

K-SHEU-LINE CR. (HORSESHOE RIDGE)
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FEASIBILITY REPORT
OF
SURFACE FACILITIES
INFRASTRUCTURE
SOCIO-ECONOMICS
ENVIRONMENT
FOR
LINE CREEK PROJECT
BRITISH COLUMBIA, CANADA
CROWS NEST INDUSTRIES LIMITED
MITSUI & CO., LTD.

OCTOBER, 1977

418

BY
CROWS NEST INDUSTRIES LIMITED

MINING RECORDER
RECEIVED and RECORDED
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M.R. #
VICTORIA, B. C.

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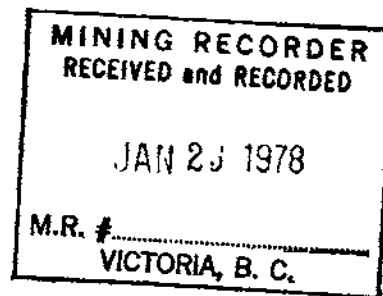
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**GEOLOGICAL BRANCH
ASSESSMENT REPORT**

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1.0 SURFACE FACILITIES

1.1 COST SUMMARY

	<u>Installed Cost</u>	<u>Yearly Operating Cost</u>
Fresh Water System	\$188,000	\$13,000
Sewage Treatment	51,300	2,600
Power Supply and Distribution	1,643,000	26,000
Outside Lighting	112,600	3,500
Rail Siding	3,300,000	
Warehouse and Shop	206,000	
General Office	239,000	
Fencing	15,000	
Communications	300,000	
Guard House	11,000	
TOTAL	\$6,065,900	\$45,100

1.2 FRESH WATER SYSTEM

SOURCE

The closest water source is Line Creek situated approximately one mile from the plant site. Stream flows have been monitored by the Water Resources Branch of the Federal Government. The minimum flow recorded over the last six years was 8.4 cubic feet per second, an equivalent of 4.5 million imperial gallons per day.

REQUIREMENTS

Water must be supplied in sufficient quantity to satisfy the demand for the plant process and domestic services.

plant process	210 Imp. gal./min.	=	252,000 Imp. gal./day
Domestic (showers, sewage, etc.)	2,000	"	
Total Daily Demand			254,000 Imp. gal./day

WATER SYSTEM

Water will be pumped from Line Creek through an 8 inch water pipe to a storage reservoir, located near the plant site. This storage reservoir will be a tank 47 feet in diameter, 20 feet in height and have a holding capacity of 200,000 imperial gallons. This volume is desired for surge capacity in case of pump failure at Line Creek and for a standby water source for fire fighting.

From this water tank water will be distributed to the buildings within the plant site. At the tanks there will be two pumps. One electrically driven pump used to supply plant and potable water while the second pump will be an automatic, diesel powered fire pump used only for fire fighting emergencies.

FRESH WATER SYSTEM - COSTS

Pumps

	HP	
Creek to Reservoir	40	\$3,000
Storage to Plant	30	2,900
Fire Fighting	525	76,100
		<u>\$82,000</u>

Storage Tank

200,000 gallon reservoir		\$49,000
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Piping

5,000 feet of 8 inch pipe		\$57,000
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Total Cost - Fresh Water System \$188,000

Yearly Operating Costs (Repair & Maintenance) \$13,000

1.3 SEWAGE TREATMENT

Two systems of sewage disposal will be considered for the Line Creek project. The system most desired for this project due to its ease of installation and low operating and maintenance costs would be a septic tank and field. To utilize this system favourable ground conditions in terms of percolation rates must be present. A septic system would cost in the range of \$13,000 with negligible operating and maintenance costs.

If the ground conditions are not favourable then a mechanical sewage treatment plant will be required. The effluent from such a plant will discharge into Line Creek.

For the purpose of feasibility a mechanical sewage system will be considered.

SEWAGE TREATMENT - COST

Sewage Plant	\$14,000
Oxidation Ditch	4,800
Discharge Pipe	30,000
Power Installation	2,500
Total Cost - Sewage Treatment	\$51,300
Yearly Operating Costs (Repair & Maintenance)	\$2,600

1.4 POWER SUPPLY AND DISTRIBUTION

POWER SUPPLY

The closest power source is the 138 K.V. Kanelk Line situated 1.25 miles from the plant site. Power will be tapped from this line by means of a switching station. Power will then be transmitted over a 138 K.V. line to the main substation. The main component of the substation will be a 15 M.V.A., 138 - 25 - 4.16 K.V. transformer. This transformer will break the power down for one 25 K.V. line to feed the mine and five 4.16 K.V. lines to feed the plant. The 25 K.V. line will be extended up the Line Creek valley by means of a six mile pole top power line. The five 4,160 volt lines will be placed underground and will provide power to all the plant site buildings.

