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ALASKA CANADA RAIL LINK

TRAFFIC DATA DEVELOPMENT and EVALUATION FOR PIPELINE CONSTRUCTION

Work Packages A1(c) & A1(f)

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PIPLINE COMSTRUCTION

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1.0 SUMMARY AND INTRODUCTION

The objective of this report is to assess the impact on the proposed Alaska Canada Rail Link (AlCan) of logistics requirements for the Alaska Highway Pipeline Project (AHPP) and Mackenzie Gas Project (MGP) natural gas pipeline project construction. This objective is met by the identification of material movement requirements providing products, volumes, and probable delivery schedules - Work Package A1(c). The pipeline construction data is then evaluated to determine the likely volumes, carloads and revenues available for the Rail Link, based on analysis of alternative product sources, supply route options, modes, freight rates to selected delivery areas along the pipeline Rights-of-Way - Work Package A1(f).

From a northern transportation impact perspective:

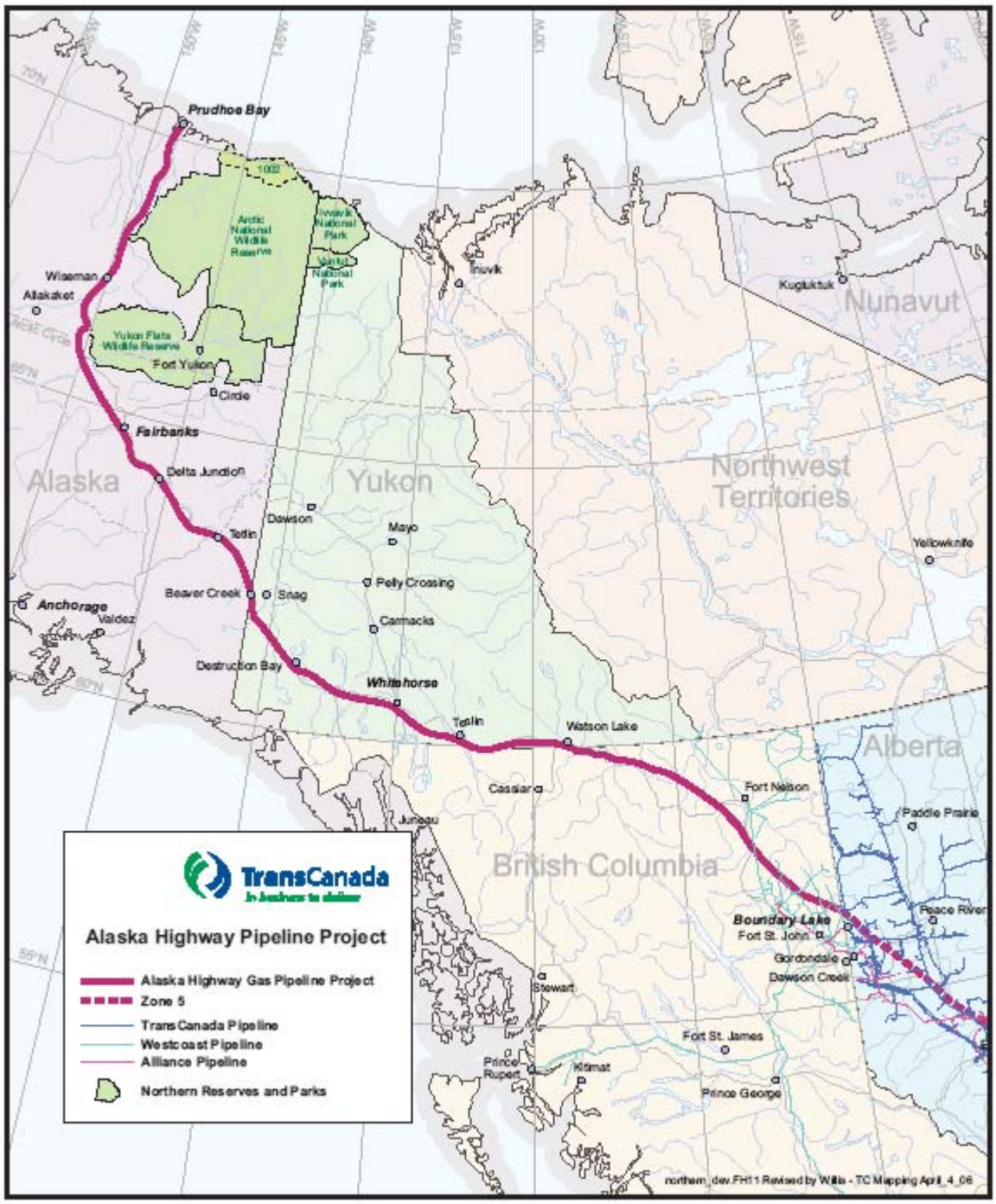
- material movement data bases have been developed in a consistent approach that facilitates accurate evaluation across the pipeline construction spectrum;

- Construction activity is time phased resulting in transportation system impacts in generic “Project Years” to allow ongoing assessment as project timing is firmed up.

It is obvious that large-scale logistics operations to complete project material movements within construction schedule constraints, pose the potential for significant traffic for the proposed new rail service, particularly where the selected route parallels the pipeline right-of-way.

Map 1 shows the AHPP route in Alaska, Yukon and northern B.C..

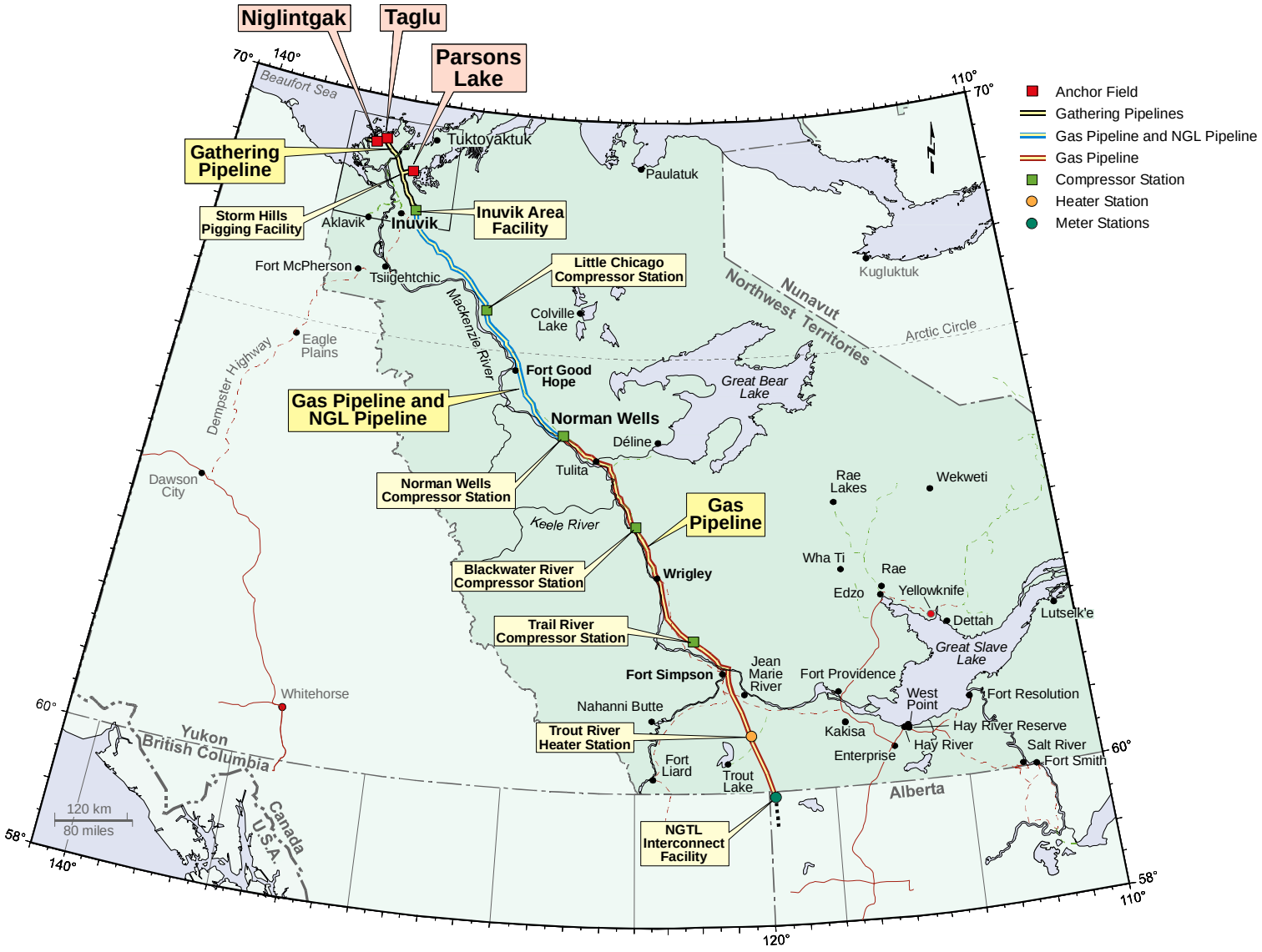
Map 1



Map 2 details the Mackenzie Gas Project in Canada's Northwest Territories, its facilities, stockpile sites and alignment.

Map 2

The Mackenzie Gas Project (MGP)



After analyzing traditional pipeline construction logistics practices, and the available transportation infrastructure (assuming the AlCan Rail Link is in place) along the two pipeline Rights of Way, it is assumed that **line pipe, construction equipment and fuel** are the commodities that lend themselves to rail transport. By themselves, this freight represents more than 85% of the total inbound construction materials volume.

We conclude that overall Alaska Highway Pipeline project logistics impacts on the Yukon transportation system are manageable. We also conclude that certain freight associated with the northern segments of

the Mackenzie Valley Pipeline project logistics can be economically facilitated by the Alaska Canada Rail Link system.

Generally, we summarize the potential impact of those material movements on the Rail Link as follows:

- Of the broad range of pipeline construction commodities, **line pipe, construction equipment and fuel** are the three product groups that can be planned for a rail service from southern supply origins, for both pipelines.
- In Yukon, and due to the northern alignment of the rail system, the AHPP, which will parallel the Alaska Highway, will not enjoy Rail Link service in the Haines Junction area, but all other stockpile delivery points will benefit.
- In Alaska, the gas pipeline logistics will not be impacted by the Rail Link from Prudhoe Bay to Delta Junction, - those segments being supplied either by marine shipments to the North Slope, or over the Alaska Railroad including its planned extension.
- In northern BC, the Rail Link alignment from Hazelton to Watson Lake eliminates several southern BC pipeline construction spreads, centered around Fort Nelson.

Specifically, we predict the potential for project induced transportation bottlenecks as follows:

- At the Inside Passage Port of Skagway, offloading of Yukon destined project cargo may conflict with over 400 cruise ship calls carrying some 600,000 passengers each summer.

As well, we identify the following potential impacts from ocean vessel operations:

- At a future Yukon White Pass & Yukon railhead at Carmacks, where rail/truck trans-shipment operations for Mackenzie Gas Project materials will occur, along with possible coating and double-joining of line pipe.

We conclude from information received on the likely Alaska Highway Pipeline construction schedule, that the Rail Link may well be in place in time to provide a sizeable transport/logistics service to the project. The Mackenzie Gas Project however, is more likely to be in place and operational prior to the Rail Link. Freight numbers are provided in this report, however, to cover the potential scenario involving use of the Rail Link. **The overall contribution of the Rail Link to the two pipeline projects, is - in tons, carloads and revenue contributions, as follows in Table 1, assuming the AlCan alignment follows the "T Route" from Hazelton, BC through Yukon over Carmacks, meeting the Alaska Highway near Beaver Creek.**

Table 1

ALCAN "T" ROUTE

TOTAL PIPELINE TRAFFIC
Alaska Canada Rail Link Potential Traffic Flows & Revenues

		Volume Short Tons	Carloads	AlCan Revenue USD
ALASKA HIGHWAY PIPELINE				
Alaska Segment				
	Pipe	275,100	3,668	$1,292,970
	Equipment	116,200	1,550	9,067,600
	Fuel	142,700	1,785	4,351,290
	Total	534,000	7,003	14,711,860
Yukon/BC Segment				
	Pipe	990,700	13,210	16,516,920
	Equipment	121,800	1624	7,243,860
	Fuel	117,400	1,468	2,277,590
	Total	1,229,900	16,302	26,038,370
Alaska Hwy Pipeline Total:		**1,763,900**	**23,305**	**$40,750,230**
MACKENZIE GAS PROJECT				
	Pipe	119,870	1,620	$2,541,244
	Equipment	78,760	1,064	4,473,568
	Fuel	101,950	1,378	1,937,050
MGP Total:		**300,580**	**4,062**	**$8,951,862**
PIPELINES-TOTAL		**2,064,480**	**27,367**	**$49,702,092**
	Inbound	**1,906,045**	**25,248**	**$39,309,578**
	Outbound	**158,435**	**2,119**	**$10,392,514**

The overall contribution of the Rail Link to the two pipeline projects, is - in tons, carloads and revenue contributions, as follows in Table 2, assuming the AlCan alignment parallels the Alaska Highway, from Fort Nelson, BC to Fairbanks, AK. ARR and WP&Y traffic and incremental revenues are included.

