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FEASIBILITY REPORT  
FOR  
BABCOCK PROJECT  
OF  
QUINTETTE COAL LIMITED

December 1974

By  
Mitsui Mining Co., Ltd.  
Tokyo, Japan

(Includes Introduction  
General Description  
Developing Plan  
Mining Plan  
Ptn. Capital Costs  
Ptn. Operating Costs  
Estimated Costs and Income)

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## Introduction

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During 1973 Denison Mines Ltd., World Resources Co., Ltd. Tokyo Boeki Ltd., and Mitsui Mining Co., Ltd. initiated and brought into being an agreement where by the four companies would plan, develop and perform hydraulic mining method in the Babcock mountain area situated in the south west of Dawson Creek, British Columbia, Canada, where massive reserves of high grade metallurgical coking coal lie at elevation varying from 5,400 to 2,800 feet.

In this joint venture, the four companies would pool both their knowledge and finances. The senior management of the joint venture initiated this feasibility study to assess the economic viability of a full scale hydraulic mine in this area based on the Mitsui's hydraulic mining experience.

April 1974, Mitsui submitted the interim report which summarised outline of the plan and the economic feasibility. The additional exploration work, from June to September 1974, was carried out mainly along the Quinteete trend and proved another 40 million tons of minable coal reserve.

Consequently, the previous developing plan has been reviewed and revised basing on the 1974 exploration work. Principal revision is that the steep area is divided into the upper level and lower level and the earlier production is planned in the upper level only by gravity flow (no underground pumping system).

As to the flat area, the plan has been also revised in order to involve the F seam into the operation.

Both the capital and the operation cost have been also reviewed and recalculated in accordance with the economical change up to the present.

We, Mitsui engineers, believe that the hydraulic mining system is always the most effective and economical method to mine coal from the steep pitching and thick coal seams. In case of less pitching coal seam, however, there is a limit to adopt the hydraulic method because the gravity flow is not effective for the flume line less than 3 degree gradient. After studying various kinds of material for the less gradient flume line we have gained confidence that the hydraulic method is quite utilized for the pitching coal seams more than 6 degrees.

Considering such an isolated area as this, it will not be easy to employ a number of skillful miners. Hydraulic method has the most advantageous point in view of recruiting underground miners because the practicing and training of this mining method are much easier than the other method prevailing through the world.

Thus, this system has been planned for the whole mining area in this property.

This report was prepared by the following personnel :

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General  
Description

## I. General Description

### 1. Summary

This plan is for the construction, development and bringing into operation of a new mine in eighty licenses in Babcock and Quintette Mountain district. This district is composed of two mining areas, so-called the flat area (Babcock Mountain Area and Babcock Creek Area) and the steep area (Waterfall Creek Area, Caribou Area, Centre Area and Quintette Mountain Area).

In the flat area, No.1 mine will be constructed in Babcock Mountain Area. The workable coal seams by hydraulic method are D, F and J. These are simultaneously worked during operation. In D and F seam one monitor unit will operate respectively. J seam will be worked with two monitor units. At the bottom of the mine a parmanent dewatering and pumping station for all seams will be constructed in order to concentrate the coal transportation system. This facility will be available for twenty years or more. Annual production will be 3,000,000 long tons of raw coal or 2,200,000 clean coal long tons including coal from developing faces.

In the steep area, No. 2 Mine will be constructed in the upper level of Caribou North Area and No. 3 Mine is also constructed in the upper level of Centre Area. The workable coal seams in this area are F, I and J. Each mine has one monitor unit and will operate simultaneously. No dewatering and pumping facilities are in their underground and all coal produced will be flumed from faces to portals. After mining both of the mines, the operation will move to No.4 Mine which will be constructed in the lower level of No. 2 and No. 3 Mine. No. 4 Mine has to



have dewatering and pumping station at the bottom in the underground as same as No. 1 Mine. Annual production in the steep area will be 1,220,000 raw coal long tons or 900,000 clean coal long tons during operation.

As for a production schedule it is expected that the first production will come from No. 2 Mine with 450,000 long tons annual after 1.5 year mine developing, and another 1 year after the first production No. 3 Mine will commence the operation with the same amount of the production. To develop No. 1 Mine will take about 3 years. Therefore, the full scale production (3,100,000 L.T. annual) will achieve 3 years after initiating the mine construction.

Although improved monitor and ancilliary equipment design, concentration etc. will undoubtedly increase efficiency, productivity and profitability while lowering costs, existing standard performances have been used throughout to ensure all targets are attainable.

The plant and most of surface facilities will be constructed and installed along the Babcock Creek which flows in the central location of this property.

As for a coal preparation plant, the basic calculation and flowsheet has been completed. The detailed design for the construction of the plant should be prepared at a later date. The capacity of the plant has to be 900 long tons raw coal fed per hour for above production. The ash content of the clean coal has been planed at 7.5% in case of 73.4% of the plant recovery.

## 2. Location and Transport

The proposed mining property, lies in the eastern foot of Rocky Mountain area, which lies at 55 degrees N Lat. and 121 degrees W Long., and is the south east of Dawson Creek B.C. (70 air miles) and south west of Chetwynd B.C. (60 air miles).

Access from Beaverlodge, located between Dawson Creek and Grande Prairie, Albata, is via secondary and dry weather roads (90 miles).

Rail way distance from Chetwynd to Vancouver is 715 miles and to Prince Rupert is 740 miles. Rail from Chetwynd to the mine site (70-75 miles) should be newly constructed.

## 3. Topography

The mining area lies in a mountainous region of the Rocky Mountain Foothills more than 2,800 feet high. Babcock Mountain is located north to the area and the ridge extended from Quintette Mountain runs south to the area in a north western direction.

Between the above-mentioned mountain and ridge, there run the Waterfall Creek in a north western direction and the Babcock Creek in a north eastern direction. The Murray River flows in a north-eastern direction along the north-west border of the property.

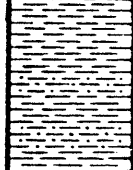
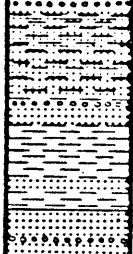
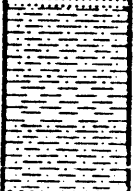

The tree line is at about 5,200 feet. Consequently, the majority of this area is covered by dense forest.

### Summary

Raw Coal Produced per year	4,200,000 L.T.
Washing Yield	73.4 %
Clean Coal Produced per year	3,100,000 L.T.
Number of Personnel	Labor 669 Salaried 105 Total 774
Production per man per day	Raw Coal 23 L.T. Clean Coal 17 L.T.
Capital Cost	C\$ 147 Million
Construction Period	3 years
Operating Cost	C\$ 14.95/C.C.L.T.
Interest	C\$ .80/C.C.L.T.
Depreciation	C\$ 3.57/C.C.L.T.
B.C. Provincial Tax 15%	C\$ 1.90/C.C.L.T.
Depletion	C\$ .15/C.C.L.T.
Federal Tax 45%	C\$ 4.75/C.C.L.T.
Total Cost	C\$ 26.15/C.C.L.T.
Sales Value F.O.B. Mine	C\$ 32.00/C.C.L.T.
Net Earnings	C\$ 5.85/C.C.L.T.
Cash Flow	C\$ 9.75/C.C.L.T.

