Project Report In Respect Of Bhatgaon Colliery

Jan. 1984

CONFIDENTIAL

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PROJECT REPORT

ON

REORGANISATION OF

BHATGAON PROJECT

(Baikunthpur - Area)

WESTERN COALFIELDS LIMITED

VOLUME ONE

(Text, Appendices & Check List)

JANUARY 1984

10/9/1984 10/9/84 10/9/84

Sub-Area Manager
Bhatgaon Sub-Area

Colliery Manager
Bhatgaon Colliery

REGIONAL INSTITUTE-IV.

Central Mine Planning & Design Institute Ltd.

(A Subsidiary of Coal India Ltd.)

COAL ESTATE, CIVIL LINES

NAGPUR - 440 001.

15/9/84

General Manager
Bhatgaon Area

PROJECT REPORT ... REGULARISATION OF

BHATGAON ... EXT.

C O N T E N T S

Colliery Manager
Bhatgaon Colliery

Surveyor
Bhatgaon Colliery

PROJECT REPORT ON REORGANISATION OF BHATGAON PROJECT

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10/9/24

Colliery Manager

Dy. (Tech.) Supdt.

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Colliery Manager

Surveyor
Bhatgaon Colliery

PROJECT REPORT OF ABOVE EXPANSION OF

BHAGGAON PROJECT

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Bhatgaon Colliery

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Surveyor
Bhatgaon Colliery

PROJECT REPORT [illegible] OF

[illegible]

[illegible]

		approved P.R. of 1973	
1.	Reserves - a) Geological reserves(M.te)	46.05	23.607
	b) Extractable reserves (M.te.)	23.66	M.te + 1.09 = 15.25
2.	Grade of Coal	Grade I	Gr. 'B' [illegible] Gr. [illegible]
3.	Expected output (M.T.P.A.) at 100%	1.00	[illegible]
	at 85%	0.85	[illegible]
4.	Existing production in 82-83	-	[illegible]
5.	Main customers	Railways and power house.	Railways [illegible] power house.
6.	Transport to [illegible]	N.A.	[illegible]
7.	[illegible]	[illegible]	[illegible]

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Bhatgaon Colliery

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Bhatgaon Colliery

12.	O.M.S. (tonne)	1.45	1.257
13.	Cost of production per tonne i) at 100% ii) at 85%	35.77 40.75	166.63 193.31
14.	Current selling price (Rs.)	43.05	230.60
15.	Profit per tonne i) at 100% ii) at 85%	(+) 7.28 (+) 2.30	(+) 63.97 (+) 37.29
16.	Year of achieving the targetted production.	1980-84	1988-89

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Surveyor
Bhatgaon Colliery

Colliery Manager
Bhatgaon Colliery

Annual Target-1 MT — P. ii Refund to
0.6 MT — P iv

RPR —

PROJECT REPORT ON REORGANISATION OF

BHATGAON PROJECT

CHECK-LIST

I. INTRODUCTION:

Bhatgaon underground project of Western coalfields Ltd. is situated in Bisrampur coalfield, Patkunthpur Area in Surguja District of Madhya Pradesh. The earlier project report was prepared in September, 73 and was sanctioned by Government in December, 1974, for a production capacity of 1.00 million tonnes per annum at a total capital cost of Rs.10.41 crores. As per this report the target production of 1.00 million tonnes was tobe achieved by 1980-81, but the project could produce only 0.24 million tonnes in 1982-83. The various reasons for delay have been dealt in detail in the project report and are summarised below under head "Justification for Reorganisation".

II. JUSTIFICATION FOR REORGANISATION:

The construction of the project was started in April, 1975, but it got delayed, mainly due to the following reasons:

(a) The originalproject report had provided a 15 km. long siding, on an assisted siding basis, in which Railways would share about half the cost of the siding. However, after

Construction Manager

Surveyor
Bhatgaon Project (WCL)

the sanction of the project report, the Railway authorities did not agree to build the siding on an equity sharing basis, but to construct it as a railway siding, thus asking the company to bear the entire cost. This being a policy decision was subsequently taken up with the Railways through Department of Coal and the Ministry. This policy decision could be taken only in 1978-79, wherein it was decided that all sidings should be constructed as private siding. Thus, the railway siding work could start only from January, 1980.

(b) Because of the above uncertainty, project development and procurement of equipment was withheld, as without siding and coal handling plant at the mine site despatching more than a nominal production by road could not have been responsible.

(c) The earlier projected method of working, namely longwall mining employing direct on crops and shaft conveyors, after conducting the study in consultation with C.M.R.I. and D.G.M. was found feasible under the shallow cover of 15 m and it exists in the project. D.G.M.S. also disagreed as no such experience of working longwall, at shallow depth, was available even abroad. Hence, it was decided to develop the mine on conventional Bord and Pillar method.

..(iii)..

Colliery Manager

Bhatdee Colliery

This timely decision helped in saving capital as no longwall equipment was bought as also in orienting the mine development to suit Board and Pillar method. This, however, delayed the projected schedule.

(d) The delay in implementation, long gestation period and escalation in prices resulted in a financial over-run of the project. Rs.10.3179 crores was spent out of the sanctioned Rs.10.41 crores till 31.3.83. To provide necessary finance for completion of the project it became necessary to revise it.

P.32/34

III. PRODUCTION:

(1) Reserves (m.tes.)	- Net Geological	23.607
	- Mineable	14.16
(2) Target output (m.tes/year)		0.6 *
(3) Grade - Steam 60%		Grade 'B'
- Slack 40%		Grade 'C'

* The reasons for reduction in target from 1.0 m.t. to 0.6 m.te. have been detailed in Chapter VII of this Project Report and Annexure III.

IV. INFRASTRUCTURE:

(A) Power:

Bhatgaon colliery receives power at a voltage of 33 KV from Bisrampur substation of MPEBwhich is about 30 kms. away from the project. One overhead line from Bisrampur substation to colliery is already existing while the other is under construction. The main sub-station building has

Colliery Manager
Bhatgaon Colliery

..(iv)..

already been constructed [illegible] ...no.6 & 7.
Keeping in view the [illegible] ...d output
from 8.00 m.t/annum [illegible] ...um, it is
proposed to equip the [illegible] ...ed with two
transformers (each rated [illegible] ...3KV/3.3KV. Out
of this one 1600 KVA, 3.3KV/3.3KV transformer
has already been installed. The underground
installation would be supplied power by means
of cables drawn through boreholes taking
advantage of shallow depth. The specific energy
consumption has been estimated [illegible] ...15.00 KWH/te
of coal.

(a) Water Supply:

At present mine water after filtration in [illegible] ...
supplied for drinking purposes. A horizontal
pressure filter of 7000 g.p.m. capacity alongwith
chlorinator is working. The permanent water
supply has been planned from river water [illegible] ...
[illegible] ...at a distance of [illegible] ...miles and the
work is in hand.

(c) Transport:

1. Surface:

The colliery is about 15 km. from Karanji
railway station. Presently coal is being
transported by road [illegible] ...departmental
tippers or by contractors. The new siding from
Karanji railway station to [illegible] ...is under
construction and is likely to be completed in
[illegible] ...4 years time. The new coal handling
plant is also under construction. Presently it

Surveyor

T a b l e

Statement showing head wise expenditure on capital account

(Fig. in Rs.lakhs)

Year	Land	Buildings	Plant & Machinery	Furniture & Fixtures	Vehicles	Railway Siding	Development	Total Investment	Actual prodn. m.t.c.
6-77	-	4.20	47.64	0.01	-	-	14.11	65.96	-
upto 76-77	-	5.20	64.20	0.01	2.36	1.37	33.96	107.10	-
7-78	-	8.10	26.21	0.06	-	-	16.27	50.64	0.0.15
8-79	-	1.60	53.50	0.39	0.31	27.61	21.46	84.87	0.0779
9-80	-	3.00	49.40	-	-	0.85	43.00	96.35	0.140
0-81	0.29	10.00	51.20	0.06	3.86	120.13	-	186.42	0.193
1-82	3.94	13.12	87.69	0.06	2.25	-	-	107.06	0.209
2-83	0.21	29.43	165.54	0.48	3.13	179.85	25.69	399.33	0.24
upto 82-83	4.44	71.28	477.94	1.06	11.91	324.81	140.38	1031.79	-

Colliery Manager
Bhatgaon Colliery

10/9/20

CHAPTER - II

NECESSITY FOR REVISION

2.1 The major reason for the revision of Bhatgaon Project Report can be divided into -

a) Technological changes

b) Financial over-run

The above reasons are spelt out in detail as follows:

2.2 TECHNOLOGICAL CHANGES:

Change in method of work, Longwall method of mining employing friction props and chain conveyors was a concept adopted in 1973 and was proposed for a number of new projects including that of Bhatgaon. After starting the development activities of the mine and conducting various scientific studies in consultation with CMRS and Indian School of Mines, it was found that Longwall Mining at a shallow depth of 15 - 60 m (as existed in the project) would not be feasible. DGMS also disagreed with the view of adopting longwall technology at shallow depth as no such experience was available indigenously or abroad. Hence, it was decided to develop the mine on the prevalent conventional Bord and Pillar Method.

Colliery Manager

Surveyor
Bhatgaon Colliery

The above decision to work on Bord and Pillar method was taken well in time i.e. before indenting for purchase of longwall equipment and hence no infructuous expenditure was incurred. The mine development was also oriented towards Bord and Pillar Method of mining, which is also the method now being proposed in this revised report.

Though the decision to revert back to conventional Bord and Pillar method of mining due to reasons given above was taken in time, the revision of the project was taken up only now as the construction of the siding has been started and thus an outlet for increased production of coal will be established in near future. Besides, there is also the need for procurement of appropriate equipment to increase the production and complete the project in next few years. This was not possible earlier as in the absence of siding, it was not feasible to complete the project and transport the entire production by road transport over a long distance.

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Bhatgaon Colliery

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Bhatgaon Colliery

2.3 FINANCIAL OVER-RUN:

The delay in the construction of the railway siding as explained in the earlier chapter, has resulted in a delayed implementation of the project. This, in turn, resulted in pegging down of production as shown in the table below and a longer gestation period. Long gestation period and the escalation in prices over the years inspite of carefully controlled investment an amount of Rs.10.3179 crores was spent till 31.3.83 out of the sanctioned Rs.10.4 crores. The details of this expenditure yearwise is tabulated below:

Table No.II

(Fig.in Rs.lakhs)

Year	Total Investment	Prodn.m.t.
73-77	65.96	-
upto 76-77	107.10	-
77-78	50.64	0.0215
78-79	84.87	0.0779
79-80	96.35	0.140
80-81	186.43	0.1815
81-82	107.06	0.209
82-83	399.33	0.24
upto 82-83	1031.79	-

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Bhatgaon Colliery

Sub Supdt

Considering this likely financial overhead, possibility in change of method of mining and likely condition of long railway siding in next few years this revision has been taken up to provide appropriate equipment for increasing the production to appropriate level.

Colliery Manager
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Surveyor

CHAPTER - III

MARKETABILITY

3.0 Bhatgaon coal is a good grade coal of Grade 'B' (Steam) and 'C' (Slack) and is mostly for Railways and Power Houses. There is a shortfall in future in demand and supply of superior quality coal as shown in the table below:

T a b l e No.III

Year	Demand of non-coking coal on W.C.L. in m.tes.	Availability of non-coking coal from sanctioned projects (excluding Bhatgaon u/g) in m.tes	Shortfall/ surplus in m.tes.
83-84	40.06	36.69	(-) 3.37
84-85	44.68	40.56	(-) 4.12
85-86	48.90	44.63	(-) 4.27
86-87	53.05	46.16	(-) 6.89
87-88	57.94	48.52	(-) 9.42
88-89	62.66	50.73	(-)11.93
89-90	66.25	52.68	(-)13.57

Likewise the future demand and supply from Central India Coalfield and of encompassing Bhatgaon Project is given in the table below:

Colliery Manager
Bhatgaon Colliery

10/9/24
Surveyor

Table No.IV

Year	Demand of coal (m.tes) (non-coking)	Availability of (m.tes)(excluding Bhatgaon u/g) non-coking.	Surplus/ Shortfall in m.tes.
83-84	16.20	15.56	(-) 0.64
84-85	17.09	16.37	(-) 0.72
85-86	17.62	17.21	(-) 0.41
86-87	18.74	17.01	(-) 1.73
87-88	19.71	17.03	(-) 2.68
88-89	20.12	16.87	(-) 3.25
89-90	20.93	16.58	(-) 4.35

Bhatgaon production of 0.60 million tonnes/annum as phased below will to a certain extent bridge this gap.

Year	Production
83-84	0.28
84-85	0.315
85-86	0.36
86-87	0.42
87-88	0.51
88-89	0.60

Colliery Manager
Bhatgaon Colliery

Surveyor
Bhatgaon Colliery

temporary arrangement has been provided consisting of two surface bunkers of 75 tons. capacity each at Incline no.6 and four surface bunkers of 100 tons. capacity each at incline no.3.

2. Underground:

(A) During Development:

(a) [illegible] Chain Conveyors [illegible] thickness 2.5 m & above.

(b) Shovelling onto light duty chain conveyors in seam thickness less than 2.5 m.

(B) During Depillaring:

(a) Side loaders onto light duty chain conveyors in seam thickness 2.5m and above.

(b) Shovelling onto light duty chain conveyors in seam thickness less than 2.5 m.

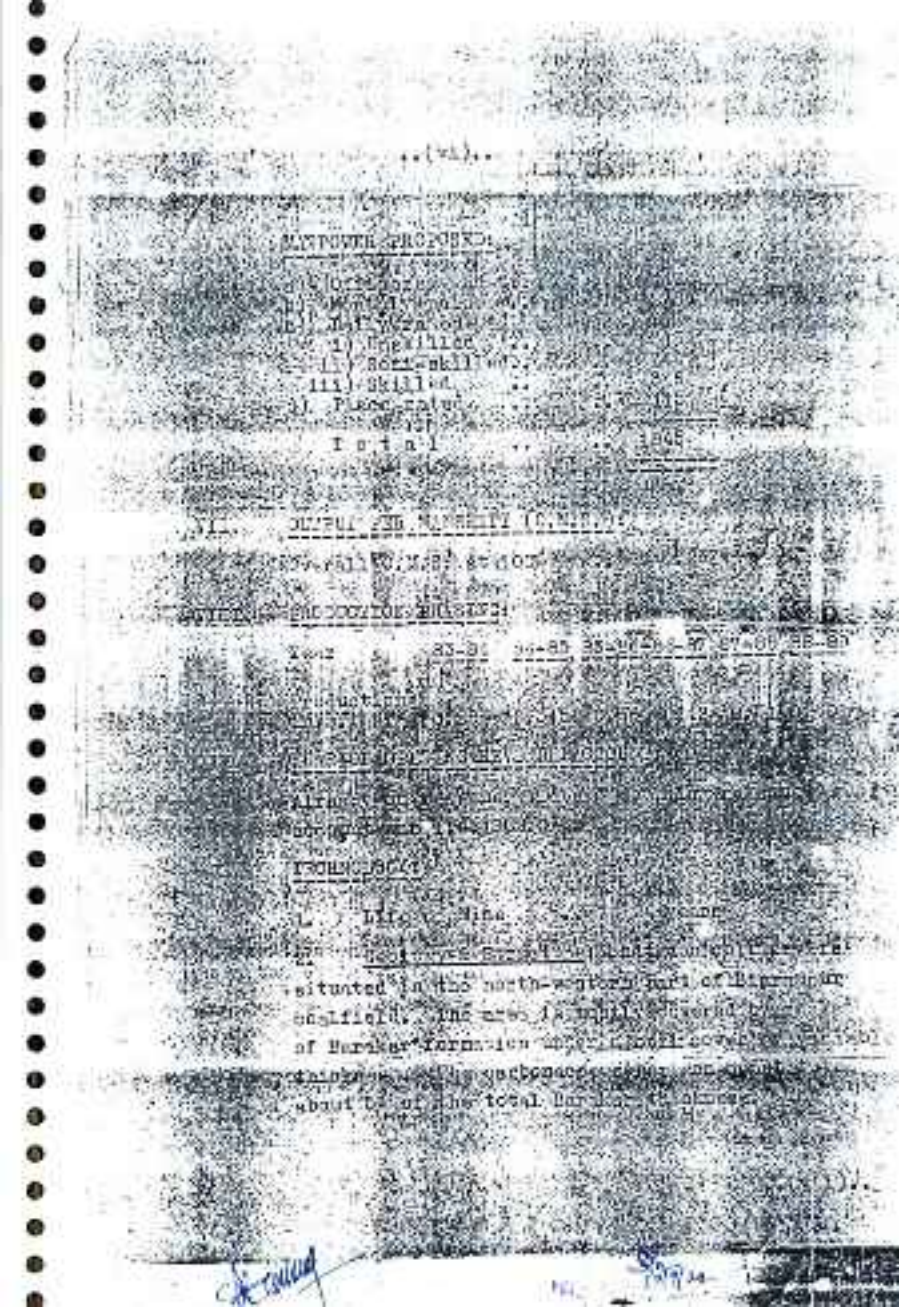
Transport of coal outbye by panels would be in tubs by endless haulages while that in trunk roads would be through belt conveyors on the northern side and endless haulages on the southern side. The coal would then be [illegible] by chain belt conveyor through incline no.4.

7. [illegible] ARRANGEMENTS: Not applicable.

Colliery Manager
Bhatgaon Colliery

..(vi)..

Surveyor
Bhatgaon Colliery



Talchers is generally composed of greenish, grey siltstone and have been encountered in a few boreholes drilled in the area. The mine being a working mine, the stratum contour of upper and lower Patpahari seams have been prepared on the basis of boreholes data as also on the spot levels of existing underground workings of both the seams.

The dip of the coal seams towards east and north-east and amounts to 1 in 28 to 1 in 40. Rolling dips are quite common. The block, however, is comparatively free from major geological disturbances.

3. Average Seam thickness:

	Thickness met in boreholes	Mining thickness
Kanch Seam	0.61 to 2.26	Tobe worked by opencast hence excluded from this report.
Upper Patpahari Seam	0.75 to 4.44	1.8 to 2.75 m general range.
Lower Patpahari Seam	0.25 to 2.04	1.35 to 2.2 m general range.
Upper Duga Seam	0.5 to 1.71	Locally seams, highly inperaistent in nature and presently not considered.
Lower Duga seam	0.2 to 1.1	

4. Type of Coal ... Non-coking.

Colliery Manager
Bhatdih Colliery

Surveyor
Bhatdih Colliery

..(ix)..

(2) ..

..more

(a) For seam thickness 2.5 m and development by Load Haul Dumpers in combination with medium duty chain conveyors and depillaring by Side Discharge Loaders;

For seam thickness less than 2.5 m - ... conveyor during both development and depillaring;

... to ... pillars (4 ...) ... be worked for ... of ... m.t/annum.

Ventilation: For an output of ... m.t/annum ... quantity of 15 m³/second would have to be supplied for fulfilling statutory requirements. The existing openings are sufficient for delivering to this quantity. From ventilation point of view, the mine has been divided into two different, but independent zones taking advantage of the various openings and keeping the pressure drop of the fan low.

Pumping & Drainage: The mine is ... Adequate dewatering capacity has been provided as already in the report. Advantage of shallow cover is taken by installing delivery ranges in the boreholes as also through inclines. 360 L.P.M. has been taken as the total dewatering capacity and ... pumping fittings have been provided accordingly.

...

Colliery Manager
Bhatgaon Colliery

Sub-Area
Bhatgaon Colliery

[redacted]

Capital requirement
township (Rs.in lakhs) ... 346.19

Per tonne of annual output ... 37.70

XIV MARKETING :

Bhatgaon coal is a good grade coal of Grade 'B' (Steam) and Grade 'C' (Black) and is meant for Railways and Power Houses. Coal is presently being supplied to power house and other customers in absence of normaling arrangements.

XV ECONOMICS :

The total estimated capital investment worked out at Rs.2683.72 lakhs or Rs.447.29 per tonne of annual production of 0.6 m.tes. Out of this, Rs.1031.79 lakhs already been spent upto 31.3.82.

The estimated investment on plant and machinery works out to Rs.1595.21 lakhs or Rs.2282.64 per tonne of annual production.

The cost of production is estimated at Rs.166.63 per Tonne at 100% capacity level. P.B.I. is estimated as Rs.82.04 The mine adds in revenue on 1.1.82.

XVI. CONCLUSION :

The profit per tonne at target production is Rs.63.97 at 100% level and Rs. 37.29 per tonne at 85% production level, at an average selling price of Rs.230.60 per tonne (Steam 'B' 60% and Slack 'C' 40%).

The reorganisation of the mine is both technically and economically justified.

Colliery Manager

ANNEXURE-II

PROJECT REPORT OF REQUANTIFICATION OF [illegible]

Statement showing analysis of cost over original estimate under (a) escalation (b) omission/ deletion and (c) addition

(Figs. in Rs.'000s)

Particulars	As per Original PR Sept.73	As per Rev.PR Jan.84	Difference	Escalation	Omission/ Deletion	Addition
Land	7000	7544	544	5630	5094	-
Buildings	14907	34548	19641	22001	3160	-
Plant & Equipment	62194	139521	77327	45318	32859	64868
Furniture & Fittings	250	606	356	356	-	-
Railway siding	7900	51600	43700	31700	-	12000
Vehicles	781	1541	760	543	33	250
Development(including prospecting & boring capitalised revenue expenditure)	11106	33012	21906	13339	980	9548
TOTAL	104138	268371	164234	123587	14926	76466

Headwise breakup of the capital expenditure

(Amt. in s.'000s)

A/c head	Particulars	As per PR of 1973	AS ON REGULARISATION REPORT OF JAN. 1987 Total	Spent upto March 1987	Additional requirement
01	Land	7000	7544	444	7100
02	Buildings				
	- Service	2135			8795
	- Residential	12772			18625
	TOTAL(02)	14907	34548	7128	27420
03	Plant & Machinery	62194	139521	47791	91730
04	Furniture & Fittings	250	606	105	500
05	Railway siding	7900	51600	32481	19119
06	Vehicles	781	1541	1191	350
07	Prospecting & Boring	579			
08	Development	7634	33012	14038	18974
09	Other exp. of Revenue nature capitalised before opening of Rev. A/c	2893			
	TOTAL INITIAL CAPITAL	104138	268372	103179	165193

sak

Annexure-III

PROJECT REPORT FOR REORGANISATION OF
BHATGAON PROJECT

TARGET OUTPUT & LIFE OF MINE - REASONS

The original project report ... 1.00 m.tes. with the life of the project 24 years ... net geological reserves of 16.0 m.tes. and extractable reserves of 2[illegible] m.tes. These extractable reserves were with [illegible] technology where overall p[illegible] extraction was taken at 90% by Ford and Fulkerson. Under these conditions, reduction of underground reserves (i) increase in area to be mined by opencast mine (upto 1:10 cut off) and; (ii) due to slightly low percentage of extraction by S & F mining the extractable reserves by underground mining are now only 14.16 m.tes. With these limited reserves, it is not prudent to project this mine for 1.00 m.tes. requiring very advanced technology and, very heavy capital investment for a limited life of 14 years. Therefore, it has been considered necessary to reduce the target capacity to 0.6 m.tes. with a life of 24 years. Another opencast mine of 0.5/0.60 m.tes. capacity to work the reserves of 16.4 m.tes. will be taken up shortly.

To summarise :-

Net proved geological u/g reserves	.. 23.607 m.tes.
Extractable reserves	.. 14.16 m.tes.
Target production	.. 0.6 m.te/annum
Therefore life of the mine	.. 24 years.

Sd/-
Sr. Surveyor
Bhatgaon Colliery

PROJECT REPORT ON REORGANISATION

OF

BHATGAON PROJECT

CHAPTER - I

INTRODUCTION

1.0 Bhatgaon underground project of Western Coalfields Ltd. is situated in Bisrampur Coalfield in Surguja District of Madhya Pradesh.

1.1 The original project report for Bhatgaon was prepared in September, 1973 and was sanctioned by Government in December, 1974, for a production capacity of 1.00 m.tes. per annum at a cost of Rs.10.41 crores.

0.6 MT/

1.2 The construction of Bhatgaon project was started in April, 1975. As per the original project report, the construction was scheduled tobe completed in 6 years time i.e. by 1980-81. However, the same has been delayed and the project has produced only 0.24 million tonnes in 1982-83. The delay in construction was principally due to the following reasons:

10/9/22

(i) The original project report prepared in 1973 had provided a 15 km long siding from Karonji railway station to the projects on an assisted siding basis (as was the accepted practice then) in which Railways used to share about half the cost of the siding. However, after the sanction of the project report, when the matter was taken up with the Railways, the Railway Authorities did not agree to give the siding on an assisted siding basis; but only to provide on a private siding basis, thus asking the company to bear the entire cost. This being a policy matter was subsequently taken up with the Railways through Department of Coal and the Ministry as a few other such cases of long sidings were involved with heavy capital. This policy decision could only be taken in 1978-79, wherein it was decided that all sidings should be taken on private siding basis. Thus, the railway siding work could start only in January,82. There was six

Colliery Engineer

Dy. 1979/20

Dy. Supdt.

years delay in the start of work of railway siding. Till date only 10% of the job has been completed.

(ii) Because of the above uncertainty, project development and procurement of equipment was withheld as without siding and coal handling plant at the mine site despatching more than a nominal production by road would not have been possible. Therefore the investment in the project was also kept pegged to the bare minimum necessary for arterial mine development and infrastructure as can be seen from the table below:

Colliery Manager
Bhatgaon Colliery

Surveyor
Bhatgaon Colliery

CHAPTER - IV

LOCATION & COMMUNICATION

4.1 The project is situated in Bisrampur Coalfield of Surguja District of Madhya Pradesh. Plate No.1 shows the location of Bisrampur Coalfield which is included in the Survey of India Toposheet No.64-I/15.

4.2 The Bhatgaon block is located towards the North - Western corner of the Bisrampur coalfield and is bounded by latitudes 23° - 21'N to 23°-23'N and longitudes 82°-58'E to 83°-02'E. The colliery is situated about 23 kms. to the north of the Bisrampur Colliery.

4.3 The nearest rail head is Karonji on Manendragarh - Bijuri - Bisrampur Branch line of South Eastern Railway, which is about 15 kms. to the southwest of the colliery.

4.4 Bisrampur, Karonji & Bhatgaon have been connected by road (Plate No.IV). Ambikapur - Varanasi fair weather road passes at a distance of about 4 kms. from the project.

4.5 The project is served by Posts & Telegraph Department and has a wireless (Walkie-Talkie) connection with the Area Office at Bisrampur.

Colliery Manager

Surveyor

CHAPTER - V

TOPOGRAPHY, DRAINAGE & CLIMATE

5.1 In common with the rest of Bijrampur Coalfield, the Bhatgaon area is an undulating plain with general elevation varying from 550 to 570 m above M.S.L. The general slope of the area is towards Masan nallah. Patpahari ridge in the western part and Bisahi hill in the north are two small elevations in the area.

5.2 Drainage of the area is controlled by Rehar river in the Western part and Mahan river in the east. Streamlets known as Masan nala, Kudaria nala, Chotago nala etc. drain the area into the above two rivers.

5.3 Based on the observations at Ambikapur for 10 years, the wind direction normally is from north and north-east to south and south-west. The wind speed normally is 6 to 10 km/hr. The total annual rainfall is about 1400 mm. The heaviest rainfall recorded ~~in 24 hours~~ is found tobe 137 mm in August, 1960.

5.4 Table no. shows the climatological data for 10 years

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TABLE I

...ental Tabl... based on observations for ... yrs.

Month	Total Rainfall (in.)	Mean Rainfall (in.)	Mean No. of Days with Rainfall	Prevailing Wind Direction (No. of days wind from)								Greatest Rainfall in 24 hrs. and year
				NE	E	SE	S	SW	W	NW	Calm	
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
Jan. I	21.9	31.		13	17	2	2	7	14	3	1	40
II				50	16	1	1	2	6	5	13	6
Feb. I	22.2	32.		13	11	4	1	11	17	4	11	38
II				55	8	1	1	1	6	9	17	2
Mar. I	20.5	31.		9	11	5	1	12	21	5	2	34
II				14	9	0	1	5	6	13	22	2
Apr. I	8.5	21.		8	12	3	4	12	24	7	2	28
II				34	6	1	2	5	9	14	29	2
May, I	14.8	51.		5	11	2	6	16	30	13	3	14
II				35	7	2	3	4	7	13	28	1
Jun. I	43.0	51.		4	3	3	5	10	34	24	5	42
II				23	9	5	8	8	17	15	14	1
July, I	34.8	109.		7	7	4	5	11	33	18	6	8
II				11	6	5	7	11	26	23	7	4
Aug. I	464.7	137.		6	12	6	8	9	17	21	9	12
II				16	9	5	6	7	21	23	11	2
Sept. I	223.9	87.	7.5	12	15	6	6	11	16	12	7	15
II				25	4	6	9	7	14	8	11	6
Oct. I	47.2	56.		9	8	6	6	11	15	6	0	9
II				47	5	5	5	6	7	6	6	3
Nov. I	1.1	6.		6	0	5	1	9	15	2	1	1
II				77	1	0	0	1	1	0	6	4
Dec. I	2.3	9.		7	5	2	1	9	14	2	0	50
II				69	1	0	1	1	3	3	8	4
Annual or Total	7402.8		7.7	8	12	4	4	10	21	10	3	20
Mean	616.9			40	10	2	4	5	10	11	14	3

...Manager

...Surveyor

CHAPTER - VI

GEOLOGY, WORKABLE SEAMS & THEIR QUALITY

DRILLING:

Occurrence of coal in the Bisrampur Coalfield was first reported in the year 1848. The field was mapped in 1872. M/s. TISCO carried out exploratory work in 1945-48. The Indian Bureau of Mines was first entrusted by N.C.D.C. to carry out proving of the block. I.B.M. undertook drilling in 1958 and 1959. A total of 1834.97 M was drilled by I.B.M. in 23 boreholes. Further drilling was done by N.C.D.C. in 1963. A total of 3928.60M in 73 boreholes were drilled by N.C.D.C.

For proving of non-coal bearing area for colony construction as well as for collecting samples for physico-mechanical tests, CMPDI Regional Institute-IV also undertook further exploratory drilling in two phases. In the first phase 11 boreholes with a total aggregate of 760.05 M were drilled while in the second phase 15 boreholes with an aggregate of 712.0 M were drilled. The procedure followed during exploration for all boreholes drilled were:

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6.2 STRATIGRAPHY:

Bhatgaon colliery is situated in the north-western part of the Bisrampur coalfield. The area is mostly covered by rocks of Barakar formation under a soil cover of variable thickness. However, exposures of coal have been located in the nala section in the north-western part of the block (Patpahani Seam) and in the Eastern part of the block (Masan Seam).

The Barakar formation is generally composed of coarse grained sandstone with few lenticular pebble beds. The carbonaceous horizons contribute about 5% of the total Barakar thickness. The Talcher is generally composed of greenish grey siltstone and shale and is exposed in the Gobrinala towards South and Babamara nallah towards west of Bhatgaon colliery. The Talchers have been encountered in a few of the boreholes drilled in the area.

The generalised stratigraphic sequence of the area is as follows:

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Table - No.VI

Recent	Alluvium	
Cretaceous to Eocene	Intrusive	Basic dykes
Lower Permian	Barakars	Coarse grained to fine grained cross-bedded felspathic sandstone with sandy shale, shal and coal seams.
Upper Carboniferous	Talchirs	Dark grey to greenis grey shales and ~~sstones.~~
---------- Unconformity ----------		
Pre-Cambrian	Metamorphics	Granite, Gneisses and quartzites.

6.3 STRUCTURE:

The major part of the area under consideration is covered by a thick mantle of soil and as such surface exposures of different formations are very much limited. The structural interpretation therei is entirely based on sub-surface data accruing as a result of drilling as also that of the underground workings of Bhatgaon colliery. The stratum contour plans of upper and lower Patpahari seams (Plate No.VI and VII) have been prepared on the basis of borehole data as also on the spot level of existing underground workings of both the seams. The incrop

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of the seams have been projected tentatively due to non-availability of surface contours. It can be seen from the floor contour plan of the seams (Plate No.VI and VII) that the strike of the bedding swings from NW - SE in the North-West to almost N - S in the East and again to NW - SE in the south-east. In the extreme North-West, near borehole NCBM - 22A and 9, the strike becomes almost East - West. This swing of the strike reflects a broad anticlinal flexture in the North-West and a synclinal flexture in the South-East.

The dip of the coal seams is towards East and North - East and the amount being 1 in 28 to 1 in40. Rolling dips are quite common as has been observed in the underground workings of Upper Patpahari Seam. The block is comparatively free from major geological disturbances. A total of 8 faults have been interpolated in determiningthe structure of the area on the basis of sub-surface data and underground workings. The faults F7 and F8 are tentative. The trend and amount of these faults will be clear after more drilling data is obtained.

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6.4 COAL SEAMS & THEIR DISPOSITION:

The coal horizons encountered in boreholes drilled in Bhaskarpur colliery area have beenshown in the form of graphic lithologs in Plate No.II and III. It is apparent from these lithologs that 2 to 3 coal horizons attain workable thickness within the project area. The most persistent coal seam i.e. Upper Patpahari Seam occurs as a pair with the Lower Patpahari Seam over the major part of the area, thus facilitating identification. The Masan Seam, where present, is of very good quality and maintains a parting of about 24 to 32 m with the upper patpahari seam.

Out of a total of 122 boreholes drilled by different agencies like I.B.M., N.C.D.C. and C.M.P.D.I. only 20 boreholes have met two more coal horizons(between 0.83 to 1.71 m) below Lower Patpahari Seam. These coal horizons are called upper Duga Seam and Lower Duga Seam. The thickness varies between 0.83 to 1.71 metres. In 8 - 10 cases, the thickness is only 0.3 to 0.6 metres. These seams are highly impersistent in nature. In many cases, the boreholes have not been drilled upto the required depth, perhaps because the seam thickness was found tobe impersistent. However, it is now proposed to drill a few u/g

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boreholes from workings of lower Patpahari Seam to know the workability of these seams.