Table 2

ALASKA HIGHWAY ROUTE

TOTAL PIPELINE TRAFFIC
Alaska Canada Rail Link Potential Traffic Flows & Revenues

ALASKA HIGHWAY PIPELINE		Volume Short Tons	Carloads	AlCan Revenue USD
Alaska Segment				
	Pipe	921,100	12,287	$19,572,880
	Equipment	116,200	1,550	8,955,200
	Fuel	142,700	1,785	4,265,200
	Total	1,180,000	15,622	32,793,280
Yukon/BC Segment				
	Pipe	1,310,000	17,468	34,834,680
	Equipment	121,800	1624	5,781,840
	Fuel	161,400	2,016	2,086,410
	Total	1,593,200	21,108	42,702,930
Alaska Hwy Pipeline Total:		**2,773,200**	**36,730**	**$75,496,210**
MACKENZIE GAS PROJECT				
	Pipe	119,870	1,620	$1,318,570
	Equipment	78,760	1,064	3,457,564
	Fuel	101,950	1,378	1,396,715
MGP Total:		**300,580**	**4,062**	**$6,172,849**
PIPELINES-TOTAL		**3,073,780**	**40,792**	**$81,669,059**

The traditionally low tank car fuel rates dictate that pipeline construction fuel requirements will be shipped from southern refineries to stockpile sites by rail, given service by AlCan to those sites. Alaska North Slope producers have advised that pipeline fuel for the Alaska segments will be sourced in Puget Sound; and Alberta or BC refineries for the Canadian sections.

2.0 PIPELINE CONSTRUCTION SCENARIOS

A multitude of pipeline alternatives has been proposed to move North American Arctic gas to southern markets over the years. For Alaska North Slope gas it seems probable that a route paralleling the Dalton

and Alaska Highways will prevail. Regulatory approval processes are already underway for Canadian Mackenzie Delta gas by developer Mackenzie Gas Project over the obvious route, the Mackenzie River valley. Both projects have been analyzed to determine a range of transportation system impacts on the Alaska Canada Rail Link.

For the Alaska gas, after calculating total "rail friendly" pipeline freight traffic (WP A1c), i.e., line pipe, fuel and construction equipment, two Rail Link (AlCan) route alignments and several potential pipe sizes being studied by its proponents, were worked through the evaluation model (WPA1f). The first group of pipeline impact evaluations were for the alignment that completely paralleled the Alaska Highway, commencing at Fort Nelson and terminating at Fairbanks. Initial calculations included incremental freight volumes and revenues allocated to the ARR and WP&Y systems. Rail Link planning engineers settled on a final alignment from Hazelton, BC to Delta Junction, AK via Carmacks, YK, resulting in somewhat lower contributions to AlCan, due to the northern route by-passing sections of the pipeline route, and a decision to eliminate ARR numbers.

Alaska Producers have not settled on a final pipe specification for the AHPP. The initial design analyzed in our model was Trans Canada Pipe Line's 48 inch OD, 1 inch wall, X 80 carbon steel pipe; the final set of numbers were based on the Alaska Producer's 52 inch, 1 ¼ inch wall, X 80 carbon steel pipe.

A comparative analysis of potential truck, rail and Mackenzie River barge freight costs determined that a sizeable portion of the northern sections of MGP's 30 inch pipeline, generally north of and including the main pipeline river stockpile site of Little Chicago, NWT, could be supplied from southern Canada and US sources by AlCan and White Pass & Yukon rail systems to Carmacks, YK and transferred to truck for final delivery to the MGP over the Dempster Highway.

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Foothills Pipe Lines (now controlled by Trans Canada Pipe Lines) is currently updating plans for the Alaska Highway Gas Pipeline which it originally proposed in accordance with the 1977 "Agreement on Principals" between the United States and Canada (still in effect).

The Alaska Gas Producers Group completed a US$ 125 million study during 2001 which compared both the Alaska Highway and Mackenzie Valley Corridors as alternate pipeline routes for Alaska Gas. Later,

and as influenced in no insignificant manner by the State of Alaska, the southern Alaska Highway route seems to have prevailed.

2.1 Alaska Highway Pipeline Project (AHPP)

In the Alaska Highway Corridor, both the Foothills Pipe Lines and Alaska Gas Producers proposals are to move Alaska Gas from Prudhoe Bay. However, beyond that common element, they are significantly different proposals, due primarily to a major difference in pipe size. In addition, there is interest in using the gas liquids extractable from the natural stream as potential feed stocks for a petrochemical industry in Alaska, whereas the Foothills plan calls for gas liquids to be extracted in Alberta, where a world-scale petrochemical industry now exists.

Foothills Pipe Lines 48" Scenario. The Trans Canada Pipe Lines Proposal is essentially sized to provide the most cost effective project from an initial investment perspective. Project criteria provided by Trans Canada are as follows:

Foothills 48" Alaska Highway Pipeline Scenario

Pipeline Route

From	Prudhoe Bay, Alaska
To	Gordondale, Alberta[1]

Via	Alaska Highway Corridor
Yukon Portion	832 km (517 miles)
British Columbia Portion	720 km (448 miles)
Alberta Portion	65 km (40 miles)
Length in Canada	1,617 km (1,005 miles)
Plus Alaska Portion	1,199 km (745 miles)
Total Project Length	2,816 km (1,750 miles)

Pipeline Design

Initial Throughput	2.5 billion cubic feet per day
Expansion Potential To	4.5 billion cubic feet per day
Operating Pressure	2500 psi
Initial Compressor Stations	12 total (7 in Canada)
Pipe Steel Grade	X-80 Carbon Steel
Pipeline Diameter	48 inches (1219.2 mm)
Pipe Wall Thickness	1 in. (25.4 mm)
Compressor Stations	8 (initial, and includes meter stations at each end)

Construction Strategy

Pipeline Spreads	3 pipeline spread contractors in each of US, Canada

[1] Connection with existing TransCanada Pipelines System

Pipeline Camps	3 (1500 man) camps at 12 campsites in each of Canada and Alaska
Peak Work Force	1,400 construction personnel per spread
Construction Duration	2 years (plus 1 year advance site prep/logistics)
Construction Seasons	winter (+/- 70 days) and summer (+/- 80 days)
Granular requirements	Alaska: 4 million Cu. Yds. Canada: 5.4 million Cu. Yds.

Alaska Gas Producers 52" Scenario. Alaska Gas producers have proposed a pipeline that is sized to provide the most cost effective future expansion potential at a substantial initial investment premium. Project information obtained from the Alaska Gas Producer Group has been supplemented with PROLOG assumptions as noted below.

Alaska Gas Producers 52" Alaska Highway Pipeline Scenario

Pipeline Route

From	Prudhoe Bay, Alaska
To	Edmonton, Alberta[2]

Via	Alaska Highway Corridor
Yukon Portion	832 km (517 miles)
British Columbia Portion	720 km (448 miles)
Alberta Portion	714 km (444 miles)
Length in Canada	2,266 km (1,408 miles)
Plus Alaska Portion	1,178 km (732 miles)
Total Project Length	3,444 km (2,140 miles)

Pipeline Design

Initial Throughput	4.5 billion cubic feet per day
Expansion Potential To	5.6 billion cubic feet per day
Max. Operating Pressure	2500 psi
Initial Compressor Stations	24 total, 28 eventual
Pipe Steel Grade	X-80 or X-100 Carbon Steel
Pipeline Diameter	52 inches (1320 mm)
Pipe Wall Thickness	1.250 inches (31.75 mm)

Construction Strategy (Ref: Fluor Study, 2002)

Pipeline Spreads	4 Canadian spreads out of 8 total Alaska to Alberta
Pipeline Camps	4 (1000-1200 man) camps in Canada
Peak Work Force	4,800 construction personnel in Canada
Construction Duration	Seeking to compress schedule from3 to 2 years.
Construction Seasons	most winter but more summer if 2 year construction

2.2 Mackenzie Valley Pipeline Project (MGP)

[2] Fort Saskatchewan area petrochemical complex for liquids extraction and connection with US market pipelines.

In the Mackenzie Valley Corridor, Imperial Oil, Shell Canada, ConocoPhillips and Exxon have formed the Mackenzie Gas Project (MGP) to move Mackenzie Delta Gas to southern markets on a stand-alone basis. The much smaller Delta Gas resource results in a much smaller pipeline proposal than for Alaska Gas.

MGP 30" Mackenzie Valley Scenario. The Mackenzie Delta Gas Producers Group has selected: a 500 km dual phase natural gas and liquids pipeline to Norman Wells; liquids extraction and injection into the existing Enbridge Oil Pipeline at Norman Wells; and a parallel 800 km single phase pipeline to carry dry natural gas from Norman Wells. Project information is provided by the MGP and used by Landspoint to develop this scenario, including the following:

Delta Gas 30" Mackenzie Valley Pipeline Scenario

Pipeline Route

From	Taglu, Northwest Territories
To	Bootis Hill, Alberta[3]
Via	Mackenzie Valley Corridor
Pipeline Length	1,285 km (798 miles)

Pipeline Design

Initial Throughput	1.2 billion cubic feet per day
Expansion Potential To	1.5 billion cubic feet per day[4]
Operating Pressure	2050 psi
Compressor Stations	4 stations initially
Pipe Steel Grade	X-80 Carbon Steel
Pipeline Diameter	
Main Gas Line	762 mm (30 inches)
Liquids Line	254 mm (10 inches)
Gathering – Various	10 – 18 inches
Pipe Wall Thickness	15.8mm (.625 inch for mail line pipe)

Construction Strategy

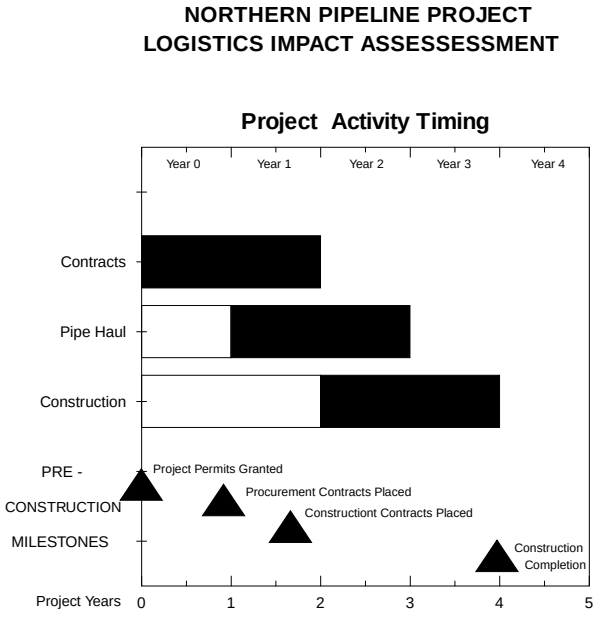
Pipeline Spreads	4 pipeline spread contractors
Pipeline Camps	4 - 800 man camps (positioned at 8 campsites)
Peak Work Force	4,000 construction personnel
Construction Duration	2 years (plus 1 year advance site prep/logistics)
Construction Season	winter (+/- 50 days)

[3] Connection with existing TransCanada Pipelines System

[4] An MOU with the Aboriginal Pipeline Group allows for up to 1/3 of total capacity to be allocated to APG.