#### 4. Geological Condition and Coal Seam.

The formations in this area is the Lower Cretaceous which briefly summarised as following figure.

Series	Group	Formation (Thickness)	Seam	Columnar Section	Description
LOWER CRETACEOUS	FORT ST. JOHN GROUP	Shaftesbury F. (270 ft +)	A B C D E F J K		Alternation of interbedded dirty gray shale and mudstone with a few thin sandy shale.
		Boulder Creek M. (400~460 ft.)			Coarse fine grained, well sorted sandstone, massive conglomerate, and non-marine gray shale with thin layers of carbonaceous materials.
		Halcross M. (300 ft.)			Dark-gray marine shale and sandy shale with a few sideritic concretions and kaolinitic mudstones.
		GATES Member (860~900 ft.)		Upper Gates Interval	Cyclic alternation of interbedded gray shale and coarse-fine grain sandstone, conglomerate and coal. About three coal seams are workable and other six coal seams are unworkable.
				Babcock Member	
				D.E.F. Zone	
				Middle Gates Interval	
				Quintette Member	
		Moosebar F. (400 ft.)			Dark gray marine shale with sideritic concretions; glauconitic sandstone and pebbles at base
		BULL HARD GROUP			

Main coal seams in this area are D, E, F, I and J in Commotion Formation and Bird zone in Gething Formation. In this report, D, F and J in the flat area (Babcock Mountain Area) and F, I and J in the steep area (Caribou North Area and Centre Area) have been planned in view of economical mining operation.

Another coal seams have not been taken into this plan for following reason. E seam, overlying very close to F seam, in the flat area is rather thin and contains rock partings, and I seam in flat area is very poor. The thickness of D seam in steep area is not sufficient enough for the effective hydraulic mining operation. For planning Bird zone in Gething Formation, it is still necessary to do more exploration work in order to prove the quality and the reserve although it has much potential to be minable.

D seam :

The seam thickness in the flat area is 8 to 10 feet and 7 to 8 feet in the most of the steep area.

The roof is mainly massive sandstone or granule to pebble bearing sandstone. The floor is shale.

F seam :

The seam thickness in the planning area is 8 to 10 feet in the flat area and 8 to 13 feet in the steep area. There contains few partings and the quality is the best in the property.

In most places there is a bed of bony at the top which gradually changes to shale to the roof. The floor is shale.

I seam :

This seam in the flat area splits into 3 parts and is not attractive for mining. In the steep area, it develops toward Caribou and Centre area, the seam thickness is 10 - 16 feet. The seam contains coaly shale and shale bands and the roof is shale.

The intervals between J and I seam varies from 3 to 60 feet in the planning area. The floor is shale.

J seam :

The seam thickness in the planning area is 17 to 22 feet and the shale parting of about 1 foot in the middle divides the seam into two parts. The lower part is of better quality compared with upper part, and contains coaly shale or shale parting of 1 to 3 feet.

The roof is shale or sandy shale. The shale contains carbonaceous material in places which may give poor roof condition. The floor is shale.

# Summary of Movable Coal Seam Condition.

Coal Seam	Seam thickness (feet. average)	Dip (Degree)	Seam interval (feet to upper seam)
Babcock Mt. Area			
D	9.8	6-14	-
F	8.6	6-14	57-169
J	18.7	6-14	37-219
Caribou North & Centre Area			
F	9.5	60-70	100-150
I	12.3	60-70	78-150
J	18.2	60-70	3-60

Developing Plan



## II. Developing Plan

### 1. General Description

This plan is composed of two mining areas. One is the flat area (Babcock Mountain Area) in which No. 1 Mine will be constructed, and the other is the steep area (Coribou North and Centre Area) in which No. 2, No. 3 and No. 4 Mine will be opened subsequently.

In case of hydraulic method, the most economical means of transportation is by open flume and gravity flow. This principle has been used throughout the design, in which dewatering station at the lowest point underground has been included.

At least 4 degree gradient will be used on all flume roadways. For the less gradient a special flume line made of plastic, grass or enameled steel will be provided in order to reduce the frictional resistance.

### 2. Flat Area (No. 1 Mine)

Two pairs of rock slopes for inlet air ways, the man and material transportation and the water supply have been designed. A pair of A Slope (A-1, A-2), which is driven from the point near the Babcock campsite (4,480 ft. Sea Level), will reach J seam and the bottom of the mine (3,800 ft. S.L.). The gradient of each slope is 23 degrees and its length is 1,740 feet. The access from surface to D and F seam is via the other pair of B Slope (B-1, B-2) which is driven from the south west side of

the mine on the 4,640 ft. elevation. Each rock slope, 970 feet long and sloping at 23 degrees into the mine, will penetrate D seam at the point of 720 feet from the portal and contact F seam after 250 feet driveage from D seam.

For concentration of the dewatering facilities, a rock flume slope from the bottom of D seam to the main flume road of J seam will be driven via the bottom of F seam. Thus all coal produced will be got together and flumed into a dewatering station at the bottom of the mine.

The oversize product of the dewatering screen will be transported to raw coal silos with conveyor belt while the underflow will be pumped by slurry pumps to the thickener. The conveyor belt and slurry pipe lines will be installed in Belt Slope which is tunneled with 16 degree gradient from portal (4,420 ft. S.L.) to the bottom (3,750 ft. S.L.) and 2,430 feet in length. At the bottom end of Belt Slope, a 400 ton raw coal hopper is constructed in order to adjust the feed to the conveyor.

A pair of main entries will be driven to form mining panels. These main entries are driven basically on the foot wall. The layout of the main entries is such that subrise lengths of about 4,500 feet are achieved throughout the operation. Although this length might be a little longer than the existing standard it could reduce the moving frequency of working faces and number of junctions. A barrier pillar, which is more than 150 feet in width will be left along the main entries. This enables effective sealings of all or any individual areas.

The interval between D and F seam is 57 to 169 feet and

between F and J seam is 37 to 219 feet. This aspect has been considered to design mining panels in order not to disturb mining operation in upper seam.

The complete retreating subrise system has been planned in mining panels.

As for the ventilation system, A and B Slope will be available for intake air way for the whole mining area respectively. An air shaft, which are constructed at the west side of the mine from the elevation of 4,800 feet to 4,300 feet (J seam), will be for outlet way from all seams. The shaft could be also intake air way if it would be necessary to convert after proceeding mining panels.

All main entries and subrisers will be driven using continuous miners except that small heading machines will be used for the crosscut drivage between main entries or subrisers.