The sequence of the coal bearing formation is as follows:

Table No.VII

Lithology	Thickness in m	Remarks
Alluvium	3m to 6.00	Sandy soil with loose boulders generally loosely cemented.
Med.to coarse gr.sandstone	20 - 25	
MASAN SEAM	0.61 - 2.26	Coal seam attains workable thickness in eastern part of the area.
Coarse grained to fine grained sandstone with two impersistent bands of coal and carbonaceous shale & lenses of pebble bearing sandstone and conglomerates.	24.11-32.84	Parting
UPPER PATPAHARI SEAM	0.75 - 4.44	Coal Seam
Coarse grained sandstone with pebbly sandstone and conglomerates.	3.09 - 12.72	Parting
LOWER PATPAHARI SEAM		Coal seam
Coarse grained sandstone with conglomerates at the top and impersistent bands of coal and carbonaceous shale.	0.25 - 2.04	
	25 - 35	Parting

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* UPPER DUGA SEAM	0.5 - 1.71	Coal Seam
Alternate bands of shale & sandstone	2 - 5	Parting
* LOWER DUGA SEAM	0.2 - 1.1	Coal seam
Coarse grained to med.gr.sandstone, shale & bands of coal.	35 - 50	Floor

Note: Seams marked (*) are occuring impersistently.

- -

6.5 CORRELATION:

The correlation of the seams has been made on the basis of two pairs of seams viz. Upper Patpahari and Lower Patpahari Seams(one pair) and Upper and Lower Duga Seams(secondpair). These pairs are separated from each other by a parting of 25 - 35 m Parting in between the upper pair of seams is 3 - The Masan seam is above Upper Patpahari Seam by 25 m. The pairs of Patpahari Seams are characteri by associated roof and floor of pebble bearing sandstone and conglomerates.

The lower Patpahari Seam has been developed by three pairs of inclines while the Upper Patpahari Seam has been developed by drifting from Lower Patpahari workings. The Masan seam is yet virgin inthe area.

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6.6 DESCRIPTION OF SEAMS:

(A) MASAN SEAM: The Masan Seam is the topmost workable horizon in the project and occurs only on the dip side of the area (i.e. south-eastern part). The seam occuring at about 24 to 32 m above the upper Patpahari Seam varies in thickness from 0.63 m (DC - 14) to 2.26 m (CMBB - 2). A persistent workable thickness of more than 1 m has been encountered in a limited area in the south-eastern part of the county. In the North-Eastern part, the seam exhibits workable thickness in boreholes of NCBM - 60, 62 and 64, but it is not possible to delineate the workable zone due to lack of borehole data. The seam is clean in disposition.

(B) UPPER PATPAHARI SEAM: This seam is the most prominent coal horizon in the area and has been encountered in 99 boreholes out of the 120 boreholes drilled in the entire area. The seam is separated from lower Patpahari seam by a parting of 3.09 - 12.72 m. Over the major part of the area, the parting between upper and lower Patpahari seams is 3 to 7 m in the north and eastern parts. This parting gradually increases to 11 to 12 m. The variation of thickness

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of the parting between the two seams has been depicted by iso-parting line shown in Plate No.VI. The coal seam thickness varies from 0.75 m (CMBB - 18) to 4.44 m (NCBM - 36). However, out of 94 boreholes, thickness below 1 m has been encountered in 7 boreholes and thickness more than 3 m has been encountered in only 5 boreholes. The general thickness varies between 1.8 to 2.75 m. The seam is clean over major part of the area. In the eastern part, however, 1 to 2 dirt bands varying in thickness from 0.05 - 0.25 m and generally composed of carbonaceous shale are present in the seam.

(C) LOWER PATPAHARI SEAM: The seam has been encountered in 90 boreholes out of 120 boreholes drilled in the area. Thickness of the seam varies from 0.35 m (BG-18) to 2.74 m (NCBM-37). The seam is unworkable i.e. seam thickness is less than 1.0m in the northern and central parts of the property. The thickness ranges from 1.09 to 2.2 m. The seam is clean in the northern and north-western part of the area. In the central part, 1 to 2 carb.shale bands with thickness varying from 0.06 m to 0.37 m

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have been developed. In the eastern part, the thickness of dirt band is generally between 0.61 to 0.68 m.

(D) LOCAL SEAMS (Upper & Lower Dugga): In some of the boreholes two locally developed seams below Lower Patpahari Seam were named as Upper Dugga Seam and Lower Dugga Seam. These seams are highly impersistent in nature. In ten boreholes the thickness which was met varied between 0.83 to 1.71 m. The seam contains 1 or 2 bands from 0.08 to 0.20 m in thickness. The meagre data available does not indicate any workable area. However, it is now proposed to drill few underground boreholes from u/g workings of lower Patpahari Seam to know the extent and nature of these seams.

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Sub-Agent

6.7 DEMARCATION OF BOUNDARY:

The mine boundary has been demarcated on geo-mining conditions as follows (Refer Plate-VI).

South	...	By fault F7 - F7
North	...	By fault F1 - F1
East	...	By 200 meters influence line or 0.9 m Isochore line.
West	...	By incrop of the seam or beyond opencast area marked on the plan.

6.8 WORKABLE SEAMS & THEIR QUALITY:

MASAN SEAM:

As described in the earlier chapter, this seam occurs only on the dip side of the area. The proposal is to work this patch by opencast. This seam has not been included in this report. The grade of coal is A - B (UHV 6706 - 6899).

UPPER PATPAHARI SEAM:

As mentioned earlier, the general thickness varies between 1.8 to 2.75 m and is the next prominent coal horizon of the area. The average quality parameter of this seam is as follows:

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Table No.VIII

Proximate analysis on 60% R.H. & 40°C basis:

	Excluding dirt bands	Including dirt bands
Moisture %	3.3 - 6.1	3.3 - 6.1
Ash %	9.9 - 20.4	9.9 - 20.8
Volatile matter percentage	24.9 - 29,4	-
Calorific value (K.Cal/kg.)	6125-7025	-
Useful heat value (K.Cal/Kg.)	5422-6451	5201- 6871
Grade	Mostly 'A'-'C'	'A' - 'C'

ULTIMATE ANALYSIS:

The coal of Upper Patpahari Seam is weakly coking to non-coking in nature having a caking index of around 5 and less. The total sulphur content of the seam varies from 0.4 to 1.0 amd the phosphorus content is generally below 0.006%. The ash analysis of seam from one borehole i.e. NCBM-25 is as table

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given below:

SiO_2 %	60.82
Al_2O_3 %	28.58
Fe_2O_3 %	5.31
TiO_2 %	1.75
MnO %	0.22
P_2O_5 %	0.06
CaO %	1.25
MgO %	1.26
SO_3 %	0.49
Alkalies (bydiff)	0.26

The ash fusion range of the seam is generally as follows:

Softening temperature .. 1200°C to 1400°C

Hemispherical temperature.. Over 1400°C.

The Coal of upper Patpahari seam as mentioned earlier is poorly caking in nature. The summarised results of grey king low temperature carbonisation on 60% R.H. at 40°C is as follows:

Table No.IX

Coke (kg)	Tar(/+)	Liquor(/+)	Ammonia(kg)	Gas(m3)	Coke type
775-798	92-100	48-60	1.0 - 1.4	90-95	mostly 'B'

5.9 Lower Patpahari Seam:

The general thickness ranges from 1.09 to 2.2 metres. The following table furnishes the summarised statement of the proximate analysis for the seam.

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Table No.X.

Proximate analysis on 60% R.H. and 40° C basis.

	Excluding band	Including band
Moisture %	3.5 - 4.9	2.8 - 4.9
Ash %	11.1 - 21.9	11.1 - 26.6
Volatile matter%	27.3 - 32.8	-
Clarific value (K.Cal/kg)	6135 - 7235	-
Useful heat value(K.Cal/kg.)	5298-6345	4760-6345
Grade	'A' to 'C'	Mostly 'A' to 'D'

The coal of the lower Patpahari seam exhibit semi-caking property in the northern part with caking index between 8 to 12. The caking index generally reduces to below 6 in the southern part of the area. The total sulphur content of the seam is generally between 0.4 - 0.8 % whereas phosphorus content is below 0.006 %.

The summarised ultimate analysis on unit coal basis for the seam is as follows:

C %	M%	N %	S% (organic)	%
84.5	4.1	1.5	0.5	7 - -
-	-	-	-	
86.1	5.2	1.8	0.8	

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The ash composition of the seam is available for only one borehole i.e. NCBM - 25 which is as follows:

SiO_2 %	..	62.48
Al_2O_3 %	..	27.27
Fe_2O_3 %	..	4.26
TiO_2 %	..	1.92
MnO %	..	0.14
P_2O_5 %	..	0.05
CaO %	..	1.45
MgO %	..	0.90
SO_3 %	..	0.13
Alkalies(by diff)		1.40

The ash fusion range of the seam is generally as below:

Softening temperature ..~~1200°C~~ to ~~1400°C~~

Hemispherical temperature Over 1400°C

The summarised yieldper tonne of dry coal is as below:

Coke(kg)	Tar(lit)	Liquor(lit)	Ammonia(kg)	Gas(cum)	Coke type
765-775	100-110	49-60	1.0 - 1.5	85 - 96	B-C

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GRADE OF COAL:

Considering that the seams are normally clean except in few patches where thin dirt bands occur which shall be picked on the picking belt of the CHP, grade of coal is expected tobe Gr.'B' for steam. In slack crushed stone may get mixed and therefore as a measure of abundant caution the grade for slack coal has been kept as Grade 'C'.

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CHAPTER - VII

COAL RESERVES, TARGET OUTPUT AND LIFE OF MINE

7.0 RESERVES:

7.1 Thefollowing table gives the reserves as per the earlier sanctioned report.

Table No.XI

Proved Reserves (in m.tes) U/g	O/c	Indicated (m.tes)	Total (m.tes.)
33.65	9.65	2.75	46.05

The earlier sanctioned report had excluded the coal reserves occuring within coal/overburden cut-off ratio 1:5 as that tobe extracted by opencast mining. However, with the advent in opencast technology, coal/OB cut -off ratio of 1:10 (1: 3.8 tonne/ cum stripping ratio) can now be worked economically. This advance of opencast technology has been gainfully utilised now in this project by excluding the reserves occuring within the cut-off ratio of 1:10 for opencast mining. Thus, the underground

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and opencast reserves now work out to be -

Table No.XII

Name of Seam	Proved u/g reserves in million tonnes			Opencast upto1:10 and in areas as shown in Plate No.	Total in m.te.
	More than 15m cover line	Reserves in barrier of future o/c & u/g mines, u/g nallah & other surface infrastructure etc.	Less than 15m cover line.		
Upper Patpahari and Lower Patpahari	23.607	2.147	1.135	14.597	42.236
Masan	-	-	-	1.75	
				16.347	

The difference in coal reserves of 4.5m.t. as compared to that of original project report is dueto change of incrop position, change in isochore of seams due to further drilling.Besides, there has been extraction of coal over the last 8 years.

The details of u/g reserves considered for the revised project report is as follows:

Table No. XIII

Details showing underground reserves ✓

Seam	Less than 1.5 m coverline (m.tes.)	More than 15m cover line (m.tes.)	Total m.tes.
Upper Patpahari Seam	0.634	15.722	16.356
Lower Patpahari Seam	0.501	7.885	8.386
T o t a l	1.135	23.607	24.742

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Note: The reserves at the peripheral extremities of workable area for Lower Patpahari Seam and that in south-eastern part for Upper Patpahari Seam where the seam thickness varies between 1.2 to 0.9m works out tobe another 2.5 million tonnes (approx.) which when explored by u/g galleries would increase the life of the mine by further 2 to 2½ years.

7.2 . . TARGET OUTPUT:& LIFE OF MINE:

The original project report had a target output of 1.00 million tonnes with the life of the project 24 years with net geological reserves of 46.04 m.tes. and extractable reserves of 23.66 million tonnes. These extractable reserves were with longwall technology where overall percentage extraction was 65% against 60% by Bord & Pillar. Under these conditions, reduction of underground reserves due to(i) increase in area tobe mined by opencast mine (upto 1:10 cut off) and (ii) due to slightly lower percentage of extraction by B & P mining the extractable reserves by underground mining are now only 14.16 m.tes. With these limited reserves, it is not prudent to project this mine for 1.00 m.t. requiring very advanced technology and very heavy capital investment for a limited life of 14 years. Therefore, it has been considered necessary to reduce the target capacity to 0.6 m.te. with a life of 24 years. Another opencast mine of 0.5/0.60 m.tes.capacity to work the reserves of 16.4 m.tes. will be taken up shortly.

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Supdt. of Mines

life of 14 years. Therefore, it has been considered necessary to reduce the target capacity to 0.6 m.t. with a life of 24 years. Another opencast mine of 0.5/0.60 m.tes. capacity to work the reserves of 16.4 m.tes. will be taken up shortly.

To summarise -

Net gproved geological u/g reserves	=	23.607 m.tes.
Extractable reserves	=	14.16 m.tes.
Target production	=	0.6 m.te/annum
Therefore life of the mine	=	24 years.

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CHAPTER : VIII

PRESENT STATUS OF THE MINE

The existing status of the mine with respect to various parameters are as follows:

8.1: MINE DEVELOPMENT:

Entries: Three pairs of inclines viz. 1 & 2, 3 and 4 and, 5&6 have been driven upto Lower Patpahari Seam. The details of these 6 openings are as follows:

Table No.XIV

S.No.	Description	X-Section slope	Gradient	Plan length	Purpose for which used
1.	No.1 Incline	4.2x2.4m	1in4	190.0M	Downcast
2.	No.2 incline	- do -	-do-	210.0M	Downcast & travelling.
3.	No.3 Incline	- do -	1in4.5	170.0M	Downcast & haulage - Production incline.
4.	No.4 Incline	- do -	-do-	175.0M	Downcast & travelling.
5.	No.5 incline	- do -	1in4	120.0M	Upcast and travelling.
6.	No.6 incline	- do -	1in4	125.0M	Downcast & haulage- PRODUCTION INCLINE

From the above table, it is clear that inclines no.3 and no.6 are presently acting as production inclines through haulages. However, a belt

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conveyor of 1000 m width is being installed in no.4 Incline, which in future would become the main production incline.

8.2 OUTPUT:

The mine is presently producing about 20,000 tonnes per month i.e. 0.24 m.tns/annum. The break up of production is as follows:

From Incline no.3 - 6,500 to 7,000 tns/month by a dip district of 5 headings.

Incline no.6 - 13,000 tonnes/month by a level district of 6 headings and a dip-district of 4 headings.

The coal is raised by 50 KW direct haulages through these inclines.

8.3 METHOD OF WORK & UNDERGROUND TRANSPORT:

Presently systematic development of main dips by manual Bord and Pillar method is being done (Refer Plate No. IX). Square pillars of sizes 22.5 m centre to centre are being driven. Level and dip headings of size 4.5 m width are being driven with skid mounted coal cutting machines

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drilling and blasting. The blasted coal is then loaded into mine cars manually and transported to the incline bottom by a series of endless haulages and then to the surface by a direct rope haulage. The details of existing transport arrangements have been shown in Plate No. IX.

As mentioned earlier, incline no.4 would be the only production incline and a belt conveyor is being installed in it. Also for mechanisation of Bord and Pillar workings, 2 side loaders have been commissioned. and are at present working as development machines in combination with chain conveyor.

VENTILATION:

Presently, inclines no.5 is acting as upcast for the whole mine, while the other five openings act as intake. The existing fan of Volted make has a capacity of 6750 cum/min. (2,50,000 cfm) working at a pressure gauge of 60 mm and driven with a 150 KW motor. The existing ventilation system is also shown in Plate No. IX.

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8.5 PUMPING:

The main sump is located in no.6 dip towards south of inclines 1 & 2. The discharge to the surface is through boreholes of 100 mm (4") pipes. The depth from surface is 15 m. Two such boreholes driven side by side are being used for pumping mine water to the surface by 2 numbers of M.L.A. - 2 pumps. Besides, a standbye pipeline with a DSM - 4 pump through Incline no.1 to the surface also exists for emergency pumping.
In addition, to the above arrangements, for every panel boreholes are drilled and water discharged directly to the surface, thus taking advantage of the low cover.
The present make of water is 1500 g.p.m. during rainy season and 800 g.p.m. during summer.

8.6 LAND ACQUISITION:

The acquired land measures 341.458 hectares, the details of which are as follows:

267.038	hectares, under CBBA
60.529	hectares, under LA.
11.391	hectares, transfer under MPLRC
3.449	hectares, direct negotiation forroad.
342.407	T o t a l

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8.7 COAL HANDLING ARRANGEMENTS & RLY.SIDING:

The present temporary arrangement of coal handling plant consists of two surface bunkers of 75 tonnes capacity each (i.e. a total of 150 tonnes) for incline no.6 and four surface bunkers of 100 tonne capacity each (i.e. a total of 400 tonnes) for incline no.3 An elevating conveyor from tippler to the bunkers is provided at both the production inclines.

Coal is then transported either by departmental tippers/or by contractors to Karonji railway siding about 15 kms away. A ramp and 2 Terex Front End Loaders have been provided for loading coal into wagons at the railway siding. The siding has a capacity of only 30 box wagons per day.

8.8 POWER SUPPLY:

The existing source of electric supply is from MPEB substation at Bisrampur which is about 26 kms away. This supply is through a 33 KV feeder. A second feeder of 33 KV is also expected tobe ready soon. A temporary sub-station of 133 KV also exists at the mine site. The construction of permanent sub-station is in progress. The location of these sub-stations are shown on Plate No. I X .

Colliery Manager

Surveyor

CIVIL WORKS:

The existing township is located at a distance of about 4 kms. from no.3 and 4 inclines near Talegaon Village. Residential buildings numbering 281 are available at the project and further 120 buildings are under various stages of construction. School building, dispensary, shopping centre and water supply arrangement exists in the township. The incline water is filtered through the horizontal pressure filter and then supplied. The existing service buildings like that of project manager's office workshop etc. are given in Appendix A.2.1 which are located near incline 3 and 4 (Refer Plate IX).

MANPOWER:

The existing manpower is as follows:

Executives	=	16
Technicians & Supervisors	=	77
Clerical Grade	=	39
Daily rated	=	429
Piece rated	=	212
Badli rated workers:		
Time rated	=	119
Piece rated	=	06
T o t a l	=	885 / 1098

8.11 EXPENDITURE INCURRED TILL 31.3.1983

S.No.	Particulars	Amount Rs.000 upto 31.3.1983
(1)	Land	444
(2)	Buildings	7128
(3)	Plant and Machinery	47791
(4)	Furniture & fittings	106
(5)	Vehicles	1191
(6)	Railway siding	32481
(7)	Development	14038
	T o t a l	103179

8.12 A BRIEF HISTORY OF THE PROJECT:

a) Date of opening of the mine .. 1.4.1975

b) Date of starting coal production .. November 1977

c) Date of going into revenue .. 1.4.1982

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Surveyor

10/9/84

CHAPTER - VI

PROPOSED METHOD OF DEVELOPMENT AND DEPILLARING

6.0 The indepth study of the geo-mining conditions brings outthe following various facts of Bhatgaon's reserves:

(a) Considerable variation in seam thickness:

The isochores in plate no.VI show considerable variation in seam thickness. The Upper Patpahari seam varies from minimum extractable thickness to as much as 3.5 m.

(b) Shallow depth of reserves:

The maximum depth of reserves at the dipmost point is 60 m. Two opencast mines have been earmarked as shown in Plate No.VI - one upto coal to O/b cut-off line ratio of 1:10 and a stripping ratio of 1:38 upto and the other at the localised dipmost point where Lower seam occurs at a depth from 10 to 20 m from the surface. Lower seam has geological reserves of 1.75 m.tons. within the existing boundry of the mine. As most of the reserve lies within 15 m of hard strata, it could be worked with O/c method for which a separate report would be made.

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Bhatgaon Colliery

16/9/82
Asst. Surveyor

Contiguous working:

[illegible] Patpahari seam [illegible] which [illegible] maximum. The development of contiguous working, [illegible] ventilation, decrease in manpower etc. could be taken by working these seams simultaneously. However, as can be seen from Plate No.[illegible] the southeastern side of the property towards the dip consists of only Upper Patpahari Seam of workable thickness while the Lower Patpahari Seam does not attain workable thickness. Thus, in this area only Upper Patpahari Seam would be worked. The area where both seams occur and are in workable thickness has also been clearly demarcated in Plate-VI. As mentioned earlier, the permission from DGMS for contiguous working of the seam has been initiated by the project authorities.

Sequence of Mining:

Keeping in view the above, the sequence of mining in Bhatgaon Deorberi would be as follows:

Barail to be developed and exhaust initially only Upper Patpahari Seam in the section where contiguity is not present.

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Bhatgaon Colliery

Surveyor
Bhatgaon Colliery

Step-II: To continue the development and extraction of Upper Patpahari Seam as in (1) above as well as to develop Lower Patpahari Seam only on the rise side of workings, where Upper Seam is absent.

Step-III: To develop and extract the Lower Patpahari seam after Masan Seam has been eliminated and strata allowed to settle.

Step-IV: To start the main opencast workings of Coal O/b 1:10 cut-off ratio after underground reserves have been fully exhausted.

9.2 METHOD OF WORK:

Bord and Pillar method of work was adopted by the project authorities after the earlier proposed method of longwall with caving did not work out tobe feasible due to shallow depth cover.

For producing 0.3 m.t/annum i.e. 2000 tonnes per day a certain degree of mechanisation is a must in Bord and Pillar system. However, considering the seam thickness variation, one single type of mechanisation is not possible. Therefore, for deciding the appropriate mechanisation the seams have been broadly divided into -

(a) Seam thickness 2.5 m and above, (4.22 m.tes.)

(b) Seam thickness less than 2.5 m and upto 1.2 m/ 0.9 m (3.7 m.tes.)

(g) [illegible] seam section in seam thickness 2.5m and above:

[illegible] thickness 2.5 m and above suit very well [illegible] deployment of Load Haul Dumps and Side Loaders. The project authorities are already getting experience with Side Loaders in developing pillars. However, as Load Haul Dumps are more mobile (tyre mounted) these have been suggested as developing machines while the Side Loaders would be deployed as depillaring machines. The details of this method and the production tobe achieved have been given in this Chapter under 'Production Parameters'.

(h) For seam thickness less than 2.5 m upto 1.2m/0.9m:

The variation of the seam thickness between 0.9 to 2.5 m is considerable. The seam averages around 1.5 m which makes it difficult to adopt a particular coal mining machine. However, a compromise has been reached between wholly manual and mechanised systems by suggesting shovelling onto chain conveyors during both development and depillaring operations. This method has the flexibility of suiting the seam thickness variations. The details of this method are mentioned in this Chapter under 'Production Parameters'.

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Bhatgaon Colliery

9.3 SEQUENCE OF UNDERGROUND MINING:

The general sequence for underground mining is as follows:

i) To drive the trunk dip headings upto the boundary of the mines.

ii) To open up panels on the flanks on either side of these trunk dip headings from the dipmost point upwards.

iii) To develop and extract panels from dip upwards.

From the above sequence, it can be seen that generally a retreating method of mining has been suggested.

9.4 PRODUCTION PARAMETERS:

The detailed calculation of the output from the two seams are as follows:

9.4.1 For seam thickness 9.5 m and above:

Method: a) Development of pillars by Load Haul Dumps and Chain Conveyors (Refer Plate No.X)

b) Depillaring by Side Loaders and Chain Conveyors (Refer Plate No.XI)

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Bhatgaon Colliery

Surveyor 14/09/20

a) Production during development for a panel:

Development panels of 6 headings would be formed. A panel would thus consist of 5 square pillars of sizes 22.5 m. The headings of 4.8 m width would be cut by crawler mounted arc wall C.C.M., drilled and blasted and the coal would be loaded by L.H.D. onto medium duty chain conveyors. These conveyors would unload coal through a stage loader to the coal tubs. (Plate No.X)

The production during development from a panel would be:

Width of development headings	.. 4.8 m.
Avg. height of seam	.. 2.75 m.
Number of headings	.. 6
Number of faces available	.. 7
Avg. Advance /round of blast	.. 1.4 m
Number of blasts/face/shift	.. 1
Sp.Gr. of coal	.. 1.4

Hence production/ panel/day

= 4.8x2.75x7x1.4x1x1.4x3 = 545 tonnes.

Considering production factor of 0.8 the output from a development panel/day would be 435 tonnes say 425 tonnes..

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Bhatgaon Colliery

Bhatgaon Colliery

For producing 425 t/day, 3 load haul dumps would be deployed. Thus, each L.H.D. would be handling 145 tonnes of coal/day or 48 t/shift. Also with the above rate of production a pillar would be developed on an average in 10 to 11 days time.

The sequence of operations in a development panel would be as follows:

The Arc wall crawler mounted coal cutter would give a cut in the face and then the face would be drilled and blasted. The blasted coal would be hauled by L.H.Ds. on to gathering medium duty chain conveyors. Coal from the two gathering MDCCs would be transported outbye by the endless haulage via a stage loader (Refer Plate No.X). The movement of L.H.D. would be restricted to a maximum of 50 m and the gathering MDCC's shifted while the stage loader MDCC conveyor would be extended as andwhen required. When this MDCC increases to a length of 100 m the track would be extended.

Production from a depillaring panel - by slicing of pillar:

The depillaring operations would consist of extraction of pillars by two slices of 5.85 m width leaving ribs of 2 m thickness (refer plate no.XI) The ribs on retreat shall be extracted judiciously.

Production from slices -

No. of pillars under extraction	=	5
No. of slices worked	=	5
Width of a slice	=	5.85 m
Number of blasts/slice/shift	=	1
Average height of seam	=	2.75 m
Average advance/blast	=	1.4 m
Number of production shifts	=	3
Specific gravity of coal	=	1.4

Therefore production per panel/day

= 5 x 5.85 x 2.75 x 1.4 x 3 x 1.4 = 475 t/day

Production factor = 0.8

Production per panel/day = 378 t.p.d. say 375 tpd.

With the above rate of production a pillar would be extracted in 10 to 11 days. For the above purpose, 3 side loaders shall be deployed perpanel. The side loaders shall load coal onto light duty chain conveyors and through a medium duty chain conveyor onto coal tubs

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Bhuggon Colliery

With the above rate of production and for a panel length of 720 m the time taken for both, development and depillaring would be about 24 months. If required, sub-panels can be formed keeping in view the incubation period.

3.4.2 For Seam thickness less than 2.5 m upto 0.9 m.
- Method

a) Development - formation of pillars by shovelling onto chain conveyor.

b) Depillaring - Shovelling onto chain conveyor.

a) Production from a development panel: The development would consist of forming five square pillars of 22.5 m by driving six headings. The drilled and blasted coal would be loaded onto light duty face chain conveyor and then through the gathering medium duty chain conveyor into coal tubs. The production from a development panel would be as follows:

Number of headings	..	6
Number of faces available	..	7 out of 11
Width of heading	..	4.8 m
Avg. seam thickness	..	1.5 m
Sp.Gr. of coal	..	1.4
Advance per blast	..	1.2 m

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Khottadih Colliery

Mining Surveyor

Number of blasts/face .. 3

Number of production shifts .. 3

Coal to be blasted/face/shift .. 1.5x1.5x1.4x1.2=3.8 tons

Therefore coal production/panel/day

= 12 x 3 x 3 = 200 tonnes.

Production factor = 0.8

Coal produced/panel/day = 200 tonnes.

b) Production from depillaring of a panel:

(i) By splitting of pillars

(ii) By slicing of pillars

Production from slices:

Width of slice .. 5.85 m

Avg. thickness of seam .. 1.5 m

Advance/blast .. 1.0 m

Spt.Gr. of coal .. 1.4

Coal / blast .. 5.85x1.5x1.0x1.4=12 tns.

No. of slices worked at - time .. 5

No. of blasts/shift .. 1

No. of production shifts .. 3

Therefore coal produced per day from slices

= 12 x 5 x 3 = 180 tonnes.

With the above rate of production a pillar which

is extracted in 9 days time. Therefore, the rate of

splitting the pillars would on an average be

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Colliery

Mining Surveyor
Chargeman Colliery

Number of blasts/face .. 1

Number of production shifts 3

Coal per blast/face/shift .. 4.8x1.5x1.4x1.2=12 tons.

Therefore coal production/panel/day

= 12 x 7 x 3 = 252 tonnes.

Production factor = 0.8

Coal produced/panel/day = 200 tonnes.

b) Production from depillaring of a panel:

(i) By splitting of pillars

(ii) By slicing of pillars

Production from slices:

Width of slice .. 5.85 m

Avg. thickness of seam .. 1.5 m

Advance/blast .. 1.0 m

Spt.Gr. of coal .. 1.4

Coal / blast .. 5.85x1.5x1.0x1.4=12 tes.

No. of slices worked at a time .. 5

No. of blasts/shift .. 1

No. of production shifts .. 3

Therefore coal production per day from slices

= 12 x 5 x 3 = 180 tonnes.

With the above rate of production a pillar will be extracted in 9 days time. Therefore, the rate of splitting the pillars would on an average be

Colliery Manager

16/9/22

17.7/9 = 2.0 m where 17.7 m is the length of the solid pillars. Hence production from 5 splits would be 4.8 x 2 x 1.5 x 1.4 x 5 = 100 tonnes. Therefore, the production from a depillaring panel = 180 + 100 = 280 tonnes say 200 tonnes.

Target production:

To achieve a target production of 0.6 m.te/annum i.e. 2000 t.p.d. the number of panels tobe worked are detailed as follows:

S.No.	Seam thickness	Method of work	No.of panels	Output/ days tes.
1.	2.5 m & above	Development by LHD	2	425x2=850
2.	- do -	Depillaring by SDL	2	375x2=750
3.	Less than 2.5m	Development by shovelling onto chain conveyors.	1	200x1=200
4.	- do -	Depillaring shovelling onto chain conveyor.	1	200x1=200

Total output/day of the mine = 2000tes.
= 0.6 m .tes/annum

Manager
Company Manager

10/9/24
Mine Surveyor
Bhatgaon Colliery

CHAPTER - X

UNDERGROUND TRANSPORT

10.1 COAL TRANSPORT:

10.1.1 AT FACE:

(A) DURING DEVELOPMENT:

Depending upon the method of work the coal from face would be transported by -

(a) Load Haul Dump onto medium duty chain conveyors in seam thickness 2.5 m and above.

(b). Shovelling onto light duty chain conveyors in seam thickness less than 2.5 m.

(B) DURING DEPILLARING:

(a) By side loaders onto light duty chain conveyors in seam thickness 2.5 m and above.

(b) By shovelling onto light duty chain conveyors in seam thickness less than 2.5 m.

10.1.2 PANEL TRANSPORT:

Transport of coal out bye from a panel shall be in tubs by endless haulages. In thin section low height tubs shall be used.

Colliery Manager

Surveyor

10.1.3 TRUNK TRANSPORT:

Transport of coal in trunk roads on the northern side would be by 800 mm wide PVC belt conveyors to the main belt 1000 mm wide (incline no.4). The tubs from the panels shall be tippled onto trunk conveyors only on the northern side. In the southern side the transport of coal shall be by endless haulage upto the bottom of incline no.4 where they shall be tippled onto the MDCC and further shall be discharged on the main belt conveyor (incline no.4). Advantages of staple shafts shall be used to lower the coal from upper Patpahari to lower Patpahari seam.

10.2 MATERIAL SUPPLY/TRANSPORT:

By endless haulages.

10.3 INCLINE DETAILS:

Incline no.4 would act as the main production incline with a 1000 mm wide belt conveyor. The details of the inclines are as follows:

T a b l e No.XVI

Sl.No.	Openings	Purpose
1.	Incline no.1	Upcast
2.	Incline no.2	Downcast & travelling

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Mine Surveyor
Bhatgaon Colliery

3.	Incline no.3	Downcast and haulage
4.	Incline no.4	Downcast and Main (belt) incline.
5.	Incline no.5	Upcast incline and travelling.
6.	Incline no.6	Downcast and haulage.

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Bhatgaon Colliery

Surveyor
Bhatgaon Colliery

CHAPTER - XI

VENTILATION

11.1 The existing ventilation system consists of an upcast fan of 6750 cum/min. capacity at 60 mm w.g. installed at no.5 incline. The other existing five openings act as intakes. The present production is only 0.24 m.t/annum (for ventilation planning of 1.0 m.t. production C.M.R.S. had prepared a report in February, 1975). For a production of 2000 t.p.d. i.e. 0.6 m.t/annum the details of air quantity requirement, horse power of fans and water gauges are calculated as follows:

11.2 AIR QUANTITY REQUIRED:

a) On the basis of output: The statutory requirement that quantity of air should not be less than 2.5 m3/min per tonne of daily output requires that

$$Q \text{ minc} = \frac{2000 \times 2.5}{0.5} = 10{,}000 \text{ m3/min.}$$

$$= 165 \text{ m3/sec. of air}$$

should be supplied for the whole mine. Therefore, the air quantity on the basis of output is 165 m3/sec.

Safety Member

Surveyor
Bhatgaon Colliery

b) On the basis of manpower: The statutory requirement that quantity of air should not be less than 6 m3/min per person on the largest shift works out tobe as -

$$Q \text{ mine} = \frac{600 \times 6}{0.5} = 7200 \text{ m}^3/\text{min.}$$

Where 600 = largest number of persons going underground in a shift.

0.5 = efficiency of the fan

= 120 m3/sec.

On comparison of the two quantities, it is found that the quantity requirement on the basis of production is higher and hence is tobe considered for further calculation.

11.3 MAIN INTAKE & RETURN OPENINGS:

The following table gives the details of openings for ventilation purposes as suggested in the sanctioned report. The table also gives statutory limitations of air velocity and hence the air quantity to flow in them.

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Bhalgora Colliery

Surveyor
Bhalgora Colliery

b) On the basis of manpower: The statutory requirement that quantity of air should not be less than 6 m3/min per person on the largest shift works out tobe as -

$$Q \text{ mine} = \frac{600 \times 6}{0.5} = 7200 \text{ m}^3/\text{min.}$$

Where 600 = largest number of persons going underground in a shift.

0.5 = efficiency of the fan

= 120 m3/sec.

On comparison of the two quantities, it is found that the quantity requirement on the basis of production is higher and hence is tobe considered for further calculation.

11.3 MAIN INTAKE & RETURN OPENINGS:

The following table gives the details of openings for ventilation purposes as suggested in the sanctioned report. The table also gives statutory limitations of air velocity and hence the air quantity to flow in them.

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Mine Surveyor
Bhatgaon Colliery

Table No. XVI

S.No.	Opening	Purpose (proposed)	Length m2	Area of x-sec. in m2	Velocity permitted m/sec.	Quantity of air permitted m3/sec.
1.	Incline no.1	Return	190	10.08	8	80
2.	Incline no.2	Intake & travelling	210	10.08	8	80
3.	Incline no.3	Intake & haulage	170	10.08	8	80
4.	Incline no.4	Intake & Belt Conveyor	175	10.08	4	40
5.	Incline no. 5	Return & travelling	120	10.08	8	80
6.	Incline no.6	Intake & haulage	125	10.08	8	80

From the above table, it would be seen that from existing four intake openings the mine can be supplied an airquantity of 280 m3/sec. which is more than the required quantity of 165 m3/sec. Hence the intake openings are sufficient for the required air quantity. Also for return purpose the two existing return openings can handle 160 m3/sec. which is sufficient.