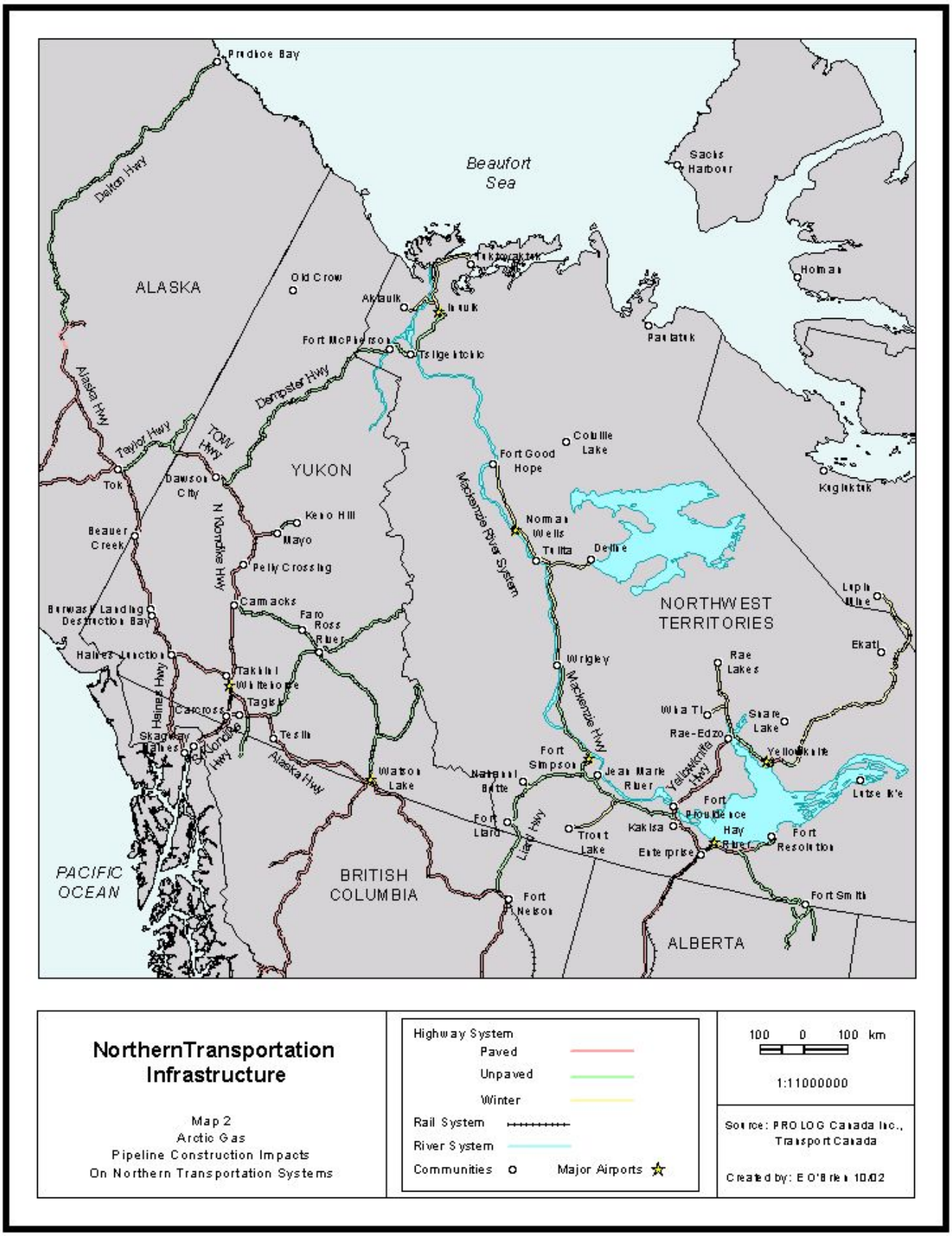
For each pipeline scenario, we have assumed similar logistics and construction activity timing within a four year project scheduling envelope. A two year construction schedule backs off from project completion at end of Year 3 for construction start at beginning of Year 2. A two year pipe haul program starts in Year 1, overlapping initial construction in Year 2. The balance of material and personnel movements continues through construction completion in Year 3.

We assume a 1 year lag between project permitting and pipe haul start-up for finalizing placement of major procurement, transportation and ancillary construction contracts during Year 0; and continuing through to construction start at the end Year 1 for the balance of compressor station and pipeline installation contracts.



Our project activity timing assumptions are consistent with the two year construction schedules planned by both Alaska Highway pipeline proponents and by the MGP in the Mackenzie Valley Corridor. **Map 3 on the following page, identifies current Northern Transportation Infrastructure.**

Map 3


Prudhoe Bay
Beaufort Sea
Sachs Harbour
Dalton Hwy
ALASKA
Old Crow
Aklavik
Inuvik
Tuktoyaktuk
Holman
Paulatuk
Fort McPherson
Tsiigehtchic
Dempster Hwy
Alaska Hwy
Taylor Hwy
Tok
Dawson City
YUKON
Klondike Hwy
Keno Hill
Mayo
Beaver Creek
Pelly Crossing
Carmacks
Faro
Ross River
Burwash Landing
Destruction Bay
Haines Junction
Takhini
Whitehorse
Tagish
Haines Hwy
Skagway
Haines
Carcross
Tesla
Watson Lake
Alaska Hwy
Fort Good Hope
Colville Lake
Norman Wells
Tulita
Deline
Mackenzie River System
Wrigley
Mackenzie Hwy
NORTHWEST TERRITORIES
Kugluktuk
Coppermine
Lupin Mine
Ekati
Rae Lakes
Wha Ti
Snare Lake
Rae-Edzo
Yellowknife
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Nahanni Butte
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On Northern Transportation Systems
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Paved
Unpaved
Winter
Rail System
River System
Communities
Major Airports
100 0 100 km
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Source: PROLOG Canada Inc., Transport Canada
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3.0 ALASKA HWY PIPELINE MATERIAL MOVEMENT PLANS – WP A1(c)

3.1 AHPP Construction Commodity and Traffic Characteristics

This section of the report (WP A1c) provides AHPP detailed destination quantity estimates and construction schedule movement requirements for selected rail-friendly project construction materials (line pipe, fuel and construction equipment), - which represents some 85% of the total freight requirements. Tonnage take-offs, delivery requirements, sourcing and routing strategies have been developed from project sponsor interviews, other Rail Link planning consultants, transportation and stevedoring companies, freight forwarding and shipping agents, port officials, and supplemented with pragmatic assumptions based on Landspoint experience.

These project logistics plans are applied in a straightforward, static model of destination spreads, alternate routes, gateways and transfer points for each pipeline construction scenario in the Northwest Territories and Yukon. Material data bases have been incorporated for mainline pipe, bulk fuel, and construction equipment. Camps, camp food and consumables, small parts, supplies and miscellaneous materials are either traditional truck movements or time-sensitive, and assumed to be non-AlCan traffic. Destination spread locations have been identified with an alpha designation from North to South and required delivery periods have been identified within a 2 year project schedule (Construction Years 2 and 3, preceded by Year 1 advanced stockpiling logistics required in the Mackenzie RiverValley, absent of full all-weather transport service over much of its ROW).

Pipe

Pipe rolling mills considered as sources included those in Canada, US, Asia and Europe. Line pipe volumes were calculated on the linear footage of the pipeline, factored up for vertical and horizontal deviations, and for a 20% wall thickness increase at river and creek crossings, and other points where forces exceeded normal (approx. 5% of the total length)[5].

Equipment

Both proponents agreed that construction equipment should be sourced in the US Midwest (e.g., Peoria, Ill's main corporate Caterpillar factory). Equipment lists received from the proponents for a "typical"

[5] Ref: Trans Canada Pipe Lines

construction spread were translated to tons by referencing Caterpillar product manuals, and from feedback by pipeline contractors.

Fuel

Project fuel was assumed to be sourced in Western Canada for the Canadian segments, and in Puget Sound, Washington, for the Alaska portion, reflecting the Producer's advice. Fuel volumes were calculated from fuel consumption operating data from equipment product manuals, and discussions with Caterpillar people, for both winter and summer operating conditions.

Please note that data manipulation and model output uses short ton as a common unit of measure for all modes and load configurations.

3.2 Alaska Segment: Pipeline Construction Material Logistics

Trans Canada Pipe Lines provided much of the initial information used to determine pipeline material requirements leading to the development of traffic models. As the Alaska Producer Group was able and willing to provide this information, substitution was made and traffic flows amended to reflect its planning. For example, TCPL's 48 inch, I inch wall pipe originally analyzed was re-worked to reflect the Producer's 52 inch, 1.250 wall pipe spec.

The Alaska section of the pipeline was assumed to involve 11 construction spreads; four separate contractors; and a two year schedule – two construction seasons in each. Realistically, pipe will likely have to be pre-positioned earlier to main stockpile sites (e.g. Seward, Fairbanks, sea lift to Prudhoe Bay) due to the sheer volume of pipe and limited individual mill capacity.

Comparative route analysis determined that the section of the pipeline generally north of the Brooks Range (Deitrich Camp) will be supplied by barge, ship and truck over Prudhoe Bay.

Spreads volumes south of Deitrich Camp were included in the AlCan evaluation (WP A1f).

Table 3 displays the total pipeline construction volumes for the Alaska segment, for each of line pipe, construction equipment and fuel, by spread and by construction season.

Table 3

Alaska Highway Natural Gas Pipeline
Freight Volumes
Short Tons - Inbound
ALASKA SEGMENT

Required Delivery By:	Winter 1	Winter 1	Winter 1	Winter 1	**Total**	Summer 1	Summer 1	Summer 1	Summer 1	**Total**	Winter 2	Winter 2	Winter 2	Winter 2	**Total**	**PROJECT**
To: Spread	AW 1	BW 1	CW 1	DW 1	**Winter 1**	AS 1	BS 1	CS 1	DS 1	**Summer 1**	AW 2	BW 2	CW 2	DW 2	**Winter 2**	**TOTAL**
Milepost Location	MP0-84	MP183-264	MP465-535	MP667-743		MP169-183	MP360	MP535-600	MP600-667		MP86-169	MP264-339	MP403-465	MP339-403		
Camp	Franklin B.	Dietrich	Fairbanks	Northway		Atigun	Yukon R.	Delta Jct.	Tok		Toolik	Prosect	Fairbanks	Five Mile		
Facility	MS-0	CS No. 6		MS-YK				CS No. 12	CS No. 14		CS No. 4	CS No. 8	CS No. 10			
Facility Location	MP 0	MP 238		MP 745				MP 537	MP 637		MP 143	MP 323	MP 434			
Destination Volumes																
LINE PIPE(1)	162,547	157,354	133,693	147,158	**600,752**	25,392	Incl. DW2	125,998	127,922	**279,312**	162,547	144,273	119,265	123,113	**549,198**	**1,429,262**
EQUIPMENT																
P/L Construction	20,680	20,680	20,680	20,680	**82,720**	repositione	repos.	repos.	repos.		repos.	repos.	repos.	repos.		
CS/Facility Constr.		3,850		1,100	**4,950**			3,850	3,850	**7,700**	3,850	3,850	3,850		**11,550**	
Total	20,680	24,530	20,680	21,780	**87,670**			3,850	3,850	**7,700**	3,850	3,850	3,850		**11,550**	**106,920**
FUEL																
P/L Construction	12,320	12,320	12,320	12,320	**49,280**	10,450		10,450	10,450	**31,350**	12,320	12,320	12,320	12,320	**49,280**	
CS/MS Constr.		1,870		550	**2,420**			1,870	1,870	**3,740**	1,870	1,870	1,870		**5,610**	
Camp Fuel	7,590	7,590	7,590	7,590	**30,360**	7,040		7,040	7,040	**21,120**	7,590	7,590	7,590	7,590	**30,360**	
	19,910	21,780	19,910	20,460	**82,060**	17,490		19,360	19,360	**56,210**	21,780	21,780	21,780	19,910	**85,250**	**223,520**
Project Total	203,137	203,664	174,283	189,398	**770,482**	42,882		149,208	151,132	**343,222**	188,177	169,903	144,895	143,023	**645,998**	**1,759,702**

(1) Pipe Specs (API Standard): 52in OD; X80 Carbon Steel; Wall Thickness 1 1/4 in; Weight 1,010 kg/m (678 lbs/ft)
A,B,C,D, - Contractors; W1,S1, W2 - First Winter, First Summer Construction Season, etc.
MP - Milepost Location; MS - Meter Station; CS - Compressor Station

3.3 Yukon, British Columbia Segment: Pipeline Construction Material Logistics.

Alaska Highway Corridor logistics models were developed for Yukon stockpile sites and transportation gateways. Much of the information provided by Trans Canada Pipe Line's Foothills unit, was modified where possible, to accommodate the Alaska Producer's technical plans. Pipe volumes, for example, were re-calculated based on the Producer's 52 inch diameter pipe for the "operative" case forwarded to the consultants preparing the total traffic estimates.

