Appendix A-5

Opex Basis Report for 1.0 mbpd

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1.0 INTRODUCTION

As part of this study Capital and Operating estimates were prepared to support and validate the buiness case and technical aspects of the report. These estimates bring together the project objectives and operating conditions.

The Alberta to Alaska Railway is envisioned to transport bitumen along with other products such as minerals generated from the Alberta Oil Sands and along the proposed route. The Railway has been designed to start in the Fort McMurray, Alberta area and travel through to Delta Junction in Alaska.

The design of the railway and supporting infrastructure has been around shipping of bitumen in 192-car unit trains along the proposed mainline. The construction of the railway comprises of earthworks, track, structures, handling facilities, storage facilities, maintenance facilities, yards, signalling and communications systems. While this railway is purpose built for the hauling of bitumen it does not preclude any other commodities normally handled by railways.

In addition, the estimate allows for rolling stock, maintenance rolling stock and makes allowances for logistics, handling, preliminaries, environmental issues and permits, and owner's costs.

Design progress is limited at this pre-feasibility stage (PFS) and the estimate is based on the CIQS Class D estimate to provide an order of magnitude cost only with a low degree of precision. A significant proportion of the estimate is based on assumptions and allowances given that design progress is 0-5% complete, appropriate for a PFS report.

2.0 GENERAL OVERVIEW

As this Pre-Feasibility report is a desktop based study, the OpEx estimate is based on a project which will be refined further as design develops. With the development of the design a different set of assumptions and parameters may be used in the re-evaluation of the operating costs.

The estimates include for the following:

- Management, supervisory and administrative team
- Rolling stock maintenance
- Facilities maintenance
- Signals maintenance
- Communications maintenance
- Structures maintenance
- Track maintenance & derailment response
- Maintenance fleet hire/rental
- Train operation (transportation) costs
- Loading and unloading of oil and fuel for the railway operation

Capital costs (CapEx) are included in another estimate of Appendix A-4; this estimate is Operating costs (OpEx) only. Excluded from this estimate and the CapEx is the sustaining capital or renewal of capital infrastructure and assets costs.

Fuel has been allowed in the estimate for transportation of the oil sands, and for freight of supplies and maintenance and inspections.

The OpEx estimate has been calculated to provide costs year on year to a point of steady state which is achieved in year 4 (year 3 of output production). At this point it is assumed that the daily output is 1,000,000 barrels per day.

3.0 RATES AND PRICES

Prices are in CAD$ money of the day.

4.0 ASSUMPTIONS

4.1 STAFF RESOURCES

The following assumptions are incorporated in to the OpEx estimate:

Description	Quantity
EXECUTIVE	
President	1
Manager Railway Operations (VP)	1
Legal Director	1
Finance Director	1
HR Director	1
Marketing Director	1
Procurement Director	1
PA	4
GENERAL AND ADMINISTRATION	
Superintendent Health and Safety	1
Superintendent Training	1
Senior Advisor Rail Health and Safety	1
Safety & Rules Trainers	2
Rules/Driver Trainers	2
Coordinator Rail Safeworking	1
Safety Advisor	1
Safety Inspector	1
Police Superintendent	1
Constables (Canada)	5
Constables (US)	2
Sales Executives	2

Description	Quantity
Contracts/Claims (Canada)	3
Contracts/Claims (US)	1
Accounts Manager	1
Accounts Personnel	4
Accounts Analyst	1
Superintendent Traffic Systems	1
Manager Customer Service	1
CSR's	4
IT	2
ROLLING STOCK MAINTENANCE	
General and Administration & Engineering:	
Manager Rolling Stock	1
Administration	1
Locomotive Workshop	
General Manager	1
Superintendent	1
Administration	6
Supervisor/Team Leader	5
Technician	27
Servicemen	80
Wagon Workshop	
General Manager	1
Superintendent	1
Administration	6
Supervisor/Team Leader	5
Technician	20
Servicemen	102
Coordinator machine shop	3
Planning Manager	1
Planners	2
Track Vehicle Workshop	
General Manager	1
Track Vehicle Workshop Manager	1
Administration	4
Supervisor/Team Leader	2
Skilled Technician	12
Semi-Skilled Technician	4

Description	Quantity
Trade Assistant	8
Planning Manager	2
Planners	2
Quality Control	2
Materials Management	
General Manager	1
Superintendent	1
Lead Buyer	1
Administration	4
Planning Manager	1
Buyers	4
Store Person	4
Trade Assistant	8
Servicemen	4
Planners	2
Logistics	1
Quality Control	1
Engineering Management	
General Manager	1
Rolling Stock Engineer	1
Locomotive Engineer	1
Wagon Engineer	1
Track Vehicle Engineer	1
Reliability Engineer	9
Condition Monitoring	3
Maintenance & Modifications	3
Environment Engineer	1
Rolling Stock Technician	6
Administration	3
Supply Depot – Fort McMurray Freight Yard Operation	
Crane Operatives	4
Laborers	4
Supply Depot – Delta Junction Freight Yard Operation	
Crane Operatives	4
Laborers	4