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Bhatgaon Colliery

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Mine Surveyor
Bhatgaon Colliery

11.4 VENTILATION AS SUGGESTED IN THE EARLIER REPORT:

The sanctioned report suggested that the intake and return openings should be as follows:

S.No.	Incline No.	Purpose
1	No.1	Return
2	No.2	Intake
3	No.3	Intake
4	No.4	Intake
5	No.5	Return
6	No.6	Intake

The earlier report thus divided the property into two different independent parts from ventilation point of view. These two parts, now detailed as 'Circuit 'A' and Circuit 'B' are as follows:

'Circuit'A': Incline no.2 and 3 acting as intakes for the western portion of the mine, where both upper and lower Patpahari seams are tobe worked, with incline no.1 as return.

'Circuit'B': Incline no.4 and 6 acting as intakes for the north-eastern portion ofthe mine, where only upper Patpahari Seam is workable in the Incline no.5 as upcast.

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Surveyor
Colliery

11.5 DISTRIBUTION OF AIR QUANTITY:

The air quantity would be distributed in circuit 'A' and circuit 'B' (refer Plate XVII) depending upon the quantity of production from these parts. As production would vary from these parts over the life of the mine, an average ratio of production of 30:70 is taken for circuit 'A' and circuit 'B' respectively for calculation and pressure drop. Therefore, the quantity distribution is

Q Circuit 'A' Production = 0.15 m.t = 40 m3/sec.

Q Circuit 'B' Production = 0.45 m.t. = 125 m3/sec.

Total = 165 m3/sec.

11.6 PRESSURE DROP:

The following consideration has been taken into account for pressure drop calculation:

(i) As the trunk headings are as long as 1½ to 3 kms. it is suggested that to reduce the pressure drop, the number of splits should be increased and hence a minimum of 3 splits for intake and 3 for return would be driven. This would also help in reducing the air velocity. Thus a total of 6 headings would be driven in trunk roadways, 3 for intake purpose and 3 for return.

Colliery Manager

(i) The ventilation within the panel is would be adequately supplemented by auxiliary fans and ductings. The details are shown in the method of work plates no. X, XI, XIII and XIV.

11.7 FAN SPECIFICATION:

(a) For circuit 'A': The fan at no.1 incline would be an exhausting axial flow fan of 40 m3/sec. capacity. The pressure gauge would vary between 50 - 70 mm w.g.

(b) For circuit 'B': The fan at no.5 incline would be an exhausting axial flow fan of 125 m3/sec. capacity. The pressure gauge would vary between 150 - 175 mm w.g.

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Bhatgaon Colliery

Bhatgaon Colliery

CHAPTER - XII

DEWATERING AND PUMPS

12.1 Presently, the make of water in Bhatgaon underground mine during rainy season is 115 L.P.S. and 60 L.P.S. during summer. As per the original report, the mine was assumed to be moderately watery, requiring about 380 - 455 L.P.S. of dewatering rate for 1 m.t/year production. This has now been considered as 230 L.P. for the present target rate of production of 0.6 m.t/ year. It is also proposed to have 50% additional capacity as stand-by. Accordingly, 360 L.P.S. has be taken as the total installed required dewatering capacity. This would form the basis of calculation for the requirement of pumps.

12.2 At present the mine is being dewatered by means of pumps installed at 2/3 puming stations by means of delivery ranges taken to the surface through borehol as also by inclines. Reorganisation proposals envis the drivage of one more set of main dips in addition to the present one as also various development and depillaring districts. In view of this factor, it is considered necessary to have 3 main dewaterin

Colliery Manager
Bhatgaon Colliery

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stations in the mine. Each station would be provided with two pumps rated 60 L.P.S., 100 m head. The delivery ranges would be taken to surface through boreholes/inclines as the case may be.

3.3 Further, provision has been made for sufficient number of intermediate stage and face pumps, the details of which have been furnished as per Appendix A.3.3. The approximate additional requirement of delivery pipes also have been indicated in the same appendix.

3.4 The estimated capital requirement for the pumps, pipe fittings etc. would be about Rs.14.32 lakhs and the details are given at Appendix A.3.3.

Colliery Manager
Bhatgaon Colliery

10/7/64
Surveyor
Bhatgaon Colliery

CHAPTER - XIII

WORKSHOP

13.1.0 An integrated unit workshop has been proposed for 0.6 m.t. per year production near incline no.3. The workshop building has already been constructed.

13.2.0 In this proposed reorganisation report, side discharge loaders, load haul dumps, roof bolters, chain conveyors, belt conveyors and a coal handling plant have been envisaged, in addition to the conventional equipments like coal cutting machines, drills, haulages, main intermediate and face pumps, main and auxiliary fans etc. In order to have good back up support for day to day maintenance of these equipment, a well organised unit workshop is necessary.

13.3.0 The proposed unit workshop would have facilities such as Machine Shop, Electrical repair shop, Mining Equipment repair shop, structural shop, smithy shop, carpentary shop and automobile shop. The list of machines, equipment, tools and tackles, required for each shop would be as per Appendix A.3.2 A unit store would be located near the workshop for fulfilling its daily requirement.

Colliery Manager
Bhatgaon Colliery

3.4.0 The major periodical maintenance and repair of the equipment would be done at Regional Workshop. All these equipments deployed in the mine would be sent to Regional Workshop for scheduled maintenance.

3.5.0 The unit workshop would be operated in general shift and with only limited staff in the second shift. The man power required would be 85. This includes Executive Engineer, Engineer, Supervisory Staff, Store Issuer, Fitters, Crane Operator, General Mazdoor etc.

3.6.0 The additional capital requirement of plant and machinery for this unit workshop would be estimated at about 29.94 lakhs and the details are given at Appendix A.3.2.

Colliery Manager

Surveyor
Bhatgaon Colliery

CHAPTER - XIV

POWER SUPPLY & TELECOMMUNICATION

14.1 EXISTING ARRANGEMENT:

At present Bhatgaon Colliery receives power at a voltage of 33 KV through a single feeder from MPEB's 132 KV/33KV substation at Bisrampur which is about 30 kms. away from the colliery.

The existing main substation is situated at a distance of about 1 km. from the incline no.3 & 4. One 500 KVA, 33KV/3.3KV transformer at this sub-station caters to the present electrical load of the project. However, another 1600 KVA, 33 KV/ 3.3 KV transformer has also been installed at this project, which is kept as standby.

On surface, power is distributed at 3.3 KV to various load centres of the project through overhead lines. Underground installationsat incline nos.3 & and 5 & 6 are supplied power by means of cables drav through boreholes. Two transformers rated (i) 100 KVA, 3.3KV/440V and (ii) 50 KVA, 3.3KV/550V cater to the load of colony lighting and water supply respectively.

14.2 PRIME CONSIDERATION IN REORGANISATION:

While working out the reorganised electrical scheme of the project, maximum utility of the existing equipment has been kept in mind. Further, the procurement of major electrical equipment and implementation as per the earlier project report (CMAL, Ranchi, September,73) have also been considered.

14.3 SOURCE AND POWER SUPPLY:

As per the proposed reorganisation scheme Bhatgaon Colliery will receive power at 33 KV from Bisrampur substation of MPEB through two overhead lines of which one is already existing and the other is under construction.

14.4 CONNECTED LOAD & MAX. DEMAND:

The main equipment/installations proposed for this project and their approximate connected load are tabulated below:

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Bhatgaon Colliery

Surveyor
Bhatgaon Colliery

Sl. No.	Equipment/Installation	Total qty/ qty. in operation.	Unit load (KW)	connected load in operation (KW)
A.	Surface:			
	Ventilator	2/2		340
	Coal handling plant	-	500	500
	Workshop, office, lighting etc.	-	325	325
	Colony and water supply	-	600	600
	Trunk transport (Belt conveyor & direct haulages)	-	205	205
B.	Underground:			
	Load haul Dumper	7/6	48	288
	Side Discharge loader	7/5	48	240
	Coal cutting machine	8/6	50	300
	Pumping	-	-	850
	Roof bolter	2/2	30	60
	Trunk transport(belt and haulage)	-	-	520
	Gate transport (Belt and haulages)	-	-	120
	Auxiliary fan	10/6	37	222
	M.D.C.C.	20/17	37	629
	L.D.C.C.	40/21	15	315
	Drills	20/9	1	9
	Misc. loads including u/g lighting.	L.S.	-	50
	T o t a l	..	..	5573

Colliery Manager

Asstt. Survey Officer

The estimated connected load is 5573 KW. Considering demand and diversity factors into account, the maximum demand has been estimated as about 1950 KW i.e. about 2120 KVA with a corrective power factor of 0.92.

14.5 ENERGY CONSUMPTION:

The expected pattern of energy consumption has been assessed on the basis of quantum of work required to be done or number of working hours per year. The details of energy consumption are as follows:

S.No.	Equipment/ Installation	Avg. power consumed (KW)	Quantum of work/no.of working hrs. per year.	Annual Energy consumption in KWH.
1.	Ventilator	275	8700	2.39×10^6
2.	Pumping	5.33 KWH/1000m3 x M head	259×10^6 m3 x M head	1.38×10^6
3.	CHP, workshop and surface lighting.	400	4000	1.60×10^6
4.	Surface transport	160	4000	0.64×10^6
5.	U/g installation	650	3600	2.34×10^6
6.	Township	L.S.	L.S.	0.7×10^6
	Total	..	..	9.05×10^6

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Therefore specific energy consumption of coal produced at targetted production of 0.6 m.te/yr. is 15.08KWH/tonne.

14.6 MAIN SUBSTATION (Ref.Plate No.XIX):

The new main substation building has already been constructed near the incline no.3 & 4. The location is justified as per the present reorganisation scheme.

In the earlier P.R.(CMAL Ranchi/Sept.73), 2 nos. 2500 KVA, 33KV/3.4KV transformers were proposed for the main substation. But as per the present re-organisation report, annual production of coal of this mine has been reduced to 0.6 m.te/year from 1.0 m.te/year as projected earlier. Thus, total connected load and maximum demand of power for the project has also reduced considerably. In view of this, now it is proposed to equip the new main substation with two transformers, each rated 1600 KVA, 33 KV/3.4 KV.

The major functional components for the proposed substation are as follows:

- 33 KV Bus section
- 33 KV Air break switch
- 33 KV primary control circuit breakers
- 33KV/3.4KV transformers

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- 3.3 KV/ 50 transformer
- 3.3 kV/ 65V - 433V transformer
- 3.3 KV indoor switchboard
- 550V indoor switchboard
- 415V indoor switchboard
- Lighting main switchboard.

(A) 3.3 KV INDOOR SWITCHBOARD:

The project authorities have already acquired a 3.3 KV, 13 panel switchboard for the new main substation. In view of the present reorganisation scheme, it is proposed to modify this switchboard by adding 5 nos. circuit breaker panels and thus to make it an 18 - panel switchboard. The function of the circuit breakers will be as follows:

-	Incoming feeder control (for secondary control of 2.5 MVA transformers) ..	2 nos.
-	Sectionaliser control ..	1 no.
-	U/g feeder control (1&2 inclines) ..	2 nos.
-	U/g feeder control(5&6 inclines ..	2 nos.
-	U/g feeder control(3&4 inclines ..	1 no.
-	U/g feeder control(5&6 inclines) ..	1 no.
-	CHP feeder control ..	2 nos.
-	Colony feeder control ..	1 no.
-	300 KVA transformer ..	1 no.

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- 500 KVA Transformer	..	1 no.
- Capacitor bank control	..	2 nos.
- Reserve feeder control	..	2 nos.
Total		18 nos.

300 KVA TRANSFORMER & 550V SWITCHBOARD:

One 300 KVA, 3.3 KV/550V transformer and a 550V, 4 _ panel switchboard, which are already existing at the project will facilitate power supply to the surface trunk belt conveyor and direct haulage at 3 & 4 inclines.

(C) 500 KVA TRANSFORMER & 415V SWITCHBOARD:

One 500 KVA, 3.3 KV/565-433 V transformer and a 415V, 5 panel switchboard has been provided at the main sub-station to feed power to workshop and lighting switchboard.

LIHGTING SWITCHBOARD:

One no.10 unit, 415V switchboard has been provided in this report for distribution of power to various surface lighting loads of the project. This switch board will consist of 1 no.incoming 100A moulded case circuit breaker and 9 nos. switch fuse units with H.R.C.fuses of adequate ratings.

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14.7 VOLTAGES & SYSTEM EARTHING:

The various voltages proposed for use at the project are as follows:

- Incoming supply voltage	..	33 KV
- Ventilator, CHP substation	..	3.3 KV
- U/g power distribution network	..	3.3 KV
- U/g utilisation voltage	..	550 V
- Workshop	..	415 V
- Surface lighting/u.g. lighting	..	230/110V

Solidly earthed neutral system has been envisaged.

14.8 POWER SUPPLY TO VENTILATOR:-

A pair of 3.3 KV overhead lines which will be drawn to feed power to 1 & 2 inclines sector will be further extended to supply power to ventilator motor at incline no.1. One of these feeders will serve as standby.

A separate 3.3 KV overhead line will be drawn from the main substation to supply power to ventilator as well as direct haulage at incline no.5 and 6. One of the two overhead lines feeding power to underground workings in incline sector 5 & 6 will be drawn via 5 & 6 incline entries. This will serve as the standby feeder for ventilator motor at incline no.5.

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Suitable earthing system will be established and all metallic frames, coverings, sheaths, transformers etc. will be earthed by connection to the system.

14.9 CONTROL & PROTECTION OF SUBSTATION:

The air break isolators associated with 33 KV circuit breakers will be interlocked with the circuit breakers to avoid mal-operation. The 3.3 KV sectionalising breaker will have electrical interlock with the incoming 3.3 KV circuit breakers to avoid parallel operation of transformers. Primary and secondary control circuit breakers of 33KV/3.4KV transformers are tobe connected for inter-tripping i.e. the Secondary control circuit breakers will trip automatically when the respective primary control circuit breaker trips.

Station class lightning arrestors will be installed to protect the equipment against high voltage surge taking the form of travelling waves. Lightning masts are tobe employed to prevent direct stroke of lightning from reaching the equipment in the sub-station.

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14.0. PROTECTION OF MAIN TRANSFORMER (33KV/3.4KV):

OVER TEMPERATURE PROTECTION:

The transformers are tobe provided with winding temperature indicators having two alarms. One alarm is to ring a bell as a warning of rising temperature over a pre-determined value and the other alarm will trip the circuit breaker controlling the transformer.

OVER CURRENT AND EARTH FAULT PROTECTION:

Inverse definite minimum time lag (IDMTL) relays will be incorporated on the primary and secondary control circuit breakers to provide overcurrent protection to transformers. The same relay will be extended for instantaneous tripping facility in the case of earth fault.

GAS & OIL ACTUATED PROTECTION (BUCHHOLZ RELAY):

Each transformer will be provided with a Buchholz relay. The upper float of the relay would normally initiate audible and visible alarm, while the lower float would trip the transformer from the supply line when there is a serious internal fault.

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POWER FACTOR:

To maintain high system power factor even during the maximum demand hours, capacitor banks will be installed at the main sub-station. Capacitor banks will have facility to connect and disconnect required number of units depending upon the loading pattern of the system.

UNDERGROUND POWER DISTRIBUTION:

The underground workings as per the present reorganisation scheme can be divided into two main sectors in the upper Patpahari Seam. These are
(i) 1 & 2 incline sector (thin zone); and
(ii) 5 & 6 incline sector (thick zone). These two sectors are connected by a trunk route passing through lower patpahari seam. It is proposed to feed power to underground workings by means of overhead lines and cables drawn through boreholes. Two separate pairs of 3.3 KV overhead lines will be drawn from the main substation to the above mentioned two sectors. Power will be tapped from these overhead lines by means of cables drawn through boreholes for distribution to various underground loads in these sectors.

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(c) UNDERGROUND POWER DISTRIBUTION CENTRE-I

(Ref. Plate No. XX).

Underground power distribution centre-I will be installed at a suitable location in the main trunk route in 1 & 2 incline sector. Power for this distribution centre will be obtained by tapping 3.3 O/H lines by means of 2 nos. 95 mm^2 PILCDWA/PVC mining type cables drawn through boreholes. This distribution centre will comprise a 3.3 KVA, 9 panel, NFLP switchboard. The functions of these panels are as follows:

- Incoming power supply	..	2 nos.
- Sectionaliser	..	1 no.
- Development District	..	2 nos.
- Depillaring District	..	2 nos.
- Transport and pumping	..	1 no.
- Reserve	..	1 no.

(d) UNDERGROUND POWER DISTRIBUTION CENTRE-II:

(Ref. Plate No. XX).

Underground power distribution centre-II will be located at a central place in the main trunk route connecting incline sectors 1 & 2 and 5 & 6. This distribution centre will receive power at 3.3 KV from the main substation by means of 70 mm^2 PILCDWA/PVC cable drawn through incline no.4. This distribution centre will consist of a 3.3 KV, 9 panel, NFLP switchboard and will feed power to 2 nos. trunk belt conveyor, 2 nos. trunk endless haulages and one main pumping station.

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(218) UNDERGROUND POWER DISTRIBUTION CENTRE - III:

(Refer Plate No. XXI)

It is proposed to install underground power Distribution Centre-III at a central place in the main trunk route of incline sector 5 & 6 for reliable distribution of power in this mechanised sector. Power for this distribution centre will be obtained by means of 2 nos. 120 mm^2, PILCDWA/PVC cable drawn through boreholes. This distribution centre will comprise of a 3.3 KV, 9 - panel, NFLP switchboard. The functions of these panels are as follows:

- Incoming power supply .. 2 nos.
- Sectionalisers .. 1 no.
- Development District .. 2 nos.
- Depillaring District .. 2 nos.
- Transport and pumping .. 1 no.
- Reserve .. 1 no.

From u/g power distribution centres, power will be distributed to various transwitch units located at different load centres by means of double wire armoured power cables of adequate size. On receiving power at 3.3 KV transwitch units will step it down to 550V for further utilisation.

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UNDERGROUND ILLUMINATION:

Travelling roads, loading points, main pump houses, power distribution centres, other working places etc. will be illuminated by FLP/Mining type fluorescent tube fittings and suitable incandescent light fittings to provide required level of illumination. Adequate number of lighting transformers rated 5 KVA, 550V/115V have been provided in this report for this purpose.

Signalling system:

Provision for intrinsically safe signalling bell transformers have been made to provide audio alarm for the start and stop of belt conveyors and haulages.

Telecommunication:

One set of P & T telephone is already existing at the project. It is proposed to hire one more telephone connection from the P & T Deptt. for effective and reliable communication.

A small automatic exchange (SAX) with capacity of 50 lines in proposed tobe installed at the project in addition to the existing 50 line SAX for facilitating communication between various offices, service centres coal handling plant, workshop, substation, residence of important officials, etc.

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It is also proposed to install a 30 line intrinsically safe communication system in the underground, so that direct communication among different underground districts and surface can be established. The surface exchange and the underground intrinsically safe exchange will be connected with the help of a suitably designed and approved type of junction box for extension of communication facilities.

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CHAPTER - XV

COAL HANDLING PLANT AND RAILWAY SIDING

15.1 INTRODUCTION:

The permanent coal handling plant and railway siding is under construction. In the absence of these the production from development faces is being handled with the help of temporary arrangement as described in Chapter-VIII.

15.2 COAL HANDLING PLANT:

The Schematic flow diagram of the permanent coal handling plant has been shown in Plate No.XVI.

The permanent plant would have a run of mine coal surge bunker, screening section for segragating steam and slack fractions from r.o.m. coal, manual picking arrangement for steam coal and main bunkers for steam and slack coal for loading into the railway wagons. The plant would also have a reject disposal arrangement

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The surge bunker's capacity is such that when in the initial stages only underground coal would be handled, the screening and picking section as also the main bunker loading system would operate on one shift basis, thereby saving in the operating cost of the plant. However, when coal from opencast mine would also be transported to the surge bunker, the above mentioned system would be operated on two shifts by increasing the necessary manpower in respect of manual pickers and operational staff for second shift.

The capacity of steam and slack coal bunkers provided would be sufficient -

(a) to load a rake of 45 Box wagons or 54 Box 'N' Wagons with single size coal in the prescribed time;

(b) to cater for the vagaries in the availability of wagons due to acute remoteness ofthe colliery siding from the main line (Karonji railway station which would be the feeding station to the colliery siding is a terminus of Anupur-Bijuri-Karonji link. It therefore often gets low priority for supply of wagons and based on the post experience of Kusmunda Area some spare capacity in the

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bunker etc has been considered); and

(c) to obviate to a large extent ground stacking and rehandling of coal due to delayed supply of wagons.

15.3 WAGON LOADING AND WEIGHMENT:

The reclaim conveyor under the steam and slack coal bunker and the wagon loading conveyor would have an average capacity of 600 TPH. Thiswould enable the loading of rakes of Box/Box-N' wagons within the time prescribed by railways. The wagons would be loaded directly on the weigh bridge to ensure accurate loading without necessity for readjustment. The shunting of wagons between the empty reception line and load bearing line at the colliery siding would be done by means of a remote controlled wagon hauler. Prior to the opening of Bhatgaon Opencast mine one rake of wagons would be loaded per day. However, with the opening of Bhatgaon opencast mine two rakes would be loaded.

15.4 ENVIRONMENTAL CONTROL:

Dust control units would be installed at various transfer points and in the screening house for creating healthy working environment.

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15.5 POWER SUPPLY, CONTROL & ILLUMINATION:

All the equipment in the plant would operate at 415 volts, 3 phase, 50 hertz supply. To cater to power requirement of the plant a substation with transformer of adequate capacity and associated primary and secondary control gears would be installed at the plant site. The distribution of power of various drives would be made by a remote controlled motor control centre (MCC). The motor control centre would be provided with, starters an all necessary protections for drive motors and oth electrical installations in the plant. The plant would be operated from a central control desk installed in the control room near the loading poi All the tunnels, conveyor gantries, drive houses, control room, screen house, siding yard etc. would be properly illuminated.

15.6 SAFETY & COMMUNICATION:

The plant would be provided with all the necessary facilities required for the safety of workmen, such as pull rope switches along the length of conveyor for stopping it in an emergency, emergency stop switches near drives, hooters for warning persons before starting the plant.

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The plant would also be provided with loud speakers for communicating important informations and instructions to the persons working at the plant. Telephones would also be installed at important points for communication between the control room and these points.

15.7 MANPOWER:

The total manpower of various categories required for coal handling plant with one shift operations would be 41 and the same has been elaborated in Appendix 'B'.

15.8 ESTIMATE:

The total capital expenditure of the coal handling plant excluding siding would be Rs.193.93 lakhs and the detailsthereof are given in Appendix A.3...

15.9 RAILWAY SIDING:

The colliery is about 15 km from Karonji railway station. Karonji railway station would be the feed station of wagons to this colliery. The siding from Karonji railway station to the mine is under construction and is likely tobe completed within 3 years. The loading yard would be as per Plate No. XVIII on 'Siding Yard for Bhatgaon Colliery'.

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At the colliery end, the siding would have space on each of the empty reception line and load bearing line equivalent to the length required to hold 30 Box wagons. It would also have space for the weigh-bridge and pilot despatch line. A short store siding to hold 6 box wagons would also be included in the siding. Space for future extension to accommodate a total of 45 empty and 45 loaded box wagons has been provided in this report as per the requirement of the railways.

The capital expenditure for construction of the siding from Karonji railway station to the colliery and the yard at the colliery would be estimated at Rs.516 lakhs. Out of this Rs.324.81 lakhs has already been spent and balance of Rs.191.19 lakhs would be spent with the progress in the construction. The details are given in Appendix A.5.

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Supdt. (Surface)

CHAPTER - XI

CIVIL CONSTRUCTION, WATER SUPPLY AND SEWERAGE WORKS

16.0 INTRODUCTION :

The Bhatgaon reorganisation project envisaged targetted coal production of 0.6 m.te. per annum for a mine life of 24 years. It is situated in Bisrampur Coalfield in Surguja District of Madhya Pradesh. Bisrampur, Karonji and Bhatgaon have been connected by road. Ambikapur-Var fair weather road passes at a distance of about 4 kms. from the project. The nearest rail head is Karonji on Manendr Bijuri - Bisrampur branch line of South Eastern Railway which is about 15 kms. to the south-west of the colliery. The area is an undulating plane with general elevation varying from 550 to 570 m above M.S.L. The proposed town and infrastructural facilities are necessary for the pro which would further contribute for the integrated development the area and improvement of the lot of the tribals in and around the project.

16.1 TYPE OF CONSTRUCTION:

The mine is planned to work for 24 years and later an opencast mine would also be worked, thus civil construct

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Water supply and sewerage scheme are proposed tobe constructed with permanent specification. Single storeyed construction is envisaged for construction of service and residential buildings.

16.2 BUILDING COST INDEX:

The building cost index for Bhatgaon reorganisation project has been worked out as 248 in Jan.84. with reference to 100 base of Delhi in October, 1976. The Appendix A.2.3 showing calculations for building cost index and plinth area rates for various categories of buildings is enclosed.

16.3 RESIDENTIAL ACCOMMODATION:

The categories of the residential buildings provided are Miner's quarters, type quarters A,B, C and D and Hostel type accommodation. Hostel type accommodation has been provided in place of 20% of total number of type quarters.

The entitlement of residential buildings for various categories of employees has been taken as per B.P.R. guidelines. The plinth area and design of type quarters are adopted as per revised Industrial Housing Standards O.M. No. 658-Adv(C)/Circular-31/71 dated 14.7.71 and circulated vide BPR's O.M.No.BPR(C) Gen.81/72/Civ/96/72 dated 7.4.72. The plinth area and design of Miner's Quarters is adopted as prescribed and approved by

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Coal Mines Welfare Organisation. A detailed statement showing the details of category/pay scale of employees, type of residential building, plinth area, number of employees, housing satisfaction, quarters required, existing quarters and additional quarters with their cost is enclosed vide Appendix A.2.2. The calculations for unit cost of type quarters, Miners quarters and Hostel Type Accommodation are given in Appendix A.2.3.

The capital requirement for residential buildings is estimated as Rs.186.25 lakhs. The Coal Mines Welfare Organisation provides subsidy at the rate of Rs.8025 per quarter for total Miners quarters tobe constructed, that is Rs.32.82 lakhs. Thus net capital requirement for residential buildings would be Rs.153.43 lakhs.

16.4 SERVICE BUILDINGS:

The necessary service buildings are provided. Appendix A.2.1 shows the list of proposed service buildings, plinth area required, existing plinth area and plinth area provided. The capital estimate works out to Rs.87.95 lakhs.

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16.5 ROADS & CULVERTS:

(a) Colony roads and culverts: The estimate cost works out to Rs.16.57 lakhs details are shown in Appendix A.8.2.1.

(b) Approach road from colony to work site: The additional length of the approach road required works out to approx. two kms and its estimate is Rs.5.42 lakhs as shown in Appendix A.8.2.2.

16.6 SEWERAGE AND TREATMENT SCHEM-E:

The provision of sewerage system has been made for handling and treating domestic and industrial waste. The capital requirement for sewerage system works out to Rs.23.30 lakhs, details of which are given in Appendix A.8.3.

16.7 WATER DEMAND:

The water supply arrangements for Bhatgaon reorganisation project would be basically include potable water and industrial water demand of the project with a life of 24 years. The total projected manpower in the above is 1845 while the existing manpower is 1165. Similarly, the total housing requirement in the above project is assessed as 016 whereas the existing houses are 001.

The potable water demand of the residential workers is based on the assumption of 5 persons per house who are supplied water at the rate of 135 ltrs. per capita per day.

The potable water demand of non-residential workers is based at the rate of 45 litres per capita per day.

The potable water demand of service buildings is based at 10% of the potable water demand of the total population.

The process and other losses have been taken into account at the rate of 10 % of the total potable water demand calculated in the manner as specified in the foregoing paras.

The industrial water demand is based at the rate of 10% of the total potable water demand inclusive of process and other losses (in the case of UG mines only).

Based on the above norms, the total water demand is assessed as 2.60 M.L.D.

Mahan river which flows approximately 6 kms from the project, will constitute the main source of water, and hence it is proposed to plan water supply arrangements for the project with Mahan river as source.

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BRIEF DESCRIPTION OF EXISTING ARRANGEMENTS:

At present mine water after filtration is supplied for drinking purposes. A horizontal pressure filter of 7500 G.P.M. capacity alongwith a Chlorinator is working. The permanent water supply from Mahan river flowing at a distance of 6 kms away is being planned by W.C.L. Hqtrs.

SALIENT FEATURES OF PROPOSED WATER SUPPLY ARRANGEMENTS:

While permanent water supply scheme would be formulated after detailed survey, hydrogeological investigations and careful appraisal of the existing arrangements, the tentative proposals and estimates thereof, are given in Appendix A.8.3.

FORECAST OF COST ESTIMATES FOR WATER SUPPLY ARRANGEMENTS ENVISAGED:

The forecast of cost estimates for providing water supply arrangements at Bhatgaon project has been prepared with a view to project the probable capital investment involved in the proposed water supply scheme. Suitable provision has also been made for hydrogeological investigation, if required, alongwith testing for its suitability and proper treatment. A capital investment of Rs. 65.67 lakhs would be need for providing permanent water supply arrangements at Bhatgaon Project. Coal Mines

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A capital investment of Rs. ~~61.56~~ 63.67 lakhs would be needed for providing permanent water supply arrangements at Bhatgaon Project. Coal Mines Welfare Organisation pays subsidy for the implementation of water supply schemes in coalfields. The quantum of subsidy is 40% of the apportioned cost of the potable water supply scheme which works out tobe Rs.21.78 lakhs. The net capital requirement would be Rs.41.89 lakhs the details of which are given in Appendix A.8.3.

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CHAPTER-XVII

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SAFETY MEASURES & STATUTORY REQUIREMENTS

.1 . SYSTEM OF SUPPORT:

i) In order to keep the roadways relatively free for the movement of Load Haul Dumpers and Side Loaders, the support system has been suggested which will cater to the needs of proper support and will occupy less space.

ii) In the S.T.R. tobe framed by the management, the foregoing aspect has tobe borne in mind.

.2 WIDTH OF ROADWAY:

To prevent supports from being knocked out by the machines tobe used, it is suggested that permission from D.G.M.S. for allowing width of galleries tobe 5.2 m may be obtained. This shall also allow free and safe movement of both men and machines.

3 CONTIGUOUS WORKINGS OF SEAM:

The suggestions regarding contiguous seam workings for UPP and LPP have been referred by the project authorities to CMRS. On the basis of studies, it is hoped that DGMS shall give permission, when the project authorities apply for contiguous workings with the [illegible].

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17.4 MECHANISED DRILLING:

Permission from D.G.M.S. is needed for mechanised drillaring with side loaders and chain conveyors. Such permission is being obtained in other mines of W.C.L.

17.5 .. GENERAL SAFETY:

Adequate manpower has been provided for dealing with coal dust cleaning, stone dusting, water spraying etc.

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CHAPTER - XVIII

ENVIRONMENTAL CONTROL MEASURES

18.1 LOCATION MAP: Location of project, existing and proposed colony/township, delineation of important surface features, surface contours water courses, habitats, area involved in mining and support facilities are shown on Plate No.VI.

18.2 VILLAGES: Within a radius of 10 kms. around the existing and proposed mining area, there are 62 villages. Most of the villages are very thinly populated. The population of big villages is as under:

S.No.	Name of village	Approx. population	Distance from mine.
1.	Bhatgaon	5000	2kms
2.	Dugga	2500	1km
3.	Bhisni	2900	3kms
4.	Kapsara	5000	3kms
5.	Talegaon	2000	4kms.

Inhabitants of these villages are Rajwara, Tribals, Ahirs, Barghas and Baniyas. Economical status of these villages is very poor and backward. The villages are mainly dominated by tribals. 70% of the population make out their living from forest and rest work on mixed professions. The socio-economic changes due to coal mining industry will

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certainly put a great impact on their way life and bring them into the main stream of the country.

18.3 PREMINING STATUS OF LAND, ITS PRESENT USE AND HABITATE:

In this region there is no forest land. Government land was scanty having wild vegetation. Mohua and small tendu trees were found on elevated piece of land. The land yield used tobe Mohua flowers and Tendu leaves. Presently this area is being utilised for colony and mine support facilities like railway sidings, explosive magazine, play-ground and green belt etc. The tenancy land was under dry cultivation except some low lying patches. Those patches were used for cultivating paddy. On elevated land Koda, Kurthi or Kulthi was sown. The land is still being used for agricultural purposes and is owned by the villagers. Only one crop is raised in a year.

18.4 PHYSICO-CHEMICAL CHARACTERISTICS OF WATER:

Reports on Physico - chemical analysis of the samples taken from incline no.1 and Mohan pit are appended in Appendix D-2 and D-3.

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18.5 ENVIRON CONTROL MEASURES:

The environmental pollution consists of four major factors which tend to disturb the ecological balance viz. ground, water, air and noise pollution. These factors are highly prone to contamination and having been polluted cause damage to plant life, animal life and human life. These contaminants are made available and discharged into the environ by the techno-socio-economic factors which are produced by modern industrialisation.

18.6 GROUND: Although no significant environmental imbalances i.e. adverse effect on flora fauna and wild life have been noticed but it is expected that pollution of the atmosphere due to coal dust/solid waste cannot be entirely eliminated. For this land would be earmarked for dumping the solid waste and rejects of C.M.P. etc. As this is an underground project, little deforestation due to mining and associated activities would result. During depillaring operation, surface cracks would be due to subsidence of the ground. These cracks and depressions would be filled up by soil to regain the prominal conditions and topography. Vegetation, moss grass, bushes

18.7 WATER:

Water pollution which causes serious problems is classified as (i) effluent; (ii) effluent water. Full scale water treatment has been provided under water supply scheme to supply potable water for domestic and industrial use to combat pollution from affluent water. Effluent water is sub-divided into two types (i) discharge from pumping of mine water; and (ii) discharge from domestic and industrial sewerage system.

The likely make of water in the mine has been assessed as 600 l.p.s. on the basis of annual rainfall. The inflow of seepage water is more or less negligible. Presently, this water is being discharged into Masan and Rohar river with no sign of pollution having been noticed. In fact, villagers are utilising this water to irrigate their land. Similarly effluent water from the domestic and sewerage system would be treated before discharging it into the river. This would protect the fauna especially on the down stream side of the river. All efforts would also be made to monitor and prevent any type of pollution into streams, rivers, reservoirs etc. in and around the mining area to preserve the quality of the water, flora and fauna.

