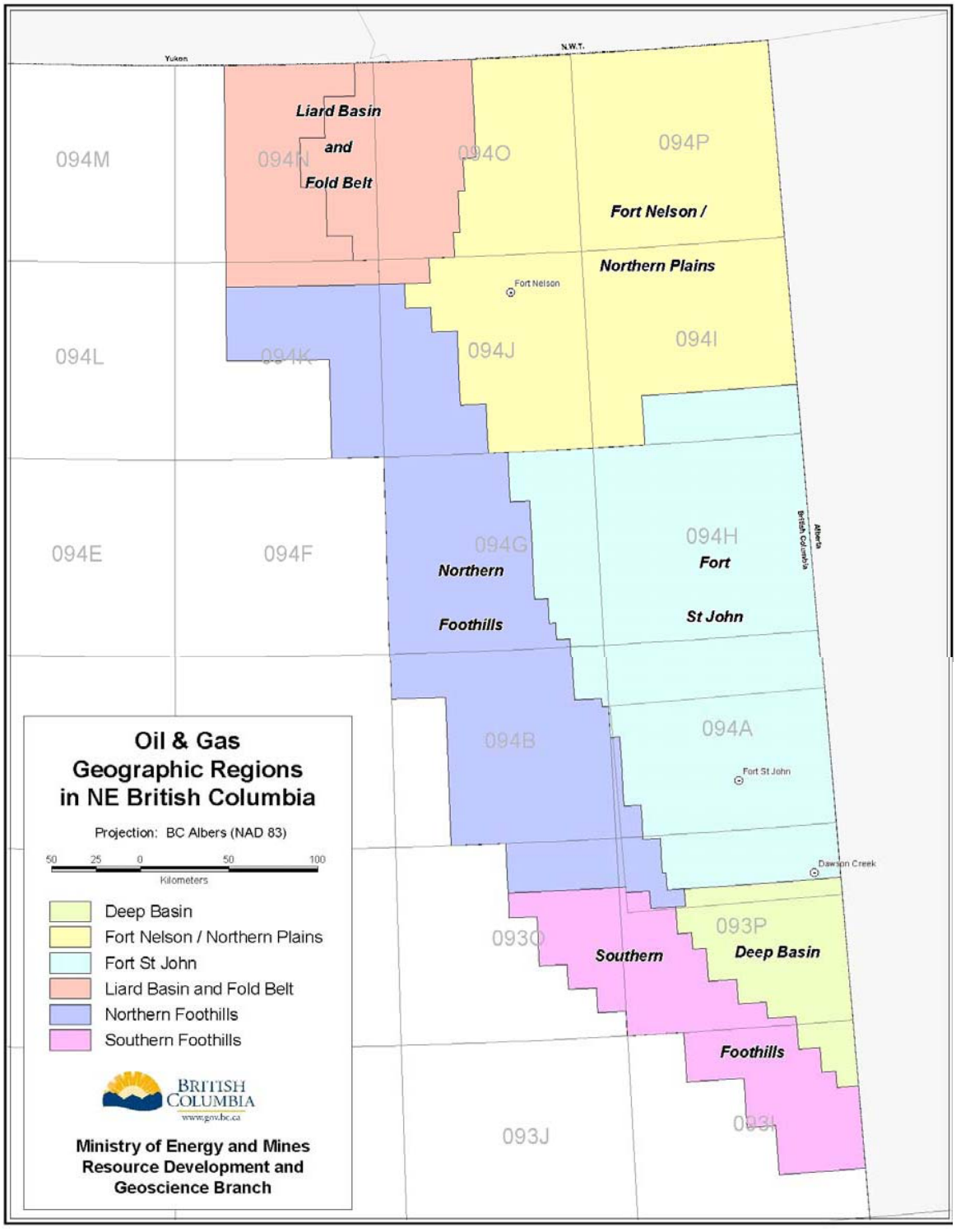
NE B.C. Resource Region	Wells Rig Released 2004
Liard Region	10
Fort Nelson / Northern Plains Region	414
Fort St. John Region	563
Deep Basin Region	118
Northern Foothills Region	28
Southern Foothills Region	20

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.

A review of publicly available information has not yielded drilling forecasts for this region. The Petroleum Services Association of Canada does produce drilling forecasts on a quarterly basis for all provinces in Canada however these do not extend beyond a 12-month period. A reasonable gauge of future activity levels can be gleaned from publicly available information from the major participants in exploration and production activity in the region. A representative view of this comes from Encana who identifies the Greater Sierra resource play located in the Fort Nelson area as a strategic resource within their global portfolio. Encana indicates that to date it has developed only 20% of its existing land base in this area and currently has a five-year inventory of 1,000 drilling locations identified. Based on 2004 well rig release data published by British Columbia Energy Mines and Resources, Encana represents approximately 45% of ongoing activity in this region.