Pipeline planners have allowed for six construction spreads in each of Yukon and BC. Each jurisdiction will have two contractors. Each contractor will have three construction seasons within a two-year overall time frame. For example, contractor A in Yukon will have three spreads, the first to be completed in the winter of year 1; moving to an adjoining summer spread; and finishing with a section the following winter.

While the Alaska Highway gas pipeline will be placed from the Alaskan North Slope to Edmonton, Alberta, only construction volumes for specific central stockpile sites from Watson Lake to Fairbanks were included in the evaluation, due to the AlCan route final alignment selection.

Table 4 displays the total pipeline construction volumes for the Yukon segment, for each of line pipe, construction equipment and fuel, by spread and by construction season.

Table 4

Alaska Highway Natural Gas Pipeline
Freight Volumes
YUKON SECTION
Short Tons - Inbound

Required Delivery By:	**Winter 1**	Summer 1	Summer 1	**Total**	Winter 2	Winter 2	**Total**	**Summer 2**	**PROJECT**
To: Spread	AW 1	AS 1	BS 1	**Summer 1**	AW 2	BW 2	**Winter 2**	BS 2	**TOTAL**
Km. Post Location	KP0-109	KP226-375	KP375-555		KP109-226	KP555-687		KP687-832	
Camp	Koidern	Canyon Cr.	Marsh L.		Burwash	Morley R.		Rancharia	
Facility		&K.Lk. X'ing	CS No. 2		CS No. 1	CS No. 3			
Facility Location			KP 455		KP 213	KP 651			
Destination Volumes									
LINE PIPE(1)	**130,649**	187,977	215,995	**403,972**	131,008	157,424	**288,432**	**172,486**	**995,539**
EQUIPMENT									
Pipeline Construction	**20,680**	Repositioned	Repos.		**Repos.**	20,680		**Repos.**	
Facility Construction			3,850	**3,850**	**3,850**	3,850			
Equipment Total	**20,680**		3,850	**3,850**	3,850	24,530	**28,380**		**52,910**
FUEL									
Pipeline Construction	**12,320**	12,650	10,450	**23,100**	**12,320**	12,320		**10,450**	
Facility Construction			1,870	**1,870**	**1,870**	1,870			
Camp Fuel	**7,590**	9,240	7,040	**16,280**	**7,590**	7,590		**7,040**	
Fuel Total	**19,910**	21,890	19,360	**41,250**	21,780	21,780	**43,560**	**17,490**	**122,210**
TOTALS	**171,239**	209,867	239,205	**449,072**	156,638	203,734	**360,372**	**189,976**	**1,170,659**

(1) Pipe Specs (API Standard): 52 in. OD; X80 Carbon Steel; Wall Thickness 1 1/4 in; Weight 1,010 kg/m (678 lbs/ft)
Kluane Lake crossing volumes included in Spread AS1
A,B - Contractors; W1, S2 - First Winter, Second Summer Construction Season, etc.
KP - Kilometre Post Location; CS - Compressor Station

Table 5 displays the total pipeline construction volumes for the Northern British Columbia segment, for each of line pipe, construction equipment and fuel, by spread and by construction season.

Table 5

Alaska Highway Natural Gas Pipeline
Freight Volumes
Metric Tonnes - Inbound
NORTHERN B.C. SEGMENT

Required Delivery By	**Winter 1**	**Summer 1**	Winter 2	Winter 2	**Total**	Summer 2	Summer 2	**Total**	**PROJECT**
To: Spread	AW 1	AS 1	A&BW 2	BW 2	**Winter 2**	AS 2	BS 2	**Summer 2**	**TOTAL**
Km. Post Loacation	KP1095-1216	KP832-963	KP1216-1336	KP1435-1552		KP963-1095	KP1336-1435		
Camp	Muskwa R.	Fireside	Prophet R.	Doig R.		Liard R.	Prespatou		
Facility	CS No. 6	CS No. 4				CS No. 5	CS No. 7		
Facility Location	KP 1210	KP 834				KP 1029	KP 1373		
Destination Volumes									
LINE PIPE(1)	**131,486**	**142,352**	130,399	127,139	**257,538**	143,439	107,579	**251,018**	**782,394**
EQUIPMENT									
Pipeline Construction	**18,800**	Repositioned	18,800	Repositioned	**18,800**	Repositioned	Repositioned		
Facility Construction	**3,500**	**3,500**				3,500	3,500	**7,000**	
Equipment Total	**22,300**	**3,500**	18,800		**18,800**	3,500	3,500	**7,000**	**51,600**
FUEL									
Pipeline Construction	**11,200**	**9,500**	11,200	11,200	**22,400**	9,500	9,500	**19,000**	
Facility Construction	**1,700**	**1,700**				1,700	1,700	**3,400**	
Camp Fuel	**6,900**	**6,400**	6,900	6,900	**13,800**	6,400	6,400	**12,800**	
Fuel Total	**19,800**	**17,600**	18,100	18,100	**36,200**	17,600	17,600	**35,200**	**108,800**
Totals	**173,586**	**163,452**	167,299	145,239	**312,538**	164,539	128,679	**293,218**	**942,794**

(1) Pipe Specs (API Standard): 52 in OD; X80 Carbon Steel; Wall Thicknesss 1 1/4 in; Weight 1,010 kg/m (678 lbs/ft)
Project Year: :ors; W1, S2 - First Winter, Second Summer Construction Season, etc.
: Post Location; CS - Compressor Station

4.1 MGP Regional Logistics Opportunities

The Mackenzie Gas Project (MGP – see Map 4 following) will provide logistics business opportunities for communities along the pipeline right-of-way in NWT. Opportunities may also exist for transportation services located in Alaska and Yukon. The producer's current plan calls for all pipeline major commodities to be delivered to the project stockpile sites by barge or truck, with only Shell Canada planning to use the Beaufort Sea route for modules to be used for gas treatment at their Niglintgak production site in the Mackenzie Delta. During construction, some consumables and supplies will no doubt be trucked from Whitehorse and other southern points to the more northerly spreads and facilities sites.

4.2 Yukon Gateway Concept

The Klondike and Dempster Highways provide an all-weather transportation gateway capable of servicing the northern end of the Mackenzie Gas Project. The proposed Alaska/Canada Rail Link could serve as a pipeline materials supply system involving an inter-modal road/rail network from industrial Canada, and the US, to the Mackenzie Delta. Segments of the MGP that could be facilitated by a southern rail and Yukon highway-based trucking system include: the three producer gas treatment and gathering systems; the Inuvik natural gas processing facility; and the two natural gas and extracted liquids pipelines south 180 km (at least) to a major camp and stockpile location on the Mackenzie River planned for the Little Chicago, NWT, barge landing site. The actual portion of the pipeline, if any, that can be economically supplied over the Yukon Gateway will be determined when detailed rail costs and system construction timing are better known.

The major pipeline construction materials that are amenable to a road/rail network are pipe (several sizes, from 10 in. – 16 in. for gathering system pipe, to 30 in. for the line pipe); fuel (the current plan is to rail winter diesel fuel from Edmonton area refineries to Hay River, NWT for furtherance by truck and barge); and construction equipment (called "yellow iron" by planners). Other major commodities such as camp buildings, drilling equipment and supporting materials, consumables, parts and supplies – will be trucked or barged directly to ROW storage areas.

4.3 Alaska/Canada Rail Link Opportunity

The "Yukon" gateway route, if viable, will involve accessing the MGP by truck with pipe, fuel and equipment sourced (a) in Alberta, Eastern Canada or the U.S., and transferred from Alaska/Canada Rail at either Whitehorse or Carmacks, or (b) from Canadian or U.S. West Coast sources via the inner passage route to rail at Skagway, shipped by an upgraded WP&Y railway system to trucks at either Whitehorse or Carmacks (see Map 1).

Pipe

The MGP's 30 inch treated natural gas pipeline to Alberta; the smaller 18 inch pipeline for extracted liquids (NGL's) from Inuvik to Norman Wells; and the Delta gathering systems (10 inch to 16 inch standard pipe) planned for the system, all involves pipe that can be rolled in North American mills. If indeed sourced in North America, **430,000 tonnes** will be shipped northward to transfer points by rail.

However, the heavy wall thickness (0.625 in.) 30 inch line pipe and other diameters may well be sourced and manufactured off-shore (Japan, Korea or Germany), pending attractive pricing incentives and lower ocean shipping rates. This presents the more obvious opportunity of accessing the project with the all-weather Yukon Gateway option i.e., rail from Skagway or other rail-served West Coast ports to either Whitehorse (WP&Y Utah Yards) or Carmacks if the Rail Link system is constructed on the northern Yukon route. If double joining and coating of pipe is planned once the pipe is off-loaded from ocean vessels and prior to the final truck leg, adequate space is available at Skagway, Whitehorse, or Carmacks, to facilitate this requirement.

Fuel

The MGP proponents intend to maximize Canadian sources for pipeline materials. Fuel, the second largest commodity volume required by the project **(192,000 tonnes)**, is currently planned for sourcing in the Edmonton area, almost certainly Imperial Oil's (the MGP's lead proponent) Strathcona refinery. The plan involves railing fuel to Hay River, NWT, and then to the stockpile/storage sites by barge and truck.

Interestingly, and for the first time, fuel was delivered to Western Arctic communities during the 2005 shipping season by NTCL barges lightered from a large ocean barge at Herschel Island in the Beaufort Sea. 12 million litres of winter diesel fuel was shipped from Imperial's marine terminal at Vancouver, BC, after being shipped over the Trans Mountain products pipeline from their Edmonton area refinery. This program makes a bold statement that even after the cost of pipeline from the refinery and

terminaling at Vancouver, fuel an be transported to the Mackenzie Delta area around Point Barrow cheaper than the conventional supply route over Hay River. A rail link from Edmonton direct to Yukon with a (relatively) short highway link to the Mackenzie Delta, may well prove to be more economic than the traditional route over Hay River to the Delta, and obviously more reliable than either it or the Pt. Barrow route, considering the all-weather capability of the proposed Yukon Gateway road/rail option.

Equipment

The MGP proponents plan to ship new "yellow iron" project construction equipment (77,100 total tonnes) from southern dealers or factories (e.g., Finning Tractor, a Caterpillar dealer in Edmonton). While equipment used in the north is typically shipped on flat deck trucks out of Edmonton or Calgary, rail flat cars could be easily substituted and likely would be used if the equipment is sourced in the U.S. or Eastern Canada, or imported from (say) Japan.

These three product groups account for 80% of the total project material requirements of 865,000 tonnes, and are easily transported by rail. **Approximately 28%, or 237,000 tonnes of this volume will be utilized north of the Little Chicago stockpile site on the Mackenzie River.** Pipe could be transported to the Inuvik area on a year-round basis and strung along the ROW service road during the construction season, or trucked directly to Little Chicago (and points between) along the all-weather Mackenzie Highway if completed in time. The same logistics would apply for construction equipment. Fuel could be moved from the Yukon rail trans-shipment point to available tankage at Inuvik, for distribution to project portable tank farms.

While the Alaska/Canada Rail Link may not be in place by the time the MGP commences, and upgraded White Pass & Yukon system could be completed in time. It is likely that Year 1 for the project has now been delayed to (at least) 2008 due to regulatory/procedural delays and aboriginal claims.

The following table presents the MGP's major commodity volumes, and season employed, and the portions to be utilized north of the Little Chicago camp and stockpile site on the Mackenzie River.