Extracted coal will be loaded into the open flume line which is extended to the heading face and sluiced to the dewatering station together with coal from monitoring faces.

The roof of main entries and subrisers in D and F seam which follow the hanging wall will be roof-bolted wherever possible. While steel square sets or arches will be used in less reliable conditions and in J seam.

Average advancing of the developing face has been planned 60 feet per day. To obtain this target even where steel supported area, temporary supports consisting of steel beams and hydraulic props will be provided in order to reduce timbering time while increasing time for cutting coal.

3. Steep Area (No. 2, No. 3 and No. 4 Mine)

To achieve the earlier production from the steep area, each individual mining area has been divided into two panels, which are upper level and lower level, and will commence mining from upper level.

In the upper level panel the raw coal transportation utilizes all gravity fluming to the portal, while the lower level panel requires underground dewatering with conveying and pumping of the coal to the surface as well as No. 1 Mine in the flat area.

As the interval between I and J seam is very short (average 26 ft.) these two seams will be simultaneously worked during operation. F seam will be worked after mining I and J seam through the all individual mining areas.

The complete retreating sublevel system will be adopted in the whole mining areas.

No. 2 Mine will be constructed in the upper level of Caribou North Area. A pair of 4 degree rock tunnels which is driven

from the 4,650 ft. elevation around the watershed of Waterfall Creek will penetrate F, I and J seam after 1,350 foot drivage

The rock tunnels can be access for Caribone South Area where is much possibility to be mined in future.

A pair of main entries in I and J seam will be driven from the end of rock tunnel (4,770 ft. S. L.) toward the north west. One of a pair will pass in I seam and the other will be driven in J seam. The gradient and the length of the main entries will be 4 degrees and 4,200 feet respectively. At the end of the main entries (5,060 ft. S. L.) they will be connected to a pair of air ways which will be driven from the outcrop.

A pair of 4 degree main entries of F seam will be independently developed from the rock tunnels and will come out to the F seam outcrop after 4,500 ft. drivage.

All of the main pipelines and the flume line will be installed in the rock tunnels and main entries which are both used for ventilation purposes. Coal produced in No. 2 Mine will be flumed to dewatering station which is constructed on the outside of the portal.

The development of I and J seam in No. 3 Mine will commence after completing the dewatering facilities around the portals which are located on the outcrops near the branch of Babcock Creek. A pair of main entries will be driven from the portals (4,500 ft. S. L.) toward the south east with the same manner as No. 2 Mine. After 11,300 ft. drivage the main entries will come out to the outcrops and form the upper level mining panel. A pair of 7 degree air ways will be driven from outcrop and connected to the main

entries at the point of 5,200 ft. far from the portals. From this junction a rock crosscut will be driven to F seam and connected to F seam's air ways. Then a pair of main entries in F seam will be developed and come out to the outcrop after 6,200 ft. drivage. All coal produced in No. 3 Mine can be flumed out of mine to the surface dewatering station.

No. 4 Mine has been planned to extract coal in the lower level of No. 2 and No. 3 Mine. The development of this mine shall be completed prior to mining out above two mines. To provide access to No. 4 Mine three rock slopes will be driven from the 4,370 ft. elevation near the Babcock campsite. One of these will be belt slope and the other two are for ventilation, man and material transportation and pipelines fixed. These rock slopes, sloping at 16 and 17 degrees into the mine, will be connected to F, I and J seam and the dewatering and pumping station which is located in the floor rock of J seam at the 3,700 ft. elevation.

Main entries along I and J seam will be developed to the both side of the slopes and form two mining areas. A rock crosscut, which is driven from the dewatering station, will connect with the main entries of each seam to concentrate the gravity fluming. Four degree gradient will be used on the main entries and the rock crosscut.

A pair of main entries developed in I and J seam toward the north west, length is 13,000 ft., will connect with air ways at three points on the way. Air ways in F seam will be developed with 7 degree gradient toward the south east via rock crosscuts which are driven from main entries of I and J seam. All sub-levels in F seam will be developed from the air ways.

The south east side of this mine will be developed in lower level of No. 3 Mine by the same manner as the north west side.

Each individual side of No. 4 Mine will be operated by one unit monitoring face simultaneously.

Heading machine and fluming system will be used during drivage. For cutting the crosscuts between subrises or main entries it is considered to employ a kind of boring machine.

In the steep pitching area, the roof of main entries, air ways, and sublevels is coal so there need reliable support such as steel arches or steel square sets for whole development. In sublevels, however, it may be difficult to recover support because of big earth pressure, so square sets with a steel beam and wooden legs will be used considering cost of supporting material.

Average advancing of the developing face has been planned 60 feet per day for I and J seam, and 50 feet per day for F seam, respectively.

MINING PLAN



### III. Mining Plan

#### 1. Flat Area (No. 1 Mine)

In case of the hydraulic mining the consistent roof condition always results in good mining recovery, productivity and quality, however, the amount of out-of-seam dilution is usually bigger comparing with that in the other mining methods. In this plan the amount of dilution has been estimated from the observation of the outcrop adits and drill core samples.

The following table presents possible aspect of the mining thickness, the amount of dilution, the raw coal ash content and the specific gravity.

	D seam	F seam	J seam
Scam Thickness	117" (9.8')	103" (8.6')	224" (18.7')
Ash %	20.00	17.33	20.12
Sp. gr.	1.50	1.48	1.50
Dilution	9"	17"	6"
Dilution Sp. gr.	2.2	2.2	2.2
Dilution Ash %	87.12	90.40	88.54
Mining Thickness	126" (10.5')	120" (10')	230" (19.2')
Raw Coal Ash %	24.79	27.68	21.90
Raw Coal Sp.gr.	1.55	1.58	1.51

Four of monitoring units has been planned i. e. 1 each for D and F seam and 2 for J seam. Each monitoring unit will be composed

of 2 monitor faces. One monitor out of a pair, at any one time, will be operating while the other will be either retreated or on standby.