Figure 2 – Oil and Gas Resource Regions – NE British Columbia



2.0 TRANSPORTATION RATES

We have selected a limited number of destinations within the immediate vicinity of the identified mineral deposits and oil and gas operations to benchmark applicable transportation rates for the principal commodities. The base case scenario assumes direct truck movement from the Edmonton area for all commodities. Table 6 below provides a list of the assumed transportation corridors and destinations including highway mileages and routings.

Table 6 – Highway Lanes, Mileages and Routings

Origin	Destination	Hwy Miles	Route	
Edmonton	Fort St. John	411	Highway 16 - 43 - 34 - 2	Via Grande Prairie, Alberta
	Fort Nelson	652	Highway 16 - 43 - 34 - 2 - 97	Via Grande Prairie, Alberta
	Whitehorse, YT	1241	Highway 16 - 43 - 34 - 2 - 97 - 1	Via Grande Prairie, Alberta
	Carmacks, YT	1348	Highway 16 - 43 - 34 - 2 - 97 - 1	Via Grande Prairie, Alberta
	Stewart, BC	900	Highway 16 - 37	Via Prince George, BC
	Watson Lake	970.6	Highway 16 - 43 - 34 - 2 - 97 - 1	Via Grande Prairie, Alberta

Rate quotations received from Edmonton based motor carriers have been applied to the above noted corridors on a commodity specific basis yielding the estimated transportation rates contained in Table 7 below.

Although this analysis presumes that all freight would originate directly from Edmonton over the highway there are options particularly with respect to the movement of diesel fuel. Petro Canada for instance have bulk diesel agents located in a number of northern British Columbia locations including Fort Nelson, Fort St. John, Dawson Creek, and Prince George. Diesel fuel moves today by rail from Petro Canada's Edmonton refinery to these locations for subsequent bulk truck delivery. It is more likely, given the potential volumes, that a multi-modal supply chain consisting of rail to tank farm and super B tanker delivery would be used as opposed to direct truck haul from Edmonton.

While the freight rates contained in Table 7 below provide a baseline from which to assess the competitive direct rail options the competitive analysis to be completed in the subsequent work packages will necessarily examine competitive rail rates against a range of potential supply chain options.

Table 7 – Estimated Highway Transportation Rates

B: Trucking Costs

Origin	Destination	Hwy Miles	Per Load: Cement	Per Load: Diesel Fuel	Per Load: General Freight
Edmonton	Fort St. John	411	$ 2,027	$ 2,122	$ 2,055
	Fort Nelson	652	$ 3,220	$ 3,366	$ 3,260
	Whitehorse, YT	1241	$ 6,120	$ 7,178	$ 6,205
	Carmacks, YT	1348	$ 6,648	$ 7,796	$ 6,740
	Stewart, BC	900	$ 4,438	$ 4,646	$ 4,500
	Watson Lake	970.6	$ 4,787	$ 5,011	$ 4,853

			Per Unit: Tonne Cement	Per Unit: Litres Diesel Fuel	Per Unit: Tonnes Gen. Frt
Edmonton	Fort St. John	411	$ 50.67	$ 0.043	$ 51.38
	Fort Nelson	652	$ 80.50	$ 0.068	$ 81.50
	Whitehorse, YT	1241	$ 153.00	$ 0.145	$ 155.13
	Carmacks, YT	1348	$ 166.19	$ 0.158	$ 168.50
	Stewart, BC	900	$ 110.96	$ 0.094	$ 112.50
	Watson Lake	970.6	$ 119.66	$ 0.101	$ 121.33

Principal assumptions used in calculation of highway transportation rates include:

- cement moving dry bulk in 8 axle pneumatic tankers with 40 metric tonne payload
- diesel fuel moving in Super B Train configuration with 49,500 liter payload
- general freight moving in 48 foot vans and flat deck with 40 tonne payloads

3.0 METHODOLOGY

3.1 Mineral Resources

To ensure consistency with other market analyses underway the baseline traffic data for inbound freight to support mineral resource development and operations in the Yukon and Northeastern British Columbia has been developed using Gartner Lee's priority mineral deposit listing.[1] This listing has been developed by Gartner Lee through a detailed review of Yukon and British Columbia mineral deposits on file with the Yukon and BC governments including a detailed review of historical feasibility studies for these deposits and where possible direct discussions with representatives of the companies who own or are examining development of the resources.