POWER DISTRIBUTION COST

	<u>COST</u>
Engineering	\$25,000
B. C. Hydro Connection	1,000,000
Main Substation	
15 M.V.A., 138-25-4.16 transformer	120,000
138 K.V. isolating switch	8,000
138 K.V. lightning arresters (3)	10,000
138 K.V. oil circuit breaker	48,000
4.16K air circuit breakers (5)	75,000
25 K.V. oil circuit breaker	16,000
25 K.V. isolating switch	3,000
25 K.V. lightning arresters (3)	3,000
Miscellaneous (towers, foundations, grounding & capacitors)	28,000
Mine Feeder	
6 miles of 25 K.V. pole line @\$40,000 per mile	240,000
Plant Feeder	
11,000 feet of 4.16 K.V. line @\$6.09 per foot	67,000
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TOTAL	\$1,643,000
Yearly Operating Costs (Repairs & Maintenance)	\$26,000

1.5 OUTSIDE LIGHTING

In designing an outdoor lighting system, reference was made to the Canada Safe Illumination Regulations for guidance in determining minimum safe illumination levels for different working areas and work intensities. Each area of the plant was assigned a certain foot candle power and the illuminated area for that power was measured and tabulated. Reference was then made to the isolux plot for a standard 1,000 watt floodlight placed 30 feet above ground. The area of influence for each foot candle power under consideration was measured and also tabulated. The number of lights required for any area or power intensity is the quotient of these two numbers.

<u>Level of Illumination (Foot Candles)</u>	<u>Area Requiring Illumination (Sq. Ft.)</u>	<u>Light Influence Area (Sq. Ft.)</u>	<u># of Lights</u>
1	320,000	10,800	30
2	320,000	7,875	40
3	30,000	6,300	5
TOTAL			<hr/> 75

Therefore, we require 75 - 1,000 watt light standards.

OUTSIDE LIGHTING COSTS

Light Standard

Fixture	\$591
Photoelectric receptacle	8
1000 watt bulb	115
Post top slip fitter	30
30 ft. pole	664
Auto-Quartz emergency light	93
Total Cost Per Light Standard	\$1,501
Require 75 standards	
Total Lighting Cost	\$112,600
Yearly Operating Cost (Repair & Maintenance)	\$3,500

1.6 RAIL SIDING

The Canadian Pacific Railway has a spur line running through the Line Creek plant site. It will be necessary to construct a rail loop for the coal loading unit trains and a spur line leading into the plant site for unloading supplies. The total length of the rail construction will be three miles. Canadian Pacific Railway recommends for feasibility studies the cost of \$1,100,000 per mile for construction. Therefore the cost for rail facilities at Line Creek will be \$3,300,000.

1.7 WAREHOUSE AND SHOP

A warehouse and shop complex for servicing the plant area has been laid out and costed by Butler Buildings Ltd. The warehouse complex will house spare equipment and parts which relate to the plant operation. The shops, which are affixed to the warehouse will deal primarily with pump and electric motor repair and rebuild. The total footage of the 70 ft. x 125 ft. complex is 8,750 square feet, of which 5,000 square feet is for the warehouse. Butler Buildings have costed such a complex at \$19.54 per square foot. This is the erected cost and includes heating, lights and taxes.

WAREHOUSE AND SHOP COSTS

Cost \$19.54 per square foot

Warehouse size	5,000 sq. ft.	\$97,700
Shop	3,750 sq. ft.	73,300
Shop tools		35,000
Total Shop and Warehouse Costs		\$206,000

1.8 GENERAL OFFICE

A general office has been laid out and has been costed by Butler Buildings Ltd. The general office will house the general manager, reclamation, accounting, traffic control, personnel and purchasing. The total footage of the 60 ft. x 90 ft. building is 5,400 square feet. Butler Building has quoted an installed price of \$40.55 per square foot which includes lighting, heating and taxes.