Description	Quantity
ADMIN TO TRACK, SIGNALS, BRIDGES, TUNNELS, CIVIL, PLANT, DERAILMENT, ANCILLARY BUILDINGS	
Railway Maintenance Manager	1
Trainer	2
Office Admin	2
TRACK MAINTENANCE	
General Manager	1
Track Inspectors	4
Assistant Track Inspectors	10
Production Supervisor	2
Foreman	10
Welding Foreman	10
Assistant Foreman	20
Welders	20
Track Maintainer	60
Truck operators	5
SIGNALS MAINTENANCE	
Manager	1
Signal Supervisor	5
Maintainer	33
Technician	24
COMMUNICATIONS MAINTENANCE	
Senior Technician - Fibre Optic Network	2
Senior Technician - Radio	2
Technician - Fibre Optic Network	2
Technician - Radio	2
COMMUNICATIONS OPERATIONS	
Manager	0
Senior Technician - Fibre Optic Network	1
Senior Technician - Radio	1
Technician - Fibre Optic Network	1
Technician - Radio	1
Mechanic	1
IT Technician	2
BRIDGES, STRUCTURES AND TUNNEL MAINTENANCE	
Manager	0
Supervisor/Inspector	2

Description	Quantity
Foreman	2
Mechanical Inspector (Tunnels)	2
Electrical Inspector (Tunnels)	2
CIVIL PLANT MAINTENANCE & CIVIL MAINTENANCE	
Supervisor	1
Operators	18
Laborers	6
ANCILLARY FACILITIES OPERATIONS	
Building/Facilities Maintenance	
Manager	1
Admin	1
Supervisor/Team Leader	3
Security Gatehouse	
Control technicians	4
Security	26
Crewing Facility	
Administration	1
ANCILLARY FACILITIES MAINTENANCE	
Building/Facilities Maintenance	
Skilled Technician	4
Semi-Skilled Technician	4
Laborers/Custodial	8
Security Gatehouse	
Laborers/Custodial	1
Crewing Facility	
Semi-Skilled technicians	4
Laborers/Custodial	4
LOADING & UNLOADING	
Operations / Maintenance Field Manager	12
Supervisor / Team Leader	32
Skilled Operator / Technician	142
Semi-Skilled Operator / Technician	26
Laborer	31

Description	Quantity
TRANSPORTATION	
Manager Train Operations (OCC)	1
Superintendent Train Control (OCC)	1
Operations Manager (OCC)	5
Crew Dispatchers (OCC)	5
RTC Controllers (OCC)	15
Railhead Yard Controllers (OCC)	12
Planning / Performance / Measures (OCC)	1
Engineering Services Coordinator (OCC)	1
Control Centre Analysts (OCC)	5
Superintendent Transportation	1
Admin	1
Road Foremen	10
Drivers	380
Yard Master Fort McMurray and Delta Junction	10
Trade Assistants	16
Bunkhouse (3) Shift Supervisor	15
Laborers (Fort McMurray & Delta Junction)	10
MAINTENANCE FLEET HIRE	
Maintenance fleet operatives	46

Resources not included are:

- Security along the mainline
- Cleaning staff

4.2 ROLLING STOCK MAINTENANCE

The maintenance costs allow for maintaining the following:

Item	Quantity
Locomotives	208
Tank Cars	6,072
Tank Cars (Fuel)	30
Switch Car	4
Side Tipper Cars	10
Maintenance Cars	30
Ballast Cars	50
Cranes	2

Costs are based on a rolling programme of cyclical preventive maintenance and reactive maintenance for repairs when required.

4.3 TRACK MAINTENANCE

The track maintenance costs have been estimated through calculation of anticipated life-cycle of track materials. The estimate allows for the following annually:

Description	Quantity
Track replacement	347,578 m
Ties including clips, pads, insulators	880 ea.
Rail Plugs (6m)	1,000 ea.
Turnouts (no 20)	2 ea.
Turnouts (no 12)	10 ea.
Ballast	262,286 m^3
Maintenance of :	
Flash Butt Welding equipment (monthly inspection, maintenance, parts, tools)	
Lubricating equipment (tools, lubricant)	
Inspections (calibration of precision equipment, repairs, software upgrades)	
Brush Cutting equipment	
Ballast Cleaning equipment	
Rail Change Out equipment	
Rail Grinding equipment	
Track Inspection and Testing equipment	
Tie Renewal equipment	
Turnout Renewal equipment	
Small tools	

4.4 SIGNAL MAINTENANCE

The following has been allowed for on an annual basis:

Description	Quantity
Interlocking Card	2 ea.
Train Control System Card	2 ea.
Object Controllers	20 ea.
RBC Cards	2 ea.
Power Supplies	10 ea.
Surge Arrestors	100 ea.
Switch Point Machines	10 ea.