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plants and trees would be planted in and around the mine. This vegetation would help in the prevention of soil erosion, hardening, alkalisation, desertification and ground water losses. The other possible imbalances and adverse effects arising out of mining operations and associated activities could be due to dumping of waste rock coming out during development phase of the mine i.e. drivage of inclines, construction of main sump, crossing of underground workings through faults, dykes and drivage of galleries in stones etc. All of this solid waste would be used for levelling of the sites for mine, township, roadways and railway siding.

Drains

The ground surface here is having natural slope to drain away the surface water to the river, however garland surface drains would be provided around the colonies and mine areas for smooth flow of discharged effluents and also to prevent accumulation of storm and waste water. This would prevent breeding of mosquitos, flies, insects etc.

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6.8 AIR.

Pollution of surface air would take place from two sources mainly

(a) by mine ventilation exhaust;

(b) by dust generated from the coal handling plants.

Carbon-di-oxide emitted as a natural by-product of oxidation of coal, respiration of the mine persons and fumes liberated from blasting etc. are let out of the mine after being adequately diluted as per provisions of coal mine regulations. Unless the mine is on fire, the chances of CO being liberated is remote. Besides, this surface coal and stone dust particles are picked and carried by the air current flowing through the mine workings. The water spraying in the mine is done to minimise air borne dust concentration and to dissolve and dilute the soluble mine gases.

Considerable amount of dust is produced by the coal handling plants. Though water sprays are incorporated at transfer points in the plant, even then sometimes fine air borne dust travels greater distances depending upon the intensity of surface air current. This aerial pollution of dust would be controlled by planting tall, spread leafy trees and also medium short height bushy plants in between the coal handling plant and service/residential buildings. These trees

CHP

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and plants would act as filters and arrest the migration of dust. Further, in the area between the C.H.P. and other buildings, fountains would be built which would spray water in the atmospheric air around the CHP to arrest the suspended dust particles and drop it to the ground. These fountains when worked in a particular sequence would also add to the scenic beauty of the mine surface. The dust problem is not severe in rainy season due to wet atmosphere and in winter due to dew formation and during the cooler part of the day but in summer it is at its maximum. Therefore these fountains would also help in keeping the surroundings temperature low during summer. Barricades would also be constructed from waste rock and trees, shrubs planted on them to increase the effectiveness of dust suppression. The residential colonies are located at a distance by 4 kms from the CHP therefore there would be no dust pollution hazard to persons living there.

18.3. NOISE POLLUTION:

Noise pollution is due to increase in noise level of the surroundings. It is caused by the running [illegible] of the mine and the operation of coal handling plant. The [illegible]

from the fan cannot be suppressed but its dispersal to a greater distance would be controlled by providing dampeners. These dampeners would be a mixture of tall, well spread out leafy trees and medium height bushy plants. They would serve as noise curtain/barriers around the fan. In addition sound barrier bunds of waste rock would also be built around the fan to localise and trap the sound.

Preliminary information as required by the E.A.C. given in appendix D-1.

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CHAPTER - XIX

PROJECT IMPLEMENTATION AND CONSTRUCTION PROGRAMME

1. PROJECT IMPLEMENTATION PROGRAMME:

The project was started in 1975. This report deals with the reorganisation and revision of production schedule. The mine was initially planned for retreating longwall faces which were abandoned after permission was refused by DGMS to work longwall panels. The mine is now being worked on manual Bord and Pillar system. The target of one million tonnes of coal per annum proposed in the earlier report has been reduced to 0.6m.t./annum as mentioned earlier. Most of the mine development jobs like opening of inclines, installationof main fan, development of one main dip has been completed. The major activities yet tobe completed are -

(1) Coal handling plant.

(2) Railway siding.

(3) Balance Service and Residential building and related items like -

a) Water and sewerage arrangements for above.

b) Road construction.

(4) Mine Development:-

c) Development of other main dips.

d) Development of production panels.

e) Equipping of coal panels with face machinery.

f) Posting of trained supervisors and disciplined mine.

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The [illegible] requirement of reserves such as plant and equipment, residential and service buildings, furniture and fittings, vehicles, manpower etc. have been given in the annexures appended with this report. The requirement of manpower and capital required for P & M, CHP, railway siding, capital outlay, civil construction and others are given below for achieving the estimated coal production programme proposed in this report.

The production programme, manpower requirement and capital phasing etc. would be as follows:

(Rs. in 000)

Year	83-84	84-85	85-86	86-87	87-88	88-89
Production in m.tes.	0.28	0.315	0.36	0.42	0.51	[illegible]
Manpower P & M	1200	1275	1450	1600	1750	[illegible]
Rs.in 000	14426	18005	21760	11926	6220	-
C.H.P.	4500	8000	6893	-	-	-
Vehicles	100	-	-	250	-	-
Railway siding	6000	6000	[illegible]	-	-	-
Furniture & fittings	250	250	-	-	-	
Development & others.	4987	4721	6644	2557	[illegible]	
Land and Building.	6500	6500	11600	7500	[illegible]	
Total	36363	43476	54016	22229	[illegible]	

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19.1 PROJECT CONSTRUCTION PROGRAMME:

A constant identification and monitoring of all jobs mentioned in the construction and development of the mine is a must to achieve the construction and production targets. A separate construction and production monitoring cell would be provided which would exclusively work for the construction of the mine. The team would be thoroughly briefed and acquaint itself of all the jobs, equipments etc. required for construction in achieving the target production within the estimated time and cost. The team leader would continuously arrange to remove all bottlenecks an solve minor/major problems which may crop up at the work sites. He would have sufficient authority to take decisions within the specified project parameters or arrange expeditious sanction from the competent authority to ensure implementation of the project on schedule.

19.2 The construction team would consist of the following personnel:

1) Team leader/project officer, Dy.C.M.E. .. one
2) Superintendent of Mines(Construction) .. one *
3) Assistant Manager .. one
4) Under Manager .. six
5) Supdt, Engineer(Civil) .. one *
6) Supdt, Engineer(E&M) .. one *
7) Senior Ex.Engineer(E&M) .. two
8) Ex.Engineer(Civil) .. two
9) Accounts Officer .. one

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10) Materials/stores officer .. One
11) Administrative officer .. One
12) Environment Assistant .. One
13) Training Officer .. One *
14) Construction staff/workmen have been provid... in Appendix 'B'. They would initially work exclusively on construction jobs.

All officers/staff/workmen, except those marked with * viz. Supdt. of Mines, Supdt. Engi... (Civil), Supdt. Engineer (E & M), Training Officer .. .. .. would be absorbed in the project after construction is ov... and project is completed and output is achieved. above manpower is included in Appendix 'B'.

Some of the functions of the construction team ar... given below:

i) Prepare detailed project implementation pla...
ii) To have a proper management information ser... regarding construction of the project;
iii) To review and monitor the various constructi... activities for achieving the planned progr...
iv) To supervise and to carry out construction jobs of various disciplines viz. civil, ... cal, mechanical and mining etc.;
v) To prepare and execute detailed plans and programmes for land acquisition, its surv... construction schedule, procurement of mat... etc.
vi) To coordinate railway siding constructi... railways;

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vii) To procure and issue construction materials (Materials Manager);

viii) To recruit and providetraining to construction personnel, to look after welfare, medical and sanitation facilities of construction manpower. To give advice on legal matters etc. (Administrative Officer).

ix) To prepare budgets and payments, arising out of construction activity, internal audit etc.

x) To coordinate with the production staff at the mine and G.M. of the area for unhindered working of the construction and production activities at the project. The construction team would ensure that all activities are completed within the time and cost parameters provided in the revised project report.

xi) To carry out such other duties and functions which are necessary for proper and timely project implementation.

As stated earlier most of the officers/staff and workmen will be absorbed in the project after construction is completed except four senior officers who would be diverted to other similar projects in the company.

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CHAPTER - XX

CAPITAL INVESTMENT, ECONOMICS AND CONCLUSION

20.1 CAPITAL INVESTMENT:

The total estimated capital investment works out to Rs.2683.72 lakhs or Rs.447.29 per tonne of annual production of 0.6 m.tes. The headwise provisions are shown in Appendix 'A'. Out of this, Rs.1031.79 lakhs has already been spent upto 31.3.83.

20.2 INVESTMENT ON PLANT & MACHINERY:

The estimated investment on plant and machinery works out to Rs.1395.21 lakhs or Rs.232.54 per tonne of annual target production. The details are shown in Appendix-A.3.

20.3 PRICING OF P&M & CIVIL WORKS:

The prices of P & M are based on the standard price list circulated by CMPDIL (HQ), Ranchi, wherever such prices were not available in the list, the estimates have been based on updated pricesavailable from reliable sources. The Civil works have been estimated on the basis Cost Index. The details of this are indicated in Appendix A.2.3.

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20.4 PRODUCTIVITY:

The total provsision of manpower at target production works out to 1845 inclusive of leave, sick etc. The O.M.S. at target production is 1.2?7. The O.M.S. has been calculated on the basis of number of working days for each surface and underground workers as 265 days and 262 days respectively.

20.5 COST OF PRODUCTION:

The cost of production is estimated as Rs.166.63 per tonne at 100% capacity level. The E.M.S. is estimated as Rs.82.24. The E.M.S. is calculated on the mid point of category/scale of NCWA-III, w.e.f. 1.1.1983.

20.6 The mine came on revenue in the month of April,1982.

20.7 SALE PRICE:

The sale price has been estimated on the basis of new useful heat value and calculated as follows:

a) Steam 'B' 60% @ Rs.247 per tonne = 148.20
b) Slack 'C' 40% @ Rs.206 per tonne = 82.40

Average of mine ... ... = 230.60

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20.8 PROFIT & LOSS:

The profit per tonne at target production is Rs.63.97 at 100% level and Rs.37.29 per tonne at 85% production level.

20.9 CONCLUSION:

From the above economics it is observed that reorganisation of the mine is technically and economically justified.

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[illegible] ... PHASED ... [illegible]

		[illegible]	[illegible]	...l.capital invest-ment	83-	84-85	85-86	86-87	[illegible]	[illegible]	[illegible]
				7100	2[illegible]0	2000	3100	–			
	Buildings a) [illegible]		–	8795	[illegible]	1500	2500	2500		24	[illegible]
	b) Residential (incl. [illegible])			18625	[illegible]	3000	3000	[illegible]		24	[illegible]
	[illegible] (02)	32548	7126	27420	[illegible]	4500	[illegible]	1500			
03	Plant & Equipment	139521	47791	91730	189	26005	20053	11925		3-28	[illegible]
04	Furniture & Fittings	505	106	500	[illegible]	250	–	–		20	[illegible]
05	Railway siding	51500	32481	19119	6050	6000	7119	–		24	[illegible]
06	Vehicles	1541	1191	[illegible]	130	–	–	250		9-13	135.5
07	Prospecting & Boring			[illegible]							
08	Development										
081	Capital outlay in mines			5530	1400	1500	2650	–		24	850.4
082	Roads & culverts			2199	660	660	400	400		20	109.9
083	Water supply arrangement and sewerage		14038	8697	2000	2600	3000	1597		20	325.3
084	Pilot school, scientific research, etc. & preparation			1064	230	264	317	159		20	53.3
	TOTAL (08)			17490	4290	[illegible]	[illegible]	[illegible]			[illegible]
09	Other expenditure			1484	297	297	297	297		20	71.2
	TOTAL (01 to 09)	[illegible]	103179	165193	36363	[illegible]	[illegible]	22229			1564.3
	Add Pre-production [illegible] dep. of capital										8500.3 [illegible]
	Less Depreciation during development period capitalised										
	Capital investment (Initial)										
	- Less Subsidy										
a)	M.Qtrs.			3282							
b)	Water supply		5456	2178							
	Total Subsidy		3920	5460							
	Net Capital Investment			159741							

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Appendix-A.1

PROJECT REPORT ON REORGANISATION OF

BHATGAON COLLIERY

Statement showing estimated requirement of land

A/c head	Particulars	Total area required (hectares)	Area already procured (hectares)	Addl. area reqd. (hectares)	Rate/ hectare	Total amount in Rs(000
0110	Land	1052.6	342.6	710.0	Rs.10,000/-	7100

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APPENDIX-A.2

PROJECT REPORT FOR REORGANISATION OF BHATGAON PROJECT

Statement showing estimated capital requirement on civil work in Jan.'84

(Amount in Rs.'000s

Sl. No.	Particulars	Total cost	Subsidy	Net cost
1.	Service buildings	8795	-	879
2.	Residential buildings	18625	3282	153
	TOTAL(1+2)	27420	3282	241
3.	Roads & culverts			
	a) Colony roads & culverts	1657	-	16
	b) Approach road, service roads & culverts	542	-	5
	Sub-Total(3)	2199	-	21
		6367	2178	41
4.	Water supply scheme	2330	-	23
5.	Sewerage disposal scheme			
	GRAND TOTAL (1 to 5)	38316	5460	32

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PROJECT REPORT FOR THE REORGANISATION OF BHATGAON PROJECT

Statement showing the estimated capital requirement on Service buildings in Jan.1984(Permanent Specifications)

Sl. No.	Particulars	Nos.	Plinth area reqd. in sq.m.	Plinth area existg. in sq.m	Addl. plinth area reqd. (sq.m)	Cost per sq.m.
1	2	3	4	5	6	7
1.	Office of the Project Officer	1	461	-	461	1106
2.	Manager's Office	1	282	282	-	-
3.	Pit office	1	93	-	93	1158
4.	a)Store Shed & Office b)Boundary wall	1	830 422rm	880 -	- 422	- 278
5.	Workshop					
	a)Building	1	1290	1330	-	-
	b)Bituminous Pavement	-	828	-	828	82
	c)Boundary wall		98 RM	-	98	278
6.	Substation	1	130	130		
7.	Service Magazine	1	56	-	56	1364
8.	Main magazine	1	152	152	-	-
9.	Pit head bath(Type C)	1	470	-	470	1158
10.	Canteen(100 seater)	1	266	266		
11.	11 bedded hospital	1	595	-	595	1158
12.	Dispensary type C	1	365	215	150	1158
13.	Officers' club	1	350	-	350	942
14.	Staff club	1	181	-	181	942
15.	Workers' Institute	1	341	211	130	942
16.	First aid centre	1	17	-	17	1158
17.	Primary school	1	277	277	-	-
18.	Secondary school	1	554	-	544	942
19.	Post Office	1	56	-	56	1106

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1	2	3	4	5	6	7
20.	Lavatories & Urinals	2	2x3(	-	60	1699
21.	Officers' Rest House	1	2x276	-	552	942
22.	Staff rest house	1	284	284		
23.	Shopping centre	2	2x139	139	139	942
24.	Group trg.centre	1	246	-	246	1106
25.	Cap lamp room (1400 lamps)	1	195	-	195	1106
26.	Rest shelter	1	39	-	39	942
27.	Garrage	1	310	-	310	583
28.	Scooter /cycle shed	1	1269	-	1260	490
29.	Fan house	L . S				
30.	CDS control room	1	134	-	134	1106
31.	Bank Bldg.	1	202	-	202	1106
32.	Police Station	1	100	-	100	1106
33.	Security cum reception room	1	15	-	15	1106
34.	Check post	7	7x3	-	21	1106
35.	Auditorium	1	800	-	800	942
36.	Bus stop shed	2	L . S			
37.	Children Parks	2	L . S			
38.	Soil investigation, land development & drainage, etc.	L . S				
39.	Swimming pool	1	L . S			
40.	Civil maintenance office in township	1	30		30	1106
41.	Telephone Exchange	1	30		30	1106
42.	Playground with stadium	existing				
43.	TOTAL					
44.	Misc. 5%					
45.	GRAND TOTAL .					

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PROJECT REPORT FOR MODERNISATION OF BT. B.O. PROJECT

Statement showing the estimated capital requirement for residential buildings(Permanent specifications)
COST INDEX 248 in Jan.1984

Sl. No.	Category/ Scale	Type of qtrs.	Plinth area in M2	No.of persons	%satis-faction	No.of Qtrs. reqd.	No.of extg. qtrs.	Addl. Qtrs.	Unit cost	Total cost (Rs000s)	Less sidy
1.	Cat.I to VI & Gr. B,C,D&E	MQ	40.43	1518	50%	759	350	409	28	11452	328
2.	404-512 to 508-860	A	35.78	156	75%	117-28** = 89	-	89	32	2848	-
3.	572-944 to 722-1278&Gr.A	B	55.76	124	75%	93-23** = 70	40	30	49	1470	-
4.	750-1350 & 800-1400	B	55.76	31	100%	31	-	31	49	1519	-
5.	1100-1700 & 1400-1950	C	83.61	14	100%	14	10	4	74	296	-
6.	1600-2200 & above	D	176.00*	2	100%	2	1	1	173	173	-
7.	Hostel type accommodation	-	20	-	-	51**	-	51	17	867	-
8.	GRAND TOTAL			1845	55%	1016	401	615	-	18625	328

*This includes Garrage - 18m2 and servant quarter - 18.6 m2
**Hostel type accommodation has been provided in Gr.C to D
..20% of total no. of type quarters,

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PROJECT REPORT FOR RECONDITIONING OF COKING COAL WASHERY

Statement showing the calculations of Building Cost Index at Bhatgaon Project (With reference to 100 Base at Delhi as on 1.10.76) in January 1984.

Sl. No.	Description	Units	Rates as on 1.10.76 at Delhi	Rate at Bhatgaon	Percentage increase (Ratio between Col.5&4)
1.	Bricks	1000	106.15	250.00	2.36
2.	Sand @67% Coarse @33% Fine	cu.m.	21.92	35.00	1.60
3.	Cement	Qtl.	35.28	90.00	2.55
4.	Stones aggregate @50% 40 mm @50% 20 mm	cu.m.	27.10	90.00	3.32
5.	Timber (Sal/Bija Sal)	cu.m.	2021.00	3800.00	1.88
6.	Mild Steel/Tar Steel	Qtl.	183.20	550.00	3.00
7.	a) Labour : Mason	each	9.89	30	3.03
	b) Carpenter	each	9.89	30	3.03
	c) Coolie	each	4.41	10	2.27

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1.	Building cost index at Delhi as on 1.10.76	..	100
2.	Cost index of Bhatgaon in January 1984	..	248
3.	Plinth area rate for residential buildings (load bearing construction) :		
	a) Plinth area for Type-A,B,C,single storeyed, based on rates approved by CPW for Delhi as on 1.10.76	..	Rs.275/m^2
	Therefore, Plinth area rate at Bhatgaon based on cost index of 248	..	Rs.68 /sq.m. - Say Rs
	b) Plinth area rate for Type-D,single storeyed, based on rates approved by CPWD for Delhi as on 1.10.76	..	Rs.325/sq.m.
	Therefore, plinth area rate at Bhatgaon based on cost index of 248	..	Rs.806/sq.m. - Say R
4.	Plinth area rate for garage based on rates approved by CPWD for Delhi as on 1.10.76	..	Rs.235/sq.m.
	Therefore, plinth area rate at Bhatgaon based on cost index of 248	..	Rs.582.8/sq.m. - Say
5.	Extra provision for foundation in poor soil based on rates approved by CPWD for Delhi as on 1.10.76	..	Rs.68/sq.m.
	Therefore, extra provision for foundation in poor soil based on cost index of 248 at Bhatgaon	..	Rs.168.64/sq.m. - S
6.	Plinth area rate for Scooter/Cycle Shed based on rates approved by CPWD for Delhi as on 1.10.1976	..	Rs.200/sq.m.
	Therefore, plinth area rate at Bhatgaon based on cost index of 248	..	Rs.496/sq.m. - Say

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UNIT COST OF BPL TYPE QUARTERS BASED ON THE COST INDEX 248 AT BHATGAON IN JAN.'84

		Amt.in Rs.
1.	**TYPE 'A'**	
a)	Plinth area =36m2@Rs.682/m2	= 24552
b)	Internal water supply & sanitary installations @ 15% of the building cost	= 3683
c)	Internal electrification @ 10% of the building cost	= 2455
d)	External service connection @ 5% of the building cost	= 1228
e)	Unit cost with permanent specifications in ordinary soil	= 31913
		Say Rs.32(in 000
2.	**TYPE 'B'**	
a)	Plinth area = 56m2@ Rs.682/m2	= 38192
b)	Internal water supply & sanitary installations @ 12½% of the building cost	= 4774
c)	Internal electrification @ 10% of the building cost	= 3819
d)	External service connection @ 5% of the building cost	= 1910
e)	Unit cost with permanent specifications in ordinary soil	= 48695
		Say Rs. 49(in000
3.	**TYPE 'C'**	
a)	Plinth area = 84m2 @ Rs. 682/m2	= 57288
b)	Internal water supply & sanitary installations @ 12½% of the building cost	= 7161
c)	Internal electrification @ 12½% of the building cost	= 7161
d)	External service connection @ 5% of the building cost	= 2864
e)	Unit cost with permanent specifications in ordinary soil	= 74471
		Say Rs. 74(in 00

Colony Manager

4. TYPE 'D'

A. a) Plinth area = 139 sq.m @ Rs.806/sq.m = 1120
b) Internal water supply & sanitary installations @ 12½% of the building cost = 140
c) Internal electrification @ 12½% of the building cost = 140
d) External service connections @ 5% of the building cost = 56
e) Unit cost with permanent specifications in ordinary soil = 1456

B. Servants' quarters(adopt the plinth area rate & specification as per Type A)
a) Plinth area = 19 sq.m @ Rs.682/m2 = 129
b) Internal water supply & sanitary installations @ 15% of the bldg.cost = 194
c) Internal electrification @ 10% of the building cost = 129
d) External service connection @ 5% of the building cost = 64
e) Unit cost with permanent specifications in ordinary soil = 1684

C. Garrage
a) Plinth area = 18 sq.m @Rs.583/sq.m = 1049
b) Unit cost with permanent specification = 1049

GRAND TOTAL OF (A),(B) & (C) = 17298

Say Rs. 173(in

5. MINERS' QUARTERS
Rate for Miners' quarters under New Housing scheme at cost index 100 = 115

Therefore, rate for Miners' quarters based on cost index of 248 = 280

Say Rs. 28(in

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6. HOSTEL TYPE ACCOMMODATION

(Adopt the plinth area rate and specifications as per Type 'A')

a)	Plinth area = 20m2@Rs.682/m2	= 13640
b)	Internal water supply, sanitary internal electrification & external service connections etc. @ 25% of building cost	= 3410
c)	Unit cost with permanent specifications	= 17050

Say Rs.17(in C...

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Appendix - A.5.

PROJECT REPORT ON REORGANISATION OF

BELTGAON COLLIERY

Life - 24 yrs.
output annum 0.6 m.tes.
O.M.S.
(Figures in Rs.000)

Statement showing estimated phased capital expenditure for plant and machinery.

Sl. No.	Details of Plant and Machinery	Reqd.	Existing	Balance reqmt.	Unit price	Total price	PHASING 83-84 1st.yr Unit	83-84 1st.yr Price	84-85 2nd.yr. Unit	84-85 2nd.yr. Price	85-86 3rd.yr. Unit	85-86 3rd.yr. Price	86-87 4th yr Unit	86-87 4th yr Price	87-88 5th.yr. Unit	87-88 5th.yr. Price	88-89 6th yr. Unit	88-89 6th yr. Price	Life	Depreciation
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.	21.
(A)	FACE MACHINERY																			
1.	Crawler mounted armoured coal cutting machine GEB with 100 m trailing cable & PLP electricals, 550V/Auger capable of making 300 mm dia holes.	4	-	4	1700	6800			2	3400	2	3400	-	-	-	-	-	-		
2.	Load haul dump of 0.75 to 1.0 m3 cap. bucket with GEB 100 m trailing cable, PLP electricals, capable of working in seam thickness 2.5m and above.	7	2	5	1600	8000	2	3200	2	3200	1	1600	-	-	-	-	-	-		
3.	Side discharge loader 0.35 m3, 0.4m3 capacity crawler mounted with PLP electricals.	7	3	4	1100	4400	-	-	-	-	2	2200	2	2200	-	-	-	-		
4.	Roof bolter with PLP electricals.	2	-	2	1800	3600	1	1800	-	-	1	1800	-	-	-	-	-	-		
5.	Roof bolting equipments	15		15	-	50	-	25	-	25	-	-	-	-	-	-	-	-		

Colliery Manager

Surveyor

Appendix [illegible]

1.	2.	7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21.	
		30 100 790 150 1165 – – – – – – – – –	36202.
6.	Hydraulic props E100/ 500 mm range.	2765 100 790 100 790 150 1165	
7.(a)	Light duty chain conveyor 40 tph, 100 m length with FLP electricals and 15 KW motor.	40 – – 10 1800 10 1800 6 6 1080 – – –	[illegible]
		220 3 540 – 2 118 10 2 1800 10 118 1800 4 236 236 – – – – –	[illegible]
(b)	Spare drive heads	472 – – 2 118 2 118 4 236	
8.(a)	Med. duty chain conveyor, 100 m length, 100 tph with FLP electricals 2x15 KW motor.	100 4 2800 2 2 1400 4 2800 2 2 1400 – – –	[illegible]
		10500 3 2100 4 2800 2 1400 4 2800	
(b)	Spare drive heads.	– 2 300 – – 2 2 300 – – – – – –	[illegible]
		600 – – 2 300 – – 2 300	
9.	Coal cutting machine [illegible] mounted GEB 100 m trailing cable & FLP electricals 550 V.	– – – – – – – – – – – – – –	
10.	Hand held drill with single unit drill panel, 100 m trailing cable and FLP electricals 125 V.	– – – – – – – – – – – – – –	
11.	Aux. fans forcing type with 37 KW motor, FLP electricals 3-7 m3/sec capacity, 200-250 mm [illegible]	150 4 200 – – – – – – – –	[illegible]
		350 3 150 4 200 – –	
12.	Stone gears for rotary drill.	5.0 3 6.0 2 4.0 – – – – – –	[illegible]
		16 3 6.0 3 6.0 2 4.0	

Colliery Manager
Bhalgaon Colliery

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Bhalgaon Colliery
[illegible]/7/14

Appendix-A.2 contd.

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.	21.
13.	Exploder int insically safe 24 Shots.	20	10	10	2	20	2	4	2	4	4	8	2	4	-	-	-	-	9	2.2
14.	Ducting 500 mm with manifold.	2000m	-	2000m	0.21	4.20	1200m	/	800m	168	-	-	-	-	-	-	-	-	3	140.0
15.	I.Section Girders	LS	-	LS		200	LS	50	LS	50	LS	50	LS	50	-	-	-	-	9	22.2
16.	Sylvester prop with drawer.	10	-	10	5	50	-	-	-	-	3	15	3	15	4	20	-	-	9	5.6
	Sub-total	-	-	-	-	43463	-	8917	-	11061	-	13580	-	7405	-	2500	-	-	-	3973.7
'B'	GATE TRANSPORT:																			
1.	Endless haulage,30KW for material transport complete with FLP electricals and stores.	7	4	3	88	264	-	-	1	88	1	88	1	88	-	-	-	-	18	14.7
2.	Rails (14 kg/m)	280 te.	30 te.	250 te.	5-6/ te.	1400	50	280	50	280	50	280	100	560	-	-	-	-	18	77.8
3.	Rope 3/4" dia	12 km	2 km	10 km	.02/m	200	2 km	40	2 km	40	2 km	40	4 km.	80	-	-	-	-	3	66.7
4.	Fish plates,dognails sleepers etc.	LS		LS	LS	200	LS	40	LS	40	LS	40	LS	80	-	-	-	-	3	66.7
5.	Material supply trolley.	12	2	10	4	40	4	16	2	8	4	16	-	-	-	-	-	-	3	13.3
	Sub-total	-	-	-	-	2104	-	376	-	456	-	464	-	808	-	-	-	-	-	224.5

Colliery Manager

Survey of
Bhatgaon Colliery

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.	21.
'C'	TRUNK TRANSPORT:																			
1.	Incline belt conveyor 1000 mm wide, 315m long 200 tph (peak), 2m/sec. belt speed, 90KW drive, FLP 550V electricals.	1	1																	
2.	Trunk belt conveyor, 800mm wide, 1000 m long, 150tph, 2m/sec. belt speed, 90KW drive, FLP, electricals, 550 V with structurals.	3	3		LS1432	-	-	LS 68	LS 459	LS 528	LS 377	-	-	18	79.8					
3.	Spares for trunk belt conveyors, (please see Appendix A.3.5)	LS	-	-	LS 12000	LS1500	LS3000	LS3500	LS 2000	LS 2000	-	-18-28		600.0						
4.	Endless haulage of 55KW complete with electricals and structure.	7	5	2	1 LS19393	LS4500	LS8000	LS 6893	-	-	-	-	-			1505.0				
5.	Trolley for material supply.	10	-	10																
6.	Tubs 1 te.	200	100	100	LS 2994	LS1000	LS1000	LS 994	-	-	-	-	-	-	18	186.3				
7.	Low height tubs	150	8	142	LS 1000	LS 200	LS 400	LS 400	-	-	-	-	-	-	18	55.6				
8.	Direct haulage of 65KW complete with electricals STRuctures.	2	2	-	LS 4360	LS 400	LS 700	LS 1200	LS 750	LS 1218	-	-	-	-	18	242.7				
9.	Rail 14 kg/m) 18000m	250 te	100 te	150 te	9173	-18926	- 26005	- 28653	- 11926	- 6220	-	-	-	-	-	7814.2				
10.	Fish plates, dognails, sleepers etc.	LS	-	-																
11.	Rope 7/8" dia	15.5 km	10 km	5.5 km																
	Sub - total																			

Colliery Manager
Bhatgaon Colliery

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Bhatgaon Colliery

PROJECT : R REORGANISATION OF
BHATGAON COLLIERY

Statement showing detailed estimated capital requirement for coal handling plant.

Refer Plate No.XVI
Production - 0.6 m.t/yr.
Life - 24 years

S.No.	Description	Qty.	Unit price Rs.000	Total Rs.000	Life in years	Depreciation Rs.000	Remarks
1.	2.	3.	4.	5.	6.	7.	8.
1.	Conveyors - a) Drive Head & Structurals	LS	LS	1905,	18	105.80	
	b) Idlers	LS	LS	870	3	290.00	
2.	Feeders, Reciprocating, 300 TPH.	23	50	1150	18	63.90	
3.	Screens, vibrating, 300 TPH	2	100	200	18	11.10	
4.	Wagon hauler for 45 Box wagons with rope and accessories.	1	1200	1200	18	66.70	
5.	Loading chute gate, twowy motorised	1	50	50	18	2.80	
6.	Sump pump, automatic, piping and fittings, FLPs 20	3	35	105	18	5.80	
7.	Dust suppression unit	LS	LS	200	18	11.10	
8.	Sampler, primary cutter (automatic), suitable for 100 mm lumps.	LS	-	300	18	16.70	
9.	* Total of item 1 to 8	-	-	5980	- -	573.90	
10.	Electricals *	LS	-	2420	37	65.40	
11.	Belting *	LS	-	1398	3	466.00	
12.	Weigh-bridge, 100 te.	1	790	790	24	32.90	Existing.
13.	Tipping truck, 8 m3	1					
14.	Erection, freight & insurance @ 16% of (*)	LS	-	17 0	24	71.20	

Colliery Manager
Bhatgaon Colliery

Surveyor
Bhatgaon Colliery

Annexure ... contd...

1.	2.	3.	4.	5.	6.	7.	8.
15.	Misc. expenses including rack and pinion chute gates, chutes, welding sets, tools and tackles, exhaust fan etc.	LS	-	250+50=300	24	12.50	
		"	-	12598	-	1221.2	
16.	Total of items 9 to 15	LS	-	6795	24	283.10	Rs.38.5lakhs have already been spent.
17.	Civil and structurals	"	-	19393	-	1805.00	
18.	Total (16 and 17)						

Colliery Manager
Chinakuri Colliery

Surveyor
Chinakuri Colliery

PROJECT REPORT FOR MECHANISATION OF

BHATGAON PROJECT

Production - 0.6m.t/yr.

Statement showing the estimated capital expenditure in colliery workshop and equipment.