# Summary of Raw Coal Production D-seam

Panel	No. 1	No. 2	No. 3	No. 4	No. 5	Total
Main Entry (ft)	49,100	14,200	31,000	8,800	19,200	122,300
Raw coal (t/ft)	7.6	7.6	7.6	7.6	7.6	7.6
Raw coal produced (t)	373,000	108,000	236,000	67,000	146,000	930,000
M.E. crosscut (ft)	12,300	3,500	7,700	2,200	4,800	30,500
Raw coal (t/ft)	5.1	5.1	5.1	5.1	5.1	5.1
R. coal produced (t)	63,000	18,000	40,000	11,000	24,000	156,000
Subrise (ft)	77,000	65,000	22,000	56,000	78,000	298,000
Raw coal (t/ft)	6.8	6.8	6.8	6.8	6.8	6.8
Raw coal produced (t)	524,000	442,000	150,000	381,000	530,000	2,027,000
S.R. crosscut (ft)	39,000	32,000	11,000	28,000	39,000	149,000
Raw coal (t/ft)	5.1	5.1	5.1	5.1	5.1	5.1
Raw coal produced (t)	196,000	166,000	56,000	143,000	199,000	760,000
Monitor Retreat (ft)	77,000	65,000	22,000	56,000	78,000	298,000
Raw coal (t/ft)	30	30	30	30	30	30
Raw coal produced (t)	2,310,000	1,950,000	660,000	1,680,000	2,340,000	8,940,000
No of Monitor Unit	1	1	1	1	1	1
R. coal produced (t/day)	2,400	2,400	2,400	2,400	2,400	2,400
Monitor Retreat (ft/day)	80	80	80	80	80	80
S.R. Heading (ft/day)	80	80	80	80	80	80
R. coal produced (t/day)	540	540	540	540	540	540
S.R.C. Heading (ft/day)	40	40	40	40	40	40
R. coal produced (t/day)	200	200	200	200	200	200
Monitoring & S.R. Heading	3,140	3,140	3,140	3,140	3,140	3,140
R. coal produced (t/day)						
Workable days	962	813	275	700	975	3,725
Workable years	4.1	3.5	1.2	3.0	4.2	16.0
Workable Reserve (t)	3,466,000	2,684,000	1,142,000	2,282,000	3,239,000	12,813,000
Monitor coal (%)	66.6	72.7	57.8	73.6	72.2	69.8

## Summary of Raw Coal Production

F-seam

Panel	No. 1	No. 2	No. 3	No. 4	Total
Main Entry (ft)	48,000	33,200	10,900	21,000	113,400
Raw coal (t/ft)	7.6	7.6	7.6	7.6	7.6
R. coal produced (t)	365,000	252,000	83,000	162,000	862,000
M.E. crosscut (ft)	12,000	8,300	2,700	5,300	28,300
Raw coal (t/ft)	5.1	5.1	5.1	5.1	5.1
R. coal produced (t)	61,000	42,000	14,000	27,000	144,000
Subrise (ft)	139,000	23,000	68,000	83,000	313,000
Raw coal (t/ft)	6.8	6.8	6.8	6.8	6.8
R. coal produced (t)	945,000	156,000	462,000	565,000	2,128,000
S.R. crosscut (ft)	70,000	12,000	34,000	41,000	157,000
Raw coal (t/ft)	5.1	5.1	5.1	5.1	5.1
R. coal produced (t)	354,000	59,000	173,000	212,000	798,000
Monitor Retreat (ft)	139,000	23,000	68,000	83,000	313,000
Raw coal (t/ft)	27	27	27	27	27
R. coal produced (t)	3,753,000	621,000	2,241,000	2,241,000	8,451,000
No of Monitor Unit	1	1	1	1	1
R. coal produced (t/day)	2,100	2,100	2,100	2,100	2,100
Monitor Retreat (ft/day)	77.8	77.8	77.8	77.8	77.8
S.R. Heading (ft/day)	77.8	77.8	77.8	77.8	77.8
R. coal produced (t/day)	530	530	530	530	530
S.R.C. Heading (ft/day)	38.9	38.9	38.9	38.9	38.9
R. coal produced (t/day)	200	200	200	200	200
Monitoring & S.R. Heading					
R. coal produced (t/day)	2,830	2,830	2,830	2,830	2,830
Workabel days	1,787	295	874	1,067	4,023
Workable years	7.6	1.3	3.7	4.6	17.2
Workable Reserve (t)	5,478,000	1,130,000	2,568,000	2,568,000	12,383,000
Monitor coal (%)	68.5	55.0	71.5	69.9	68.2

# Summary of Raw Coal Production J-seam

Panel	No. 1	No. 2	No. 3	No. 4	Total
Main Entry (ft)	41,700	47,800	40,400	25,400	155,300
Raw coal (t/ft)	7.6	7.6	7.6	7.6	7.6
Raw coal produced (t)	317,000	363,000	307,000	193,000	1,180,000
M.E. crosscut (ft)	10,400	12,000	10,100	6,400	38,900
Raw coal (t/ft)	5.1	5.1	5.1	5.1	5.1
R. coal produced(t)	53,000	61,000	52,000	32,000	198,000
Subrise (ft)	112,000	132,000	87,000	124,000	455,000
Raw coal (t/ft)	6.8	6.8	6.8	6.8	6.8
Raw coal produced(t)	762,000	898,000	592,000	843,000	3,095,000
S.R. crosscut (ft)	56,000	66,000	44,000	62,000	228,000
Raw coal (t/ft)	5.1	5.1	5.1	5.1	5.1
Raw coal produced(t)	286,000	337,000	224,000	316,000	1,163,000
Monitor Retreat (ft)	112,000	132,000	87,000	124,000	455,000
Raw coal (t/ft)	59	59	59	59	59
Raw coal produced(t)	6,608,000	7,788,000	5,133,000	7,316,000	26,845,000
No of Monitor Unit	2	2	2	2	2
R.coal produced (t/day)	5,400	5,400	5,400	5,400	5,400
Monitor Retreat (ft/day)	91.5	91.5	91.5	91.5	
S.R. Heading (ft/day)	91.5	91.5	91.5	91.5	91.5
R. coal produced (t/day)	620	620	620	620	620
S.R.C. Heading (ft/day)	45.8	45.8	45.8	45.8	45.8
R.coal produced (t/day)	230	230	230	230	230
Monitoring & S.R. Heading	6,250	6,250	6,250	6,250	6,250
R.coal produced (t/day)					
Workable days	1,224	1,442	950	1,355	4,971
Workable years	5.2	6.2	4.0	5.8	21.2
Workable Reserve(t)	8,026,000	9,447,000	6,308,000	8,700,000	32,481,000
Monitor coal (%)	82.3	82.4	81.4	84.1	82.6

D and F seam :

Shift Subrise		1	2	3	4	5	6
D	No.1	Monitoring		Retreating		Monitoring	
	No.2	Retreating		Monitoring		Retreating	
F	No.1	Monitoring	Retreating		Monitoring		Retreating
	No.2	Retreating	Monitoring		Retreating		Monitoring

J seam :

Shift Subrise		1	2	3	4	5	6
No.1		Monitoring			Retreating		
No.2		Retreating			Monitoring		
No.3		Monitoring	Retreating			Monitoring	
No.4		Retreating	Monitoring			Retreating	

For every given shift the number of men monitoring will be two per monitor. The manpower required to retreat the another monitor of a pair will be four per shift. So the total manpower in the actual monitoring face area is 6 men per shift for one unit monitor. The grand total of men for all seams is 24 men per shift or 72 men per day excluding foreman.

## 2. Steep Area (No. 2, No. 3 and No. 4 Mine)

As for the Out-of-seam dilution in the steep area, it is estimated that the amount of dilution will be bigger than that in the flat area. Because the apparent width of mining room is narrow so that diluting rock tends to fall mainly front of monitor. The roof condition of F seam seems to be similar to the flat area, however, in case of J seam it will have to estimate more dilution especially for the short intervals between I and J seam.