Description	Quantity
Copper Cable (multicore)	5,000 m
Fibre Cable (12-24 core)	5,000 m
Cable Joints	20 ea.
On Board Locomotive Control Systems	2 ea.
Asset protection systems	2 ea.
Axle Counter evaluators	2 ea.
Axle Counter Trackside equip	40 ea.
Computers	4 ea.
Maintenance Tools sets	4 ea.

The following assumptions apply:

- Workload for each mainline maintainer would be to cover three sidings
- Each mainline maintainer territory starts with radio/block location 15 km to east of siding then goes to Radio/block site 15 km west of third siding inclusive
- Each Terminal signal maintainer covers the terminal needs plus the first radio/ block site out of terminal
- Each mainline S&C/fibre/Communications technician workload will be 1/4 of mainline territory.
- Mainline technicians would work from each terminus plus two out of a midpoint train crew change point.
- Terminus technicians would be responsible for train radios etc. and computer base at their location along with the radio towers and communications locations

4.5 COMMUNICATIONS MAINTENANCE

The following has been allowed for on an annual basis:

Description	Quantity
Single Mode Fibre Optic Cable (96 core), m	1,200 m
Fibre Optic cable joints, pcs	8 ea.
Batteries, set	5 ea.
Miscellaneous cable items (including cable ties, springs and tags etc.) , set	4 ea.
Miscellaneous patch cords, set	4 ea.
Telephone, VoIP	10 ea.
TETRA BST	2 ea.
TETRA antennas	5 ea.
TETRA handset	60 ea.
Coaxial cable	600 m
Leaky coax	500 m
Lightning protection Inc surge arrestor	50 ea.
Transmission system	2 ea.

Description	Quantity
Air con repair kit, set	5 ea.
Electrical/ mechanical tool set	4 ea.
Fusion splicing equipment/ consumables	4 ea.
Other consumables, set	4 ea.

4.6 STRUCTURES MAINTENANCE

The following has been allowed for on an annual basis:

Bridge concrete repairs	50 ea.
Bridge parapet repairs	100 ea.
Re-surfacing	1,500 m^2
Concrete repairs	100 m^3
Capping or granular material for roads	1,000 m^3
Curbs	100 m
Lighting	25 ea.
Fencing	100 ea.
Utility repairs	50 ea.

4.7 ANCILLARY FACILITIES

Generally allowances have been made to cover maintenance to each building to cover equipment, the building, the roof, sanitary fittings and electrical repairs.

Power, water supply and foul water costs have been included.

4.8 LOADING AND UNLOADING

Personnel and equipment has been allowed for within the estimate to load and unload the oil sands/crude oil and the fuel for the operation of the railway.

4.9 TRANSPORTATION

The quantity of fuel allowed has been calculated using 1 million barrels output per day at steady state (year 3 onwards), and assessing that 329 operating days of the year will be utilised for generating this output, allowing for maintenance outages for the other days.

		1 Million Barrels Daily		
Location	Function	Crews Required	Daily Fuel (litres)	Daily Fuel Cars
Fort McMurray	Terminal	17	575,761	5.2
High Level	Crew Change Away			
Fort Nelson	Crew Change Home	34		
Laird River Crossing	Crew Change Away and Fuel		916,797	8.3
Ross River	Crew Change Home	34		
Kirkman Creek	Crew Change Away			
Delta Junction	Terminal	17	346,743	3.2
Total			**1,839,301**	**16.7**

Fuel for Railway Operations (Revenue Trains):		$618,111,035	*
	Fuel	**618,111,035**	litres / annum
Fuel for Railway Operations (Freight Train):		$3,782,635	*
	Fuel	**3,782,635**	litres / annum
Fuel for Track Maintenance		$7,519,000	*
	Fuel	**7,519,000**	litres / annum
Fuel for S& C Maintenance		$613,200	*
	Fuel	**613,200**	litres / annum
Fuel for Rolling Stock Maintenance		$504,714	*
	Fuel	**504,714**	litres / annum
TOTAL COST FOR RAILWAY OPERATIONS:		**$630,530,584**	
TOTAL FUEL QUANTITY FOR RAILWAY OPERATIONS:		**630,530,584**	**litres / annum**

The total estimated amount of fuel used over 329 operating days is 630,530,584 litres per year. The price allowed per litre is $1.00.

4.10 MAINTENANCE CREW

A maintenance crew complete with equipment has been allowed within the estimate to carry out rail maintenance and support the management, technical and labour force. It is assumed that this would be a maintenance contractor and therefore contractor overheads have been included as a cost to the operational cost.