4.4 Project Freight Volumes For Rail Link Via Yukon Gateway

Table 6

MGP Major Commodity Volumes & Carloads

& Volumes & Carloads for Little Chicago North

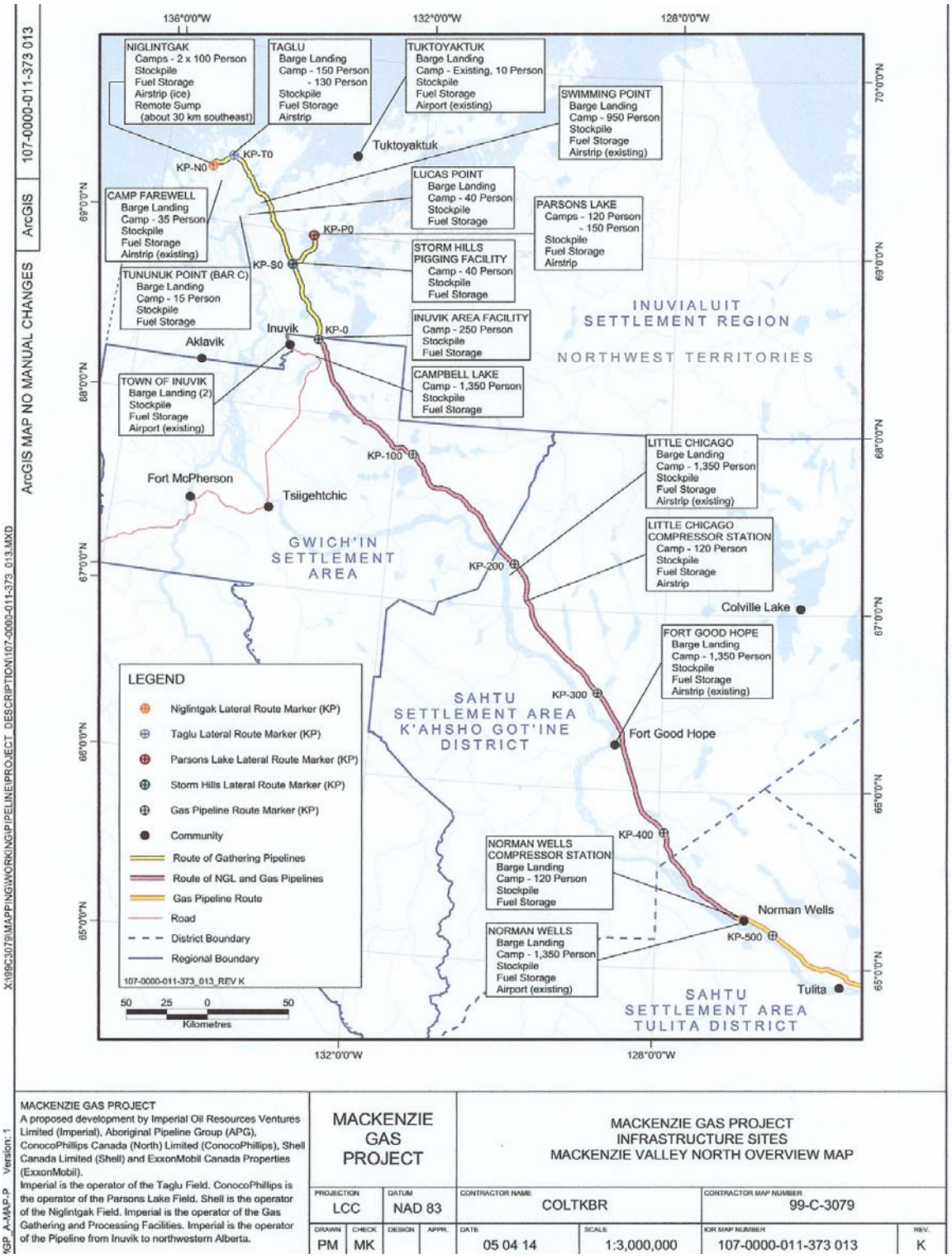
		Total Project – Inbound			De-Mob	Little Chicago North		
		Year 1	Year 2	Total In	Total Out	Year 1	Year 2	AK/Can
Commodity	**Unit**							
Pipe	tonnes	240,780	189,700	430,480	-	88,610	20,360	108,970
Carloads	@74 MT	3,254	2,564	5,818	-	1,198	275	1,473
Fuel	tonnes	65,680	126,140	191,820	-	30,990	61,690	92,680
Carloads	@60 MT	1,095	2,103	3,198	-	517	1,028	1,545
Equipment	tonnes	61,100	16,000	77,100	77,100	27,800	8,000	35,800
Carloads	@60 MT	1,018	267	1,285	1,285	464	133	597
Totals								
Volume – Tonnes (In)				**699,400**		**147,400**	**90,050**	**237,450**
Tonnes (Out)					**77,100**			**35,800**
Carloads – (In)				**10,301**		**2,179**	**1,436**	**3,615**
(Out)					**1,285**			**597**

TOTAL CARLOADS FOR AK/CAN RAIL/YUKON ROUTE **4,212**

Map 4 [6] provides more specific details on the MGP pipeline infrastructure at the northern end of the project, through which the Yukon Gateway could provide logisitics benefits.

[6] Maps 2 & 4 courtesy Mackenzie Gas Project

Map 4


136°0'0"W
132°0'0"W
128°0'0"W
70°0'0"N
69°0'0"N
68°0'0"N
67°0'0"N
66°0'0"N
65°0'0"N
NIGLINTGAK
Camps - 2 x 100 Person
Stockpile
Fuel Storage
Airstrip (ice)
Remote Sump
(about 30 km southeast)
TAGLU
Barge Landing
Camp - 150 Person
- 130 Person
Stockpile
Fuel Storage
Airstrip
TUKTOYAKTUK
Barge Landing
Camp - Existing, 10 Person
Stockpile
Fuel Storage
Airport (existing)
SWIMMING POINT
Barge Landing
Camp - 950 Person
Stockpile
Fuel Storage
Airstrip (existing)
Tuktoyaktuk
KP-T0
KP-N0
CAMP FAREWELL
Barge Landing
Camp - 35 Person
Stockpile
Fuel Storage
Airstrip (existing)
LUCAS POINT
Barge Landing
Camp - 40 Person
Stockpile
Fuel Storage
PARSONS LAKE
Camps - 120 Person
- 150 Person
Stockpile
Fuel Storage
Airstrip
KP-P0
KP-S0
STORM HILLS
PIGGING FACILITY
Camp - 40 Person
Stockpile
Fuel Storage
TUNUNUK POINT (BAR C)
Barge Landing
Camp - 15 Person
Stockpile
Fuel Storage
INUVIALUIT
SETTLEMENT REGION
NORTHWEST TERRITORIES
Inuvik
KP-0
Aklavik
INUVIK AREA FACILITY
Camp - 250 Person
Stockpile
Fuel Storage
TOWN OF INUVIK
Barge Landing (2)
Stockpile
Fuel Storage
Airport (existing)
CAMPBELL LAKE
Camp - 1,350 Person
Stockpile
Fuel Storage
KP-100
LITTLE CHICAGO
Barge Landing
Camp - 1,350 Person
Stockpile
Fuel Storage
Airstrip (existing)
Fort McPherson
Tsiigehtchic
GWICH'IN
SETTLEMENT
AREA
LITTLE CHICAGO
COMPRESSOR STATION
Camp - 120 Person
Stockpile
Fuel Storage
Airstrip
KP-200
Colville Lake
FORT GOOD HOPE
Barge Landing
Camp - 1,350 Person
Stockpile
Fuel Storage
Airstrip (existing)
SAHTU
SETTLEMENT AREA
K'AHSHO GOT'INE
DISTRICT
KP-300
Fort Good Hope
KP-400
NORMAN WELLS
COMPRESSOR STATION
Barge Landing
Camp - 120 Person
Stockpile
Fuel Storage
Norman Wells
KP-500
NORMAN WELLS
Barge Landing
Camp - 1,350 Person
Stockpile
Fuel Storage
Airport (existing)
Tulita
SAHTU
SETTLEMENT AREA
TULITA DISTRICT
LEGEND
Niglintgak Lateral Route Marker (KP)
Taglu Lateral Route Marker (KP)
Parsons Lake Lateral Route Marker (KP)
Storm Hills Lateral Route Marker (KP)
Gas Pipeline Route Marker (KP)
Community
Route of Gathering Pipelines
Route of NGL and Gas Pipelines
Gas Pipeline Route
Road
District Boundary
Regional Boundary
107-0000-011-373_013_REV K
50 25 0 50
Kilometres
ArcGIS MAP NO MANUAL CHANGES
ArcGIS
107-0000-011-373 013
X:\99C3079\MAPPING\WORK\NGP\PIPELINE\PROJECT DESCRIPTION\107-0000-011-373_013.MXD
NGP_A-MAP-P Version: 1
MACKENZIE GAS PROJECT
A proposed development by Imperial Oil Resources Ventures Limited (Imperial), Aboriginal Pipeline Group (APG), ConocoPhillips Canada (North) Limited (ConocoPhillips), Shell Canada Limited (Shell) and ExxonMobil Canada Properties (ExxonMobil).
Imperial is the operator of the Taglu Field. ConocoPhillips is the operator of the Parsons Lake Field. Shell is the operator of the Niglintgak Field. Imperial is the operator of the Gas Gathering and Processing Facilities. Imperial is the operator of the Pipeline from Inuvik to northwestern Alberta.
MACKENZIE GAS PROJECT
MACKENZIE GAS PROJECT
INFRASTRUCTURE SITES
MACKENZIE VALLEY NORTH OVERVIEW MAP
PROJECTION LCC
DATUM NAD 83
CONTRACTOR NAME COLTKBR
CONTRACTOR MAP NUMBER 99-C-3079
DRAWN PM
CHECK MK
DESIGN
APPR.
DATE 05 04 14
SCALE 1:3,000,000
IOR MAP NUMBER 107-0000-011-373 013
REV. K

5.1

5.0 PIPELINE TRAFFIC EVALUATION – WP A1(f)

5.1 Rail Link Route Alignment Alternative Impacts

The original Alaska Canada Rail Link concept perceived the system paralleling the Alaska Highway, itself providing a significant transportation corridor through which (generally) the gas pipeline ROW would be located. This southern rail route provided direct rail access to all major pipeline stockpile sites along the ROW which, along with short truck hauls, allowed rail-based traffic from the Alaska Brooks Range to Fort Nelson, BC. This overall network would result in some 3 million tons of pipeline traffic, and $82 million revenue for the AlCan Link, over the two years construction period.

The final route selection commencing on the CN Rail system at Hazelton, BC and terminating at Delta Junction, AK via the Tintina Trench in Central Yukon, results in a trade-off of pipeline traffic for much higher volumes mineral traffic.

The stockpile site near Haines Junction, BC loses rail movements of pipe and fuel to truck service over Haines, AK. Construction equipment for the Haines Junction area spreads would be trucked in from Whitehorse, thereby avoiding the double handling at a port, which pipeline contractors prefer.

Extending the Alaska Railroad to Delta Junction eliminates any Rail Link pipe traffic to Fairbanks and Delta Junction pipeline stockpile sites. These movements will likely involve Oregon Steel Mills (OSM) or Asian pipe transported to the two locations by the ARR over Seward, AK.

Extending the White Pass and Yukon rail line to Carmacks from Whitehorse, YK increases AlCan revenue for the MGP traffic, assuming the Rail Link and MGP construction schedules are correctly timed.

The southern terminus at Hazelton, BC allows off-shore or OSM pipe to be shipped to stockpile sites at or near Watson Lake, on an all-rail supply option from Prince Rupert, BC, at a lower cost than alternative routes.

5.2 Pipeline Construction Commodity Sources and Considerations

PIPE

The Challenge

Steel line pipe constitutes some 70% of the total volume of major pipeline construction commodities associated with the building of the Alaska Highway (AHPP) and Mackenzie Valley (MGP) natural gas (NG) pipeline projects. These two systems, when in place, will transport (initially) over 5 billion cubic feet per day of natural gas from the North American arctic coast to southern markets. In the case of the Alaska Highway pipeline this represents over 2 million metric tonnes (2.2 million short tons) of either 48 inch or 52 inch diameter pipe (depending on prospective developer designs). This is a huge, perhaps unprecedented volume of pipe associated with a single project in North America, and will tax any supplier to produce the entire volume in a single (and normal) contractual period.

The Opportunity

No single pipe forming company facility in the world can likely meet the pipe procurement demand of the AHPP, without capital expenditure to expand manufacturing capacity, or contract for a lengthy supply schedule. It has been generally accepted that the high volume of high strength steel pipe for this project would have to be produced in foreign mills, either Japan, Germany or perhaps Korea. It has been thought that North American manufacturers just do not have the ability to participate competitively in these large arctic pipeline projects.

