





FEASIBILITY REPORT

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COAL PREPARATION FACILITIES

FOR

LINE CREEK PROJECT

BRITISH COLUMBIA, CANADA

CROWS NEST INDUSTRIES LIMITED

MITSUI & CO., LTD.

MINING RECORDER RECEIVED and RECORDED

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M.R. #_____ VICTORIA, B. C.



MITSUI MINING COMPANY, LIMITED

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1.0 INTRODUCTION

Since April 1976, Mitsui Mining Co., Ltd. has been studying and planning on the Line Creek Project which is a coal mine developping project jointly being proceeded by Crows Nest Industries Ltd., who is the owner of this property, and Mitsui & Co., Ltd. by whom this study was requested. The location of this project lies around the Line Creek area of B.C., Canada.

This planning is a feasibility study to make sure the possibility of the development of this mine applying surface mining method and having about 2 million short tons of raw coal annual production. Most of the product will be metallurgical coal and a part of it will be thermal coal.

This report is a part of the mine planning feasibility study and describes the details concerning coal preparation area in particular.

For the planning, under the consideration of the mine production scale, mining plan, raw coal washability etc., the following conditions were especially taken into account.

a. Simplifying the plant design as much as possible.

 Keeping the efficiency and accuracy of coal preparation as high as possible.

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Consequently, the plant capacity was decided to be able to handle 500 short tons of raw coal per hour. This calculation is based upon that the assumed annual workable days are 245 days and plant availability is 75 percent, therefore, this plant will have raw coal annual capacity of maximum 2.2 million short tons.

Scope of this design ranges from raw coal truck dump bin to clean coal railroad loading point, and also includes emergency tailings ponds and refuse desposal facility. This report consists of following items:

- a. Quality analysis of raw coal and clean coal
- b. Basic planning
- c. Washability of raw coal
- d. Selection of equipment
- e. Prediction of plant performance
- f. Design criteria
- g. Flowsheet
- h. Equipment list
- i. Manpower
- j. Capital cost
- k. Operating cost
- 1. Construction schedule
- m. Drawings

From the environmental point of view, this plant was very carefully designed by paying deep consideration on the pollution matters. The closed water circuit system was chosen for waste water treatment in order not to discharge any plant bleed to the river and in order to use all the water for reuse except the moisture on the products and solid disposal.

Design capacity of the dryer was minimized by using enough efficient mechanical dewatering equipments and resulting surface moisture reduction as much as possible so that total amount of fugitive dust emissions can be minimized.

In addition to those, it was taken into account satisfactorily to provide enough room for the solid waste materials at the refuse disposal area. And also rock protective berm will be built surounding the area to prevent any bleeding of the waste materials. Furthermore, this plant was designed on the reasonable noise and vibration control level.

2.0 SUMMARY

2.1 Location and Climate

Line Creek Area is locating in southeastern part of B.C., Canada, 710 miles away from Vancouver eastward, 49°58' north latitude and 114°45' west longitude.

The preparation plant is expected to be built in Elk-Fording Valley which lies between the Line Creek and the Grave Creek, which are branches of the Elk River. This location is about 6 miles away down stream from the mine site along the Line Creek.

There is an existing railroad of C.P.R., from Sparwood to Fording Coal Mine alongside the Elk River. Planned plant site is very close to this railroad and the distance from Kaiser's Balmer Mine is about 10 miles.

Average annual precipitation of this area is about 40 inches, average snowfall during winter time is about 12 feet and average height of snowfall is about 2.5 feet. It is possible to get enough water for the plant and domestic use from the Line Creek. Average temperature of this area is 70°F in Summer and 20°F in Winter. The registered lowest temperature is -43°F and the highest is 97°F.

2.2 History of Study

Various studies and test works have been done on Line Creek

Ridge Area so far.

From 1968 to 1973, samples were taken from more than 50 bore holes and 12 adits, and various tests were carried out on coal quality, washability, coking property etc.

In 1970, practical washing tests were carried out on 10 tons of composite samples of seams No.8, 9, 10B and 10A at Deister Concentrating Company.

John T. Boyd Company presented a Coal Mine Developing Report to C.N.I., and 600 tons of raw coal were taken from Adit 4, 5, 7 and 12, then practical washing test was done at the Coleman Collieries Plant in the same year. Meanwhile, in 1970, clean coal samples of seams No.8, 9, 10B and 10A were sent to Japanese steel mills for their testing and evaluated as coking coal.