The followings is the estimation of the Out-of-seam dilution, the mining thickness, the raw coal ash content and the specific gravity.

	F seam	I seam	J seam
Seam Thickness	114" (9.5')	147" (12.3')	218" (18.2')
Ash %	17.33	20.12 (Assumption)	20.12
Sp. gr.	1.48	1.50	1.50
Dilution	17"	18"	13"
Dilution Sp. gr.	2.2	2.2	2.2
Dilution Ash %	87.12	90.40	88.54
Mining Thickness	131" (10.9')	165" (13.8')	231" (19.25')
Raw Coal Ash %	27.07	27.96	24.37
Total Sp. gr.	1.57	1.58	1.54

Two monitoring units has been planned, one for Caribou North Area (No. 2 Mine and the north west of No. 4 Mine) and another for Centre Area (No. 3 Mine and the south east of No. 4

Mine), through the mining operation in the steep area. The monitoring unit in F seam will be composed of 2 monitor faces and operate alternately as well as the operating system in No. 1 Mine. I and J seam will be jointly worked as if one coal seam. In this case, the monitoring unit will be composed of a face in I seam and a face in J seam and they will be operated alternately.



## Summary of Raw Coal Production.

No. 2 Mine

	I & J Seam	F Seam	Total
Main Entry & air way (ft.)	16,400	9,000	25,400
Raw coal (t/ft.)	5.2	6.7	5.7
R coal produced (t)	85,000	60,000	145,000
Sublevel (ft.)	51,800	22,200	74,000
Raw coal (t/ft.)	5.3	5.4	5.3
R. coal produced (t)	275,000	120,000	395,000
Monitor Retreat (ft.)	41,400	12,300	53,700
Raw coal (t/ft.)	34.5	22	31.6
R. coal produced (t)	1,428,000	271,000	1,699,000
No. of monitor unit	1	1	
R. coal produced (t/d)	2,050	1,770	1,990
Monitor retreat (ft/d)	59	80	63
S. L. Heading (ft/d)	74	144	86
R. coal produced (t/d)	390	780	460
Monitoring & S. L. Heading R. coal produced (t/d)	2,440	2,550	2,450
Workable days	702	154	856
Workable years	3.0	0.7	3.7
Workable Reserve (t)	1,788,000	451,000	2,239,000
Monitoring coal (%)	79.9	60.1	75.9

## Summary of Raw Coal Production.

No. 3 Mine

	I & J Seam	F Seam	Total
Main Entry (ft.) & air way	25,200	15,200	40,400
Raw coal (t/ft.)	5.4	6.7	5.9
R. coal produced (t)	136,000	102,000	238,000
Sublevel (ft.)	72,000	20,100	92,100
Raw coal (t/ft)	5.3	5.4	5.3
R. coal produced (t)	382,000	109,000	491,000
Monitor Retreat (ft)	46,000	11,500	57,500
Raw coal (t/ft.)	34.5	22	32
R. coal produced (t)	1,587,000	253,000	1,840,000
No. of monitor unit	1	1	
R. coal produced (t/d)	2,050	1,770	2,010
Monitor retreat (ft/d)	59	80	62
S.L. Heading (ft/d)	93	140	100
R. coal produced (t/d)	490	760	530
Monitoring & S.L. Heading R. coal produced (t/d)	2,540	2,530	2,540
Workable days	774	143	917
Workable years	3.3	0.6	3.9
Workable Reserve (t)	2,105,000	464,000	2,569,000
Monitoring coal (%)	75.4	54.5	71.6

## Summary of Raw Coal Production.

No. 4 Mine (West)

	I & J Seam	F Seam	Total
Main Entry & air way (ft.)	40,800	17,900	58,700
Raw coal (t/ft.)	5.3	6.7	5.7
R. Coal produced (t)	214,000	120,000	334,000
Sublevel (ft.)	162,700	76,100	238,800
Raw Coal (t/ft)	5.3	5.4	5.3
R. Coal produced (t)	862,000	410,000	1,272,000
Monitor Retreat (ft.)	134,800	62,900	197,700
Raw Coal (t/ft)	34.5	22	30.5
R. Coal produced (t)	4,651,000	1,383,000	6,034,000
No. of monitor unit	1	1	
R. Coal produced (t/d)	2,180	1,880	2,100
Monitor retreat (ft/d)	63	85	69
S.L. Heading (ft/d)	76	103	83
R. Coal produced (t/d)	400	560	440
Monitoring & S.L. Heading R. Coal produced (t/d)	2,580	2,440	2,540
Workable days	2,136	738	2,874
Workable years	9.1	3.2	12.3
Workable Reserve (t)	5,727,000	1,913,000	7,640,000
Monitoring Coal (%)	81.2	72.3	79.0

## Summary of Raw Coal Production.

No. 4 Mine (East)

	I & J Seam	F Seam	Total
Main Entry & Air Way (ft.)	41,400	21,600	63,000
Raw Coal (t/ft.)	5.3	6.7	5.8
R Coal produced (t)	218,000	145,000	363,000
Sublevel (ft.)	150,600	85,300	235,900
Raw Coal (t/ft)	5.3	5.4	5.3
R. Coal produced (t)	798,000	461,000	1,259,000
Monitor Retreat (ft.)	109,400	68,600	178,000
Raw Coal (t/ft)	34.5	22	29.7
R. coal produced (t)	3,774,000	1,509,000	5,283,000
No. of monitor unit	1	1	
R.Coal produced (t/d)	2,180	1,880	2,080
Monitor retreat (ft/d)	63	85	70
S. L. Heading (ft/d)	87	106	93
R. Coal produced (t/d)	460	570	500
Monitoring & S. L. Heading R. Coal produced (t/d)	2,640	2,450	2,580
Workable days	1,733	805	2,538
Workable years	7.4	3.4	10.8
Workable Reserve (t)	4,790,000	2,115,000	6,905,000
Monitoring Coal (%)	78.8	71.4	76.5

Capital Cost

CAPITAL COST TOTAL (\$'000)