Project engineers meanwhile are trying to develop a pipe material specification and system design that: attains initial target NG production volumes; recognizes the strain-based design spec due to presence of discontinuous permafrost along the route; minimizes the delivered unit cost of pipe; and allows for installation by conventional equipment, thereby reducing construction costs.

For pipe manufacturers, the variables are: (1) metallurgy, i.e. the ability to produce pipe with high-structural strength steel, X80 grade or better (100 - 120,000 psi stress limit), (2) the ability to form pipe in their rolling mills to the diameters required (e.g. 48 inches or better); (3) the ability to form pipe in their rolling mills to the wall thicknesses (wt) required to carry NG at the design pressures; and (4) to be

competitive in unit pricing, and delivered cost to project stockpile sites, and the most obvious (5) the capacity to manufacture sufficient volumes of pipe to participate in the project. Some North American mills can only form pipe, while others can both make steel and form pipe.

Current Status – North American Mills

Metallurgical ability is not a problem for the three main "big inch" pipe producers in North America, - **Inter-Provincial Steel Company Ltd. (IPSCO)** of Regina, SK; **Camrose Pipe Company** of Camrose, AB; and **Berg Steel Pipe Corporation** of Panama City, FL. Any of these three companies can produce X80 grade pipe.

IPSCO, who have facilities throughout Canada and the U.S., advised that they produced the first X80 steel and are currently experimenting with yet higher grades (e.g., 120,000 psi) to enable gas producers to ship larger volumes at high pressures, minimizing pipe wall thicknesses. Their "big inch" line pipe forming mill can roll and spiral weld X80 grade pipe to 56 inch diameter, but is currently limited currently to 0.75 inch wall thickness. Capacity is currently 300,000 tons per year.

Camrose Pipe can currently produce up to 42 inch diameter pipe, and a maximum wall thickness of 0.75 inches. This mill can currently produce pipe suitable for the MGP pipe specification. Interestingly, Camrose is now 100% owned by **Oregon Steel Mills** of Portland, Oregon, OSM having recently purchased the 40% they didn't previously own from Stelco Inc., the financially troubled Eastern Canadian steel producer now out of the pipe business. One of their divisions, **Oregon Steel Pipe**, is currently building a new spiral weld pipe mill to manufacture high strength large diameter API grade pipe. The forming line will be able to build pipe up to 60 inches diameter, and up to 1 inch wall thickness, in lengths up to 80 feet (double-jointed if necessary). The new mill will have a capacity of 170,000 tons annually. The new mill will also be able to apply "fusion bonded epoxy coatings" which will resist external abrasion, and improve flow efficiency if applied to the interior of the pipe.

Berg Steel Pipe Corporation, owned now equally by Mannesmannrohren-Werke AG and Dillenger Huttenwerke of Germany, advertise an ability to roll X70 grade pipe up to 64 inches diameter, and 1.375 inches wall thickness. Although plant capacity is 150-180,000 tons per year, rolling of high-strength thick-walled pipe shortens joint length (requiring double-jointing) and slows production.

North American Pipe Supply Prospects - AHPP

All three major large diameter line pipe producers very much consider their companies "in the game" as potential suppliers to the AHPP. They are in touch with the pipeline proponents on a regular basis, exchanging ideas on design and discussing production and sales service issues. **IPSCO** in particular is prepared to make capital expenditures at its plant to be able to participate in the project. **Berg** can meet the current AHPP spec now, and **OSM** will be able to shortly. The current challenges, concerns and/or issues impacting North American mill participation are:

1. The need for final pipeline system design specifications
2. Knowledge that the Japanese have X100 grade pipe available now
3. Extent and nature of required capital investment to meet the spec in 1. above
4. Cumulative production capacity limitations considering the size of the (potential) pipe order, timing, and the length of the project construction period
5. Transportation concerns given direct ocean access from Asian mills to Alaskan ports
6. The prospect of building a rolling mill at (say) Fairbanks, as is being considered by at least one of the Alaska Producers, is not considered realistic by one of the mills contacted, as the facility would be stranded after the project and in turn, tough to economically justify due to the (usual) need of long term use to achieve payout.

Observation and Conclusions

IPSCO's work in developing X100 grade steel will no doubt enable them to meet the wall thickness spec for the AHPP. Planned capital expenditures will ensure it. Its 0.75 inch wt current capability is very close to the Alaska Producer's present spec of 0.8 inches for the Canadian portion of the pipeline, and not too far from meeting the 0.9 inch U.S. spec.

All North American mills feel they can be price competitive with international producers, at the plant gate.

Although the mills at Portland, Oregan and Panama City, Florida could supply the AHPP with a marine delivery service to Alaskan Ports, an Alaska/Canada Rail Link operation could move 80 foot, double-

jointed, coated pipe – directly from the three mills to stockpile sites along the Alaska Highway, thereby minimizing damage from multiple handlings inevitable in marine movements.

Mill capacity will be the major issue facing AHPP planners. Even individual Asian mills will be hard-pressed to meet project needs, and it is likely that a wide mix of suppliers will be required to supply the 2.2 million tons of pipe required, on a timely basis. It is likely that IPSCO could supply (by rail) the 550,000 tons required in the Northern B.C. segment over a two year period, and a good portion of the 640,000 ton requirement for the Yukon section, if a three year supply contract could be structured.

OSM could supply 80 ft., coated pipe by (relatively) short rail access to supply all three pipeline segments providing the rail line parallels the Alaska Highway. Berg would have a much longer rail haul, but could deliver pipe by rail and again, - minimize product handlings.

A “Buy American” procurement policy will benefit all three Companies, as even IPSCO has a sizeable American presence, and can roll pipe from steel made in one of their U.S. steel mills.

If international sources are required to meet pipe supply volumes, Asian mills could be used to supply the Fairbanks-North Slope segment, either by sea lift direct to Prudhoe Bay and southbound truck deliveries, or north by rail and truck over Seward and Fairbanks. This portion of the pipeline involving 320,000 tons will require multiple handlings in any event. If the AlCan southern terminus is indeed Hazelton, BC some 485,000 tons of pipe could enter the Rail Link system, destined for pipeline spreads near Watson Lake, southward towards Fort Nelson.

Summarizing, while theoretically all of the pipe could be supplied from North American pipe mills, some 2 million tons of the pipe required by the AHPP and MGP could realistically be supplied over the Alaska/Canada Rail Link.

FUEL

Background

With the eventual and successful completion of the Alaska Canada Rail Link project the methods and cost of transporting fuel to Alaska and Yukon could be significantly impacted, as well as the AHPP. While the AlCan study work determines the most economical fuel supply route to selected central

geographic delivery points along the proposed AHPP route, the AlCan Rail link system also results in significant fuel transportation economies to communities located near the new railway.

Refineries are currently located at, or near, each end of the proposed system. Traditionally, oil companies and their agents participating in remote markets tend to allow the highest cost denominator to set pump and wholesale prices there. For instance, if an oil company's agent in Whitehorse purchases fuel fob the oil company's refinery in Edmonton, the agent supplies his own trucking and his market price in Yukon reflects the Edmonton wholesale "rack" price plus his trucking cost over the Alaska Highway. This, of course, is the most expensive way to move fuel to Yukon from Canadian refineries. Competing oil companies and/or their agents happily allow the pump price for all outlets to be set containing this highest transportation cost increment.

This tradition was proven factual in the nineties, when an independent American retailer installed a retail outlet in Whitehorse selling fuel priced on a "cost" basis. The program featured a (relatively) low cost supply route from a Vancouver refinery by barge through the West Coast Inner Passage, and truck to Whitehorse over a purposely constructed tank farm at Haines, Alaska. The retail price dropped 7 – 8 cents per litre overnight.

An attractive rail rate now exists for transporting fuel from Edmonton to Fort Nelson. Several oil companies currently ship fuel to Yukon by truck from their Fort Nelson agency tank farms, with attendant savings over the all-truck alternative. Likewise fuel barged from Vancouver and trucked into Yukon over Skagway will enjoy even greater transport cost savings. If the Rail Link route selected originates at Hazelton, BC, the Husky refinery at Prince George will enjoy a geographic advantage over other Canadian refineries, as will the Flint Hills refinery near Fairbanks. The Rail Link Study details revenue contributions to the potential rail system for moving fuel in the most cost-efficient supply route, to central delivery points along the Alaska Highway Natural Gas Pipeline Right of Way in Northern BC, Yukon, and Alaska.

Traditionally, fuel shipped by rail in tank cars is one of the lowest rated tariffs posted by railways. Strip away all taxes and the value of the product after finding, production, refining and marketing costs, is approximately 50 cents/litre, even with crude priced at $70 per barrel. Often cars are owned or leased by the oil companies, and there are no railway personnel handling costs as refinery personnel and their agents both load and off-load product at each end. In addition, the oil companies often negotiate national

transportation contracts with the rail companies resulting in significant volume discounts. This results in attractive rail rates for fuel, which will likely be extended into Yukon with completion of the AlCan, bringing sizeable economic benefits to northern consumers.

While not in the original Terms of Reference in Work Package A1 (f), Landspoint was asked to determine the likely post-AlCan distribution orbit of the two refineries located near each of its northern and southern terminus points.

Market Size, **Features**[7]

Our estimate of the Yukon (only) total market for fuel is 155,000 short tons (180 million litres), comprising:

	Winter	Summer	Average		
Distillate	70%	60%	65%	126,000,000 litres	(115,000 tons)
Gasoline	30%	40%	35%	54,000,000 litres	(45,000 tons)
			Total	180,000,000 litres	(160,000 tons)

More specifically, to the nearest 5 million litres, market segment demand categories are estimated as follows:

Retail Motor Fuel	
• Gasoline	55 mm litres
• Diesel	35 mm litres
Heating Fuel	35 mm litres
Yukon Government	30 mm litres
Aviation Fuel	15 mm litres
Mining, other	10 mm litres
	180 mm litres

By supplier, estimated current market share and transport method:

[7] Sources: Oil Company Officials – Skagway, Haines, Fort Nelson; PROLOG archives – e.g., Northern Territories Transportation Systems Study, Annual Northern Territories Freight Analysis, Yukon Fuel Supply Options (includes Whitehorse Weigh Scale and Pleasant Camp truck traffic data).

Supplier	Volume	Supply Chain
North 60 (Shell)	70 mm litres	Barge ex. Vancouver; truck ex. Skagway & Ft. Nelson
Fas Gas	30 mm litres	Barge ex. Vancouver; truck ex. Haines(Delta Western)
PetroCanada	30 mm litres	Rail ex. Edmonton, truck ex. Ft. Nelson
Imperial Oil	20 mm litres	Trucked ex. Edmonton by Jobber, Alberta Fuels
Husky	20 mm litres	Rail ex. Prince George, truck ex. Fort Nelson
Flint Hills, other	10 mm litres	Truck ex. Fairbanks/North Pole
Total	180 mm litres	

Post Rail Link Supply Scenario

Typically the base price for any refined petroleum product is set at the refinery gate. The wholesale rack price is a benchmark from which comparative end market pricing commences. The Alaska Canada Rail Link will be blessed with a refinery at each end of its system, - the Flint Hills production facility at North Pole, Alaska, near Fairbanks and the Husky Oil refinery located at Prince George, B.C. on the CN network east of Hazelton, the southern terminus of the Rail Link.

Wholesale rack prices are generally influenced by: prevailing crude oil market price; demand for specific petroleum products within market segments – often impacted by seasonal influences; and the tendency amongst refiners to take the lead in price-setting from time to time in regional markets. As an example, Vancouver wholesale prices often exceed those in Edmonton, where 80% of the product sold in southern BC is manufactured, and carries with it an 8 – 10 cent cost premium for pipeline transportation.

The transportation operating cost and attendant fuel rail freight rate is assumed to be the same whether south (from the North Pole refinery), or north (from the Husky Prince George refinery), and will be purely mileage-based, even though there is a 264 mile CN Rail component northwest from Prince George to Hazelton, B.C. Tank car loadings would also be equal at 105,000 litres per shipment.