S.No.	Description	Total reqd. in nos.	Existing	Balance reqd.	Unit cost Rs.000	Total Cost Rs.000	Remarks
1.	2.	3.	4.	5.	6.	7.	8.
	(A) MACHINE SHOP:						
1.	Heavy duty centre lathe, 320 mm (CH) x 3000mm DBC, power of main motor 15 KW.	1	-	1	290	290	
2.	Medium duty centre, lathe, 250 mm(CH) x 2000 mm DBC - power of main motor 11KW	1	-	1	200	200	
3.	Med. duty centre lathe HMT with complete accessories, 7.5 KW motor.	1	1	-	-	-	
4.	Shaping machine 2.2 KW motor	1	1	-	-	-	
5.	Light duty lathe, 190 mm CH x 1000 mm DBC, power of main motor 3.75 KW	2	-	2	64	128	
6.	Pillar drilling m/c, capacity 23 mm	1	1	-	-	-	
6a.	Radial drilling m/c.	1	1	-	-	-	
7.	Bench drill, capacity of drilling 13mm dia	1	-	1	13	13	
8.	Universal screw threading m/c, max.threading diameter for pipes = 200 mm	1	-	1	75	75	
9.	Hack saw machine	1	1	-	-	-	
10.	Grinder heavy duty with accessories	2	2	-	-	-	
11.	Bench Grinder	1	1	-	-	-	
12.	Surface plates, tools, gauges etc.	LS	-	LS	LS	20	
	S u b - t o t a l (A)	..	..	..	..	728	

Colliery Manager
Bhatgaon Colliery

Surveyor
Bhatgaon Colliery

1.	2.	3.	4.	5.	6.	7.	8.
	(B) ELECTRICAL REPAIR SHOP:						
1.	Automatic coil winding machine	1	-	1	10	10	
2.	Streamline type oil filtration m/c, capacity 500 ltrs./hr. portable.	1	-	1	30	30	
3.	Vaccum impregnation machine	1	-	1	60	60	
4.	Transformer oil dielectric strength kit and step gauge 4 nos cap.0 to 50 KV.	1	-	1	8	8	
5.	Motor drying furnace temp range 0to200°C internal dimensions 3m x 2m x 3 m.	1	-	1	50	50	
6.	Bench drill, drilling cap. in steel 13mm, dia, power of motor 0.55 KW	1	-	1	13	13	
7.	Electric blower with suction attachment, capacity 1.5 cum/min.	1	-	1	3	-	
8.	Battery charging set, cap.12/24V 3to5 amps.	1	-	1	12	12	
9.	Hydraulic pulling and lifting m/c capacity 3/5 tonne.	2	2	-	-	-	
10.	Mechanical jacks of various cap.5to10 te.	2	-	2	5	10	
11.	Transformer & current regulating set.	1	-	1	150	150	
12.	Motor testing panel upto 90 KW	1	-	1	20	20	
13.	H.V.Testing kit	1	-	1	20	20	
14.	Cable fault detector	1	-	1	12	12	
15.	Cable vulcaniser	2	2	-	-	-	
16.	Elec. tool kit, meters, meggers, gauges, vices and other impl ments.	LS	-	LS	LS	40	
	Sub-total (B)	..	..	..	..	438	

Colliery Manager

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1.	2.	3.	4.	5.	6.	7.	8.
	(C) MINING EQUIPMENT REPAIR SHOP:						
1.	Hydraulic press, capacity 50 tc.	1	-	1	56	56	
2.	Hydraulic jack, 10 tc.	1	-	1	5	5	
3.	Pulling and lifting machine cap.3/5tc.	2	1	1	5	5	
4.	Skid pellet of 1.5 tc.	2	-	2	4	8	
5.	Bench drill, drilling cap.13mm in steel 0.55 KW motor.	1	-	1	13	13	
6.	Portable hand drill, drilling cap.13 mm.	2	1	1	4	4	
7.	Flexible shaft grinder wheel dia 100 mm	2	-	2	4	8	
8.	Washing machine	1-	-	1	20	20	
9.	Transformer welding set, cap. 400 amp.	1	1	-	-	-	
10.	Oxy acetylene gas cutting and brazing set.	1	-	1	7	7	
11.	Hydraulic equipment repair, testing, calibrating equipment, tools and other impelements.	LS	-	LS	40	40	
12.	Tools and other implements.	LS	-	LS	LS	10	
	S u b - t o t a l (C)	..	..	..	..	176	
	(D) STRUCTURAL SHOP:						
1.	Profile cutting machine	1	-	1	10	10	
2.	Motor generator welding, max. welding current 350 amps.	1	1	-	-	-	
3.	Transformer welding set, max. welding current 400 amps.	2	2	-	-	-	
4.	Oxyacetylene gas cutting & brazing set.	2	-	2	7	14	
5.	Hand operated plate bending machine, plate width 6 mm thick.	2	-	2	1	1	

Colliery Manager
Bhatgaon Colliery

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Bhatgaon Colliery

1.	2.	3.	4.	5.	6.	7.	8.
6.	Hack saw machine	1	1	-	½	½	8
7.	Flexible shaft grinder wheel dia 100 mm.	2	-	½	¼	½	8
8.	Portable hand drill, drilling cap.13 mm.	2	-	½	¼	½	8
9.	Tools and other implements.	LS	-	LS	-	LS	10
	Sub-total (D)	..	..	..	..	..	60
	(E) SMITHY SHOP:						
1.	Pneumatic power hammer, wt.of falling parts = 100 kg., power of motor 30KW	1	-	1	180	180	
2.	Hearth with elec.blower, power of motor 1.1KW	2	-	2	40	40	
3.	Anvils, swage blocks, blacksmith tool kits etc.	LS	-	LS	LS	12	
	Sub-total (E)	..	..	..	..	232	
	(F) CARPENTRY SHOP:						
1.	Heavy duty band saw machine, wheel dia 900 mm, power of motor 7.5 KW.	1	-	1	18	18	
2.	Cappentry tools, bench, vices etc.	LS	-	LS	LS	4	
	Sub-total (F)	..	..	..	..	22	
	(G) AUTOMOBILE SHOP(FOR LIGHT VEHICLES):						
1.	High precision washing m/c complete with electricals with double gun max.20kg/cm2 power = 2.25 KW.	1	-	1	12	12	
2.	Hydraulic vehicle lift, cap.10 te.	1	-	1	20	20	
3.	Air compressor, 7.5 KW.	1	1	-	-	-	
4.	Bench drill, drilling capacity 20 mm in steel, power of motor 0.75 KW	1	-	1	14	14	

Colliery Manager
Srirampur Colliery

Surveyor
Srirampur Colliery

1.	2.	3.	4.	5.	6.	7.	8.
5.	Portable hand drill, drilling cap.13mm	1	-	1	4	4	
6.	Flexible shaft grinder	1	-	1	4	4	
7.	Valve seat grinder	1	-	1	10	10	
8.	Oxyacetylene gas cutting & brazing set.	1	-	1	8	8	
9.	Electric vulcanizing unit for repairs of inntr tubes.	1	-	1	4	4	
10.	Grease gun servicing tool kits, hand operated testing equipments, for injectors and fuel pumps etc.	LS	-	LS	25	25	
	S u b - t o t a l - (G)	..	..	..	..	101	
	(H) COMMON EQUIPMENTS:						
1.	Mobile crane 7.5 te. cap.for surface installation.	1	-	1	600	600	
2.	E.O.T. Crane floor operated cap.3 te.	1	-	1	160	160	
3.	Elec. hoist, cap.5 te.	1	-	1	50	50	
4.	Pulley block, cap. 5 te.	1	-	1	5	5	
5.	Jib Crane , 3 te.	1	1	-	-	-	
6.	Time clock and card punching machine	1	-	1	12	12	
7.	Elec.siren range 5 kms.	1	-	1	3	3	
8.	Electric clock	2	-	2	2	2	
9.	Air compressor cap.2.5m3/min/7 kg/cm2	1	-	1	30	30	
10.	Misc. equipment.	LS	-	LS	LS	60	
11.	Fire fighting equipment.	LS	-	LS	LS	30	
	Sub-total (H)	..	..	..	..		

Colliery Manager
Bhatgaon Colliery

Surveyor
Bhatgaon Colliery

1.	2.	3.	4.	5.	6.	7.	8.
	Total 'A' to 'H'						2709
	Add: Freight, insurance installation charges atthe rate of 10.5% of total:						285
	T o t a l						2994

Colliery Manager
Bhatgaon Colliery

Bhatgaon Colliery

1.	2.	3.	4.	5.	6.	7.	8.
1.7	16 panel, 3300 V, indoor type, switchboard with 10 circuit breaker panels, 400A, symmetrical breaking capacity, 100 MVA as foll ws: - 2 nos. incoming control circuit breaker with C.T. ratio 300A/5A. - 1 no. sectionaliser control circuit breaker with C.T.ratio 300A/5A. - 2 nos. feeder control circuit breakers for 1 & 2 inclines with C.T.ratio 200A/5A. - 1 no. feeder control circuit breakers for 4 & 5 incline (surface) substation with C.T.ratio 100A/5A - 2 nos. feeder control circuit breakers for 5 & 6 incline (u/g) substation with C.T.ratio 250A/5A. - 2 nos. CHP feeder control circuit breakers with C.T.ratio 150A/5A. - 1 no. workshop feeder control circuit breaker with C.T.ratio 100A/5A. - 1 no. feeder (for surface transport at 3&4 inclines) control circuit breaker with C.T. ratio 50A/5A. - 2 nos. reserve feeder for control circuit breaker with C.T.ratio 100A/5A. - 1 no. feeder control (cable through incline 3) circuit breaker with C.T.ratio 100A/5A. - 1 no. colony feeder control circuit breaker with C.T.ratio 150A/5A. - 2 nos. capacitor bank control circuit breaker with C.T.ratio 100A/5A. All panels should conform to IS:3427(current) and relevant parts as per IS:2516(current).	set	1 set (13panel)	1 set (5 panels)	60	300	

Colliery Manager
Bhatgaon Colliery

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Bhatgaon Colliery

1.	2.	3.	4.	5.	6.	7.	8.
	Incoming panels should be provided with restricted earth fault protections and other panels with ordinary earth fault protections. Voltmeter on incoming and ammeter on all panels should be provided.						
1.8	Switchboard,550V, indoor type,comprising 4 nos. of ACB with E/L and O/L protection, symmetrical breaking capacity 25 MVA and other details asfollows: - 600A, ACB with CTratio 300A/5A - 1 no. - 400A, ACB with CTratio 100A/5A - 1 no. - 200A, ACB with CTratio 100A/5A - nos.	1set	1set	-			
1.9	Switchboard,415V, indoor type,comprising 5 nos. of ACB with E/L and O/L protection, symmetrical breaking capacity 25MVA and other details as follows: - 500 A, ACB with CT ratio 400A/5A - 1 no. - 400 A, ACB with CT ratio 150A/5A - 4 nos.	1set	-	1set	65	65	
1.10	Switchboard,10-panel,415V,indoor type,for lighting comprising of 1 no.incoming 100 Amp. MCCB and 9 nos. switch fuse units with HRC fuses of various ratings.	1set	-	1set	5	5	
1.11	Capacitor bank, 3.3KV, 500 KVAr.	2set	150 KVAr	650 KVAr	Rs.180.00 per KVAr.	153	
1.12	Battery charging set and emergency lighting arrangement inside the substation control room.	LS	-	-	-	80	
1.13	Misc. items including steel,structures etc.	LS	-	-	-	50	
2.0	Power Distribution (surface) near 1&2 inclines sector & 5and6 inclines sector.		1				
2.1	Air break switch,.3.3KV, 3 pole gang operated as per IS:1818 (current).	5	-	5	-	15	
2.2	Oil circuit breaker, 3.3KV,400 A with C.T.Ratio .	1	1	-	-	-	

Colliery Manager
Bhatgaon Colliery

Bhatgaon Colliery

1.	2.	3.	4.	5.	6.	7.	8.
2.3	Transformer, 3.3KV/550V, 250KVA, DV-11 with off load tap changer, conforming to IS:2026 (current).	1	1	-	-	-	
2.4	Lighting transformer, 550V/220V	1	1	-	-	-	
2.5	3-Panel, 550V switchboard with 3-circuit breaker panels of symmetrical breaking capacity 25 MVA as follows: - 400 A circuit breaker with C.T. ratio 200/5 - 1 no. - 300A circuit breaker with CT Ratio 100/5 - 2 no.	1set	1set	-	-	-	
3.0	Underground power distribution - 1 & 2 inclines sector:----------						
3.1	Switchboard, 3.3KV, 7 panel, mining type, suitable for u/g use with 9 nos. circuit breakers, 400A as follows: - 2 nos. for incoming power supply control with C.T. ratio 300/5. - 1no. for sectionaliser control with C.T. ratio 300/5. - 4 nos. for outgoing feeder control with C.T. ratio 60/5. - 1 no. for outgoing feeder control with C.T. ratio 50/5. - 1 no. for reserve feeder control with C.T. ratio 60/5.	1set	-	1set	405	405	
3.2	Transwitch unit, 315 KVA, 3.3KV/565V mining type/FLP. 250 KVA, 3.3KV/565V, FLP/type	2 1	2 1	- -	-	-	
3.3	ACB, 550V, FLP type 400A 200 A 100 A	5 8 4	- 8 4	5 - -	- -	- -	
3.4	FLP lighting transformer, 550V/110V, 63KVA	3	3	-	-	-	

Sunderbani
Bhatinda Colliery

1.	2.	3.	4.	5.	6.	7.	8.
4.0	Underground power distribution: 3&4 inclines sector-transport & pumping:						
4.1	Switchboard, 3.3 KV,4-panel, mining type,suitable for u/g use with 4 nos. circuit breakers as follows: - 1 no.400A C.B.for incoming power supply with C.T.ratio 200/5. - 2 nos.200A C.B. for outgoing feeder control with C.T.ratio 50/5. - 1 no.200A C.B. for reserve feeder control with C.T.ratio 50/5.	1set	-	1 set	180	180	
4.2	Transwitch unit 315KVA, 3.3KV/565V Miningtype. 250 KVA, 3.3KV/565V mining/FLP type	1 1	1 -	1	275	275	
4.3	FLP lighting transformer 550V/110V,5KVA	2	2	-	-	-	
4.4	ACB, 550V,FLO type 400A 200A	2 4	- 4	2 -	22 -	44 -	
5.0	Underground power distribution: 5 and 6 incline sector:						
5.1	Switchboard 3.3 KV, 9 panel,mining type, suitable for - 2 nos. 400ACB for incoming power supply control with CT ratio 200A/5A. - 1 no.400 ACB for sectionaliser control with C.T.ratio 200A/5A. - 5 nos. 200 ACB for district feeder control with CT ratio 50A/5A. - 1 no.200 ACB for reserve feeder control with C.T.Ratio - 50A/5A.	1set	-	1 set	405	405	

Colliery Manager
Bhatgaon Colliery

Bhatgaon Colliery

1.	2.	3.	4.	5.	6.	7.	8.
5.2	Transwitch unit 315 KVA,3.3KV/565V mining type.	7	-	7	410	2870	
	250 KVA,3.3KV,565V Mining/FLP type	3	1	2	275	550	
5.3	ACB,550V FLP type 400A	7	-	7	22	154	
	300A	3	3	-	-	-	
	200A	16	5	11	17	187	
	100A	6	6	-	-	-	
5.4	FLP lighting transformer,550//110V,5KVA	8	7	1	12	12	
6.0	Underground light fittings and fixtures including lighting cable etc.	LS	-	-	-	250	
7.0	Overhead lines and cables:						
7.1	OHL, 3.3KV(3x65 sq.mm + 1 x 65 sq.mm) ACSR, 'DOG' conductor	8km	4km	4km	60	240	
7.2	PVC/PILCDWA mining type cable,3.3KV grade, with copper conductor of sizes: 3 x 120 sq.mm. 3 x 95 sq.mm 3 x 70 sq.mm 3 x 35 sq.mm.	LS	-	LS		1500	
7.3	PVC/PILCDWA mining type cable,1.1KV, grade with copper conductor of wsizes: 95 sq.mm.; 70 sq.mm.; 35 sq.mm.;	LS	LS	LS	LS	1500	Tobe hired fr P & T.
8.0	Telecommunication & Signalling:	2	1	1	-	-	
8.1	P & T telephones	2sets	1set	1 set	160	160	
8.2	Small automatic exchange(SAX) with a capacity of small 50 lines.	1set	-	1set	370	370	
8.3	Intrinsically safe telecommunication system with a cap.of 30 lines.	LS	..	-	..	500	
9.0	Township power supply	LS	-	-	..	312	
10.0	Miscellaneous					10000	

Appendix 'A' (part)

[illegible] PROJECT REPORT ON RECONSTRUCTION OF

BHATGAON COLLIERY

Statement showing capital required for u/g belt conveyor, drive head, structurals, idlers etc.

Production - 0.6mt/yr.
Life - 24 years

S.No.	Description	Total reqd.	Existing	Balance reqd.	Unit Price Rs.000	Total Rs.000	Life in Years	Depreciation Rs.000	Remarks
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1.	Belt conveyor 1000 mm wide, 315 m, long, 200 tph(peak) capecity 2m/sec. belt speed 90 KW drive, 550V electricals and starters etc.								
	a) Drive head, tailend, take-up, structurals etc.	1set		1set					
	b) Idlers(carrying, return & impact)	LS		LS					
	c) Belting	695 m		695 m					Main trunk conveyor already inst lled in incline no.1.
2.	Belt conveyor, 800 mm wide, 1000m long, 150 tph(peak) cap.1.5m/sec. belt speed, 90 KW, drivePLP, 550V electricals & starters. etc.								
	a) Drive head, tail end, take-up structurals etc.	3 set		3sets					
	b) Idlers(carrying, return&impact)								
	c) Belting								
3.	Belt conveyor 800 mm wide, 90KW, drive, PLP, 550V electricals and starters etc.								
	a) Drive head, tail-end, structurals etc.	1 set		1set					Trunk conveyor 2,3 & 4.
	b) Idlers	LS	-	LS	-				
	T o t a l	..	..	..	0.87	365	18	20.30	
						260	3	86.70	
						625	..	17.00	

Colliery Manager
Bhatgaon Colliery

Surveyor 10/9/82
Bhatgaon Colliery

PROJECT REPORT FOR MODERNISATION OF BHATGAON PROJECT

Appendix-I.3.1.

Statement showing estimated capital expenditure for pumps, pipe fittings, valves, etc.

S.No.	Description	Total qty. required	Existing	Balance reqmt.	Unit cost Rs.000	Total cost Rs.000	Remarks
1.	2.	3.	4.	5.	6.	7.	8.
1.	Main pumps 60 LPS, 100 meter head, 90 KW, flameproof 550V electricals.	6	-	6	140	840	
2.	* Intermediate pumps, 30 LPS, 75m head, 37 KW, flameproof 550V electricals.	11	* 10	1	60	60	
3.	* Face pumps, 11 LPS, 30 m head, 11KW, flame proof, 550V electricals.	16	* 15	1	30	30	
4.	* Face pumps, 20 LPS, 30 m head, 11 KW flame proof, 550V electricals.	4	-	4	35	140	
5.	a) G.I.Pipe 150 mm dia	-	*	400m	0.244	98	
	b) G.I.Pipe 80 mm dia.	-	*	600m	0.122	74	
	c) G.I.Pipe 65 mm dia.	-	*	500m	0.097	49	
6.	Pipe fittings, valves etc.	-	*	LS	-	30	
7.	Installation & Misc.equipment etc.	-	-	LS	-	100	
	T o t a l 1 to 7	..	..	..	..	1432	

* Note: The specifications indicated is for additional equipment. Before taking procurement action for additional equipment, the exact availability and details for existing equipment is tobe considered.

Colliery Manager

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CONTINUED FROM PAGE OF 1440:

PROJECT FOR REORGANISATION OF

BHATGAON PROJECT

Statement showing estimated capital expenditure for Electrical Plant and Machinery.

NB: Before raising indents for addl.P & M; the exact position of existing plant and machinery & those in pipeline should be ascertained.

S.No.	Description	Quantity			Unit price Rs'000	Amount Rs.'000	Remarks
		Total	Exist.	Additional			
1.	2.	3.	4.	5.	6.	7.	8.
1.	MAIN SUBSTATION:						
1.1	Air break switch,3 pole,outdoor type, gang operated 33 KV, 400 amps.conforming to IS: 1818 (current).	5	1	4	5.0	20	
1.2	Circuit breaker,outdoor type,33 KV,400A, symmetrical breaking capacity 750MVA with C.T.ratio 30/5A.	2	2	-	-	-	
1.3	Lightning arrester,30KV,10KA, station class for 33 KV system. It should conform to IS:3070 (Current)	2sets	-	2sets	7.5	15	
1.4	Transformer,outdoor type,33KV/3.4KV, 1600 KVA, DY-11 with off load tap changer and neutral point brought out on a separate bushing conforming to IS:2026 (Current) and complete with all accessories as perIS:3639 (Current).	2	1	1	220	220	
1.5	- do - but 300 KVA, 3300V/550V	1	1	-	-	-	
1.6	- do - but 500 KVA, 3300 V/565 V - 433 V	1	-	1	83	83	

Colliery Manager
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APPENDIX-

PROJECT REPORT ON
RECONSTRUCTION OF BHATGAON COLLY

Statement showing estimated capital expenditure for Furniture & Fittings.

(Amount in Rs.'000s)

I/c code	Head of Accounts	No. of items	Total
010	General furniture & fittings	LS	150
020	Office Equipments	LS	100
030	Air Conditioning Equipment	LS	50
		LS	
050	Misc. equipments	LS	50
060	Canteen equipment & School furniture	LS	150
	TOTAL:		500

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Colliery Manager
Bhatgaon Colliery

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Bhatgaon Colliery

Appendix- 5

PROJECT REPORT ON REORGANISATION OF

BHATGAON COLLIERY

Statement showing estimated capital expenditure on railway sidings.

S.No.	Particulars	Qty.	Total amt. reqd. in Rs.000	Amt. spent in Rs.000	Addl. amount reqd. Rs.000	Remarks
1.	Railway siding from Karonji Railway Stn. to Bhatgaon Colliery	Approx. 15km.	45,000	32401	19119	
2.	Loading yard for handling a rake of 58 box wagons.	approx. 2.2km.	6,600			
	T o t a l	..	51,600	32481	19119	

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19/2/74
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PROJECT REPORT ON REORGANISATION OF

BHATGAON COLLIERY

Appendix-A.6

(Rs. in '000)

Statement showing estimated capital expenditure on vehicles.

S.No.	Particulars	Requirement	Existing	Addl.reqd.	Unit cost	Total Cost	Life	Depreciation
1.	Diesel Truck	3	3	-	-	-	9	-
2.	Tipping trucks	4	4	-	-	-	9	-
3.	School bus	2	1	1	250	250	9	27.8
4.	Explosive Van	1	1	-	-	-	9	-
5.	Jeep	2	2	-	-	-	10	-
6.	Ambulance	1	1	-	-	-	-	-
7.	Cash Van	1	1	-	-	-	-	-
8.	Motor Car/Trekker	1	-	1	100	100	13	17.7
9.	Motor cycle	1	1		-	-	-	-
	T o t a l	..	..	..	..	350	..	35.5

Colliery Manager
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Bhatgaon Colliery

Appendix-A.8.1.

PROJECT REPORT ON REORGANISATION OF

BHATGAON COLLIERY

Statement showing capital requirement under capital outlay in mines.

(Amount in Rs.000)

S.No.	Particulars	Length of drivage	Rate of drivage	Total capital
1.	Staple shafts for coal transport	Dia 4.0 m Depth 4-6 m	10	30
2.	Permanent support of roadways in places and at transfer points.	-	LS	500
3.	Misc. making of sweeps, pump houses, boreholes, excavation & foundation of tipplers, haulage houses, u/g first aid room, latrines etc.	-	LS	5000
	Total	..	..	5530

PROJECT REPORT FOR REORGANISATION OF BHATGAON PROJECT (Amt. Rs. [illegible])

COLONY ROADS AND CULVERTS

1. Grade 'A' Road:
   i) Specification
   3.35m. wide, 15cm. thick boulder soling
   3.05m. wide, 11.25 cm thick metalling
   and two coats of bitumen painting .. .. 53[illegible]
   ii) Length of road 3700 @ Rs.151

2. Grade 'B' Road:
   i) Specifications
   3.05m. wide, 15cm thick boulder soling
   with 7.5 cm thick moorum top = 19[illegible]
   ii) Length of road = 2450 @ Rs. 79/-

3. Culverts(7.32m. wide)
   i) 4.57m. span RCC slab culvert = 18[illegible]
   = 2 Nos. @ Rs. 93000/-
   ii) 3.05m. span RCC slab culvert - 12[illegible]
   = 2 Nos.@ Rs. 62000/-
   iii) 1.83m. span RCC slab culvert = 7[illegible]
   = 2 Nos. @ Rs. 37200/-
   iv) 0.61m. dia. hume pipe culvert = [illegible]
   = 6 Nos. @ Rs.7688/-

4. Pucca Drains = 10[illegible]
   i) 22.5cm x 30cm : Length 1540RM Rs.69 = 17[illegible]
   ii) 30 cm x 45 cm : Length 1230 RM@Rs.141 = 13[illegible]
   iii) 60 cm x 90 cm : Length 620 RM@ Rs. 258/- = 1[illegible]

5. Tree Guards = 246 Nos. @ Rs.77

6. RCC Slab for drain crossing: [illegible]
   (1.53m. x 0.61m x 7½ cm)
   = 246 Nos. @ Rs. 64

GRAND TOTAL = 1057

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Colliery Manager
Bhatgaon Colliery

Asstt. Survey Officer
Bhatgaon Colliery

Appendix-A.8.2.2

PROJECT REPORT FOR REORGANISATION
OF BHATGAON PROJECT

(Amount in Rs.'000)

APPROACH ROADS, SERVICE ROADS & CULVERTS

1. a) Specifications:

i) 3.35m. wide & 15cm. thick boulder soling
ii) 3.05m. wide & 15 cm. thick metalling
iii) 3.05m. wide & 2.5cm. thick bitumen carpet

b) Length = 2000 @ Rs. 186/- = 372

c) Culverts(7.32m. wide)

i) 4.57m. span RCC slab culvert
= 1 No. @ Rs. 93000 = 93
ii) 3.05m. span RCC slab culvert
= 1 No. @ Rs. 62000 = 62
iii) 0.61m. dia. hume pipe culvert
= 2 Nos. @ Rs. 7638 = 15

TOTAL: = 542

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Colliery Manager
Bhatgaon Colliery

10/9/74
Surveyor
Bhatgaon Colliery

Statement showing the capital requirement for the Water Supply Arrange
at Cost Index 246 in January 1984.

Sl. No.	Particulars	Qty.	Unit	Rate	Per
1	2	3	4	5	6
1.	Intake well and raw water pump houses with suitable raw water drawal arrangements.	241000	Ltr.	0.4	Ltr.
2.	Raw water boosting pump set (Centrifugal type@15HP	2	nos.	30000	each
3.	Raw water rising main : i) 200mm dia. ii) Add 7½% for saddle supports, valves, bends etc.	6000	m.	526	m.
4.	New water treatment plant with Aerator, Chemical House, Clarifloculator, Rapid Gravity Filter, Chlorinator etc.	602200	Ltr.	0.69	Ltr.
5.	Ground water reservoir after treatment plant (for storage of clear water)	41000	Ltr.	1.61	Ltr.
6.	Clean water pumps (Centrifugal type) 5 HP	2	nos.	10000	each
7.	Clean water rising main : i) 150 mm dia. ii) Add 7½% for saddle supports, valves, bends etc.	500	m.	365	m.
8.	Zonal Storage :				
	a. RCC Overhead Tank - for clear water	182500	Ltr.	2.73	Ltr.
	b. RCC Overhead Tank - for industrial water	182500	Ltr.	2.73	Ltr.

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10/9/84
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Appendix-A.6.2(contd.)

1	2	3	4	5	6	7	8
9.	Distribution system :						
	A. New Distribution system to new houses :						
	i) 100 mm dia. main	950	m.	231	m.	219	
	ii) 80 mm dia. main	950	m	186	m	177	
	iii) Add 7½% for saddle supports,valves,bends,etc.					30	
	B. Industrial water distribution system :						
	i) 100 mm dia. main	1000	m.	231	m.	231	
	ii) 80 mm dia. main	1000	m.	186	m.	186	
	iii) Add 7½% for saddle supports,valves,bends,etc.					31	
10.	Electrical Installation :						
	A. Transformer and switchgear B. Overhead Line	------ L S ------				625	
11.	Investigation for : a) Hydrogeological data b) Collection & testing of raw water samples (physico-chemical & bacterilogical analysis					67	
12.	TOTAL :					6367	
13.	LESS :- Anticipated subsidy from CMWC					2178	
14.	NET CAPITAL INVESTMENT TO BE MADE BY WBL					4189	
15.	Provide for temporary water supply scheme.						

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Appendix-B.(c)

SEWERAGE DISPOSAL SCHEME

(A) COLONY

Total no. of houses proposed in the colony	= 1016
Cost of sewerage disposal scheme per house at cost index 100	= 750
Therefore, total cost of sewerage disposal scheme of colony at C.I 248	= 18,89,760

(B) SERVICE BUILDINGS

Total cost of service buildings	= 87,95,000
Cost of sewerage disposal scheme @ 5% of above	= 4,39,750
Total:	Rs. 4,34,750

GRAND TOTAL(A) & (B) Rs. 23,29,510

Say Rs. 2330(in 000

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Bhatdeeh Colliery

Asstt. Surveyor
Bhatdeeh Colliery

PROJECT REPORT FOR REORGANISATION OF BHATGAON PROJECT

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Statement showing the capital expenditure for Pilot scheme, Scientific Research and Project report preparation

Sl. No.	Particulars	
1.	Scientific Research, Pilot Scheme, etc.	
2.	Project report preparation cost	

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Surveyor
Bhatgaon Colliery

ANNEXURE-IX

PROJECT REPORT FOR REORGANISATION
OF BHATGORA PROJECT

Statement showing the expenditure
of Revenue nature to be capitalised

(Amt. in Rs.'000)

Sl. No.	Particulars	Amount
1.	Salaries & Wages of additional manpower for construction of the project	1484
		1484

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Bhatgora Colliery

Mgr. Surveyor
Bhatgora Colliery

Appendix

PROJECT REPORT ON RE-
ORGANISATION OF BHATGAON COLLY.

Statement showing categorywise/jobwise requirement of manpower

Sl. No.	Designation	Category/scale
1	2	3
A.	CUTTING & LOADING:	
1.	Coal Cutting Machine operator	V
2.	-do- helper	III
3.	Load haul dump operator	VI
4.	-do- helper	II
5.	Side discharge loader operator	VI
6.	-do- helper	II
7.	P.R.Loader	PR
		Sub-Total
B.	DRILLING & BLASTING	
1.	Shot firer	508-860
2.	Shotfirer helper cum explosive carrier	II
3.	Driller	IV
4.	Driller helper	II
5.	Drossels	III
		Sub-Total
C.	SUPPORT	
1.	Roof bolter operator	VI
2.	Roof bolter operator helper	II
3.	Timber mistry	IV
4.	Timber mazdoor	II
		Sub-Total
D.	HAULAGE TRANSPORTATION	
1.	L.H.D.C. Operator	III
2.	L.D.C.L. operator	III
3.	Shifting wire/chain clipper	I
		Sub-Total

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Mine Surveyor
Bhatgaon Colliery

1	2	3	
II.	PRODUCTION SERVICE(UNDERGROUND)		
A.	TRANSPORTATION		
1.	Haulage khalasi	III/IV	11
2.	Trammer/clipman	III/IV	12
3.	Friction roller mazdoor	I	12
4.	Line Mistry	IV/V	1
5.	Line Mistry helper	II	2
6.	Belt conveyor operator	III	11
7.	Belt cleaning mazdoor/ General Mazdoor	I	12
8.	General Mazdoor/Material supply gang	I	24
9.	Transfer point cleaner/Chute cleaner	I	18
		Sub-Total	272
B.	UNDERGROUND MAINTENANCE		
1.	Mechanical fitter	V/VI	21
2.	Mech.fitter helper	I	21
3.	Elect.fitter	V/VI	21
4.	Elect.fitter helper	I	21
5.	Timber Mistry	IV	3
6.	Timber Mazdoor	II	6
7.	Sub-str. attendant	III	17
8.	Rope splicer	III	7
		Sub-Total	117
C.	VENTILATION & PUMPING		
1.	Mason	IV	3
2.	Mason mazdoor	II	10
3.	Mazdoor for spraying & drain cutting	I	20
4.	Pump Khalasi	III	20
5.	Sump cleaning/bailing mazdoor	I	20
6.	Air sampler	II	7
7.	Dust-in-charge	640-1160	1
8.	Sampling incharge	640-1160	1
9.	Ventilation mazdoor	I	35
		Sub-Total	119

Colliery Manager

Surveyor
Bhatgaon Colliery

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1	2	3	
D.	SAFETY & PERSONNEL:	640-1160	2
1.	Overman		20
2.	Mazdoor for dusting and cleaning	I	22
		Sub-Total	
B.	UNDERGROUND SUPERVISION		6
1.	Sr.Overman	722-1278	13
2.	Overman	640-1160	21
3.	Mining Sirdar	572-1008	2
4.	Foreman-in-charge	722-1278	13
5.	Foreman	640-1160	60
		Sub-Total	
	UNDERGROUND PERSONNEL - TOTAL		1295
III.	SURFACE		
A.	PRODUCTION SERVICE		
1.	Conveyor operator	III	4
2.	Haulage Driver	II	7
3.	Trammer	III	22
4.	M.T.K.	508-808	7
5.	Magazine clerk	508-808	4
6.	Body Searcher	II	7
7.	Main fan khalasi	III	7
8.	Sub-station attendant	III	11
9.	Lamp room incharge	572-944	2
10.	Lamp fitter	460-636	7
11.	Lamp cleaner	460-636	7
12.	Lamp issuer	I	7
13.	Telephone mechanic(CDS)	V	2
14.	Tel.Mech.helper	II	2
15.	Magazine issuer	III	1
		Sub-Total	
B.	WORKSHOP & MAINTENANCE		
1.	Foreman-in-ch...	722-1278	
2.	Foreman	640-1160	
3.	Tracer	640-1160	
4.	Mech.fitter	IV/V/VI	
5.	Mech.fitter helper	II	
6.	Electrician	V/VI	

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Colliery Manager
Bhalgora Colliery

Surveyor

1	2	3
7.	Electrician helper	II
8.	Machinist/turner	IV/V/VI
9.	Armature winder	IV
10.	Armature winder helper	II
11.	Auto electrician	V
12.	Auto mechanic	V
13.	Auto Mech.helper	II
14.	Bit sharpener/rope splicer	III
15.	Carpenter	IV
16.	Carpenter helper	II
17.	Welder	III/IV/V
18.	Welder helper	II
19.	Blacksmith	VI
20.	Hammerman	VI
21.	Tyndel zamadar	IV
22.	Tyndals	I/II
23.	Workshop mazdoor	II
24.	Store issuer	A
25.	Mobile crane operator	Sub-Total
C.	COAL HANDLING & DESPATCH	
1.	Foreman/Foreman-in-charge	640-1160/ 722-1278
2.	Technical Inspector	640-1160
3.	Weighbridge clerk	508-860
4.	Loading/despatch inspector	508-860
5.	Control room operator	V/VI
6.	Clipman	IV
7.	Truck driver	508-860
8.	Mechanical fitter	IV/V
9.	Electrical fitter	IV/V
10.	Helpers	II
11.	Welder	V
12.	Conveyor operator(for tripper conveyor & shuttle conveyor)	III/IV
13.	Feeder operator	III/IV
14.	Shale pickers	I
15.	General Mazdoor/Cleaners	I
		Sub-Total

Colliery Manager

Surveyor
Bhatgaon Colliery

1	2	3
D.	WORKING EXPENSES	
1.	Dy.Chief Mining Engineer	1900-2500
2.	Supdt. of Mines	1600-2200
3.	Colliery Manager	1400-1950
4.	Asstt.Colliery Manager	1100-1700
5.	Safety Officer	1400-1950
6.	Ventilation Officer	1100-1700
7.	Under Manager	800-1400
8.	Sr.Ex.Engineer(E&M)	1400-1950
9.	Ex.Engineer(E&M)	1100-1700
10.	Engineer(E&M)	800-1400
11.	Ex.Engineer(Civil)	1100-1700
12.	Engineer(Civil)	800-1400
13.	Overseer	572-1008
14.	Chemist	508-860
15.	Administrative Officer	800-1400
16.	Office Supdt.	722-1278
17.	Sr.Clerk	640-1084
18.	Upper Division Clerk	572-944
19.	LDC/Typist	508-808
20.	Sr.Finance Officer	1100-1700
21.	Finance Officer	800-1400
22.	Accountant	722-1278
23.	Sr.Steno/PA	640-1084
24.	Jr.Stenographer	572-944
25.	Chief Cashier	640-1084
26.	Pay Clerks	572-944
27.	Driver(H.V)	508-860
28.	Driver(L.V)	460-652
29.	Cleaner	II
30.	Peon	II
31.	Central Despatch Operator	508-860
32.	Mali	II
		Sub-Total
E.	STORES	
1.	Stores Officer	800-1400
2.	Chief Store Keeper	722-1278
3.	Storekeeper	640-1084
4.	SA/Store Keeper	508-808
5.	LDC/Typist	508-808
6.	Store Attender	I
		Sub-Total