GENERAL OFFICE COSTS

Costs \$40.55 per square foot

Office size	5,400 sq. ft.	\$219,000
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Office furnishings		20,000
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Total General Office Costs		\$239,000
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1.9 FENCING

Fencing will be placed around areas where passage should be restricted to specialized personnel or for safety. Such areas encountered in the plant area would be the substations, guard house, septic field or sewage treatment plant and outside storage. An installed cost for each fencing unit of a six foot chain link fence has been quoted by McLellan Supplies Ltd. of Calgary.

Assuming a gate and a corner may be installed on the average of every 100 feet, then an approximate unit price may be determined.

<u>Fencing Unit</u>	<u>\$/Unit</u>	<u># Units</u>	<u>Installed Cost</u>
Gate	\$21.83/ft.	12 ft.	\$262.00
Gate Posts	\$56/post	2 posts	112.00
Corner Posts	\$75/post	1 post	75.00
Straining Post	\$75/post	1 post	75.00
Fencing Mesh	\$8.66/ft.	100 ft.	866.00
Prov. tax			60.00
Fed. tax			50.00
			<hr/>
			\$1,500.00

Therefore, the installed unit cost per foot = \$15.00

FENCING COST

Fencing Costs \$15 per foot

Require 1,000 feet @\$15/foot

\$15,000

1.10 COMMUNICATIONS

B. C. Tel is presently studying the situation at Line Creek for telephone services. This may involve major construction of a new telephone line of which the costs will be absorbed by The Line Creek Project. For estimating purposes B. C. Tel recommends a total cost of \$300,000.

1.11 GUARD HOUSE

The guard house will be used to house the security people and put some control on the flow of people entering and leaving Line Creek property. The installed cost for this structure will be \$11,000.

2.0 INFRASTRUCTURE

TOWNS

No major problems are anticipated in establishing prospective employees in a community of their choice. A breakdown as to how they will distribute themselves is indicated in the Socio Economic section.

The existing communities of Elkford, Sparwood, Fernie, Coleman and Blairmore are all well established with populations ranging from 3,000 to 6,000 inhabitants. Sparwood will be required to undertake the largest expansion and is undertaking the necessary land assembly and study of services required to cope with expansion. Impacts of other communities should be readily resolved.

TRANSPORTATION

Line Creek Coal plant site is situated on the Kaiser-Fording spur line 715 miles distant from Vancouver.

The entire route is upgraded for unit trains and has been in use for the past several years by both Kaiser Resources and Fording Coal. Double tracking is being undertaken at three key locations which will reduce grade for loaded west bound trains while est bound will utilize existing trackage.

TRANSPORTATION - Cont.

There are, at present, three terminal options, Roberts Bank, North Shore (Neptune) and Port Moody with each having merits and drawbacks which are being investigated in detail.

Present indicated costs are:

	Neptune	Port Moody	Roberts Bank
C.P.R.	10.63	10.60	10.60
C.N.R.	0.795	-	-
Car Lease	1.100	-	-
Terminal	0.900	1.97* or 3.04	2.00
Totals	13.425	12.57 or 13.64	12.60

* Contingent on additional million tons available from other operations.

A) Roberts Bank Terminal - operating at full capacity now but contemplating expansion for which there is at present no firm time factor.

B) Port Moody - Facilities will require upgrading since it is not equipped to unload unit trains without breaking. Storage facilities would also require enlargement. Maximum ship size entry is 65,000 d.w.t.

C) North Shore (Neptune) - When approach is lengthened, will hold 104 cars of 10,000 tons. Turn around times are longer than for Roberts Bank and since an interchange is involved at Sapperton with C.P.R. using a few miles of C.N.R. tracks, there are legal and economic problems which must be solved. A recent arbitration hearing instituted by the Canadian Transport Commission submitted a decision which would resolve some of the contentious issues which have existed between the two companies. With this settlement, elimination of shipper-supplied cars is now a possibility.

ROADS AND HIGHWAYS

The Southern Trans Canada Highway (No. 3) runs past Sparwood and the increased vehicular traffic generated by Line Creek coal development can be readily absorbed. Midway between Sparwood and Elkford (No. 4 District Highway) a lateral blacktopped road and bridge over the Elk River will permit easy access to the plant site and mine. The lateral road and bridge will be constructed by Line Creek Coal.