ITEM	Q'TY	TOTAL	1 st	2 nd	3 rd	4 th	5 th	6 th	7 th	8 th	9 th	10 th	11 th	12 th	13 th	14 th	15 th	16 th	17 th
Mining Facilities																			
Flat Area Total (1)		85,162	13,466	26,374	40,578	380	158	191	871	492	-	582	-	158	696	582	96	238	300
Reduction	*	34,937	-	*2,899	*32,038	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Flat Area Total (2)		50,225	13,466	23,475	8,540	380	158	191	871	492	-	582	-	158	696	582	96	238	300
Steep Area Total (1)		60,543	14,428	14,301	9,977	9,963	8,663	2,147	429	635	-	-	-	-	-	-	-	-	-
Reduction	*	13,937	-	*4,409	*1,303	*3,581	*3,733	*911	-	-	-	-	-	-	-	-	-	-	-
Steep Area Total (2)		46,606	14,428	9,892	8,674	6,382	4,930	1,236	429	635	-	-	-	-	-	-	-	-	-
Facilities Total (1)		145,705	27,894	40,675	50,555	10,343	8,821	2,338	1,300	1,127	-	582	-	158	696	582	96	238	300
Reduction Total	*	48,874	-	*7,308	*33,341	*3,581	*3,733	*911	-	-	-	-	-	-	-	-	-	-	-
Facilities Total (2)		96,831	27,894	33,367	17,214	6,762	5,088	1,427	1,300	1,127	-	582	-	158	696	582	96	238	300
Preparation Plant Facilities Total		42,000	11,000	20,000	11,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Utilities Services Total		8,000	7,450	550	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Grand Total		146,831	46,344	53,917	28,214	6,762	5,088	1,427	1,300	1,127	-	582	-	158	696	582	96	238	300

\* Reduction from Credit Coal

# Credit Coal

This amount of value has been reduced from capital expenditure.

	1 st	2 nd	3 rd	4 th	5 th	6 th	Total
Plant Feed (Raw Coal '000 L.T.)							
Flat Area	-	131	1,440	-	-	-	
Steep Area	-	199	59	161	168	41	
<u>Total</u>	-	330	1,499	161	168	41	
Clean Coal ( '000 L.T.)							
Flat Area	-	96	1,057	-	-	-	
Steep Area	-	146	43	118	123	30	
<u>Total</u>	-	242	1,100	118	123	30	
Value of F.O.B Mine (\$ / L.T.)	-	32	32	32	32	32	
Processing Cost (\$ / L.T.)	-	1.80	1.69	1.65	1.65	1.65	
Reductable Value of Credit Coal (\$ / L.T.)	-	30.20	30.31	30.35	30.35	30.35	
Amount of Reduction from Capital (\$'000)							
Flat Area	-	2,899	32,038	-	-	-	34,937
Steep Area	-	4,409	1,303	3,581	3,733	911	13,937
<u>Total</u>	-	7,308	33,341	3,581	3,733	911	48,874

Capital Cost Total \$,000's By Years (\$,000's)

ITEM	Q'TY	TOTAL	1 st	2 nd	3 rd	4 th	5 th	6 th	7 th	8 th	9 th	10 th	11 th	12 th	13 th	14 th	15 th	16 th	17 th
Mining Facilities																			
Flat Area Total		85,162	13,466	26,374	40,578	380	153	191	871	492	-	502	-	150	696	502	96	238	300
Steep Area Total <i>cost/yr 1971 estimate</i>		60,543	14,428	14,301	9,977	9,963	8,663	2,147	429	635	-	-	-	-	-	-	-	-	-
Mining Facilities Total		145,705	27,894	40,675	50,555	10,343	8,821	2,338	1,300	1,127	-	502	-	150	696	502	96	238	300
Preparation Plant Facilities Total		42,000	11,000	20,000	11,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Utilities Services Total		8,000	7,450	550	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sub Total		195,705	46,344	61,225	61,555	10,343	8,821	2,338	1,300	1,127	-	502	-	150	696	502	96	238	300
Reductable Value of credit coal during construction		48,874	-	7,308	33,341	3,581	3,733	911	-	-	-	-	-	-	-	-	-	-	-
Grand Total		146,831	46,344	53,917	28,214	6,762	5,088	1,427	1,300	1,127	-	502	-	150	696	502	96	238	300
<i>Mitsui doesn't have confidence in paper cost est.</i>																			



Operating Cost

1. Mining Cost (\$. / C.C.L.T.)

Year	1 st	2 nd	3 rd	4 th	5 th	6 th	7 th	8 th-
1. Flat Area	-	-						
Wages	-	-	2.16	3.04	3.04	3.02	2.96	3.00
Salaries	-	-	1.29	.52	.52	.52	.51	.51
Materials	-	-	1.37	1.37	1.37	1.36	1.34	1.35
Power	-	-	.48	.39	.39	.39	.38	.39
Maintenance	-	-	2.84	2.21	2.25	2.29	2.21	2.32
Utilities	-	-	.10	.10	.10	.10	.10	.10
Outside Service (\$ 500,000/ )	-	-	.27	.23	.23	.23	.22	.22
Sub Total	-	-	8.51	7.86	7.90	7.91	7.72	7.89
Contengency (10 %)	-	-	.85	.79	.79	.79	.77	.79
Total	-	-	9.36	8.65	8.69	8.70	8.49	8.68
2. Steep Area								
Wages	-	4.41	4.44	4.29	4.47	4.18	4.01	4.27
Salaries	-	1.73	1.19	.94	.98	.85	.88	.94
Materials	-	2.37	2.79	2.05	2.23	2.31	2.47	2.08
Power	-	.44	.36	.40	.42	.41	.43	.46
Maintenance	-	2.61	2.67	3.66	4.84	4.06	3.64	3.19
Utilities	-	.10	.10	.10	.10	.10	.10	.10
Outside Service (\$ 300,000/y)	-	.34	.39	.34	.36	.31	.32	.34
Sub Total		12.00	11.94	11.78	13.40	12.22	11.85	11.38
Contengency (10 %)		1.20	1.19	1.18	1.34	1.22	1.19	1.14
Total		13.20	13.13	12.96	14.74	13.44	13.04	12.52

Mining Cost (\$/C.C.L.T.)

Year	1st	2nd	3rd	4th	5th	6th	7th	8th -
○ 3. Total								
Wages	-	4.41	4.15	3.40	3.44	3.38	3.27	3.36
Salaries	-	1.73	1.19	.64	.65	.62	.62	.63
Materials	-	2.37	2.43	1.56	1.61	1.65	1.67	1.56
Power	-	.44	.37	.40	.40	.40	.40	.41
Maintenance		2.61	2.69	2.63	2.97	2.83	2.63	2.56
Utilities		.10	.10	.10	.10	.10	.10	.10
Outside Service		.34	.37	.26	.26	.25	.25	.26
Sub Total		12.00	11.30	8.99	9.43	9.23	8.94	8.88
Contengency (10%)		1.20	1.13	.90	.94	.92	.89	.89
<u>Grand Total</u>		<u>13.20</u>	<u>12.43</u>	<u>9.89</u>	<u>10.37</u>	<u>10.15</u>	<u>9.83</u>	<u>9.77</u>