Colliery Manager
Bhatgaon Colliery

1	2	3	
F.	SECURITY		
1.	Security Officer	800-1400	1
2.	Security Inspector	572-1008	4
3.	Security Guard	440-584	20
4.	Watchman	404-512	6
5.	Armed Guards	440-584	28
		Sub-Total	
G.	SURVEYING		
1.	Survey Officer	800-1400	1
2.	Surveyor	722-1278	4
3.	Asst.Surveyor	640-1160	2
4.	Tracer/Ferro Printer	460-652	10
5.	Chainman	440-584	2
6.	D'man	572-1008	23
		Sub-Total	
H.	WELFARE		
1.	Labour Welfare Officer	800-1400	1
2.	Canteen clerk	508-808	2
3.	Canteen cook	III	3
4.	Canteen boys	I	3
5.	Canteen cleaners	I	2
6.	Pitheai bath attendant	I	1
		Sub-Total	12
I.	MEDICAL & SANITATION		
1.	Sr.Medical Officer	1100-1700	1
2.	Medical Officer	800-1400	4
3.	Lady Medical Officer	800-1400	1
4.	Specialist	1100-1700	1
5.	Compounder	508-860	5
6.	Dresser	404-512	5
7.	Nurse	508-860	5
8.	Wardboy	404-512	5
9.	Sanitary Inspector	572-1008	1
10.	Asstt.Storekooper	508-808	1
11.	Sweeper	I	1
12.	Ambulance Driver	460-652	1
		Sub-Total	

Surveyor

1	2	3	4
J.	VOCATIONAL TRAINING		
1.	Vocational Training Officer	800-1400	1
2.	Instructor	722-1278	2
3.	Demonstrator	572-1008	2
4.	L.D.C	508-808	1
5.	Peon	404-512	1
		Sub-Total	7
K.	WATER SUPPLY & BLDG.MAINTENANCE		
1.	Raw water pump attendant	III	4
2.	Filter operator	III	4
3.	Clean water pump operator	III	4
4.	Plumber	V	2
5.	Plumber helper	II	2
6.	Valveman	II	8
7.	Chemical Mazdoor	I	4
8.	Masons	V	2
9.	Mason Mazdoor	I/II	6
10.	Carpenter	V	2
11.	Carpenter helper	I/II	2
12.	General Mazdoor	I	4
		Sub-Total	45
L.	ENVIRONMENT & ECOLOGY		
1.	Agronomist/Horticulturist	640-1084	1
2.	Gardener	II	4
3.	General Mazdoor	I	9
		Sub-Total	14
	TOTAL :	Surface	530
		Underground	1295
		GRAND TOTAL	1825

Colliery Manager
Bhatgaon Colliery

Bhatgaon Colliery

APPENDIX-

PROJECT REPORT FOR REORGANISATION
OF BHATGORA PROJECT

Statement showing Scale/Category-wise manpower requirement and their wages and benefits

Sl. No.	Scale/Category	Strength	Wages		
1	2	3	4		
	A.UNDERGROUND				
1.	I	222	2968440	1421232	438957
2.	II	273	3622437	1707615	533004
3.	III	309	4330635	2280420	661170
4.	IV	153	2292552	1169685	346[illegible]
5.	V	56	913080	448448	136152[illegible]
6.	VI	72	1334952	620640	195559-
7.	P.R	115	1586770	611340	219811[illegible]
8.	678-1198	21	366702	174426	541128
9.	742-1422	21	413616	187215	600831
10.	810-1586	35	752360	329175	1081535
11.	892-1701	8	182520	78120	260640
		1295	18764064	9028316	27792360
	B.SURFACE				
1.	I	83	970021	489617	1459638
2.	II	94	1137964	565692	1703656
3.	III	68	868088	484432	1352520
4.	IV	21	286062	154686	440748
5.	V	24	354960	184704	539664
6.	VI	18	301806	148590	450396
7.	A	2	42938	17670	60608
8.	567-763	29	352060	179916	531976
9.	605-857	16	208416	115104	323520
10.	625-947	30	412920	222060	634980
11.	678-1198	60	932040	474240	1406280
12.	742-1422	25	436650	211225	647875
13.	810-1586	18	342414	160002	502416
14.	892-1701	15	302445	138180	440625
15.	800-1400*	31	586799	395542	982341
16.	1100-1700*	11	247819	148430	396249
17.	1400-1950*	3	77487	51042	128529
18.	1600-2200*	1	28529	17848	46377
19.	1900-2500*	1	32129	16897	49026
		550	7921547	4176877	12098424
	GRAND TOTAL	1845	26085611	13205193	39890804

* Executive Scales under revision

Surveyor
Colliery

MANPOWER ANALYSIS

	Strength	Manshifts	Total Wage & benefits
UNDERGROUND	1295	339290	27792330
SURFACE	550	145750	12098624
	1845	485040	39890954

O.M.S(Te) 1.237
E.M.S 82.24
Salaries & Wages/te 66.48

Salaries & Wages of Additional Manpower for construction during construction period

Scale	Strength	Wages (Rs)	Benefits (Rs)	Total (Rs)
1900-2500	1	32129	15097	47226
1600-2200	4	114116	56044	170160
800-1400	1	18929	10989	29918
		165174	82130	247304

Total salary for one year 247304

Amt. to be capitalised for 6 years 247304 x 247304 = Rs. 14838[illegible]

10/9/20

Surveyor
Bhatdeon Colliery

Colliery Manager

PROJECT REPORT FOR ... LIMITED
... PROJECT

Statement showing unit cost estimate
& Profitability at various levels
of production

Coal - O.C. ... M.T.

Sl. No.	Particulars	Cost/ te	Variable cost/ te	Fixed cost/ te
1.	O.M.S(Te)	1.237	-	-
2.	E.M.S(Rs.)	82.24	-	82.24
3.	Wages& Salaries	66.48	-	66.48
4.	Stores	18.00	10.55	7.45
5.	Power	6.03	1.51	4.52
6.	Misc. expn.incl.PS debits	6.14	2.45	3.69
7.	Administration charges	11.18	-	11.18
8.	Depreciation	28.60	-	28.60
9.	Interest on Wrkg.capital@19%	6.83	0.92	5.91
10.	Interest on Loan capital@12%	23.37	-	23.37
		166.63	15.43	151.20

mak

Colliery Manager

Surveyor
Bhatgaon Colliery

APPENDIX 'C'

PROJECT REPORT FOR
REORGANISATION OF BHATGAON PROJECT

Profitability and Profitability at various levels of production

Sl.	Level of production	80%	85%	90%	100%
1.	Production in M.T.	0.48	0.51	0.54	0.60
2.	Variable cost/te(Rs)	15.43	15.43	15.43	15.43
3.	Fixed Cost/te (Rs)	189.00	177.88	168.00	151.20
4.	Total cost/te (Rs)	204.43	193.31	183.43	166.63
5.	Capital investment/te of annual output (Rs)	559.11	526.22	496.99	447.29
6.	Equity Capital/te(Rs)	315.61	297.05	280.54	252.49
7.	Return on equity 012%(Rs)	37.87	35.65	33.66	30.29
8.	Min.selling price to yield the above return(Rs)	242.30	228.96	217.09	196.92
9.	Present/selling price(Rs)	230.60	230.60	230.60	230.60
10.	Profit/Loss/te (Rs)	-11.70	1.64	13.51	33.68
11.	R.O.E. (%)	8.29	12.55	16.81	26.71
12.	R.O.I. (Gross, i.e. before charging interest on loan capital to cost)	9.91	12.31	14.72	19.54

Colliery Manager
Bhatgaon Colliery

Sundaram
Bhatgaon Colliery

Annexure-II

[illegible]

[illegible]

Part 'A' General information about Mining Operation:

1. General:

1.1 Name & Address of the Mines:

Place .. Bhatgaon
District .. Surguja
State .. Madhya Pradesh
Phone .. 26 Bishrampur
Cable .. WESTCOAL

Name & Address of Owner: Western Coalfields Ltd.

1.2 Date of Opening of Mines: 1.4.1975.

1.3 Mineral Exploitation Details:

2. Reserves (proved and estimated) in the above location of each mineral/ore (in tonnes):

2.1

S.No.	Mineral/Ore	Reserves (m.tes.) Proved	Extractable
1.	C o a l	23.607	14.16

2.2 Average daily production of various minerals. If it is less than the planned production, time phasing for achieving full production capacity.

S.No.	Mineral/ore	Avg.daily production
1.	C o a l	2000 tonnes.

Production phasing (m.tes.) 83-84 [illegible] 84-85 0.315 85-86 [illegible]

2.3 Nature of Mining Operation: Underground.

2.5 For underground mines only:

2.5.1 Depth of the workings(attach typical vertical section of the working showing lithology). Attached.

2.5.2 Mode of Entry: Inclined.

Manager

19/9/84
Surveyor
Colliery

2.5.5	Details of machinery used	Underground
	At face ..	CCM.Side Loaders,LHD
	For transportation ..	Chain conveyors, endless haulage, belt conveyor, direct haulage.
2.5.5	For underground coal mines:	
2.5.5.1	Method of Mining ..	Bord and Pillar
2.5.5.2	Method of depillaring ..	Caving
2.6	Are you carrying out ancillary operation for processing of the minerals/ores mined. If so, please specify.	Screening of ROM Coal into steam and slack fractions. Picking of shale and stones.

PART 'B' ENVIRONMENT

1.	General:	
1.1.	Location ..	Balkunthpur Area,WCL
1.1.1	Total lease area(in hectares) ..	3641.32
1.1.2	Elevation above M.S.L. ..	550.35 m to 570 m.
1.1.3	Indicate general topography of the land ..	Undulating plain.
1.1.4	Area based for mining ..	1052.6 hectares.
1.1.5	Features existing within 10 kms. of mine site ..	Human settlements, agricultural land, grazing land, nullahs, streams, river, -state/District Highway.

1.2 Climates:

1.2.1 Rainfall - [illegible] .. 1400 mm

2.2 Manpower Breakup- Below ground Opencast

2.2.1 [illegible] employed 1285 [illegible]

[illegible] 5[illegible]

[illegible] 4 kms.

Colliery Manager
Bhatgaon Colliery

Surveyor
Bhatgaon Colliery

Pollution:

2.1 Water

2.1.1 Source of water .. Mine water

2.1.2 Avg. daily quantity of water consumed .. 0.600x10^6 ltrs/day.

2.1.3 Waste water discharges per day from:

Mines .. 20.00 x 10^6 ltrs/day.

Township .. 0.50 x 10^6 ltrs./day.

20.50 x 10^6 ltrs./day.

2.1.4 Point of final discharges: Fallow land/agricultural

2.1.5 Do you treat waste water before discharging .. No

2.1.6 Characteristics of the discharging water. .. Sent for analysis.

2.2 Solid wastes .. Not applicable.

2.3 Air:

2.3.1 Are there any emmissions of dust or gases(CO,CO2,SO2, NOx,CH4,24C) from your mining ore processing operations into the atmosphere? If yes,specify nature and concentration and stepsto control/abate such air pollution. Not applicable (please see text)

2.4 Health Hazards:

2.4.1 Is there any potential health hazard from dust or gasses in u/g mine atmosphere? If yes, specify nature of such hazards and measures to prevent exposure of workers. No

2.5 Other types of pollution:

2.5.1 Do various operations in mines/ plant causes noise pollution or any other type of pollution? Not appreciable (pl. see text

Colliery Manager

10/9/22

Surveyor

Bhatgaon Colliery

2.6 Management:

2.6.1 Have you had your mine monitored for environmental pollution hazards at any time.

Gas/ventilation survey

2.6.2 Do you propose to reclaim excavated/subsided area after completion of mining operations? If yes, indicate, broad features of the scheme.

Yes. Filling of surface cracks. In case of loss of areas to be reclaimed with plantation of sapling.

(Pl. see text)

Colliery Manager
Bhatgaon Colliery

Surveyor
Bhatgaon Colliery

Appendix-D.1

PROJECT REPORT ON REORGANISATION OF
BHATGAON PROJECT

Report on Physico-Chemical analysis of water sample of incline no.1(tested by NEERI, Nagpur).

NEERI Ref.No.	..	WD/1448
Party's Ref.No.	..	BHAT/74/79/2263-66 dt. 7/8th April,1979.
Party's Address	..	Office of the Supdt. of Mines, Bhatgaon Colliery, Western Coalfields Ltd. P.O.Bhatgaon,Dist.Surguja MP.
Source of sample	..	Incline no.1
Date ofcollection	..	8.4.1979

PHYSICAL CHARACTERISTICS

Appearance ..	HAZY	PH ..	6.5
Colour ..	NONE	Langelier Index	2.7
Turbidity units	15	Conductivity ms/cm..	75

CHEMICAL CHARACTERISTICS

(All values shown below are in mg/l)

Dissolved solids ..	75	Sodium as Na ..	3.0
P-alkalinity * ..	0	Potassium as K ..	4.0
M-alkalinity * ..	15	Iron as Fe ..	0.1
Total hardness * ..	18	Manganese as Mn..	0
Alkaline hardness * ..	15	Chlorides as Cl..	2.5
Non-alkaline hardness..	3.0	Sulphates as SO4	7.5
Free CO2 * ..	21	Flourides ..	0.1
Permagnate value ** ..	0	Nitrates as N ..	0.5
Calcium as Ca ..	6.0	Phosphate as PO4	0
Magnesium as Mg ..	0.8	Silica as SiO2 ..	2.5

Colliery Manager

Surveyor
Bhatgaon Colliery

Appendix-D.2contd.

PROBABLE COMPOSITION OF RESIDUE

CaCO3	.. 15	CaSO4	.. [illegible]	CaCl2	.. 0	Ca(No3)2	.. [illegible]
MgCO3	.. 0	MgSO4	.. 4	MgCl2	.. 0	Mg(NO3)2	.. [illegible]
Na2CO3	.. 0	Na2SO4	.. 6	NaCl	.. 3	NaNO3	..
K2CO3	.. 0	K2SO4	.. 0	KCl	.. 0	KNO3	..10

*** as Oxygen, 4 hrs. at room temperature

* $CaCO_3$

SiO2	.. 35
Fe2O3	.. 0.14
Mn2O3	.. 0
Al2O3	.. -

REMARKS

Refer to the following numbers overleaf.

15, 8 &17

Sd/-
Analyst
Water Division

Sd/-
Head
Water Division

Sd/-
Director
NEERI

Rs.375/-

8. The sample is acid and corrosive.
15. A corrective treatment may be necessary.
17. Heavy metals [illegible].

Colliery Manager

10/9/24
Surveyor
Bhatgaon Colliery

TECHNICAL REPORT OF [illegible]

BHATGAON PROJECT

Report on Physico-Chemical analysis of Water Supply of Mahan River (Bhatgaon)(Tested by NEERI, Nagpur.)

NEERI Ref.No.	..	WD/1447
Party's Ref.No.	..	BHAT/74/79/2263-68 dt.7/[illegible] April,1979.
Party's Address	..	Office of the Supdt.of [illegible] Bhatgaon Colliery, Western Coalfields Ltd., P.O.Bhatgaon. Dist.Surguje-M.P.
Source of the sample	..	MAHAN RIVER (BHATGAON) Distance along the road app. 11 kms. [illegible] app. 7 kms.
Date of application	..	8.4.1979.

PHYSICAL CHARACTERISTICS

Appearance	..	HAZY	Ph	..	7.7
Colour	..	NONE	Langelier Index	..	0.4
Turbidity,units	..	5	Conductivity	..	174

CHEMICAL CHARACTERISTICS

(All values shown below are in mg/1)

Dissolved solids	..	110	Sodium as Na	..	10
P-alkalinity *	..	0	Potassium as K	..	4.0
M-alkalinity *	..	72	Iron as Fe	..	0
Total hardness *	..	60	Manganese as Mn	..	0
Alkaline hardness *	..	60	Chlorides as Cl	..	5.0
Non-alkaline hardness*	..	0	Sulphates as SO4	..	6.0
Free CO2 *	..	7.0	Fluorides as F	..	0.3
[illegible] value **	..	0.9	Nitrates as [illegible]	..	0.5
Calcium as Ca	..	16	Phosphates as PO4	..	0
Magnesium as Mg	..	4.9	Silica as SiO2	..	17

Surveyor

[illegible] Colliery ..(ii)..

..(ii)..

PROBABLE COMPOSITION OF RESIDUE

CaCO3	.. 40	CaSO4	.. 0	CaCl2	.. 0	Ca(NO3)2	.. 0
MgCO3	.. 17	MgSO4	.. 0	MgCl2	.. 0	MgCl2	.. 0
Na2CO3	.. 12	Na2SO4	.. 9	NaCl	.. 5	NaNO3	.. 0
K2CO3	.. 0	K2SO4	.. 0	KCl	.. 5	KNO3	.. 4
						SiO2	.. 17
						Fe2O3	.. 0
						Mn_2O_3	.. 0
						Al_2O_3	.. -

* CaCO3

** as oxygen 4 hrs at room temperature.

REMARKS

Refer to the following numbers overleaf.....

15, 8 & 17

Sd/-
Director
NEERI

Sd/-
Head
Water Division

Sd/-
Analyst
Water Division

8) The sample is soft and corrosive.

15) A corrective treatment may be necessary.
17) Heavy metals as mg/l:

Arsenic as As	.. 0
Cadmium as Cd	.. 0
Chromium as Cr	.. 0
Copper as Cu	.. 0
Lead as Pb	.. 0
Zinc as Zn.	.. 0

Colliery Manager
Bhatgaon Colliery

10/9/24

Surveyor
Bhatgaon Colliery

Annexure 'E'

PROJECT REPORT FOR REVISION OF

BHATGAON PROJECT

Copy of letter no.WCL/DT/[illegible] dt.7.7.79 from TV Lakshmanan, Technical Director, WCL, Nagpur, addressed to -

The General Manager,
Baikunthpur.

Sub: Method of work at Bhatgaon and Katkona.

****

Dear Sir,

The method of work proposed at Bhatgaon project as per the project report is longwall system of mining. In view of the fact that most of the property is lying at a shallow cover less than 60 m longwall system of mining is likely to pose problem of roof control and the DGMS is reluctant to grant permissions for longwall mining at shallow depth. The matter was discussed in the meeting held on 31.7.79 under the Chairmanship of CMD, when RD/CMPDI and GM(Plng) were also present. It has been decided that the project report calls for revision in view of the proposed change in method of mining.

In order to fulfil the production targets till the alternative method of mining is given in the revised project report, you are requested to go ahead with the development and depillaring by conventional Bord and Pillar system. The inputs required for achieving the production targets may please be intimated to the undersigned for doing the needful.

Yours faithfully,
Sd/-
(TV Lakshmanan)
Director(Technical)

CC: 1. RD/CMPDI.
2. GM(Plng)
3. Secretary to CMD.

Colliery Manager

Surveyor
Bhatgaon Colliery

Annexure 'E' Contd.

Copy of record note of discussions held in the CMD's Chamber on 31st July, 1979.

....

The following were present:

1. Sri DF Gupta, CMD.
2. Sri TV Lakshmanan, Director(Technical)
3. Sri JN Sarkar, C.E(H.)
4. Sri BRS Bhatnagar, General Manager(Plg)
5. Sri SP Mathur, Regional Director, CMPDI.
6. Sri PN Mathur, Addl.C.E, CMPDI.
7. Sri G.K.Jha, Material Manager.
8. Sri HKL Jain, SE(Exn)(Plng).
9. Sri KC Vijh, TS to D/T.

BAIKUNTHPUR AREA:

1. Bhatgaon - method of work provided in the project report is longwall. In view of the shallow cover in most of the property it was decided that we should go for Bord and Pillar method. The Director(Tech) will issue his approval to the CE for working in the mine on Bord and Pillar panel and RD,CMPDI, has been requested to revise the project report.

2. For Katkona Project the method of work provided in the project report in Seam No.I is room and pillar with scraper and for Seam No.III is longwall. It was decided that Director (Tech.) will send a letter to GM Baikunthpur for working no.III Seam with conventional Bord and Pillar as the property is highly faulted and there is toomuch variation in the seam thickness.

Sd/-
(TV Lakshmanan)
Director (Tech.)

No.WCL/DT/4C/[illegible] dt.7/[illegible].8.79.

Distribution:

1. RD/CMPDI
2. [illegible]
3. [illegible]
4. [illegible]
5. [illegible]
6. [illegible]
7. Shri [illegible]

8. Shri HKL Jain,
9. GM, Pathakhera.
10. [illegible]
11. [illegible]
12. [illegible]
13. [illegible]
14. GM, Wardha Valley.

10/9/79

Gallery Manager
Surveyor
Bhatgaon Colliery

REVNUE SECTION

DRAFT
REVISED PROJECT REPORT
FOR
REORGANISATION OF
BHATGAON PROJECT

REGIONAL INSTITUTE - IV,
CENTRAL MINE PLANNING
&
DESIGN INSTITUTE LTD.
NAGPUR - 440 001.

Colliery Manager
Bhatgaon Colliery

19/2/24
Surveyor
Bhatgaon Colliery

CENTRAL MINE PLANNING & DESIGN INSTITUTE LTD.
(A Subsidiary of Coal India Limited)
Coal Estate, Civil Lines, Nagpur-440001.

No.RIN/Bhatgaon/83/1191 Dt.21.6.83

Please find enclosed herewith the Draft Project Report for revision of Bhatgaon Project. It is proposed to discuss the above draft report in a meeting on 12th July,83, at 11.00 A.M. in the office of the Regional Director, CMPDI Ltd., Coal Estate, Nagpur. The comments on the above report may please be sent before 9th July,83. We shall be grateful for participation by you or your representative.

REGIONAL DIRECTOR

Encl:As above.

I. WESTERN COALFIELDS LTD. WORKS, NAGPUR:

1. CMD,W.C.L.
2. Director (F)
3. Director (P)
4. GM(Coordn)
5. GM(Plng) - 2 copies
6. GM(Finance)
7. GM(S&M)
8. GM(S&C)
9. CE (P&M)
10. CE (Civil)

WCL/BILASPUR DIVISION:

1. Executive Director
2. CME(Bilaspur Divsn.)

Area:

1. GM/WCL/Saikunthpur -2copies
2. Supdt.of Mines,Bhatgaon Colliery.

II. COAL INDIA LTD., CALCUTTA

1. Chief (PS&P)
2. Chief Project Monitoring Cell & Corporate Plan.

III. DIRECTORATE OF MINES SAFETY:

1. Dy.D.G.M.S.,SeminaryHills, Nagpur. 2 copies.
2. Dy.Director, Mines Safety, Manendragarh.

IV. INDIAN BUREAU OF MINES: NAGPUR:

1. Controller of Mines.

V. CMPDIL/ RANCHI:

1. Director.
2. Regional Director(HQ)
3. Addl.CME(P.S.Cell)

VI.REGIONAL INSTITUTES:

1. R.D.,RI-I Asansol
2. R.D.,RI-II,Dhanbad
3. R.D.,RI-III,Ranchi.

..(2).

Colliery Manager
Bhatgaon Colliery

Surveyor
Bhatgaon Colliery

VII: CMPDIL,RI-IV,NAGPUR:

1. Shri B.C.Misra, Addl.CME
2. Dy.C.G. - 2 copies.
3. Shri R.M.Bansal,Addl.CME
4. Shri K.I.Srinivasa,Addl.CME
5. Shri B.S.Nag, Dy.CME
6. Shri D.Banerjee, Dy.CME
7. Shri J.M.Goyle,Dy.CE(E&M)
8. Shri M.K.L.Jois,Dy.CE(E&M)
9. Shri R.P.Agarwal,S.E(Civil)
10. Shri P.Bhattacharjee,Sr.F.O.
11. Shri S.P.Gupta, Addl.CME.

Colliery Manager
Bhatgaon Colliery

Surveyor
Bhatgaon Colliery

D R A F T

REVISED PROJECT REPORT ON REORGANISATION OF BHATGAON PROJECT

C O N T E N T S

Colliery Manager
Bhatgaon Colliery

Surveyor
Bhatgaon Colliery

S.K.

1.
2.
3.
4.
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14.

Colliery Manager
Bhatgaon Colliery

10/9/24
Surveyor
Bhatgaon Colliery

[illegible] REVISED PROJECT REPORT ON
[illegible] OF BILTARI COLLY

"SUBSIDISED PART"

Sl. No.	Particulars	As per approved P.R(1973)	As per Rev.PR (1983)
1	2	3	4
1.	Extractable reserves(M.tons)	23.60	15.365
2.	Grade of Coal 60% stone 40% slack	Gr.I	Gr... Gr.I
3.	Targetted output (M.tons/yr)		
	i) At 100% capacity	1	1
	ii) At 95% capacity	0.95	0.95
4.	Main customer	Railways & Powerhouse	Railways & Powerhouse
5.	[illegible] Ratio	[illegible]	[illegible]
6.	Life(Yrs) at 100% at 95%	24 20	15 15
7.	Existing capital expenditure upto 31.3.1983(Rs.lakhs)	1031.79	
8.	Initial capital outlay(Rs.lakhs)		
	i) Total out of which share of	1041.3[illegible]	[illegible]
	(a) Equity capital	603.40	[illegible]
	(b) Loan capital	437.90	2101.37
	ii) Per te. of rated capacity(Rs)	104.14	[illegible]
9.	Capital outlay on P&M		
	i) Total(Rs.lakhs)	621.94	2826.76
	ii) Per tonne (Rs).	62.19	282.68
10.	Foreign exchange(Rs.lakhs)	149.47	350.05
11.	Manpower(Nos)	2512	2959
12.	O.M.S(Te.)	1.45	1.205
13.	Cost of Production(Rs./te)		
	i) At 100% capacity	35.77	153.75
	ii) At 95% capacity	40.75	156.07
14.	Current average selling price(Rs./te)	43.35	137.60
15.	Profit/Loss per te(Rs)		
	i) At 100% capacity	(+) 7.20	18.25
	ii) At 95% capacity	(+) 2.30	(-)[illegible]
16.	Te. of achieving the rated/best production	1983-84	[illegible]-84

Colliery Manager

Surveyor
Colliery

D R A F T

REVISED PROJECT REPORT ON [illegible]

BHATGAON PROJECT

LIST OF APPENDICES

Colliery Manager
Bhatgaon Colliery

Surveyor
Bhatgaon Colliery

Colliery Manager
Bhatgaon Colliery

Surveyor
Bhatgaon Colliery

DRAFT

REVISED PROJECT REPORT ON REORGANISATION

BHATGAON PROJECT

LIST OF PLATES

Plate No.	Particulars	Drawing No.
I	Location plan	
II A	Lithologs of boreholes drilled by CMPDI in Bhatgaon	
IIB	Lithologs of Boreholes drilled by NCDC & IBN in Bhatgaon Colliery Area.	
IIIB	Location of roads and railway and railway line.	
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REVISED PROJECT REPORT ON REORGANISATION OF BHATGAON PROJECT

CHAPTER - I

INTRODUCTION

1.0 Bhatgaon Underground project of Western Coalfields Ltd. is situated in Bisrampur Coalfield in Surguja District of Madhya Pradesh.

1.1 The original project report for Bhatgaon was prepared in September, 1973 and was sanctioned by Government in December, 1974 for a production capacity of 1.00 m.tes. per annum at a cost of Rs.10.41 crores.

1.2 The project was started in April, 1975, and commenced production from November, 1977. The project should have achieved its target production of 1.00 m.tes. by the year 1980-81 as per the sanctioned report It has, however, produced 0.24 m.tes. in [illegible]. The various reasons for the delay in achieving the target are dealt in detail in Chapter-III of this report under 'Justification for [illegible] Marketability'. The main reasons for the [illegible]

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in production are as follows:

(i) Slippage due to the method of work as proposed in the sanctioned report i.e. longwall mining with caving using flight loaders and friction props was not permitted by D.G.M.S. due to low cover of the property;

(ii) Due to above reason the plant and machinery as proposed was not procured and the mine has been raising coal manually which has its limitations; such large output could be achieved from Mechanised extraction of coal.

(iii) The workings at present are generally concentrated in upper Patpahari seam where the area is free from extractable portion of lower Patpahari Seam. These two seams occur contiguously with a parting of 3 to 9 m between them. Permission from D.G.M.S. is to be obtained for working these seams simultaneously. C...a... ...s been asked for advise in this regard.

(iv) The existing siding at Karonji railway station is about 15 kms. away from the project. This siding has a limit of loading only 30 box wagons/day. The coal is being transported by road fro

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the project to this siding. Until the railway siding and coal handling plant proposed in the report are ready, the mine cannot despatch the rated capacity and therefore raise the target output.

(v) The sanctioned expenditure for the project has been exceeded. The reasons are essentially delay due to change in technology. A detailed study of the expenditure incurred until March, [illegible] that of additional requirement for achieving the targetted production has been given in this report.

1.3 This revised project report studies the problems faced by the project, the solutions of the same and updating the capital requirements. The report gives the change in the method of work and the corresponding changes in terms of time, personnel, P & M and finance for obtaining 1.00 m.t./annum.

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CHAPTER - II

LOCATION & COMMUNICATION

2.1 The project is situated in Bisrampur Coalfield of Surguja District of Madhya Pradesh. Plate No.I shows the location of Bisrampur coalfield which is included in the Survey of India Toposheet No.64-I/15.

2.2 The Bhatgaon block is located towards the North - Western corner of the Bisrampur coalfield and is bounded by latitudes 23° - 21'N to 23°-23' N and longitudes 82°-58'E to 83°-02'E. The colliery is situated about 23 kms. to the north of the Bisrampur Colliery.

2.3 The nearest rail head is Karonji on Manendragarh - Bijuri - Bisrampur Branch line of South Eastern Railway, which is about 14 kms. to the southwest of the colliery.

2.4 Bisrampur, Karonji & Bhatgaon have been connected by road (Plate No.II). Ambikapur - Varanasi fair weather road passes at a distance of about 4 kms. from the project.

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2.5 The project is served by Posts & Telegraph Department and has a wireless (Walkie-Talkie) connection with the Area Office at Bisrampur.

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CHAPTER-III

JUSTIFICATION FOR REVISION AND MARKETABILITY

3.1 The project report for Bhatgaon had to be revised due to major change in the method of work as also due to resultant slippage in production, overrun of expenditure and other infrastructures. The reasons for justifying the revision of the report are as follows:

(i) The earlier sanctioned report suggested retreating longwall mining with caving as the method of work. This method required deployment of flight loaders and friction props on a longwall face under shallow cover of 15 m to 60 m. This method was not permitted by D.G.M.S. (Please see annexur and was therefore changed to Bord and Pillar and at present is being worked manually which cannot give the target production. The mechanisation required for Bord and Pillar Mining to achieve 1.0 m.t/annum calls for revision.

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(ii) Absence of Mechanisation: The target production was tobe achieved by working mechanised longwall panel. Armoured face conveyors were tobe installed for transport of coal from the face. Due to change in technology the face conveyors were cancelled. The supply of gate and trunk conveyors was delayed.

(iii) Simultaneous Seam workings: The working of contiguous seams has its own advantage like that of a common transport system in the lower seam, proper distribution of air and ease of air flow, less manpower tobe deployed greater production etc. The two workable seams, the upper Patpahari Seam and the Lower Patpahari Seam occur with a parting of 9 to 9 m and can therefore be worked simultaneously with advantage. Pending permission from D.G.M.S., the project authorities have the present working only in one seam in a minor area. The parting was studied by C.M.R.S. and a favourable report is awaited when both the seams could be worked together.

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(iv) Additional Capital Requirement: Due to slippage resulting from the above causes out of the sanctioned amount of 10.41 crores an amount of Rs.6.33 crores has already been spent till 31.3.82 and Rs. 10.3179crores till March,83. In order to provide for plant and machinery for the changed method of work for mechanisation as well as for completing other major activities which are under construction such as railway siding, coal handling plant, fan house, underground transport arrangements, housing and welfare activities etc. this report gives the additional capital required to achieve the target output at the prevailing prices.

(v) Coal Despatch: The existance of Baronji Railway siding at an approx. distance of 14 kms. and with a capacity of 30 box wagons/day is a bottleneck in despatching coal. The coal from incline top has also transported by road to a distance of 14kms. This means that if the project has to achieve 1.0 m.t/annum target the completion of railway siding & CHP are critical activities.

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CHAPTER - IV

TOPOGRAPHY, DRAINAGE & CLIMATE

4.1 In common with the rest of Bisrampur Sheet No. the Bhatgaon area is an undul[illegible] with general elevation varying from 550 to 570 m above M.S.L. The general slope of the area is towards Kasan nallah. Patchari river in the north-w[illegible] and Bisahi hill in the north are two small elevated in the area.

4.2 Drainage of the area is controlled by Rohar river in the western part and Kasan river in the east. Seasonal lets known as Kasan nala, Kulharia nala, Chotanala nala etc. drain the area into the above two rivers.

4.3 Based on the observations at Ambikapur for 10 years, the wind direction normally is from north and north-east to south and south-west. The wind speed [illegible] is 6 to 10 km/hr. The normal annual rainfall is 1400 mm. The heaviest monthly rainfall recorded in the area is found to be 137 mm in August, 1960.

4.4 Table no. I shows the climatological data for 10 years.

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Appendix-A.3.

PROJECT REPORT ON REORGANISATION OF

BHATGAON COLLIERY

Summarised statement showing estimates of plant and machinery & civil structurals for Coal Handling Plant.

(Refer Plate No.XVI) (Amt.in Rs.000)

S.No.	Description	Qty.	Total amt. Rs.000	Life in yrs.	Depre-ciation	Remarks
1.	2.	3.	4.	5.	6.	7.
1.	Plant and machinery (including cost of weigh bridge).	LS	10330	9/18/24	465.9	
2.	Idlers & belting	LS	2268	3	756.00	
3.	Civil & structurals	LS	6795	24	283.10	
	T o t a l	..	19393	..	1505.00	

* ~~xx~~ Already Rs.38.50 lakhs have been spent on steel structures.