Bus service is scheduled twice daily between Calgary and Vancouver with a connection also to Spokane. Pacific Western Airlines operates two flights daily to Vancouver and one to Calgary from the Cranbrook airport.

Being proposed, is a 5,000 foot air strip north of Sparwood or shorter strip between Sparwood and Fernie.

HYDRO AND GAS

B. C. Hydro and Columbia Natural Gas service Kaiser Resources and Fording Coal and will be available to Line Creek Coal Co. However, natural gas will not be available for thermal drying of coal.

3.0 SOCIO-ECONOMICS

3.1 In order to have a guideline, at least for planning purposes, Line Creek Coal has made certain assumptions regarding housing and labour force distribution in the adjacent communities namely Elkford, Sparwood, Fernie, all in British Columbia and Coleman and Blairmore in Alberta.

Total work force	348
Males	318
Females	30
Married	261
Single	87
Living in	
Sparwood	191
Ferne	105
Elsewhere	52
Married living in	
Sparwood	144
Ferne	78
Elsewhere	39
Single living in	
Sparwood	48
Ferne	26
Elsewhere	13

Houses required

Sparwood	101
Fernie	55
Elsewhere	28

Apt. Units Required

Sparwood	60
Fernie	32
Elsewhere	16

Trailer Space required

Sparwood	31
Elsewhere	8

Work force total of 348 is original contemplated work force and used for Socio - Economic study. Current work force figure is 384.

3.2 Land Assembly

- A) There are no surplus lots or houses available in Sparwood, however, council is preparing for contingencies relevant to future expansion. Some 800 acres of land have been optioned directly north and Council, jointly with the Provincial Government, is actively engaged in planning and outlining expansion procedures. Line Creek Coal, together with Kaiser Resources, recently met with Council and Provincial Government representatives to outline their present position and future expectations so that

when firm commitments are made, expansion in Sparwood can take place with minimum delay.

- B) Fernie has sufficient serviced lots to accommodate expansion and a satisfactory reserve of land that can be easily serviced.

Available at present are 161 serviced lots, 6 condominium units, 40 apartments and 30 or more houses.

- C) Impacts on other communities will be minor.

3.3 Housing Incentives

- A) Line Creek Coal intends to provide housing incentives for its employees. Final formulation has not yet been ascertained, but being considered is a \$10,000 second mortgage forgivable over a period of 10 years. The company will, as well, assume certain responsibilities relative to general community well being in that they will budget for donations to recreation, cultural or other activities. Projected total expenditures are in the order of \$3,140,000.

- B) Source of Labour Force

The proposed operation is open pit and as a consequence should not experience undue problems in recruitment of a labour force. There are shortages at present in some skilled trades categories

such as heavy duty mechanics, millwrights and electricians. The recent "Coal Policy Statement" issued by the Government of British Columbia indicates that they will assume a more positive role in training mining personnel. Company training programs will be implemented as required.

C) Service Industries

A good nucleus of service industries facilities are now well established in the general area and as required, they could service or expand to meet Line Creek Coal needs.

D) Construction Phase

A camp to accommodate about 350 plant construction and pre-production workers will be situated near the plant site area.

4.0 ENVIRONMENT

The Environmental and Land Use Committee of the province of British Columbia have set forth conditions for assessments regarding environmental impacts of proposed coal mines. The submissions are to be made in three stages. Line Creek Coal, during the spring of 1975, retained B. C. Research of Vancouver to conduct the complete investigation, including applications for permits, leases, etc.

Initial step was to file with the committee a Prospectus, which can be described as a broad outline of the project and a statement of intentions. This was followed by the Stage I presentation, which in essence is a base line study of all environmental aspects of pre-operation conditions and a preliminary indication of impacts. The Stage I study was accepted by the committee who in turn posed a number of responses towards which the Stage II study was to be directed. In addition, the Stage II was to outline in detail all aspects of the proposed operation and what mitigative or compensatory steps would be taken to offset adverse impacts. The Stage II study has been completed and submitted and is presently being reviewed by the committee. Acceptance of the Stage II study implies acceptance in principle for the project. Stage three will be concerned with the required applications for and receipt of permits from various branches of government, such as Ministry of Mines & Petroleum Resources, Pollution Control Board, Water Rights Branch, Ministry of Forestry, etc.

Request for cabinet approval follows the Stage III submission after which Stage IV is a program for continuous long range monitoring.