A total of forty-two (42) priority deposits were identified and have been included in the assessment of potential freight tonnages for construction and ongoing operations. The deposits by region and commodity type are summarized in Table 8 below.

Table 8 – Summary of Priority Mineral Deposits

Commodity	Region	# Deposits	(Million Tonnes) Mineable Resources	(Million Tonnes) Shippable Tonnes
Coal	Yukon	9	231.1	169.1
	B.C.	6	523.3	292.6
Copper	Yukon	2	10.9	0.48
	B.C.	2	607.1	11.3
Copper/Gold/Molyb.	Yukon	1	178.2	2.42
	B.C.	3	1,030	9.25
Iron	Yukon	1	3,016	1,219
Lead-Zinc	Yukon	5	169.9	21.9
	B.C.	1	18.5	3.04
Molybdenum	Yukon	1	46.0	0.102
	B.C.	3	451.0	0.504
Nickel-Copper	B.C.	1	36.5	1.553
Polymetallic	Yukon	3	24.0	3.604
	B.C.	2	21.1	2.520
Tungsten	Yukon	1	12.9	0.141
Tungsten / Molyb.	Yukon	1	162.0	0.294
Total			**6,716**	**1,292**

[1] Gartner Lee has been retained by the Alaska Canada Rail Link project to development baseline traffic data for mineral exports from the Yukon and Northeastern British Columbia as part of the broader market study being completed for this project.

The principal challenge to identifying potential freight volumes associated with the development and ongoing operation of these mines has been the absence of meaningful historical data. None of the priority deposits identified by Gartner Lee have reached the production stage and most remain in various stages of feasibility analysis. Many of the deposits can be classified as dormant having had preliminary geological work undertaken for reserve estimation within the last twenty years but not currently being actively pursued for commercial development.

Without an effective baseline from which to derive unit values of consumable goods for extrapolation against the proposed operations it was necessary to develop a model that would, based on the proposed mineable resources and annual throughput volumes, estimate the volume of freight associated with such operations. Two freight estimation models have been developed – one for mine construction and the other for ongoing operational support. These models have been developed with the assistance of a geological engineer experienced in both the construction and operation of base metal mines.

Recognizing the level of accuracy required at this stage of the analysis we have not differentiated the models significantly based on the type of mining operation. For estimating construction related volumes we have applied the same model to all proposed developments regardless of commodity.

3.1.1 Mine Construction

Our model assumes 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 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.

The model uses a base case set of unit values assuming a mining operation producing in the order of 7,000 metric tonnes per day. Recognizing that the estimated daily operating rates of these deposits vary between 1,000 and 100,000 tonnes per day, as estimated in the Gartner Lee analysis, it was necessary to extrapolate the base unit values using a limited set of assumptions. We have extrapolated the base unit values to create three additional scenarios reflecting daily production rates of 20, 50, and 100,000 tonnes per day. We have subsequently applied a limited number of assumptions to each of the consumables to arrive at unit values for each consumable product within each scenario. We believe this is a more reasonable approach than simply scaling the consumables on a straight prorate basis against the base case.

The assumptions used to derive the unit values reflected in Table 9 below are:

1. Construction material requirements are not assumed to be linear with production levels.
2. Camp and office requirements are held constant across all scenarios assuming that field operations in this regard will be relatively basic and any differences in related freight volumes for this item would be negligible in the overall analysis.
3. Fuel tank material requirements have been held constant in the 20KT scenario and increased by 100% from the base case for the 50 KT and 100 KT scenarios. It is recognized that operational fuel consumption will increase on a relatively linear basis with production levels but we do not believe it is reasonable to assume that the effective on site storage capacity should also be increased on a linear basis.
4. All other consumables have been increased 25% for each scenario as compared to the next lowest case.

Table 9 – Freight Consumption for Mineral Resource Development (tonnes)

Consummables	Base Scenario	Extrapolation Based on Production Volumes		
	7KT Per Day	20KT Per Day	50KT Per Day	100KT Per Day
Cement	6,000	7,500	9,375	11,719
Civil/Mechanical Equipment and Supplies	4,000	5,000	6,250	7,813
Owners Pit and Surface Equipment	8,000	10,000	12,500	15,625
Structural Steel	4,000	5,000	6,250	7,813
Tankage (40 million litre capacity)	2,000	2,000	4,000	4,000
Cladding	600	600	600	600
Camp/office	1,500	1,500	1,500	1,500
Fuel	8,000	10,000	12,500	15,625
Total	**34,100**	**41,600**	**52,975**	**64,694**

In order to efficiently apply the model and on the assumption that differences that might arise from a more refined model would be negligible at this stage of the analysis, the unit volumes in the four scenarios have been applied to a range a daily production volumes as follows:

- Base case unit values (7 KT) for all operations up to 19,000 MT per day
- 20 KT unit values for all operations up to 49,000 MT per day
- 50 KT unit values for all operations up to 99,000 MT per day
- 100 KT unit values for all operations over 100,000 MT per day.