## (A) Wages (Per day)

	2 nd		3 rd		4-5th		6 th		7 th		8 th-	
	No.of	Amount	No.of	Amount	No.of	Amount	No.of	Amount	No.of	Amount	No.of	Amount
	Men	(\$/day)	Men	(\$/day)	Men	(\$/day)	Men	(\$/day)	Men	(\$/day)	Men	(\$/day)
Flat Area												
Underground		-	12	812.24	357	24,520.77	"	"	"	"	"	"
Surface		-	3.25	215.74	47	3,157.70	"	"	"	"	"	"
Sub Total		-	15.25	1,027.98	404	27,678.47	404	27,678.47	404	27,678.47	404	27,678.47
Steep Area												
Underground	50.5	3,516.79	177.5	12,461.39	192	13,338.81	209	14,573.09	192	13,338.81	201	13,937.82
Surface	8.5	562.20	26	1,720.42	35	2,316.47	35	2,316.47	35	2,316.47	26	1,738.49
Sub Total	59	4,078.99	203.5	14,181.81	227	15,655.28	244	16,889.56	227	15,655.28	227	15,676.31
Mine Total												
Underground	50.5	3,516.79	189.5	13,273.63	549	37,859.58	566	39,093.86	549	37,859.58	558	38,458.59
Surface	8.5	562.20	29.25	1,936.16	82	5,474.17	82	5,474.17	82	5,474.17	73	4,896.19
Total	59	4,078.99	218.75	15,209.79	631	43,333.75	648	44,568.03	631	43,333.75	631	43,354.78

## Wages (Per year)

	2 nd (\$'000/year)	3 rd (\$'000/year)	4 th (\$'000/year)	5 th (\$'000/year)	6 th (\$'000/year)	7 th (\$'000/year)	8 th- (\$'000/year)
Flat Area	-	241	6,477	6,477	6,477	6,477	6,477
Steep Area	954	3,318	3,663	3,663	3,952	3,663	3,663
Mine Total	954	3,559	10,140	10,140	10,429	10,140	10,145

## Total Wages Per Year Including absenteeism (\$'000)

	2 nd	3 rd	4 th	5 th	6 th	7 th	8 th-
Flat Area	-	248	6,676	6,676	6,676	6,676	6,676
Steep Area	983	3,418	3,775	3,775	4,072	3,775	3,780
Mine Total	983	3,666	10,451	10,451	10,748	10,451	10,456
Flat Area	-	2.16	3.04	3.04	3.02	2.96	3.00
Steep Area	4.41	4.44	4.29	4.47	4.18	4.01	4.27
Mine Total	4.41	4.15	3.40	3.44	3.38	3.27	3.36

\$/C.C.L.T.

Estimated Costs  
and Income

Babcock Project

Estimated Cost and Income Statement

	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th	13th	14th	15th	16th	17th	Total
Annual Production Clean Coal L.T. Thousands	223	884	3,075	3,037	3,184	3,195	3,184	3,181	3,165	3,078	3,105	3,069	3,217	3,043	3,024	3,079	44,743
Costs - C\$ per L.T.																	
Mining Cost	13.20	12.43	9.89	10.37	10.15	9.83	9.77	9.77	9.77	9.77	9.77	9.77	9.77	9.77	9.77	9.77	9.92
Washing & Loading Cost	1.80	1.69	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65
Union Royalty	.30	.30	.30	.30	.30	.30	.30	.30	.30	.30	.30	.30	.30	.30	.30	.30	.30
Housing Subsidy	.47	.41	.30	.30	.30	.30	.30	.30	.30	.30	.30	.30	.30	.30	.30	.30	.30
Selling & Administration	2.24	1.13	.65	.65	.65	.65	.65	.65	.65	.65	.65	.65	.65	.65	.65	.65	.67
W.Resources & Mitsui's Fee	.37	.37	.37	.37	.37	.37	.37	.37	.37	.37	.37	.37	.37	.37	.37	.37	.37
Insurance Land Tax & Others	2.24	.79	.32	.32	.32	.32	.32	.32	.32	.32	.32	.32	.32	.32	.32	.32	.34
B.C. Province Royalty	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
Total Costs	22.12	18.62	14.98	15.46	15.24	14.92	14.86	14.86	14.86	14.86	14.86	14.86	14.86	14.86	14.86	14.86	14.95
Sales Value F.O.B. Mine	32.00	32.00	32.00	32.00	32.00	32.00	32.00	32.00	32.00	32.00	32.00	32.00	32.00	32.00	32.00	32.00	32.00
Profit Margin	9.88	13.38	17.02	16.54	16.76	17.08	17.14	17.14	17.14	17.14	17.14	17.37	17.44	17.44	17.44	17.44	17.05
Balance - C\$ Thousands																	
Profit before Int. Dep. & Taxes	2,203	11,828	52,337	50,232	53,364	54,571	54,574	54,522	54,248	52,757	53,220	53,309	56,104	53,070	52,739	53,698	762,776
Interest r=10%	1,165	3,069	12,938	9,515	6,108	2,788	-	-	-	-	-	-	-	-	-	-	35,583
Depreciation	999	8,602	38,857	30,531	22,898	16,457	11,909	8,675	6,072	4,425	3,098	2,216	1,760	1,406	1,013	781	159,699
B.C. Provincial Tax. 15%	6	24	81	1,528	3,654	5,299	6,400	6,877	7,226	7,250	7,518	7,664	8,152	7,750	7,759	7,938	85,126
Depletion	33	133	461	456	478	479	478	477	475	462	466	460	483	456	454	462	6,713
Total Other Reductions	2,203	11,828	52,337	42,030	33,138	25,023	18,787	16,029	13,773	12,137	11,082	10,340	10,395	9,612	9,226	9,181	287,121
Earnings before Federal Tax	-	-	-	8,202	20,226	29,548	35,787	38,493	40,475	40,620	42,138	42,969	45,709	43,458	43,513	44,517	475,655
Federal Tax. 45%	-	-	-	3,691	9,102	13,297	16,104	17,322	18,214	18,279	18,962	19,336	20,569	19,556	19,581	20,033	24,046
Net Earnings	-	-	-	4,511	11,124	16,251	19,683	21,171	22,261	22,341	23,176	23,633	25,140	23,902	23,932	24,484	261,609
Cash Flow	1,032	8,735	39,318	35,498	34,500	33,187	32,070	30,323	28,808	27,228	26,740	26,309	27,383	25,764	25,399	25,727	423,021
Allot for Next Years Installation	1,032	8,735	5,088	1,427	1,300	1,127	-	582	-	158	696	582	96	238	300	-	21,361
Payback to Bank	-	-	34,230	34,071	33,200	27,876	-	-	-	-	-	-	-	-	-	-	129,377
Remaining Debt at the Beginning of the Year	13,237	30,688	129,377	95,147	61,076	27,876	-	-	-	-	-	-	-	-	-	-	-
Payback Period		5.8 Years				*											
Dividend or Reserve	-	-	-	-	-	4,184	32,070	29,741	28,808	27,070	26,044	25,727	27,287	25,526	25,099	25,727	277,283
Ditto Cumulative	-	-	-	-	-	-	36,234	65,995	94,803	121,873	147,917	173,644	200,931	226,457	251,556	277,283	6.20