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TABLE No. I

Station: Kothagudem

Climatological Tables based on observations for 10 Years

Month	Rainfall Monthly total (mm)	Heaviest fall in 24hrs (mm)	Wind Mean & speed (knots)	Mean no. & days of wind from N	NE	E	SE	S	SW	W	NW	Calm	Heaviest fall in 24 hrs. date and year
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
Jan I	21.9	21.0	6.1	13	17	3	2	7	14	3	1	40	30th. 1956
II				50	16	1	1	2	6	5	13	6	
Feb.I	22.2	48.0	6.9	13	11	4	1	11	17	4	1	38	3rd. 1955
II				55	8	1	1	1	6	9	17	2	
Mar.I	20.3	21.8	7.9	9	11	5	1	12	21	5	2	54	16th, 1952
II				44	9	0	1	3	6	13	22	2	
Apr.I	8.9	21.3	8.8	8	12	3	4	12	24	7	2	28	7th, 1951
II				34	6	1	2	3	9	14	29	2	
May,I	15.8	51.1	9.7	5	11	2	6	16	30	13	3	1	27th, 1956
II				35	7	2	3	4	7	13	28	1	
June,I	105.1	51.3	10.1	4	3	3	5	10	34	24	5	12	21st, 1954
II				23	9	3	8	8	17	15	14	1	
July,I	43.4	139.2	9.3	7	7	4	5	11	33	18	6	3	31st, 1954
II				11	4	3	7	11	21	21	7	1	
Aug. I	464.7	137.6	7.5	6	12	6	8	9	17	21	9	12	25th, 1955
II				16	3	3	6	7	21	23	11	2	
Sept.I	221.9	87.2	7.5	12	15	5	6	11	16	12	7	15	12th, 1964
II				25	14	5	9	7	14	8	11	6	
Oct. I	93.9	56.2	6.7	9	15	5	6	11	15	9	5	25	2nd, 1960
II				47	15		5	6	7		6	3	
Nov. I	6.	6.	5.4	6	10		1	3	15		1	1	2nd, 1957
II				77	11	3	3	1	1		6	1	
Dec. I	9.	9.	4.5	7	15	2	1	3	1		3	1	9th, 1956
II				69	11	0	1	1	5		8	1	
Annual or Total	740.9		7.7	8	12	4	4		1	1	1	3	1 [illegible]
				40	10	2	2		1	1	1	3	21 [illegible]

Superintendent

Surveyor
Bhatgaon Colliery

CHAPTER - V

G E O L O G Y

5.1 DRILLING:

Occurrence of coal in the Bisrampur Coalfield was first reported in the year 1848. The field was mapped in 1872. M/s. TISCO carried out exploratory work in 1945 - 53.

The Indian Bureau of Mines was first entrusted by N.C.D.C. to carry out proving of the block. I.B.M. undertook drilling in 1958 and 1959. A total of 6020' 4" was drilled by I.B.M. in 23 boreholes. Further drilling was done by N.C.D.C. in 1969. A total of 12669' (3866 m) in 73 boreholes were drilled by N.C.D.C.

For proving of non-coal bearing area for colony construction as well as for collecting samples for physico-mechanical tests, CMPDI Regional Institute-IV also undertook further exploratory drilling in two phases. In the first phase 11 boreholes with a meterage of 750.35 m were drilled while in the second phase 15 boreholes with a meterage of 712.9 m were drilled. The present revised report incorporates the data of all boreholes drilled till date.

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5.2 STRATIGRAPHY:

Bhatgaon colliery is situated in the north-western part of the Pisrampur coalfield. The area is mostly covered by rocks of Barakar formation under a soil cover of variable thickness. However, exposures of coal bearing strata are found in the nala section in north-western part of the block (Patpahari Seam) and in the Eastern part of the block (Nasan Seam).

The Barakar formation is generally composed of coarse grained sandstone with few lenticular pebble beds. The carbonaceous horizons constitute about 5% of the total Barakar thickness.

The Talcher is generally composed of greenish grey siltstone and shale and is exposed in the Gobrinala towards west of Bhatgaon colliery. The Talchers have been encountered in a few of the boreholedrilled in the area.

The generalised stratigraphic sequence of the area is as follows:

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Table - No.2

Recent	Alluvium	
Cretaceous to Eocene	Intrusive	Basic dykes
Lower P	Barakars	Coarse grained to fine grained bedded felspathic sandstone with sandy shale, shale and coal seams.
Upper Carboniferous	Talchirs	Dark grey to greenish grey shales and siltstones.
----------	Unconformity	----------
Pre-Cambrian	Metamorphics	Granite gneisis and quartzites.

5.3 STRUCTURE:

The major part of the area under consideration is covered by a thick mantle of soil and as such surface exposures of different formations are very much limited. The structure interpretation therefore is entirely based on sub-surface data accruing as a result of drilling as also that of the underground workings of Bhatgaon Colliery. The stratum contour plans of upper and lower Patpahari seams (Plate No. IV and V) have been prepared on the basis of borehole data as also on the spot level of existing underground workings of both the seams. The incrop of the seams have been projected tentatively due to non-availability of surface contours.

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It can be seen from the floor contour plan of the seams (Plate No. IV and V) that the strike of the bedding swings from NW - SE in the North-West to almost E - W [illegible] and again to NW - SE in the south-east. In the extreme North-West, near borehole NCBM - 22A and 9, the strike becomes almost East - West. This swing of the strike reflects a broad anticlinal flexture in the North-West and a synclinal flexture in the South-East.

The dip of the coal seams is towards East and North - East and the amount being 1 in 28 to 1 in 40. Rolling dips are quite common as has been observed in the underground workings of upper Patpahari Seam.

The block is comparatively free from major geological disturbances. A total of 8 faults have been interpolated in determining the structure of the area on the basis of sub-surface data and underground workings. The faults F7 and F8 are tentative. The trend and amount of these faults will be clear after more drilling data is obtained.

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5.4 COAL SEAMS & THEIR DISPOSITION:

The coal horizons encountered in boreholes drilled in Bhatgaon colliery area have been shown in the form of graphic lithologs in Plate No. IIA' and II'B'. It is apparent from these lithologs that 2 to 3 coal horizons attain workable thickness within the project area. The most persistent coal seam i.e. Upper Patpahari seam occurs as a pair with the Lower Patpahari Seam over the major part of the area, thus, facilitating identification. The Masan seam, wherever present, is of very good quality and maintains a parting of about 24 to 32 m with the Upper Patpahari Seam.

Out of a total of 122 boreholes drilled by different agencies like I.B.M., N.C.D.C. and C.M.P.D.I., only 20 boreholes have met two coal horizons (between 0.83 to 1.71 m) below lower Patpahari Seam. These coal horizons are called upper Duga Seam and Lower Duga Seam. The thickness varies between 0.83 to 1.71 metres. In 8 - 10 cases, the thickness is only 0.3 to 0.6 metres. These seams are highly impersistent in nature. In many cases, the boreholes have not been drilled upto the required depth, perhaps because the seam thickness was found to be impersistent. However, it is now provided to drill few u/g boreholes from workings of lower Patpahari seam to know the workability of these seams.

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The sequence of the coal bearing formation is as follows:

Table No.3

Lithology	Thickness in m	Remarks
Alluvium	3m to 6.00	Sandy soil with loose boulders generally loosely cemented.
Mod. to coarse gr.sandstone	20 - 25	
BASAN SEAM	0.61 - 2.26	Coal seam attains workable thickness in south-ern part of the area
Coarse grained to fine grained sandstone with two impersistent bands of coal and carbonaceous shale & lenses of pebble bearing sandstone and conglomerates.	24.11 - 32.84	Parting
UPPER PATPAHARI SEAM	0.75 - 4.44	Coal seam
Coarse grained sandstone with pebbly sandstone and conglomerates.	3.09 - 12.72	Parting
LOWER PATPHARI SEAM	0.25 - 2.44	Coal seam
Coarse grained sandstone with conglomerates at the top and impersistent bands of coal and carbonaceous shale	25 - 35	Parting
* UPPER DUGA SEAM	0.5 - 1.71	Coal seam
Alternate bands of shale & sandstone	2 - 5	Parting
* LOWER DUGA SEAM	0.2 - 1.1	Coal seam
Coarse grained to mod. grained sandstone, shale & bands of coal	35 - 50	

Note: Seams marked (*) are occuring impersistently.

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5.5 CORRELATION:

The correlation of the seams has been made on the basis of two pairs of seams viz. Upper Patpahari and Lower Patpahari Seam (one pair) and Upper and Lower Duga Seam (second pair). These pairs are separated from each other by a parting of [illegible]. Parting in between the upper pair of Seams is 3 - 12 m.. Masan seam is above Upper Patpahari Seam by 25 m.

The pairs of Patpahari Seams are characterised by associated roof and floor of pebble bearing sandstone and conglomerate.

The lower Patpahari seam has been developed by three pairs of inclines while the upper Patpahari seam has been developed by drifting from lower Patpahari workings. The Masanseam is yet virgin in the area.

5.6 DESCRIPTION OF SEAMS:

(A) MASAN SEAM: The Masan Seam is the topmost workable horizon in the project and occurs only on the dipside of the area. The seam occuring at about 24.32 m above the upper Patpahari Seam varies in thickness from 0.63 m (BG - 14) to 2.26 m (CMBB - 2). A persistant workable thickness of more than 1 m has been encountered in a limited area in the south-eastern part of the area. In the North-western part, the seam exhibits workable

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thickness in boreholes of NCBM-60, 62 and 64, but it is not possible to delineate the workable zone due to lack of borehole data.
The seam is clean in disposition. The analytical details and quality are given in next Chapter (Chapter No.VI).

(B) UPPER PATPAHARI SEAM: This seam is the most prominent coal horizon in the area and has been encountered in 99 boreholes out of the 120 boreholes drilled in the area.
The seam is separated from lower Patpahari seam by a parting of 3.09 - 12.72 m. In the major part of the area, the parting between upper and lower Patpahari seams is 3 to 7 m in the northern and eastern parts. This parting gradually increases to 11 to 12 m. The variation of thickness of the parting between the two seams has been depicted by iso-parting line shown in Plate No. IV.

The coal seam thickness varies from 0.75 m (NCBM - 18) to 4.44 m (NCBM - 56). However, out of 94 boreholes, thickness below 1 m has been encountered in 7 boreholes and thickness more than 3 m has been encountered in only 6 boreholes. The average thickness varies between 1.8 to 2.75 m.

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The seam is clean over major part of the area. In eastern part, however, 1-2 ... bands varying in thickness from 0.05 - 0.25 m and generally composed of carbonaceous shale are present in the seam. The quality details has been given in next Chapter (Chapter No.VI).

(C) LOWER PATPAHARI SEAM: The seam has been encountered in 90 boreholes out of 120 boreholes drilled in the area. Thickness of the seam varies from 0.25 m (BG-16) to 2.74 m (NCBM-37). The seamis unworkable i.e. seam thickness /1.0m in the northern and eastern parts of the area. The average thickness ranges from 1.35 to 2.2 m. The seam is clean in the northern and north-western part of the area. In the Central part, 1 to 2 carb. shale bands with thickness varying from 0.06 m to 0.37 m have been developed. In the Eastern part, the thickness of dirt band is generally between 0.61 to 0.69 m. The quality details of the seam have been given in next Chapter (Chapter No.VI).

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(D) LOCAL SEAMS(Upper & Lower Dugga):

In some of the bore holes two locally developed seams below lower Patpahari seam were named as Upper Dugga Seam and Lower Dugga Seam. These seams are highly impersistent in nature. In ten boreholes thickness not varies between 0.33 to 1.71 m. The seam contains 1 or 2 bands from 0.08 m to 0.20 m in thickness. The meagre data available does not indicate any workable area. However, it is now provided to drill few underground boreholes from u/g workings of lower Patpahari Seam to know the extent and nature of these seams.

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CHAPTER - VI

DEMARCATION OF MINE BOUNDARY, WORKABLE SEAMS, QUALITY OF COAL RESERVES AND LIFE OF MINE.

6.1 DEMARCATION OF MINE BOUNDARY:

The mine boundary has been demarcated on geo-mining conditions as follows (Refer Plate - IV).

South	..	By fault F7 - F7
North	..	By fault F1 - F1
East	..	By 200 meters influence line or 1.2 m Isochore line.
West	..	By incrop of the Seam.

6.2 WORKABLE SEAMS & THEIR QUALITY:

MASAN SEAM:

As described in the earlier chapter, this seam occurs only on the dip side of the area i.e. above the inclines. The patch of the area in and around the inclines of U.P.P. and L.P.P. Seams with an stripping ratio of 1:7.2 has been

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Virgin area for development working ([illegible]).
The proposal is to work this patch alongwith the main block by opencast only after the underground reserves are exhausted. This would avoid many disadvantages of working an opencast mine in the rise side of an underground mine, such as water percolation, fire etc. into [illegible].
This seam has not been included in this report.
The grade of coal is A - B (UHV 6706 - 6899).

UPPER PUTTADIH SEAM:

As mentioned earlier the average thickness varies between 1.8 to 2.75 m and is the most prominent coal horizon of the area. The average quality parameter of this seam is as follows:

Table No.4

Proximate analysis on 60 % R.H. & 40°C basis

	Excluding dirt bands	Including dirt bands
Moisture %	5.3 - 6.1	5.3 - 6.1
Ash %	9.9 - 20.4	9.9 - 20.4
Volatile matter %	24.9 - 29.4	-

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Calorific value (K.cal/Kg.)	6125 - 7025	-
Useful heat value(K.Cal/kg)	5478 - 6871	5201 - 6871
Grade	Mostly 'A'-'B'	Mostly 'A'-'B'

to

ULTIMATE ANALYSIS:

The coal of upper Patpara seam is semi coking to non-coking in nature having a caking index of around 5 and less. The total sulphur content of the seam varies from 0.4 - 1.0 and the phoshorus content is generally below 0.006%. The ash analysis of seam from the borehole i.e. M.C.B.M. - 25 is available and is

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given below:

SiO_2 %	60.82
Al_2O_3 %	20.58
Fe_2O_3 %	5.31
TiO_2 %	1.75
MnO %	0.22
P_2O_5 %	0.06
CaO %	1.25
MgO %	1.26
SO_3 %	0.49
Alkalies (by diff)	0.26

The ash fusion range of the seam is generally as follows:
Softening temperature .. 1200°C to 1400°C
Hemispherical temperature.. Over 1400°C.

The Coal of upper Patpahari seam as mentioned earlier is poorly caking in nature. The summarised results of grey king low temperature carbonisation on 60g N.T. at 40°C is as follows:

Table no.5

Coke (kg)	Tar(/+)	Liquor(/+)	Ammonia(g)	Gas(m3)	Coal
775-795	92-100	48-60	1.0 - 1.4	90-95	

5.3 Lower Patpahari Seam:

The average thickness ranges from 1.0m to [illegible]. The following table furnishes the summarised results of the proximate analysis for the seam.

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Table No.6

Proximate analysis on 60% R.H. and 40° C basis.

	Excluding band	Including band
Moisture %	3.5 - 4.9	2.[illegible] - [illegible].9
Ash %	11.1 - 21.[illegible]	11.1 - 26.6
Volatile matter%	27.3 - 32.8	-
Clarific value (K.Cal/g)	6135 - 7235	-
Useful heat value(K.Cal/kg.)	5298 - 6788	4760 - 6788
Grade	A - C	mostly A - C

The coal of the lower Patpahari seam exhibit [illegible]-caking property in the northern part with caking index between 8 to 12. The caking index generally reduces to below 6 in the southern part of the area. The total sulphur content of the seam is generally between 0.4 - 0.8 % whereas phosphorus content is below 0.006 %.

The summarised ultimate analysis on unit coal basis for the seam is as follows:

C %	H%	N %	O% (organic)	%
84.9 - 86.1	4.9 - 5.2	1.5 - 1.8	0.5 - 0.3	7 - 8

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The ash composition of the seam is available for only one borehole i.e. NCBM - 25 which is as follows:

SiO_2 %	..	62.48
Al_2O_3 %	..	27.27
Fe_2O_3 %	..	4.26
TiO %	..	1.92
MnO %	..	0.14
P_2O_5 %	..	0.05
CaO %	..	1.45
MgO %	..	0.90
SO_3 %	..	0.13
Alkalies(by diff)		1.40

The ash fusion range of the seam is generally as below:

Softening temperature .. 1200°C to 1400°C

Hemispherical temperature Over 1400°C

The summarised yieldper tonne of dry coal is as below:

Coke(kg)	Tar(lit)	Liquor(lit)	Ammonia(kg)	Gas(cum)	S
765-775	100-110	49-60	1.0 - 1.5	85 - 96	3-0

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RESERVES:

An area of 11.168 sq.km. has been considered for proved reserve calculation in Bhatgaon Colliery. As stated earlier only the upper Patpahari Seam maintains workable thickness throughout the area, while lower Patpahari seam is unworkable in the western and eastern part of the area. The workability of Masan Seam has been established only over a small area in the south-eastern part of Bhatgaon colliery and net geological reserves of 1.03 million tonnes has been estimated for opencast. A total of 31.126 million tonnes of net geological reserves have been estimated in the area under consideration for Upper and Lower Patpahari Seams. The break up of the above reserve is as follows:

Coal Seam	Net geological reserves in million tonnes.		
	less than 15m cover	more than 15m cover	total
Upper Patpahari	8.206	17.820	26.026
Lower Patpahari	6.483	8.617	15.100
Total	14.689	26.437	41.126

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The reserves likely tobe available upto 1200 m/ OB cut off line are also estimated and are about 21.00 million tonnes for both the seams. The net geological reserves left after this would be 20.1 million tonnes for underground mining:

Coal seam	Net geological reserves in million tonnes.	Total in m.t.s.
Upper Patpahari	16.3	16.3
Lower Patpahari	3.8	3.8
	20.1	20.1

6.5 LIFE OF MINE:

Net proved reserves	=	20.10 m.tes.
Extractable reserves	=	13.085 m.tes.
Target of the mine	=	1.00 m.tes/year
Life of the mine	=	13 years

GRADE OF COAL:

Considering that the seams are normally clean coal in few patches where thin dirt bands occur which should be picked on the picking belt of the CHP, grade of coal is expected tobe Gr.'A' for steam. In slack crushed stone may get mixed and therefore as a measure of abundant caution the grade for slack coal has been

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kept as Grade 'C'.

6.6 If, however, the original boundary as proposed in old P... is taken into consideration for underground workings a further 8.364 mt proved ... would be added to the mentioned above. With this addition, the total extractable reserves would total 18.8266 m.tons. and the life of the mine would go upto 19 years. Considering the construction period the life of the mine in the earlier case would be 16 years while in the later it would be 22 years.

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CHAPTER - VII

PRESENT STATUS OF THE MINE

The existing status of the mine with respect to various parameters are as follows:

7.1 MINE DEVELOPMENT:

Entries: Three pairs of inclines viz. 1 & 2, 3 and 4 and 5&6 have been driven upto Lower Patpahari Seam. The details of these 6 opencast are as follows:

Table No.

S.No.	Description	X-Section slope	Gradient	Plan length	Purpose for which used
1.	No.1 Incline	4.2x2.4m	1in4	190.0M	Downcast
2.	No.2 incline	- do -	-do-	210.0M	Downcast & travelling.
3.	No.3 Incline	- do -	1in4.5	170.0M	Downcast & travelling. Product from mine -
4.	No.4 Incline	- do -	-do-	175.0M	Upcast & travelling.
5.	No.5 incline	- do -	1in4	120.0M	Upcast & travelling.
6.	No.6 incline	- do -	1in4	125.0M	Downcast haulage- PRODUCTION INCLINE

From the above table, it is clear that inclines no.3 and no.6 are presently being used as production inclines through haulages. However, [illegible]

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conveyor of 1000 mm width is being installed in no.4 incline, which in future would become the main production incline.

7.2 OUTPUT:

The mine is presently producing about 20,000 tonnes per month i.e. 0.24 ..tes/annum. The break up of production is as follows:

From Incline no.3 - 6,500 to 7,000 tes/month by (dip district of 5 headings.

Incline no.5 - 13,000 tonnes/month by a level district of 6 headings and a dip district of 4 headings.

The coal is raised by 60 KW direct haulages through these inclines.

7.3 METHOD OF WORK & UNDERGROUND TRANSPORT:

Presently systematic development of mine is being done by manual Bord and Pillar method (Refer Plate VII). Square pillars of size 22.5 m centre to centre are being driven. Level and dip headings of size 4.8 m width are being driven with skid mounted coal cutting machines

drilling and blasting. The blasted coal is then loaded into coal tubs manually and transported to the incline bottom by a series of endless haulages and then to the surface by a direct rope haulage. The details of existing transport arrangements have been shown in Plate No. VII .

As mentioned earlier, incline no.4 would be the only production incline and a belt conveyor is being installed in it. Also for mechanisation of Bord and Pillar workings, 2 side loaders have been commissioned. Besides, 4 load haul dumpers are also expected to reach the mine this year.

7.4 VENTILATION:

Presently, inclines no.5 is acting as upcast for the whole mine, while the other five openings act as intake. The existing fan of Voltas make has a capacity of 6750 cum/min.(2,50,000 cfm) working at a pressure gauge of 60 mm and driven with a 150 KW motor. The existing ventilation system is also shown in Plate No. VII .

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7.5 PUMPING:

The main sump is located in no.6 dip towards south of inclines 1 & 2. The discharge to the surface is through boreholes of 100 mm (4") pipes. The depth from surface is 15 m. Two such boreholes driven side by side are being used for pumping mine water to the surface by 2 numbers of M.L.A. - 2 pumps. Besides, a standby pipeline with a DSM - 4 pump through Incline no.1 to the surface also exists for emergency pumping.

In addition, to the above arrangements, for every panel borehole are drilled and water discharged directly to the surface, thus taking advantage of the low cover.

The present make of water is 1500 g.p.m. during rainy season and 600 g.p.m. during summer.

7.6 LAND ACQUISITION:

The acquired land measures 341.458 hectares, the details of which are as follows:

267.038 hectares under CBBA

60.529 hectares under LA.

11.391 hectares transfer under MPL20

2.500 hectares direct negotiation forward.

341.458 Total

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7.7 COAL HANDLING ARRANGEMENTS & RLY.SIDING:

The present temporary arrangement of coal handling plant consists of two surface bunkers of 75 tonnes capacity each (i.e. a total of 150 tonnes) for incline no.4 and four surface bunkers of 100 tonnes capacity each (i.e. a total of 400 tonnes) for incline no.3. An elevating conveyor from tippler to the bunkers is provided at both the production inclines.

Coal is then transported either by departmental tippers/or by contractors to Karonji railway siding about 14 kms away. A ramp and 2 Terex Front End Loader have been provided for loading coal into wagons at the railway siding. The siding has a capacity of only 30 box wagons per day.

7.8 POWER SUPPLY:

The existing source of electric supply is from MPEB substation at Bisrampur which is about 24 kms away. This supply is through a 33 KV feeder. A second feeder of 33 KV is also expected to be in soon. A temporary sub-station of 133 KV also exists at the mine site. The construction of permanent sub-station is in progress. The location of these sub-stations are shown on Plate No. VII.

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7.9 CIVIL WORKS:

The existing township is located at a distance of about 4 kms from no.3 and 4 inclines near Salegaon village. Residential buildings numbering to 281 are available at the project and further 120 buildings are under various stages of construction. School building, dispensary, shopping centre and water supply arrangement exists in the township. The incline water is filtered through the horizontal pressure filter and then supplied. The existing servicing buildings like that of project manager's office, workshop etc. are given in Appendix A.2.1 which are located near incline 3 and 4 (Refer Plate vii).

7.10 MANPOWER:

The existing manpower is as follows:

Executives	=	16
Technicians and supervisors	=	77
Clerical Grade	=	39
Daily rated	=	496
Piece rated	=	212
Badli workers:		
Time rated	=	119
Piece rated	=	206
T o t a l ..		1165

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CIVIL WORKS:

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T o t a l ..		1165

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7.11 EXPENDITURE INCURRED TILL 31.3.82 & 31.3.83

S.No.	Particulars	Amount Rs.'000 upto 31.3.82	upto 31.3.83
(1)	Land	436	[illegible]
(2)	Building	4167	[illegible]
(3)	Plant & Machinery	31237	[illegible]
(4)	Furniture & fittings	59	[illegible]
(5)	Vehicles	178	[illegible]
(6)	Railway siding	14990	[illegible]
(7)	Development	11469	[illegible]
	Total	63246	[illegible]

7.12 A BRIEF HISTORY OF THE PROJECT:

a) Date of opening of the mine .. 1.4.75

b) Date of starting coal production November,77

c) Date of going into revenue 1.4.80

The following table gives the other details of the mine:

Table No.

S.No.	Year	Actual prodn. achieved in m.tns.	O.M.S.	Despatch by rail	Despatch by others	Man-power	Prod. target as approved for the year (in m.tns.)
1.	1977-78	0.0215	-	0.0020	..	395	0.3
2.	1978-79	0.0779	-	0.023	0.036	505	0.4
3.	1979-80	0.140	0.82	0,093	0.008	829	0.8
4.	1980-81	0.1815	0.84	0.136	0.0018	824	1.0
5.	1981-82	0.209	0.84 (incl.dev.)	0.287	0.021	951	
6.	1982-83	0.24	0.91 (incl.dev) upto Dec.82	0.17	0.023 upto Dec.82	1165	

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CHAPTER - VIII

PROPOSED METHOD OF DEVELOPMENT & DEPILLARING

8.0 The indepth study of the geo-mining conditions brings out the following various facts of Bhatgaon's reserves:

a) Considerable variation in seam thickness: The isochores shown in Plate No.V show considerable variations in seam thickness. The upper Patpahari seam varies from a minimum extractable thickness of 1.2 m to as much as 3.5 m. Sometimes the seam thickness changes considerably even over a length of one panel.

b) Shallow depth of reserves: The maximum depth of the reserves at the dipmost point is 60 m. The reserves were studied for opencast mining. As per studies two opencast mines have been earmarked as shown in Plate No.IV, one upto an O/b to coal ratio cut off line of 10:1 and the otherat the localised dipmost point where Masan seam occurs at a depth from 10 to 20 m from the surface. Within the existing boundary the Masan seam occurs at the dipmost point with a reserve of 1.7 m.tes. As most of these reserves lie within 15 metres of hardcover they would be worked with opencast methods for which either a separate scheme maybe made out or considered alongwith the main opencast mine on the rise side of the property.

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c) Sequence of Mining: Keeping in mind the above fact, the sequence of mining may be first to extract the underground workings and then to opencast operations. This would do away with the problems associated with simultaneous workings of opencast and underground mines like that of inundation etc. The Mawan Seam patch would be worked only after the strata has settled on exhausting both the UPP and LPP seams by caving underneath it. This would also help in easy breakage of coal and this explosive consumption may be reduced for/economist mine.

d) Contiguous workings: The upper Patpahari and lower Patpahari seams occur with a parting of 0 m which makes them contiguous. The advantages of contiguous workings viz. common transport, better ventilation, decrease in manpower etc. can be taken of by working those seams simultaneously. However, as can be seen from Plate No.IV, the eastern side of the property towards the dip, consists of only upper Patpahari seam of workable thickness while the lower Patpahari seam does not attain workable thickness. Thus, in this area only upper patpahari seam would be worked. The area showing where both seams occur/are in workable and thickness has also been clearly demarcated in Plate IV. As mentioned earlier, the portion of

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D.G.M.S. for contiguous working of the seams has been initiated by the project authorities.

5.1 METHOD OF WORK:

Bord and Pillar method was adopted by Project authorities afterthe earlier proposed method longwall with caving did not work out tobe feasible due to shallow cover.

For producing 1 m.tes/annum mechanising the Bord and Pillar syston is the only solution. However, seeing the seam thickness variation one single type of mechanisation is not possible.For deciding mechanisation, the reserves were broadly divided into

a) Seam thickness 2.5 m and above.

b) Seam thickness less than 2.5 m.

Mechanisation in Seam thickness 2.5 m and above:

The seam thickness of 2.5 m and above suit very well the deployment of Load Haul Dumps and Side Loaders. The Project authorities have already gained experience with Side Loaders in Developing Pillars. However, as Load Haul Dumps are mobile (tyre mounted) these have been suggested as developing machines, while the side loaders could be deployed as depillaring machines. The details

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of this method and the production to be achieved have been given in this under 'Production Parameters'.

Seam Thickness less than 2.5m i.e. from 1.2 to 2.5

The variation of the seam thickness between 1.2 to 2.5 m is considerable. The seam averages around 1.5 m. The variation of seam thickness even over a panel length makes it difficult to adopt a particular coal mining machine. Hence a compromise has been provided between wholly manual and mechanised system by suggesting shovelling onto chain conveyor during both development and depillaring operations. This method has the flexibility of suiting the seam thickness variations. The thin seam panels give less output so themethod adoptedisthat ofsimultaneous development and depillaring. The details of this method are mentioned below under the head 'Production Parameters'. Continuous Miners have been provided for speedy blocking out of the panels, for simultaneous development and depillaring.

8.2 Sequence of Underground Mining:

The sequence of underground mining is detailed as follows:

(i) To drive the trunk dip headings upto the boundary of the mine.

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(ii) To open up panels on the flank of either side of those trunk roadways from the dipmost point upwards.

(iii) To develop and depillar panels from dip upwards.

(iv) In case of seam thickness less than 2.5 m to open up panels by bord and pillar and then to develop and depillar simultaneously.

From the above sequences it can be seen that the mining method is one of retreating the mine from the dipmost boundary.

8.3 PRODUCTION PARAMETERS:

The detailed calculation of the output from the two seams are as follows:

8.3.1 For Seam Thickness 2.5 m and above:

Method - a) Development by S.D.L. and Chain Conveyor (Refer plate no.VIII)

b) Depillaring by Side Loaders and Chain Conveyors (Refer Plate No.IX)

a) Production during development from a panel:

Development panels or roadways (4 pillars) would be formed as sub-panels by keeping a barrier pillar between them. This barrier pillar between two sub-panels may be called as sub-panel barrier.

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A sub-panel would thus consist of five headings forming four square pillars of sizes 22.5 m. The headings of 4.8 m width would be drilled and blasted and the coal loaded by L.H.D. onto the medium duty chain conveyor as shown in Plate No.XIII. The medium duty chain conveyor would discharge the coal onto the panel belt conveyor via a lump breaker.

The production thus during development from a sub-panel would be -

Width of development heading	..	4.8 m
Average height of seam	..	2.75 m
Number of headings	..	5
Number of working faces	..	5 out of 9
Average pull/round of blast	..	1.5 m.
Number of blasts/face/shift	..	1½
Sp. Gr. of Coal	..	1.4

Therefore production per sub-panel per day

= 4.8 x 2.75 x 1.5 x 5 x 1.5 x 3 x 1.40 =619 t.
say 600 tonnes/day.

For producing 600 tonnes/day from a sub-panel, 4 load haul dumps have been provided. Thus, each L.H.D. would be handling 150 tns. of coal per day or 50 t/shift. Also with this rate of production a pillar would be developed on an average in 7days time.

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The sequence of operations in a development sub-panel would be as follows:
The drilled and blasted coal would be hauled by L.H.D. onto a medium duty chain conveyor (refer Plate No.VIII). The coal from this MDCC would be sized by a lump breaker and then transported outbye by the gate belt conveyor. The movement of L.H.D. would be restricted to a maximum of 100 m and the MDCC conveyor would be extended as and when required keeping the above condition in view. When the MDCC increases to a length of 100 m the belt conveyor would be extended.

b) Production from a depillaring panel:

i) By splitting of pillars
ii) By slicing of pillars

During depillaring operations two sub-panels would be depillared simultaneously and the sub-panel barrier would also be extracted (Please see Plate No. IXA as reference).
The depillaring operations would consist of splitting the pillar into two by a 4.8 m wide dipriso split. The split pillars would in turn be extracted by two slices of 5.85 m width leaving ribs of 2 m thickness (Refer Plate No.IX). The

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ribs on retreat shall be extracted judiciously.

Calculation of production from already split pillar i.e. from splices -

No. of pillars under extraction	=	4
No. of slices worked	=	4
Width of a slice	=	5.85 m
Number of blast/slice/shift	=	1
Average height of seam	=	2.75 m
Average advance/blast	=	1.5 m
Number of production shifts	=	3
Specific gravity of coal	=	1.4

Therefore production per sub panel/day

= 4 x 5.85 x 2.75 x 1.5 x 3 x 1.4 = 405 t/day

= 400 tonnes / day.

With the above rate of production a pillar would be extracted in 6 to 7 days. Therefore, the rate of splitting the pillars would on an average be

$\frac{17.7}{6.5}$ = 2.70 m

Therefore, production from 4 splits shall be

= 4.8 x 2.75 x 2.7 x 1.4 x 4 = 200 t/day

Hence output from depillaring sub-panel per day

= 400 + 200 = 600 tonnes per day.

Therefore two sub-panels will give production of

600 x 2 = 1200 tonnes per day.

For the above purpose, four side loaders shall be employed per sub-panel. The side loaders shall

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load coal onto light duty chain conveyors and through lump breaker mounted on medium duty chain conveyor the coal produced from the panel would be dropped on to the gate belt conveyor. With the above rate of production and for a panel length of 720 m the time taken for both development and depillaring would be about 9 months each i.e. a panel of 720 m length would be extracted in 18 months time.

8.3.2 For Seam Thickness less than 2.5 m:

Method a) Development - Blocking out of panels by continuous miner and then formation of pillars by shovelling onto chain conveyor.

b) Depillaring .. By shovelling onto chain conveyors.

b) Production from Development of Panel:

The development work in this method can be sub-divided into two major activities:

i) opening up or blocking of panels by continuous miners.

ii) formation of pillars from the barrier i.e. by retreating method and dividing the panel into two sub-panels by construction of B.P.Dams in between. The advantage would

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be that after a sub-panel is partly developed, depillaring operations can be started and if necessary sealed while the other part of the panel would continue tobe developed.

i) Production from opening up or blocking of panels by continuous miners - (Refer Plate No.X):

As shown in the plate, this would consist of driving two extreme single headings of 4.8 m width and connecting these two headings at the panel boundary by continuous miners. Thus panels would be blocked out. The average rate of advance per day per continuous miner would be 6 m/day. Therefore production per day from a continuous miner face

6 x 4.8 x 1.5 x 1.4 = 60 tes.

Where 1.5 m is the average height of the gallery and 1.4 is the sp. gr. Therefore production from two continuous miner faces would be 60 x 2 = 120 tonnes per day.