The unit values and assumptions outlined above have been applied against each of the priority deposits identified in the Gartner Lee analysis. The resultant estimated freight volumes are summarized in Section 1.0 of this report. Detailed data is provided as Appendix A to this report.

3.1.2 Operations Support Volumes

Freight volumes associated with ongoing mineral resource production have also been estimated by developing a model of the goods or consumables typically used in such operations. In this instance we have used two models; one for base metal mining and one for coal mining.

Coal Operations

The model used for estimating the freight associated for coal mine operations uses two input variables: fuel and other supplies. The base model values used are shown in Table 10 below.

Table 10 – Coal Mine Operations Support Model

(1) Base Model Values

Ore tonnes per day of Operation	6,575
Operating Days Per Year	365
Type of mining operation	Open Pit - strip mining
Waste to ore ratio	0.5 : 1
Power Generation	On Site
Work Force Support	On Site
Non Fuel Per Tonne of Ore	9

(2) Production Model Values

	Tonnes	
	Annual	**Daily**
Ore Production	2,400,000	6,575
Rock Tonnes Mined	3,600,000	9,863

		Annual Consumption			
(3) Consummables	**Unit Consumption**	**Freight (MT)**	**Per Day Production**	**Per Ore Tonne Production**
Total Fuel Consumption (Litres)	12,900,000	10,578	1.6	0.004
Other Supplies (kg)	21,600,000	21,600	3.3	0.009
		32,178	**4.9**	**0.013**

Annual Freight Consumed Per Daily Mill Throughput	**4.9 (Per 6,575 Tonnes)**
Annual Freight Consumed Per Ore Tonne Throughput	**0.013**

(4)Assumed Fuel Consumption

Mine	2,700,000
Mill	7,200,000
Other	3,000,000
	12,900,000

Notes:
Est. 0.75 litres of fuel per total tonne of rock moved due to the efficiency of large equipment.
Est. 3 litres of fuel per ore tonne milled - heavy media separation and cycloning.
Est. 30% factor of mine/mill fuel consumption for camp support

Principal assumptions of the model include:

- daily operating rate of 6,575 tonnes per year with a waste to ore ratio of 0.5:1 using open pit strip mining operations;
- fuel consumption calculated for mining, milling and “other” operations based on either volume of rock tonnes mined or ore tonnes milled; and

- on-site power generation and work force support.

The Gartner Lee analysis identified fifteen priority coal deposits in the Yukon and Northern British Columbia with estimated mineable resources of 754 million tonnes and total estimated shippable quantities of 462 million tonnes. Estimated daily production rates for these properties, based on known resources and anticipated mine life, range from 1,000 to 24,000 tonnes per day. Assuming that the volume of consumables would rise somewhat proportionately with production rates the model values were scaled accordingly by calculating the ratio of daily production for each deposit against the base model and applying these factors to the fuel and other supply values.

Base Metal Operations

The model used for calculating freight volumes associated with base metal mining operations was somewhat more detailed than that used in the coal analysis. The model identifies the principal consumables used in these operations and the proportionate values of each. Principal commodities used in such operations include: crusher liners, mill liners, grinding balls, lime, lubricants, and diesel fuel.

Two base case scenarios were developed representing daily operating rates of 1,000 and 6,600 tonnes per day. With the exception of fuel all consumable unit values were held constant and in proportion to the operating rates. In the case of fuel the base case consumption values differ slightly with the 6,600 tonne per day operation assuming 60% fuel savings associated with mining operations assuming the use of larger more fuel-efficient mining equipment.

Principal assumptions contained in the model include:

- daily production levels of 1,000 and 6,600 tonnes per year;
- waste to ore ratios of 2.5:1 and 4:1 respectively – the waste to ore ratio impacts fuel calculation as it impacts the volume of rock mined to achieve designated daily production rates; and
- on-site power generation and workforce support

Model values and assumptions are detailed further in Table 11 below.