1. Investment and equity ratio in Babcock joint venture

Denison & World Resources 75%

Mitsui & Tokyo Boeki 25%

2. Cost of installation

Amount for 17 years \$146,831,000.00

3. Owned capital in Babcock joint venture

$\$146,831,000 \times 25\% = \$36,707,750$

Denison & World Resources \$27,530,813

Mitsui & Tokyo Boeki \$ 9,176,937

+ requires interest until  
operation commences

4. Capital investment schedule (\$'000)

year	Flat Area	Steep Area	Preparation Plant	Utilities	Total
1st	+13,466	+14,428	+11,000	+7,450	46,344
2nd	+23,475	9,892	+20,000	+550	53,917
3rd	+8,540	8,674	+11,000	-	28,214
4th	380	6,382	-	-	6,762
5th	158	4,930	-	-	5,088
6th	191	1,236	-	-	1,427
7th	871	429	-	-	1,300
8th	492	635	-	-	1,127
9th	-	-	-	-	-
10th	582	-	-	-	582
11th	-	-	-	-	-
12th	158	-	-	-	158
13th	696	-	-	-	696
14th	582	-	-	-	582
15th	96	-	-	-	96
16th	238	-	-	-	238
17th	300	-	-	-	300
Total	50,225	46,606	42,000	8,000	146,831



## 5. Raising plan of capital funds during construction

Year	Description	Investment	Owned Capital	Short	Interest r=10%/year	Borrowed Capital
1st	Flat Area	13,466	13,466	-	-	-
	Steep Area	14,428	14,428	-	-	-
	Plant	11,000	8,814	2,186	243	2,429
	Utilities	7,450	-	7,450	828	8,278
	Total	46,344	36,708	9,636	1,071	10,707
2nd	Flat Area	23,475	-	23,475	2,608	26,083
	Steep Area	-	-	-	-	-
	Plant	20,000	-	20,000	2,492	22,492
	Utilities	550	-	550	981	1,531
	Total	44,025	-	44,025	6,081	50,106
3rd	Flat Area	8,540	-	8,540	3,847	12,387
	Steep Area	-	-	-	-	-
	Plant	-	-	11,000	3,991	14,991
	Utilities	-	-	-	-	-
	Total	8,540	-	19,540	-	-

## 6. Initial capital cost detail

Description	2nd year	3rd year	4th year
Flat Area	-	-	51,936
Steep Area	14,428	-	-
Plant	-	-	48,726
Utilities	-	9,809	-
Total	14,428	9,809	100,662

7. Interest (r=10% per year)

Year	Loan at the beginning of the year (\$'000)	Interest (\$'000)	\$ per C.C.L.T
2nd	<div> <div>9,892</div> <div>working capital: 3,345</div> <div>13,237</div> </div>	<div>989</div> <div>176</div> <div>1,165</div>	5.22
3rd	13,237 + 8,674 + 9,809 - 1,032 = 30,688	3,069	3.47
4th	30,688 + 6,762 + 51,936 + 48,726 - 8,735 = 129,377	12,938	4.21
5th	129,377 + 5,088 - 39,318 = 95,147	9,515	3.13
6th	95,147 + 1,427 - 35,498 = 61,076	6,108	1.92
7th	61,076 + 1,300 - 34,500 = 27,876	2,788	0.87
8th	27,876 + 1,127 - 33,187 = (-) 4,184	-	-

Borrowed working capital (\$'000)

Initial mining & plant cost during 6 months

(13.20 + 1.80) x 223 = 3,345 -----B.W. Capital

3,345 ÷ (1-0.05) - 3,345 = 176 -----Interest

## 8. Depreciation

Decline is 30% per year except 2nd-4th year

Year	Capital assents at the beginning of the year (\$'000)	Depreciation (\$'000)	\$ per C.C.L.T.
1st			
2nd	14,428	999	4.48
3rd	$14,428 - 999 + 9,892 + 9,809 = 33,130$	8,602	9.73
4th	$33,130 - 8,602 + 8,674 + 51,936 + 48,726 = 133,864$	38,857	12.64
5th	$133,864 - 38,857 + 6,762 = 101,769$	30,531	10.05
6th	$101,769 - 30,531 + 5,088 = 76,326$	22,898	7.19
7th	$76,326 - 22,898 + 1,427 = 54,855$	16,457	5.15
8th	$54,855 - 16,457 + 1,300 = 39,698$	11,909	3.74
9th	$39,698 - 11,909 + 1,127 = 28,916$	8,675	2.72
10th	$28,916 - 8,675 = 20,241$	6,072	1.92
11th	$20,241 - 6,072 + 582 = 14,751$	4,425	1.44
12th	$14,751 - 4,425 = 10,326$	3,098	1.00
13th	$10,326 - 3,098 + 158 = 7,386$	2,216	0.72
14th	$7,386 - 2,216 + 696 = 5,866$	1,760	0.55
15th	$5,866 - 1,760 + 582 = 4,688$	1,406	0.46
16th	$4,688 - 1,406 + 96 = 3,378$	1,013	0.34
17th	$3,378 - 1,013 + 238 = 3,378$	781	0.25
18th	$2,603 - 781 + 300 = 2,122$		
Total	2,122	159,699	

9. Union Royalty

\$0.27 per clean coal N.T. ? *and of total* *UMWA*

$\$0.27 \times 1.12 = \$0.30$  per clean coal L.T.

10. Housing Subsidy

\$1,200 per man per year

<u>Year</u>	<u>No. of Men</u>	<u>Amount (\$'000)</u>	<u>\$/C.C.L.T.</u>
2nd	88	106	0.47
3rd	305	366	0.47
4th	774	930	0.30
\$	\$	\$	\$
17th	774	930	0.30

11. Selling and Administration Cost *- estimate*

<u>Year</u>	<u>Amount (\$'000)</u>	<u>\$ per C.C.L.T.</u>
2nd	500	2.24
3rd	1,000	1.13
4th	2,000	0.65
\$	\$	\$
17th	2,000	0.65

12. W. Resources & Mitsui's Fee

<u>Year</u>	<u>W.Resources</u>	<u>Mitsui</u>	<u>Total</u>
2nd	0.07	0.30	0.37
\$	\$	\$	\$
12th	0.07	0.30	0.37
13th	0.07	0.07	0.14
14th	0.07	-	0.07
\$	\$	\$	\$
17th	0.07	-	0.07

13. Insurance, Land Taxes & Others

<u>Year</u>	<u>Amount (\$'000)</u>	<u>\$/C.C.L.T.</u>
2nd	500	2.24
3rd	700	0.79
4th	1,000	0.32
5	5	5
17th	1,000	0.32

*ROUGH  
EST.*

14. B.C. Province Royalty

\$1.50 per clean coal L.T.

15. Depletion

\$0.10 per raw coal N.T.

$\$0.10 \div 73.4\% \times 1.12 = \$0.15$  per C.C.L.T.

16. Sales Price

F.O.B. Mine      \$32.00 per C.C.L.T.