In 1972, 20,000 tons of raw coal were mined at Test Pit No.10 of No.8 seam and washed at the Coleman plant in commercial basis.

In 1976, bulk samples of No.8, 9, 10B and 10A seams were taken and most of them were shipped to Japanese steel mills as clean coal after being washed at Birtley Engineering, and a part of the bulk samples was sent to Mitsui Mining Co., Ltd., then quality and washability tests were carried out. Besides, coal quality and washability tests were done on the channel samples, which were taken from adits of No.6 and No.7 seams respectively about

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the end of the year.

2.3 Minable Seams

There are six minable seams in this property, namely, No.6, 7, 8, 9, 10B and 10A seams in descending order, and distance between each seam is comparatively close. Average seam thickness and raw coal ash contents are shown below.

<u>Seam</u>	Seam Thickness	<u>Raw Coal Ash</u>
	(ft)	(%)
# 6	15.21	12.2
# 7	16.96	27.0
# 8	38.22	17.3
# 9	17.80	17.5
#10B	14.64	16.1
#10A	9.17	20.7

Among above seams, four seams, such as No.8, 9, 10B and 10A are considered as main minable seams. And No.8 seam is the thickest minable seam, for example, working height of No.8 seam is nearly the same as the total working height of the other three main seams.

These coals are rather difficult to wash by jig washer because the washability of each seam is not so good in general. As far as washability is concerned, No.6 and No.9 seams are comparatively good, No.8 and No.10B are worse and No.10A is the worst. Coking

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Property of No.8 seam is somewhat inferior comparing with the other seams.

Because there are prenty of differences on quality and washability among the seams, careful blending of raw coal will be necessary in order to keep quality of clean coal uniform. Therefore, some consideration should be taken into account on the blending matter not only at the plant site but also at the mine planning stage.

2.4 Coal Preparation Plant

This coal preparation plant is designed to wash about 2 million short tons of raw coal to produce approximately 1 million metric tons of metallurgical coal and approximately 0.4 million metric tons of thermal coal annually. Design criteria of this plant are as follows:

a. Clean coal ash

	Metallurgical coal	9.5%
	Thermal coal	10 - 12%
b.	Total moisture	8.0%
c.	Plant capacity	500 STPH (Raw coal)
đ.	Working days	245 days annually
		5 days <mark>a we</mark> ek
		3 shifts a day
e.	Availability	75%
f.	Average clean coal yield	70%
g.	Cleaning process	

	Size range
H.M. Cyclone	2" x 28M
Deister Table	28M x 100M
Froth flotation	100M × 0

This plant will have two paralleled circuits except thermal dryer, which handle 28 Mesh x 0 fine coal up to 40 percent of plant feed.

2.5 Coal Handling

Extracted raw coal will be hauled to raw coal stock yard of mine site, where is devided into six sections via belt conveyor after reducing the top size up to 6 inches, where metallurgical and oxidized raw coal will be stored separately seam by seam by stacker.

Front end loader will be used to load the raw coal onto trailers, which transports the raw coal to the plant. When the coal is loaded onto the trailers blending will be carried out on the basis of certain blending ratio of the seams.

The raw coal from the mine site will be received at a truck dump bin at the plant site, the metallugical and oxidized coal will be separately stored in a stockpile building with roof via a transfer tower.

A tunnel conveyor will be used to reclaim the coal from the

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bottom of the stockpile building and transport to a breaker station prior to go into the washing process. However, in case of oxidized coal, there is an emergency raw coal storage area, where the coal will be transported by trucks from a loading bin, to where the coal will be conveyed via the transfer tower.

Storage system of clean coal is very similar to the raw coal, that is, the metallurgical and thermal clean coal will be separately stored into a roofed stockpile building. Besides, there will be provided an emergency storage area, which can store up to 10,000 tons by belt conveyor only. However, the capacity can be expanded up to 100,000 tons by bulldozer. A belt conveyor will be used to store the coal and a tunnel conveyor will be used to reclaim the coal.

The clean coal stored in the clean coal stockpile building will be drawn by a tunnel conveyor, then will be loaded onto unit trains at a rate of 3,000 short tons per hour. Two unit trains will be provided.

It will take about four days for one round trip of the unit trains from Line Creek to Vancouver.

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