Table 11 – Base Metal Mine Operations Support Model

Base Metal Mine Consummables Assumptions - Ongoing Operations

(1) Base Model Values	Scenario 1:	Scenario 2
Daily Production (tonnes)	1,000	6,600
Operating Days Per Year	365	365
Annual Production	365,000	2,400,000
Annual Rock tonnes mined	1,277,500	12,000,000
Waste to Ore Ratio	2.5:1	4:1
Power Generation	On-site	On-site
Worforce Support	On Site	On Site

(2) Consummables Per Year	Consumption	Units	Freight (Tonnes/Yr)	Consumption	Units	Freight (Tonnes/Yr)
Crusher liners(2)	1.00	Set	20	6.60	Set	132
Mill Liners	1.00	Set	30	6.60	Set	198
Grinding Balls 75mm	2.00	Kg/tonne (ore)	730	13.20	Kg/tonne (ore)	4,800
Lime etc	2.00	Kg/tonne (ore)	730	13.20	Kg/tonne (ore)	4,818
Fluxes	0.01	Kg/tonne (ore)	4	0.07	Kg/tonne (ore)	24
Lubricants	1.00	lot	5	6.60	lot	25
Misc. Mill & Lab Supplies	1.00	lot	5	6.60	lot	25
Mine Consumeables	0.50	Kg/tonne (rock)	639	3.30	Kg/tonne (rock)	6,000
Food	1.00	kg/day	102	6.60	kg/day	675
Subtotal Non Fuel Items			**2,265**			**16,697**
Bulk Diesel*	18,450.0	l/day	**5,522**	96,438	l/day	**28,864**
Contingency 25% (ALL)			1,947			11,390
Total Estimated Consummables			**9,733**			**56,951**

Annual Freight Consumed Per Daily Mill Throughput	Tonnes of Freight Per 1,000 Tonnes of Ore	Ratio		Ratio
Fuel	5.52	71%	Fuel	56%
Other	2.26	29%	Other	32%
Contingency	1.95		Contingency	
Total	**9.7**		Total	**8.7**

(3) Assumed Fuel Requirements	Daily Consumption Litres	Tonnes	Tonnes Per Ore Tonne Per Day	Daily Consumption Litres	Tonnes	Tonnes Per Ore Tonne Per Day
Power	12,000	9.84	0.0098	62,724	51.43	0.0078
Mine (incl. Explosives)	5,000	4.1	0.0041	26,135	21.43	0.0032
Freight Haul	1,200	0.984	0.0010	6,272	5.14	0.0008
Misc. Vehicles etc.	250	0.205	0.0002	1,307	1.07	0.0002
Total Fuel	**18,450**	**15.129**	**0.0151**	**96,438**	**79.08**	**0.0120**

3.2 Oil and Gas

Freight volume linked to well drilling activity in Northeastern British Columbia has been calculated using base statistics of drilling activities from the Canadian Association of Oilwell Drilling Contractors (CAODC). The principal source of information is the CAODC's publicly available Weekly Western Canadian Drilling Rig Count report. This report provides a detailed listing by province of active drilling rigs weekly for the prior four years. As the report does not identify specific rig operators or the start and end dates associated with individual rigs it is not feasible to precisely identify the number of individual rigs operating at any given time.

Table 12 – Average Monthly Rigs Active - NEBC

	2003	2004	2005	2006
January	124	148	135	124
February	135	158	148	
March	109	116	93	
April	28	32	37	
May	10	13	32	
June	10	12	32	
July	26	34	53	
August	40	45	59	
September	47	32	63	
October	53	53	66	
November	62	62	76	
December	95	90	82	

In lieu of this the weekly statistics were used to calculate the average number of active rigs by month for the period January 2003 to December 2005.

Using industry estimates for unit freight consumption for rig resupply activities we applied these against the estimated rig volumes to calculate total estimated freight volumes.

Principal assumptions for rig resupply include:

- rig resupply for 120 days of operation equal to 110 truckloads of freight consisting of:
    - 22% or 24 truckloads of diesel fuel
    - 78% or 86 truckloads or other rig supplies
- fuel is assumed to move at 40 tonnes per truck using “B” train configurations
- other supplies are assumed to be a mix of flat decks and vans carrying general freight

Table 13 below identifies the assumed freight quantities per rig resupply season.

Table 13 – Unit Values for Rig Resupply

		Truckloads	(tonnes) Average Payload	(tonnes) Estimated Freight
Fuel	22%	24	40	968
All Other	78%	86	30	2,574
			Total	**3,542**

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