The assumption is therefore made that the wholesale rack prices for diesel fuel and gasoline at the Flint Hills Refinery in North Pole, Alaska will be the same as the refinery gate pricing at the Husky refinery in Prince George, BC. The most economical supply route to the selected market areas will therefore be

the shortest route to those destinations, from either North Pole or Prince George. **The overall selected Rail Link route length from Prince George, BC to Fairbanks/North Pole Alaska via Hazelton, BC is 1,664 miles. Both refineries would access Whitehorse over an assumed link south from Carmacks, YT.**

MILEAGE COMPARISON

Destination, to:	Origin-North Pole, AK	Origin-Prince George, BC
Watson Lake, YT	**907**	**758**
Whitehorse, YT	**607**	**1,264**
Tok/Ladhue R., AK	**280**	**1,385**

Summary

All community destinations north and west of a point 75 miles north of Watson Lake, including Whitehorse, can be supplied from the Alaska refinery more economically than from the Prince George refinery. The village of Tuchitua on the Robert Campbell Highway is the approximate break point.

The model developed for the Rail Link in-bound pipeline market analysis also determined that a transportation program supplying fuel to Yukon's main market point of Whitehorse, by an all-rail service with refinery origins as far as Edmonton and Puget Sound, was 34% more economical than the Vancouver-based barge/truck service over Skagway, currently the least costly supply method. This is largely influenced by the current attractive CN Rail fuel freight rates which were used as the pricing basis for the Rail Link system analysis.

It should be noted that the Flint Hills Refinery has no current plans to install a sulphur-stripping unit, enabling it to comply with the new sulphur content regulations (30 ppm gasoline; 15 ppm diesel fuel) due to be implemented by October ’07, by the U.S. and Canadian federal governments. Oil company officials expect this spec will be extended to all motor fuel, including off-highway use, by this date or shortly thereafter. Flint Hills will be entering an exchange arrangement with Tsoro’s Kenai, AK refinery, whereby Tsoro will supply Flint Hill’s Ultra Low Sulphur (ULS) diesel requirements, estimated at only 5% of their total current production. **The traffic balance developed above may be impacted, depending on how the two Alaskan refineries set pricing strategies on their exchanged product volumes. Husky has invested in a new sulphur recovery unit at Prince George, and will be able to meet the new specs.**

EQUIPMENT

Sources

No manufacturer in the world has the depth and breadth of earth moving and pipeline construction equipment as the Caterpillar Corporation, headquartered in Peoria, Illinois. While Caterpillar has factories all over the world, it was assumed that the “Buy American and Canadian” policies being touted by governments and project planners for AHPP, would result in Peoria being a logical central supply point for equipment. Komatsu of Japan and other heavy equipment manufacturers will no doubt also actively pursue AHPP business.

Many of the pipeline contractors eventually selected will have existing equipment fleets which will accommodate some of the construction tasks. But the sheer size and weight of the pipe itself is unique to the project and will likely require considerable new investment in specialized equipment such as side booms, trenchers and pipe handling machines.

Transportation

Typically such equipment is moved by truck from factories to their local dealers where they are serviced for operations. Finning Tractor, Caterpillar’s agent in Western Canada, believe that a long haul such as from Illinois to Alaska, given the existence of an all-rail route to project stockpile sites and nearby construction spreads, would and could indeed, move by rail.

This is high-rated freight (say, compared to fuel) with shippers preferring minimal handling once the machine and/or its parts are lashed to a flat car. A D9R Caterpillar Bulldozer has a new price of $1.1

million, a fact not lost on railway rate makers. Recently railroad rate pricing has approached truck rates for this freight class, even over long distances. The rail tariff for heavy equipment from Peoria to Fort Nelson reflects a 6.32 cents per ton-mile charge (75 ton payload) while the cost per ton-mile for fuel for a 1060 mile haul is 2.4 cents (80 ton payload).

5.3 Traffic Evaluation - pipe

Even with the Rail Link alignment paralleling the Alaska Highway, it is readily apparent that 100% of the construction spreads could not be supplied with pipe over the AlCan rail system. It is obvious that the Prudhoe Bay, AK pipeline terminus point and spreads near the North Slope would be more economically supplied pipe by sea lift, from Asia (lowest cost) or Oregon (slightly higher).

Existing known truck, rail and shipping tariffs were used to determine the break point of the “over the top” marine/truck route vs. southern supply route involving rail and truck combination options. It was determined that virtually everything north of the Brooks Range could be better served from the north, and all other Alaskan spreads more economically supplied with pipe by a barge, ARR combination over Seward, AK with a small contribution to AlCan for two construction spreads in the Tok, AK area.

The initial assumption of the Rail Link northern terminus being Fairbanks resulted in significantly more revenue to the AlCan, which disappeared when it was later assumed that the ARR would be extended to Delta Junction by the time the Rail Link was completed.

Table 7 demonstrates the lowest rate combinations for pipe to major central ROW delivery points selected along the Alaskan segment of the pipeline, considering the more obvious alternative supply route options, and provides the volumes and per ton rate contributions to the Rail Link.

Table 7
TRAFFIC EVALUATION - A1(f)
Alaska Highway Natural Gas Pipeline
PIPE - ALASKA
(USD Per Short Ton)

Stockpile Location:			Prudhoe Bay	Dietrich	Fairbanks	Delta Junction	Tok
Route Alternatives:		**Milepost:**	MP-0	MP-238	MP-465	MP-537	MP-637
Source	**Via**	**Mode**					
Asia	**Direct**	**Ship**	**41.50**				
Oregon	Direct	Barge	45.20				
Asia	**Prudhoe Bay**	**Ship/Truck**		**92.90**			
Oregon	Prudhoe Bay	Barge/Truck		96.60			
Oregon	Seward/F'banks	Barge/Rail/Truck		119.60			
Asia	Seward	Ship/ARR			134.40		
Florida	Seward	Ship/ARR			119.50		
Europe	Seward	Ship/ARR			184.60		
E. Europe	Seward	Ship/ARR			190.30		
Oregon	**Seward**	**Barge/ARR**			**62.40**		
OR/SK	Ft. Nelson	All Rail/AlCan			133.00		
Asia	Seward/F'banks	Ship/ARR/Truck				161.00	
Oregon	Valdez	Barge/Truck				81.70	
Oregon	**Seward**	**Barge/ARR**				**66.30**	
OR/SK	Ft. Nelson	All Rail/AlCan				112.20	
Asia	Valdez	Ship/Truck					153.80
Oregon	Valdez	Barge/Truck					78.80
Oregon	**Seward**	**Barge/ARR/AlCan**					**71.00**
OR/SK	Hazelton	All Rail/AlCan					105.00
	Spreads-Ref: A1(c)		AW 1 AW 2	AS 1 BW 1	BW 2 DW 2 CW 2 CW 1	CS 1	DS 1 DW 1
	Total Freight (tons)						
		Year 1	162,600	182,700	133,700	126,000	275,100
		Year 2	162,600		386,700		
	Carloads @ 75 tons ea.						
		Year 1	-	-	1,783	1,680	3,668
		Year 2	-		5,156		
	AlCan Rate Portion						
	USD Per Ton		**-**	**-**	**-**	**-**	**4.70**

Legend:
Lowest "Through" Freight Rate:
Lowest Rate - AlCan Traffic Component
Lowest Rate - Non-AlCan Traffic

Assumes "T" Route terminates at Delta Junction, AK and meets the Alaska Highway at Beaver Creek, YK.

The final AlCan route selection starting the system at Hazelton, BC rather than Fort Nelson, BC on the Alaska Highway, to Delta Junction via Yukon's Tintina trench also reduced AHPP pipe volumes originally considered for the Rail Link. Haines Junction area stockpile sites for instance, could be supplied pipe more economically by a truck and barge combination over the port of Haines.

The relative short distance from Hazelton to the port of Prince Rupert, BC resulted in a more favourable marine/rail freight rate combination to Watson Lake, YK – compared to a marine/rail supply route over Skagway, which was the lowest cost route when the AlCan system commenced at Fort Nelson, BC.

Table 8 demonstrates the lowest rate combinations for pipe to major central ROW delivery points selected along the Yukon and British Columbia segments of the pipeline, considering the more obvious alternative supply route options, and provides the volumes and per ton rate contributions to the Rail Link.

5.4 Traffic Evaluation – Fuel and Equipment

FUEL

The final selection of the more northern "T Route" over the Alaska Highway route did not materially impact the revenue contributions to AlCan for pipeline fuel movements. They are actually higher than the Alaska Highway route due to the longer AlCan rail mileage at the southern end.

Although the Husky refinery in Prince George is much closer to the AHPP than Edmonton refineries, pipeline planners are assuming Imperial Oil/Exxon, Shell (Edmonton), BP (Puget Sound) will be the likely sources of diesel fuel. These oil companies are part of producer groups planning the two northern gas pipelines. The Flint Hills refinery near Fairbanks is not an option as it is not planning to manufacture low sulphur diesel fuel, which will likely be the single brand product used for construction of both the AHPP and MGP pipelines.

As with the pipe analysis, stockpile sites near Haines junction lost their all-rail supply option to a marine /truck haul over the Port of Haines, AK.

Table 9 demonstrates the lowest rate combinations for fuel to major central ROW delivery points selected along the Alaska, Yukon and British Columbia segments of the pipeline, considering the

more obvious alternative supply route options, and provides the volumes and per ton rate contributions to the Rail Link.

Table 9
TRAFFIC EVALUATION
Alaska Highway Natural Gas Pipeline
FUEL
(USD Per Ton)

Stockpile Location:			Prudhoe Bay	Dietrich	Fairbanks	Delta Junction	Tok	Beaver Creek	Haines Junction	Whitehorse	Watson Lake	Fort Nelson
Route Alternatives:		**Location:**	MP-0	MP-238	MP-465	MP-537	MP-637	KP-61	KP-290	KP-420	KP-834	
Source	**Via**	**Mode**										
Puget Sd.	Direct	Barge	**67.50**									
Puget Sd.	Prud. Bay	Barge/Truck		**105.90**								
Puget Sd	Seward	Barge/Rail			81.10							
Puget Sd.	**Hazelton**	**All Rail**			**52.30**	**49.70**	**47.10**					
Puget Sd.	Valdez	Barge/Truck				82.80	80.30					
Vancouver	Haines	Barge/Truck						77.70	54.70			
Edmonton	**Pr G/AlCan**	**All Rail**						**41.00**		**44.20**	**32.00**	
Edmonton	Beaver Cr	Rail/Truck							80.00			
Vancouver	Skagway	Barge/Truck								52.10	71.70	
"	Skagway	Barge/ Rail								47.00	60.70	
Pr. George	Skagway	Rail/Aqua/WP								45.30		
Edmonton	Direct	All Rail										**21.40**
Spreads-Ref: A1(c)			AW 1 AW 2	AS 1 BW 1	BW 2 DW 2 CW 2 CW 1	CS 1	DS 1 DW 1	AW 1-YK	AS 1-YK AW 2-YK	BS 1-YK BW 2-YK	BS 2-YK AS 1-BC AS 2-BC	AW 1-BC BW 1-BC BS 2-BC BW 2-BC
Total Freight (tons)												
Year 1			19,900	39,300	19,900	19,400	39,900	19,900	21,900	19,400	19,400	41,700
Year 2			21,800		63,500				21,800	21,800	36,900	39,300
Carloads @ 80 tons ea.												
Year 1			-	-	249	243	499	249	274	243	243	521
Year 2			-		794				273	273	461	491
AlCan Rate Portion												
USD Per Ton			**-**	**-**	**32.30**	**29.70**	**27.10**	**25.50**	**-**	**25.20**	**13.00**	**-**

Legend:
Lowest Through Freight Rate - Non-AlCan Route
Lowest Through Freight Rate - AlCan Route

Notes:
1. AlCan rate portion calculated from Hazelton, BC
2. Barge rates are courtesy Island Tug & Barge, Vancouver, B.C.
3. AK trucks, 45,000 litres payload; Canada 48,000 litres payload
4. Terminal handling costs as per Delta Western, Petro Marine
5. AK rail rates courtesy ARR Cdn rail rate basis - CNR/Imperial Oil
6. Jumbo tank cars: 105,000 litres avg. capacity (80 tons/tank car)
7. Product is winter diesel fuel, Sp. Grav. 0.83
8. Alaska pipeline construction fuel sourced in Puget Sound; Canada - Edmonton or Vancouver

EQUIPMENT

Equipment traffic revenues to AlCan to pipeline central delivery points in Alaska decreased somewhat with the final “T Route” Rail Link alignment selection, due to the necessity to convey a larger portion of the rate to the ARR, their system now assumed to extend to Beaver Creek.

Yukon and BC equipment revenue contributions were higher due to the longer mileage at the southern end of the system commencing at Hazelton, BC vs. the Fort Nelson, BC Alaska Highway alignment. In addition, extending the White Pass and Yukon to Carmacks added all-rail equipment mileage and revenue to AlCan for the “T Route” alternative servicing Whitehorse and Haines Junction area pipeline spreads. Equipment for the Haines Junction spreads would be railed to Whitehorse, and then delivered by truck directly to the pipeline.

Freight rates for supply options including the CN Aquatrain failed to compete with all rail land options considered.

Table 10 demonstrates the lowest rate combinations for equipment to major central ROW delivery points selected along the Alaska, Yukon and British Columbia segments of the pipeline, considering the more obvious alternative supply route options, and provides the volumes and per ton rate contributions to the Rail Link.

Table 10
TRAFFIC EVALUATION
Alaska Highway Natural Gas Pipeline
EQUIPMENT
(USD Per Ton)

Stockpile Location:			Prudhoe Bay	Dietrich	Fairbanks	Delta Junction	Tok	Beaver Creek	Haines Junction	Whitehorse	Watson Lake	Fort Nelson
Route Alternatives:		**Location:**	MP-0	MP-238	MP-465	MP-537	MP-637	KP-61	KP-290	KP-420	KP-834	
Source	**Via**	**Mode**										
Seattle	Direct	Barge	**56.00**									
Seattle	Prud. Bay	Barge/Truck		**119.00**								
Peoria, Il	Pr. Geo	All Rail										**143.10**
Peoria, IL	**Hazelton**	**All Rail**			**210.20**	**203.50**	**196.70**	**189.70**		**189.00**	**157.00**	
Peoria, IL	**Whitehorse**	**Rail/Truck**							**205.40**			
	Spreads-Ref: A1(c)		AW 1 AW 2	AS 1 BW 1	BW 2 DW 2 CW 2 CW 1	CS 1	DS 1 DW 1	AW 1-YK	AS 1-YK AW 2-YK	BS 1-YK BW 2-YK	BS 2-YK AS 1-BC AS 2-BC	AW 1-BC BW 1-BC BS 2-BC BW 2-BC
	Total Freight (tons)											
		Year 1	20,700	24,600	20,700	3,900	25,700	20,700		3,900	3,900	45,300
		Year 2	3,900		7,800				3,900	24,600	3,900	3,900
	Carloads@75 tons ea.											
		Year 1	276	328	276	52	343	276		52	52	604
		Year 2	52		104				52	328	52	52
	AlCan Rate Portion USD Per Ton		-	-	**84.50**	**77.80**	**70.90**	**64.10**	**63.30**	**63.30**	**31.30**	**-**

Legend: Lowest Through Rate - Non-AlCan Traffic
Lowest Through Rate - AlCan Traffic Component

Notes:
1. Source: Peoria, IL (Caterpillar Inc.) to AlCan Points over Hazelton, BC
2. Barge rates are courtesy Alaska Marine Lines, Juneau, AK
3. Flat cars carry 75 tons each. Trucks 35 tons.
4. AML barges estimated payload 10,000 tons to North Slope
5. Equipment weights, dimensions, supply logistics courtesy Finning (Canada)
6. Heavy equipment rail rates based on routing over BNSF/CNR systems

5.5 Rail Link Pipeline Traffic and Revenue Contributions

Other Potential Commodities

A review of the total list of pipeline-related construction materials includes huge volumes of **granular fill,** much of it cleaned, dried and classified (screened and graduated). In the case of the MGP, the volume of granular materials required for roads, facility pads, campsites and trench backfill far exceeds any other commodity.

Yukon Highways provided a report to Landspoint Consulting detailing the locations, size and material quality of granular deposits along the Alaska portion of the AHPP route paralleling the Alaska and Dalton Highways. They also reported that the Yukon section of the Alaska Highway featured similar deposits with the same spacing between them. An overall average of less than 10 miles separation between locations, exists in both jurisdictions, with BC much the same. Accordingly, gravel movements were not considered as potential freight traffic for the Rail Link project study. Trucks will be used by the contractors in this activity.

The management of granulars is also a significant challenge for MGP proponents. There are some 140 gravel pits available to the MGP in NWT along the 1,200 km Mackenzie River corridor, of which 60 or 70 are expected to be used. 9 million tones of granular material will be placed - for facility pads, drilling sites, roads, camps and for backfilling the pipeline trench. Logistically, 200 trucks making 330,000 trips over 3 winter seasons are required to complete the necessary work.

Skids, timbers generally 6 inches square by four or six feet long, are used to support pipe as joints are aligned and prepared for welding, prior to lowering into the trench. This activity presents an opportunity for communities along the ROW. Local logging companies and saw mills can likely produce the required volume of skids, and trucks used to transport the skids directly to ROW delivery points.

Pine beetle-damaged trees, otherwise useless for lumber production, could likely be used to manufacture skids. Skids and their delivery to pipeline work sites are best handled by trucks, and do not likely represent any opportunity for the Rail link system. Quick calculations of possible skid requirements for the AHPP are 1.2 million units in Alaska (approx. 30,000 tons), and 1.6 million in the Canadian segments (40,000 tons).

Potential Freight Revenues – AlCan Rail Link

ALASKA

The following **Table 11** shows the total volume of inbound and outbound freight volumes to/from the Alaskan pipeline segment for the three central delivery points which can be serviced by AlCan – by commodity, volume, year required, carloads, and the attendant revenue contribution to the Rail Link system.

These figures represent the gas pipeline contributions to the Rail Link system, considering the “T Route” railway alignment.

Table 11
Alaska Highway Natural Gas Pipeline
Potential Freight Revenues - AlCan Rail Link
ALASKA SEGMENT - "T" ROUTE

	Year One			Year Two			Total	Total
Delivery Area:	Tons	AlCan Rate	Revenue	Tons	AlCan Rate	Revenue	Revenue	Carloads
Fairbanks								
Pipe	133,700			386,700				
Equipment-IN	20,700	84.50	$1,749,150	7,800	84.50	$659,100	**$2,408,250**	**380**
Equipment-OUT				28,500	84.50	$2,408,250	**$2,408,250**	**380**
Fuel	19,900	32.30	$642,770	63,500	32.30	$2,051,050	**$2,693,820**	**1,043**
Delta Jct								
Pipe	126,000							
Equipment-IN	3,900	77.80	$303,420				**$303,420**	**52**
Equipment-OUT				3,900	77.80	$303,420	**$303,420**	**52**
Fuel	19,400	29.70	$576,180				**$576,180**	**243**
Tok								
Pipe	275,100	4.70	$1,292,970				**$1,292,970**	**3,668**
Equipment-IN	25,700	70.90	$1,822,130				**$1,822,130**	**343**
Equipment-OUT				25,700	70.90	$1,822,130	**$1,822,130**	**343**
Fuel	39,900	27.10	$1,081,290				**$1,081,290**	**499**
Total Alaska	**664,300**		**$7,467,910**	**516,100**		**$7,243,950**	**$14,711,860**	**7,003**

Note that the inbound pipeline construction equipment volumes are assumed to be relocated to southern Canada and the US after completion of the pipeline, as part of the normal de-mobilization activity. We have assumed that the outbound volumes and revenues are the same as the inbound movement, and 100% of the equipment volume will be removed at the end of the final construction season.

Table 12 provides similar information for the Canadian central pipeline delivery points during the AHPP construction period.

Table 12
Alaska Highway Natural Gas Pipeline
Potential Freight Revenues - AlCan Rail Link
CANADA SEGMENT - "T" ROUTE

	Year One			Year Two			Total	Total
Delivery Area:	**Tons**	**AlCan Rate**	**Revenue**	**Tons**	**AlCan Rate**	**Revenue**	**Revenue**	**Carloads**
Beaver Cr.								
Pipe	130,700	8.20	$1,071,740				**$1,071,740**	**1,743**
Equipment-IN	20,700	64.10	$1,326,870				**$1,326,870**	**276**
Equipment-OUT				20,700	64.10	$1,326,870	**$1,326,870**	**276**
Fuel	19,900	25.50	$507,450				**$507,450**	**249**
Haines Jct								
Pipe	188,000			131,000				
Equipment-IN				3,900	63.30	$246,870	**$246,870**	**52**
Equipment-OUT				3,900	63.30	$246,870	**$246,870**	**52**
Fuel	21,900			21,800				
Whitehorse								
Pipe	216,000	11.00	$2,376,000	157,400	11.00	$1,731,400	**$4,107,400**	**4,979**
Equipment-IN	3,900	63.30	$246,870	24,600	63.30	$1,557,180	**$1,804,050**	**380**
Equipment-OUT				28,500	63.30	$1,804,050	**$1,804,050**	**380**
Fuel	19,400	25.20	$488,880	21,800	25.20	$549,360	**$1,038,240**	**516**
Watson Lk.								
Pipe	156,600	23.30	$3,648,780	330,000	23.30	$7,689,000	**$11,337,780**	**6,492**
Equipment-IN	3,900	31.30	$122,070	3,900	31.30	$122,070	**$244,140**	**104**
Equipment-OUT				7,800	31.30	$244,140	**$244,140**	**104**
Fuel	19,400	13.00	$252,200	36,900	13.00	$479,700	**$731,900**	**704**
Total Canada	**800,400**		**$10,040,860**	**792,200**		**$15,997,510**	**$26,038,370**	**16,307**

It should be noted that the time frame being considered for the Rail Link planning, approvals and construction processes could well match the 7 – 10 years being estimated to complete the AHPP pipeline. The MGP may well precede this, but nothing is certain at this point in time. This is evidenced by the regulatory approvals process delays to date, and aboriginal resistance prior to land claims settlement.

The MGP contributions to Rail Link system are detailed in the following **Table 13**, which provides volumes, carloads, traffic season, and the revenue contribution to the Rail Link system for the MGP. Note that this encompasses pipeline construction requirements for the sections of the MGP system north of the Mackenzie River major stockpile and camp location at Little Chicago, NWT. Comparison of the traditional Mackenzie River barge rates with Yukon Gateway Alcan rail/Dempster Highway truck delivery cost estimates resulted in the Alcan/WP&Y route being more economical.

Table 13

Mackenzie Gas Project
Major Pipeline Construction Commodities
AK/Can Rail Link-Potential Traffic & Revenues

ALCAN "T ROUTE" ALIGNMENT

		Total Project In-bound			De-Mob	Little Chicago North		
Commodity	**Unit**	**Year 1**	**Year 2**	**Total In**	**AK/Can**	**Year 1**	**Year 2**	**AK/Can**
PIPE								
	tons:	264,860	208,670	473,530	-	97,470	22,400	**119,870**
Carloads	74 tons ea.	3579	2820	6399		1317	303	**1620**
Rate	USD Per Ton					$21.20	$21.20	**$21.20**
FUEL								
	tons	72,250	138,750	211,000	-	34,090	67,860	**101,950**
Carloads	80 tons ea.	976	1875	2851		461	917	**1378**
Rate	USD Per Ton					$19.00	$19.00	**$19.00**
EQUIPMENT								
	tons:	67,210	17,600	84,810	**39,380**	30,580	8800	**39,380**
Carloads	75 tons ea.	908	238	1146	**532**	413	119	**532**
Rate	USD Per Ton				**$56.80**	$56.80	$56.80	**$56.80**
					Total Volume (tons)			**300,580**
					Total Carloads			**4,062**
					Potential AlCan Revenue (USD)			**$8,951,860**

Notes:

1. Pipe is assumed to be sourced from the point with the most favorable freight rate to Carmacks
2. Pipe sourced in Portland, OR, delivered to Skagway by barge, to Whitehorse via WP&Y
3. Fuel sourced in Edmonton, delivered to Carmacks by AlCan over Hazelton
4. Equipment sourced in Peoria, Il, delivered to Whitehorse by AlCan over Hazelton, Carmacks
5. Pipe, Fuel and Equipment to truck at Carmacks for delivery to MGP over Dempster Hwy.
6. Note outbound movement, - demobilization of equipment at end of Year 2
7. AlCan traffic shaded