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Bhatgaon Colliery

'B'

ii) Production from development of a thin seam panel:

The development would consist of forming four square pillars of 22.5 m by driving three headings - the outer two headings being already made by continuous miner. The drilled and blasted coal would be loaded onto light duty face chain conveyor and then to the gathering heading duty chain conveyor via a lump breaker onto the gate belt conveyor. One of the belt conveyors of the continuous miners would be retained as the gate belt conveyor. Material supply would be by means of low height battery operated 'Scoops'. The production from development panel would be as follows:

Number of headings = 3
Number of faces available = 3 out of 5
Width of heading = 4.8 m
Avg.seam thickness = 1.5 m
Specific gravity of coal = 1.4
Advance per blast = 1.2 m
Number of blasts/face = (2)
Number of production shifts = 3
Coal per blast/face = 4.8 x 1.5 x 1.4 x 1.2
= 12 te.

Therefore coal per face per shift = 12x2=24 te.

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Another over flowing main ground bunker, [illegible] two compartments will be constructed as shown in Drawing No./Plate No.XIV to store steam and slack coal. The steam coal compartment will have a capacity of 5000 tes. while that for slack coal would be 4000 te. The capacity of main bunker and surge bunker (with ground stock facility) has been kept more in order to handle coal from Bhatgaon opencast mine. Main bunker would be having 20 pockets each fitted with rack and pinion chute gate and reciprocating feeder for feeding to reclaim conveyor C7 uniformly. The ground bunkers would be having a sump. The water from sump will be pumped out with the help of a pump. An extra sump pump has been provided as a spare.

12.2.4 WAGON LOADING AND WEIGHMENT:

The steam or slack coal will be reclaimed from main bunker by conveyor 'C7'. It will be transferred to loading conveyor C8 for loading into wagons with the help of two way motorised chute gate. Reclaim conveyor and loading conveyor will be having a capacity of 600 tph (av rate). This enables loading of 30/45 box rake within prescribed time of 5 hours. The wagons will be

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[illegible]
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Therefore coal produced per panel/day
= 24 x 3 x 3 = 216 tonnes say 210 tonnes

b) Production from depillaring of a panel:

(i) By splitting of pillars

(ii) By slicing of pillars

Production from slices:

Width of slice = 5.85 m

Avg. thickness of seam = 1.5 m

Advance perblast = 1.2 m

Specific gravity of coal = 1.4

Coal per blast = 5.85 x 1.5 x 1.2 x 1.4

= 15 te.

No. of slices worked at a time = 4

No. of blasts/shift = 1 1/3

No. of production shifts = 3

Therefore coal production per day from slice

= 15 x 4 x 4/3 x 3 = 240 tonnes

With the above rate of [illegible] a pillar w

be extracted in 6 days time.

Therefore the rate of splitting the pillars

on an average be $\frac{17.7}{6}$ = 2.95 m,

Where 17.7 m is the length of the solid pill

Therefore production from 4 splits would be

4.8 x 2.95 x 1.5 x 1.4 x 4 = 118 tonnes
say = 110 tonnes.

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Therefore the production from a depillaring panel = 240 + 110 = 350 tonnes.

8.4 Target Production:

To achieve a target production of 1.0 million tonnes/annum i.e. 3333 t.p.d. the number of panels tobe worked are detailed in the following table.

S.No.	Seam thickness	Method of work	No.of panels	Output/ day
1.	2.5 and above	Development by L.H.D.	2	600x2=1200
2.	- do -	Depillaring by side discharge loaders.	2½	600x5/2=1500
3.	less than 2.5m	Development by continuous miner.	1	120 x 1 = 120
4.	- do -	Development by shovelling onto chain conveyor.	1	210 x 1 = 210
5.	- do -	Depillaring by shovelling onto chain conveyor.	1	350x1 = 350
		Total output/day of the mine - in raisings		3330

Providing adjustment for varying seam thickness, the output per day would be 3333 or 1.0 m.t/annum.

With the above target the life of the project would be 13 years after achieving rated production.

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To maintain continuity of supply of 1 m.tes of coal per annum from the mine over a fairly long period of say 20 years or more, separate project report for opencast mining would be prepared for the reserves earmarked for opencast mining (as shown in Plate No.IV) so that necessary sanction and construction of opencast mine starts well in time and before the underground reserves are either fully liquidated or production from underground starts dropping heavily due to depletion of reserves.

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CHAPTER- IX
UNDERGROUND TRANSPORT

9.1 The underground transport for Bhatgaon Project would be as follows:

Coal Transport:

A) AT FACE:

a) During Development:

Depending upon the method of work the coal from the face would be transported by

i) Dead Haul Dump onto medium duty chain conveyor in seam thickness 2.5 m [illegible]

ii) Shovelling onto light duty chain conveyors in seam thickness less than 2.5 m.

b) During Depillaring:

i) By side loaders onto light duty chain conveyors in seam thickness 2.5 m & above.

ii) By shovelling onto light duty chain conveyor in seam thickness less than 2.5 m.

B) OUTBYE - TRANSPORT:

Trunk road - Belt conveyor

Gate road - Belt conveyor

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MATERIAL SUPPLY:

i) By endless haulage in seam thickness 2.5m &

ii) By low height battery operated 'Scoop' in seam thickness less than 2.5m

A line diagram of underground transport is shown in Plate No. XII . The incline no. would act as the main production incline as in the dingram (Plate No. XII), while incline no.3 would act as haulage incline for material supply and no.2 and 6 would act as travelling inclines. The following table gives the purpos of the various openings.

Table

S.No.	Openings	Purpose
1.	Incline no. 1	Upcast incline
2.	Incline no.2	Downcast & travelling incline.
3.	Incline No.3	Downcast and haulage incline.
4.	Incline no.4	Downcast and main production incline.
5.	Incline no.5	Upcast incline and travelling incline.
6.	Incline no.6	Downcast - haulage incline.

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CHAPTER - X

VENTILATION

10.1 The existing ventilation system consists of an upcast fan of 6750 cum/min. capacity at 60 mm W.G., installed at no.5 incline. The other existing five openings act as intakes. The present production is only 0.24 m.t/annum. For ventilation planning of 1.0 m.t. production C.M.R.S. has prepared a report in February,1975. For a production of 3333 t.p.d. i.e. 1.0 m.t/annum the details of air quantity requirement, horse power of fans and water gauges are calculated as follows:

10.2 AIR QUANTITY REQUIRED:

a) On the basis of output: The statutory requirement that quantity of air should not be less than 2.5 m3/min per tonne of daily output requires that:

$$Q \text{ mine} = \frac{3333 \times 2.5}{0.6} = 13887.50 \text{ m}^3/\text{min.}$$

$$= 230 \text{ m}^3/\text{sec. of air.}$$

should be supplied for the whole mine. Therefore, the air quantity on the basis of output is [illegible].

b) On the basis of manpower: The statutory requirement that quantity of air should not be less than 6 m3/min per person on the largest shift works out to be:

$$Q \text{ mine} = \frac{880 \times 6}{0.6} = 8800 \text{ m3/min.}$$

Where 880 = largest number of persons going underground in a shift.

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0.6 = officiency of the fan

= 150 m3/sec.

On comparison of the two quantities, it is found that the quantity requirement on the basis of production is higher and hence is tobe considered for further calculation.

10.3 MAIN INTAKE AND RETURN OPENINGS:

The following table gives the details of openings for ventilation purposes as suggested in the sanctioned report. The table also gives statutory limitations of air velocity and hence the air quantity to flow in them.

S.No.	Opening	Purpose (proposed)	Length m2	Area of x - sec. in m2.	Velocity permitted m/sec.	Quantity of air mitt m3/s
1.	Incline no.1	Return	190	10.08	8	80
2.	Incline no.2	Intake &travelling	210	10.08	8	80
3.	Incline no.3	Intake & haulage	170	10.08	8	80
4.	Incline no.4	Intake & Belt conveyor	175	10.08	4	40
5.	Incline no.5	Return & Travelling	120	10.08	8	80
6.	Incline no.6	Intake & haulage	125	10.08	8	80

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From the above table, it would be seen that from existing four intake openings the mine can be supplied an air quantity of 280 m3/sec. which is more than the required quantity of 230 m3/sec. Hence the intake openings are sufficient for the required air quantity. However, for return purpose, the two existing return openings can handle only 160 m3/sec instead of 235 m3/sec. Hence another return opening capable of catering 235 - 160 = 75 m3/sec. is required. The details of the type and size of this opening is discussed later in this chapter.

10.4 VENTILATION AS SUGGESTED IN THE EARLIER REPORT:

The sanctioned report suggested that the intake and return openings should be as follows:

Sl.No.	Incline No.	Purpose
1	No.1	Return
2	No.2	Intake
3	No.3	Intake
4	No.4	Intake
5	No.5	Return
6	No.6	Intake

The earlier report thus divided the property into two different independent parts from ventilation point of view. These two parts, now detailed as

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'Circuit A and Circuit B' are as follows:

'Circuit 'A': Incline no.2 and 3 acting as intakes for the western portion of the mine, where both upper and lower Patphari seams are to worked, with incline no.1 as return.

'Circuit 'B': Incline no.4 and 6 acting as intak for the north-eastern portion of the mine, where only upper Patpahari seam is workable in th incline no.5 as upcast.

10.5 DISTRIBUTION OF AIR QUANTITY:

The air quantity would be distributed in circuit 'A' and circuit 'B' depending upon the quantity of production from those parts. As producti would vary from these parts over the life of t mine, an average ratio of production of 30:70 is taken for circuit 'A' and circuit 'B' respectively for calculation and pressure drop. Therefore the quantity distribution is

Q circuit 'A' production = 0.3mt = 70 m3/sec.

Q circuit 'B' production = 0.7mt = 160 m3/sec.

Total = 230 m3/sec.

When reserves in sector 'B' get depleted, the position would be reversed and then production from Sector 'A' would rise to 0.7 m.t., the out from sector 'B' would drop to 0.3 m.tes/annum.

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'E'

6 PRESSURE DROP:

The following consideration has been taken into account for pressure drop calculation:

(i) As the trunk headings are as long as 1½ to 3 kms. it is suggested that to reduce the pressure drop, the number of splits should be increased and hence a minimum of 3 splits for intake and 2 for return would be driven. This would also help in reducing the air velocity. Thus a total of 5 headings would be driven in trunk roadways, 3 for intake purpose and 2 for return.

(ii) The ventilation within the panels would be adequately supplemented by auxiliary fans and ductings. The details are shown in the method of work plates No.VII, VIII and IX.

0.7 FAN SPECIFICATION:

a) For Circuit 'A': The fan at no.1 incline would be an exhausting axial flow fan of 70 m3/sec. capacity. The pressure gauge would vary between 75 - 100 mm w.g. The H.P. of the fan works out to be 100 75 KW.

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b) For Circuit 'B': Taking into consideration that one extra opening for return purpose has tobe made and with the earlier suggested circuit the pressure drop for the fan comes in the region of 300 - 350 mm, a shaft opening has now been proposed towards the dip of the north-eastern portion. Thus there would be 3 intake openings viz. Incline no.4, 5 and 6 and one return upcast shaft. This modified circuit would bring down the pressure drop to about 100 mm. Considering the disadvantage of high pressure drop, like considerable leakage and high running ventilation cost, the provision of providing an exhaust fan at 300 - 350 mm w.g. has been ruled out. The provision of an upcast shaft as shown in Plate-VII has been included in this report. Thus the specification for this circuit is an exhaust fan of 160 m3/sec. at a water gauge of 100 mm. The diameter of opening works out as 4.0 m keeping the air velocity within the statutory limit of 15 m/sec.

10.8 The ventilation for the project thus requires modification over the earlier suggested scheme. The modification as suggested results in fans of lesser horse power and working at lower pressure gauge with a new return opening in the form of 4.0 m shaft for meeting the statutory

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limitation of velocity. Similarly an upcast shaft on the dip side in Sector 'A' would also be required. The position of the shafts 'A' and 'B' are shown in Plate-VII. Their sinking would be easy as underground galleries would be developed before hand.

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CHAPTER - XI

DEWATERING & PUMPS

11.1 Presently, the make of water in Bhatgaon u/g mine during rainy season is 115 l.p.s. and 60 l.p.s. during summer. As per the project report for Bhatgaon colliery, the mine was assumed to be moderately watery requiring about 380 - 455 L.P.S. of dewatering rate which has been considered as 400 L.P.S. It is also proposed to have 50% additional capacity as standby. Accordingly 600 L.P.S. hasbeen taken as the total dewatering rate which forms the basis of calculation for the requirement of pumps.

11.2 At present the mine is being dewatered by means of pumps installed at 3/4 pumping stations by means of delivery ranges taken up through boreholes and inclines. Reorganisation proposals envisage the drivage of two more sets of main dip in addition to the present one as also various development and depillaring districts. In view of this factor, it is considered necessary to have 5 main dewatering stations in the mine as per this report. Each station will be provided with two pumps rated 60 L.P.S., 100 m head (maximum). The delivery ranges will be taken to surface through boreholes/inclines as the case may be.

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11.3 Further, provision has been made for sufficient number of intermediate stage and face pumps, the details of which have been furnished as per Appeddix A.3.3. The approximate additional requirement of delivery pipes also has been indicated in the same appendix.

The estimated capital requirement for the pumps and pipe fittings wouldbe about Rs.20.55 lakhs as shown in Appendix A.3.3.

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CHAPTER - XII

COAL HANDLING PLANT AND RAILWAY SIDING

12.1 COAL HANDLING PLANT:

Coal handling plant of Bhatgaon mine will be constructed near the coal raising incline no.4. The mine is situated about 14 kms from Karonji railway siding in Baikunthpur area.

Presently, coal despatch is R.O.M. (Grade 'B') to power houses with the help of temporary coal handling arrangements constructed near inclines no.3 and 6 and wagon loading arrangement at Karonji siding. The temporary coal handling arrangement constructed near incline no.3 consists of an elevating conveyor, 600 mm wide, and four numbers of overhead truck loading hoppers of 100 te capacity each, where as the arrangement installed near incline no.6 consists of an elevating conveyor, 800 mm wide and two numbers of overhead truck loading hoppers of 75 te. capacity each. Coal is being raised through incline no.3 & 6 by tubs by direct haulages of 65 KW and 50 KW respectively. Coal is discharged on conveyor 800 mm wide by tub tippler. Trucks are loaded below the overhead hoppers and carried to Karonji railway siding for further despatch to customers by rake of 30 box wagons.

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Rake loading is partly by trucks, by conv... by Terex way loaders. Prompt siding has an capacity of only 30 box wagons in a day.

As per the original report, the proposed CHP was to handle 1 m.t/year. Afterwards, the CHP has been designed as per Drawing No. ...gn/Lay... on "Layout of Bhatgaon CHP" prepared by CMPDI. Ranchi. The capacity of CHP has been kept more than 1 million tonne/year keeping in view that handling and despatch of coal of Bhatgaon opencast mine would be from the same CHP. The construction of CHP and railway siding is in progress. ... 30% work for main and surge bunker has safely been completed. It is expected that CHP and siding would be completed within a period of 3to 4 years.

12.2 BRIEF DESCRIPTION: (Refer Plate No. XIII & XIV ...)

12.2.1 COAL FLOW: Run of mine coal which would come out of mine through incline no.4 by conveyor, 'Z' be stored into a surge bunker. The r.o.m. coal would be reclaimed by conveyor 'C1' and discharged onto vibrating screens. Screens will separate coal into slack (- 50 mm) and steam (+ 50 mm). The slack coal will be ... slack coal ... bunker by conveyor C5 for ... Shuttle conveyor C6 would be used for spreading slack coal in the bunker.

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The steam coal will be collected on slow moving picking conveyors C2 for removal of shale and stone pieces. After picking the cleaned steam coal would be discharged on to conveyor C4 for storing into steam coal ground bunker with the help of tripper conveyor C5. The rejects will be collected in a 50 to. overhead hopper with the help of conveyor C9. The shale and stone pieces would be disposed off by a tipping truck to a pre-selected dumping yard. Depending on the availability of wagons the steam coal or slack coal would be reclaimed from the ground bunker and loaded into railway wagons over the weigh bridge. The wagons would be moved with the help of a wagon hauler.

12.2.2 SCREENING AND PICKING HOUSE:

Screening and picking house will house two vibratory screens associated with slow moving picking conveyors. The screen will be of single deck type for separating slack coal (-50 mm) and steam coal (+ 50 mm). No processing will be done on slack coal before storing it in the slack coal ground bunker. The steam coal after the screening will be taken on to the picking conveyors C2 for removal of shale and stone pieces manually, so as to

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maintain the quality. Steam coal after deshaling will be collected on conveyor 'C4' for carryin to the steam coal ground bunker. The coal in this bunker would be spread with the help of tripper conveyor 'C5'.

Shale and stone pieces will be thrown on a reject conveyor C9 which will drop it in an overhead hopper of 50 tcd capacity. The dumping truck will be loaded for disposing the rejects at a pre-selected dumping yard.

12.2.3 **STORAGE:**

A self flowing ground surge bunker will be constructed near the raising incline no.4 for storing run-of mine coal through main trunk conveyor. This bunker will be having a 1350 te. self flowing capacity. Provision of a 4 m3 capacity scraper will be made for building the ground stock and also for reclaiming the same. ground pocket will be made to receive coal from scraper. The bunker will be having three no.of pockets. Each pocket will be equipped with rack and pinion chute gate and reciprocating feeder for uniform discharge of coal onto the reclaim conveyor 'C1'.

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loaded while being weighed on a 100 tc. weigh-bridge. This system will ensure accurate as per railway rules and to obviate any further weighment readjustment in wagons. The movement of wagons will be by means of a remote controlled wagon hauler.

Another loading conveyor C10, weigh bridge 100 tc. and a wagon hauler as per system drawing no. DGN/LAYOUT/1140C will be required, in future, if three rakes are tobe loaded in a day after opening of Bhatgaon opencast mine.

12.2.5 ENVIRONMENTAL CONTROL:

Dust control units will be installed at various transfer points and at screening house for creating healthy working environment.

12.2.6 POWER SUPPLY,CONTROL & ILLUMINATION:

All the equipment in the plant will operate at 415 volts, 3 phase, 50 hertz supply. To cater to the needs of the plant a substation with transformer of adequate capacity and associated primary and secondary control gears will be made by a remote controlled,motor control centre (MCC). The motor control centre will be provided with, starters and,all necessary protections for the motors and equipment. All the tunnels, conveyor

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centrics, drive houses, control room, screen house etc. will be properly illuminated.

12.2.7 SAFETY AND COMMUNICATION:

The plant will be provided with the necessary facilities, required for the safety and communication of workmen, such as pull rope switches along the length of the conveyors for stopping it in an emergency, emergency stop switches and warning signals for drives, hooters for warning persons, loud speakers and telephones for communicating important information and instructions to the persons working at the plant etc.

12.2.8 MANPOWER:

The total manpower required for coal handling plant with two shifts operation will be 71 which includes engineers, supervisory staff and workmen.

12.2.9 ESTIMATE:

The total capital expenditure of this coal handling plant excluding siding will be Rs. 750.93 lakhs.

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12.3 RAILWAY SIDING:

Railway siding from Karonji railway station to the mine is under construction and likely to be completed within 3-4 years. The loading yard will be as per drawing no. XVI on 'Siding Yard for Bhatgaon Colliery'.

Siding will be having facilities to accommodate 30 empty and 30 loaded box wagons with a catch escape line and a loading yard. Future extension to accommodate a total of 45 empty and 45 loaded box wagons will be provided for catering to increase in production from opencast mine.

The capital expenditure for installing above mentioned siding yard will be about Rs.55 lakhs.

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CHAPTER - XIII

POWER SUPPLY & TELECOMMUNICATION

13.1 SOURCE AND SUPPLY VOLTAGE:

Presently Bhatgaon Colliery receives power at voltage of 33 KV from MPEB's (Madhya Pradesh State Electricity Board) 132 KV/33 KV substation at Bisrampur by means of a single feeder. A second feeder is also under construction, which means finally Bhatgaon colliery will receive power from M.P.E.B. by means of two feeders.

13.2 CONNECTED LOAD AND MAXIMUM DEMAND:

As per the proposals made in this report, the total connected load comes to about 9200 KW. This indicates a maximum power demand of about 3650 KW i.e. about 3950 KVA with a corrective power factor of 0.92 at targetted production.

13.3 TRANSFORMER CAPACITY:

Maximum demand to the tune of 3950 KVA calls for an installed capacity around 5000 KVA. In view of this, it is proposed to equip the main sub-station with two transformers each rated 2500 KVA 33KV/3.4 KV as proposed in the earlier report

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13.4 SPECIFIC ENERGY CONSUMPTION:

Specific energy consumption estimated on the basis of quantum of work tobe done or number of working hours per year comes to 16.7 KWH/te. of production of coal.

13.5 TELECOMMUNICATION:

An automatic telephone exchange with a nominal capacity of 50 lines, in addition to the existing one set of 50 lines (SAX) has been provided at the project to facilitate communication between various offices, industrial operations etc. A 30 line 'Intrinsically Safe Telecommunication System' for underground communication has been provided so that direct communication between different underground districts and surface can be established.

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CHAPTER - XIV

CIVIL CONSTRUCTION, WATER SUPPLY AND SEWERAGE WORKS

14.0 INTRODUCTION :

The Bhatgaon reorganisation project envisaged targetted coal production of 1.00 m.te. per annum for a mine life of 13 years. It is situated in Bisrampur Coalfield in Surguja District of Madhya Pradesh. Bisrampur, Karonji and Bhatgaon have been connected by road. Ambikapur-Bijuri - Bisrampur branch line of South Eastern Railway which is about 14 kms. to the south-west of the colliery. The area is an undulating plane with general elevation varying from 550 to 570 m above M.S.L. The proposed and infrastructural facilities are necessary for the and would also contribute for the integrated development the area and improvement of the lot of the tribals around the project.

14.1 TYPE OF CONSTRUCTION:

The mine is planned to work for 13 years and later opencast mine would also be worked, thus civil co

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CHAPTER - XIV

CIVIL CONSTRUCTION, WATER SUPPLY AND SEWERAGE WORKS

14.0 INTRODUCTION :

The Bhatgaon reorganisation project envisaged targetted coal production of 1.00 m.te. per annum for a mine life of 13 years. It is situated in Bisrampur Coalfield in Surguja District of Madhya Pradesh. Bisrampur, Karonji and Bhatgaon have been connected by road. Ambikapur-Varan fair weather road passes at a distance of about 4 kms. from the project. The nearest rail head is Karonji on Manendra Bijuri - Bisrampur branch line of South Eastern Railway which is about 14 kms. to the south-west of the colliery. The area is an undulating plane with general elevation varying from 550 to 570 m above M.S.L. The proposed township and infrastructural facilities are necessary for the project and would also contribute for the integrated development of the area and improvement of the lot of the tribals in the around the project.

14.1 TYPE OF CONSTRUCTION:

The mine is planned to work for 13 years and later opencast mine would also be worked, thus civil constr

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water supply and sewerage scheme are proposed tobe constructed with permanent specification. Single storeyed construction is envisaged for construction of service and residential buildings.

BUILDING COST INDEX:

The building cost index for Bhatgaon reorganisation project has been worked out as 232 in May,83, with reference to 100 base of Delhi in October, 1976. The Appendix A.2.3 showing calculations for building cost index and plinth area rates for various categories of buildings are enclosed.

RESIDENTIAL ACCOMMODATION:

The categories of the residential buildings provided are Miner's quarters, type quarters A,B, C and D and Hostel type accommodation. Hostel type accommodation has been provided in place of 20% of total number of type quarters.

The entitlement of residential buildings for various catogories of employees has been taken as per S.C.M. guidelines. The plinth area and design of quarters are adopted as per revised Industrial Housing Standards O.M. No. 658-Adv(C)/Circular-91/71 dated 14.7.71 and circulated vide BPR&H O.M.No.BPR(C) Gen.81/72/Cir/96/72 dated 7.4.72. The plinth area and design of Miner's Quarters is adopted as prescribed and approved by

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Coal Mines Welfare Organisation. A statement showing the details of category/pay scale of employee, category of residential building plinth area, number of employees, unit cost, existing buildings and additional quarters required with their total cost is enclosed vide Appendix A.2.2. The calculations for unit cost of Type Quarters, Miners Quarters and Hostel Type Accommodation are given in Appendix A.2.3

14.4 The capital requirement for residential buildings is estimated as Rs.343.28 lakhs. The Coal Mines Welfare Organisation provides subsidy at the rate of Rs.8025 per quarter, for total Miner Quarters tobe constructed, that is Rs.71.74 lakhs. Thus net capital requiremont for residntial buildings would be Rs.271.54 lakhs.

14.5 SERVICE BUILDINGS:

Appendix A.2.1 shows the list of proposed service buildings, existing area of service buildings after taking into consideration buildings required for underground mines. The capital estimate works out to Rs.107.78 lakhs.

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4.6 ROADS & CULVERTS:

(a) Colony roads and culverts: The estimate works out to Rs.2937 lakhs as shown in Appendix A.8.2.1

(b) Approach road from colony to work site: The additional length of the approach road works out to approx. two kms and its estimate is Rs.5.02 lakhs as shown in Appendix A.8.2.2.

4.7 SEWERAGE AND TREATMENT SCHEME:

The provision of sewerage system has been made for handling and treating domestic and industrial waste. The capital requirement for sewerage system works out to Rs.33.44 lakhs, details of wtch are given in Appendix A.8.3.

4.8 WATER DEMAND:

4.8.1 The water supply arrangements for Bhatgaon reorganisation project would basically include potable water and industrial water demand of the project with a life of 13 years.

4.8.2 The total projected manpower in the above project is 2955, while the existing manpower is 1'55. Similarly, the total housing requirement in the above project is assessed as 1612, whereas the existing houses are 401.

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14.8.3 The potable water demand of the residential workers is based on the assumption of 5 persons per house who are supplied water at the rate of 135 ltrs. per capita per day.

14.8.4 The potable water demand of non-residential workers is based at the rate of 45 litres per capita per day.

14.8.5 The potable water demand of service buildings is based at 10% of the potable water demand of the total populati

14.8.6 The process and other losses have been taken into account at the rate of 10 % of the total potable water demand calculated in the manner as specified in the foregoing paras.

14.8.7 The industrial water demand is based at the rate of 10% of the total potable water demand inclusive of process and other losses (in the case of UG mines only).

14.8.8 Based on the above norms, the total water demand is assessed as 1.52 M.L.D.

14.8.9 Mahan river which flows approximately 6 kms from the project will constitute the main source of water, and hence it is proposed to plan water supply arrangements for the project with Mahan river as the source.

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14.9 BRIEF DESCRIPTION OF EXISTING ARRANGEMENTS:

At present mine water after filtration is supplied for drinking purposes. A horizontal pressure filter of 7500 G.P.H. capacity alongwith a Chlorinator is working. The permanent water supply from Mahan river 6 kms away is being planned by W.C.L. Hqtrs.

14.10 SALIENT FEATURES OF PROPOSED WATER SUPPLY ARRANGEMENTS:

While permanent water supply scheme would be formulated after detailed survey, hydrogeological investigations and careful appraisal of the existing arrangements, the tentative proposals and estimates thereof, are given in Appendix A.8.3.

14.11 FORECAST OF COST ESTIMATES FOR WATER SUPPLY ARRANGEMENTS ENVISAGED:

The forecast of cost estimates for providing water supply arrangements at Bhatgaon project has been prepared with a view to project the probable capital investment involved in the proposed water supply scheme. Suitable provision has also been made for hydrogeological investigation, if required, alongwith testing for its suitability and proper treatment. It would be seen that a capital investment to the tune of Rs.6496 (amount in Rs.000) (Gross) would be needed for providing water supply arrangements at Bhatgaon Project. Coal Mines

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Welfare Organisation pays subsidy for the implementation of water supply scheme in coal-fields. The quantum of subsidy is 40% of the approtioned cost of the potable water supply scheme, is expected tobe Rs.29.27 lakhs, resulting in the net capital investment of Rs.55.69 lakhs. The estimate is given in Appendx A.8.3.

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CHAPTER - XV

SAFETY MEASURES & STATUTORY REQUIREMENTS

15.1 SYSTEM OF SUPPORT:

i) In order to keep the roadways relatively free for the movement of Load Haul Dumpers and Side Londers, the support system has been suggested which will cater to the needs of proper support and will occupy less space.

ii) In the S.T.R. tobe framed by the management, the foregoing aspect has tobe borne in mind.

15.2 WIDTH OF ROADWAY:

To prevent supports from being knocked out by the machines tobe used, it is suggested that permission from D.G.M.S. for allowing width of galleries tobe 5.2 m may be obtained. This shall also allow free and safe movement of both men and machines.

15.3 CONTIGUOUS WORKINGS OF SEAM:

The suggestions regarding contiguous seam workings for UPP and LPP have been referred by the project authorities to CMRS. On the basis of studies, it is hoped that DGMS shall give permission, when the project authorities apply for contiguous workings of both the seams.

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15.4 MECHANISED DEPILLARING:

Permission from D.G.M.S. is needed for mechanised depillaring with side loaders and chain conveyors. Such permission is being obtained in other mines of W.C.L.

15.5 GENERAL SAFETY:

Adequate manpower has been provided for dealing with coal dust cleaning, stone dusting, water spraying etc.

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CHAPTER - XVI

ENVIRONMENTAL CONTROL MEASURES

16.1 LOCATION MAP: Location of project, existing and proposed colony/township, delineation of important surface features, surface contours water courses, habitats, area involved in mining and support facilities are shown on Plate No.VI.

16.2 VILLAGES: Within a radius of 10 kms. around the existing and proposed mining area, there are 62 villages. Most of the villages are very thinly populated. The population of big villages is as under:

S.No.	Name of village	Approx. population	Distance from mine.
1.	Bhatgaon	5000	[illegible]
2.	Dugga	2500	[illegible]
3.	Bhisai	2500	3kms
4.	Kapsara	5000	3kms
5.	Talogaon	2000	[illegible]

Habitants of these villages are Rajwars, Tribals, Ahirs, Barghas and Baniyas. Economical status of these villages is very poor and backward. The villages are mainly dominated by tribals. 70% of the population make out their living from farming and rest work on mixed professions. The socio-economic changes due to coal mining industry would

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certainly put a great impact on their way of life and bring them into the main stream of the country.

16.3 PREMINING STATUS OF LAND, ITS PRESENT USE AND HABITATE:

In this region there is no forest land. Government land was scanty having wild vegetation. Mohua-tree and small tendu trees were found on elevated piece of land. The land yield wood tobo Mohua flowers and Tendu leaves. Presently this area is being utilised for colony and mine support facilities like railway sidings, explosive magazine, play-ground and green belt etc. The tenancy land was under dry cultivation except some low lying patches. Those patches were used for cultivating paddy. On elevated land Koda, Kurthi or Mujhri was sown. The land is still being used for agricultural purposes and is owned by the villagers. Only one crop is raised in a year.

16.4 PHYSICO-CHEMICAL CHARACTERISTICS OF WATER:

Reports on Physico - chemical analysis of water samples taken from incline no.1 and Mohan river are appended in Appendix D-2 and D-3.

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16.5 ENVIRON CONTROL MEASURES:

The environmental pollution consists of four major factors which tend to disturb the ecological balance viz. ground, water, air and noise pollution. These factors are highly prone to contamination and having been polluted cause damage to plant life, animal life and human life. These contaminants are made available and discharged into the environ by the technico-economic factors which are produced by modern industrialisation.

16.5.1 GROUND: Although no significant environmental imbalances i.e. adverse effect on flora fauna and wild life have been noticed but it is expected that pollution of the atmosphere due to coal dust/solid waste cannot be entirely [illegible]. For this land would be earmarked for dumping the solid waste and rejects of C.M.P. etc. As this is an underground project, little deforestation due to mining and associated activities would result. During depillaring operation, surface cracks would be due to subsidence of the ground. These cracks and depressions would be filled up by soil to regain the premining conditions and topography. In addition, more grass, bushy

Colliery Manager
Bhatgaon Colliery

Surveyor
Bhatgaon Colliery

16.5 ENVIRON CONTROL MEASURES:

The environmental pollution consists of four major factors which tend to disturb the ecological balance viz. ground, water, air and noise pollution. These factors are highly prone to contamination and having been polluted cause damage to plant life, animal life and human life. These contaminants are made available due discharged into the environ by the techno-socio-economic factors which are produced by modern industrialisation.

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Colliery Manager

Surveyor
Bhatgaon Colliery

plants and trees would be planted in and around the mine. This vegetation would help in the prevention of soil erosion, hardening, alcolisation, desertification and ground water losses. The other possible imbalances and adverse effects arising out of mining operations and associated activities could be due to dumping of waste rock coming out during development phase of the mine i.e. drivage of inclines, construction of main sump, crossing of underground workings through faults, dykes and drivage of galleries in stones etc. All of this solid waste would be used for levelling of the sites for mine, township, roadways and railway siding.

The ground surface here is having natural slope to drain away the surface water to the river, however garland surface drains would be provided around the colonies and mine areas for smooth flow of discharged effluents and also to prevent accumulation of storm and waste water. This would prevent breeding of mosquitos, flies, insects etc.

Colliery Manager
Bhatgaon Colliery

Surveyor
Bhatgaon Colliery

16.5.2 WATER:

Water pollution which causes serious problems is classified as (i) effluent: (ii) offl... t water. Full scale water treatment has been provided under water supply scheme to supply potable water for domestic and industrial use to combat pollution from affluent water. Effluent water is sub-divided into two types (i) discharge from pumping of mine water; and (ii) discharge from domestic and industrial sewerage system.

The likely make of water in the mine has been assessed as 600 l.p.s. on the basis of annual rainfall. The inflow of seepage water is more or less negligible. Presently, this water is being discharged into Masan and Rohar river with no sign of pollution having been noticed. In fact, villagers are utilising this water to irrigate their land. Similarly ... effluent water ... the domestic and sewerage system would be treated before discharging it into the river. This would protect the fauna especially on the down stream side of the river. All efforts would also be made to monitor and prevent any type of pollution into streams, rivers, reservoirs etc. flowing through mining area to preserve the quality of the water, flora and fauna.

Colliery Manager
Jamadoba Colliery

Sr. Surveyor
Bhuggeon Colliery

16.5.3- AIR:

Pollution of surface air would take place from two sources mainly

(a) by mine ventilation exhaust;

(b) by dust generated from the coal handling plant.

Carbon-di-oxide emitted as a natural byproduct of oxidation of coal, respiration of the engaged persons and fumes liberated from blasting operations are let out of the mine after being adequately diluted as per provisions of coal mine regulation. Unless the mine is on fire, the chances of C O being liberated is remote. Besides, this suspended coal and stone dust particles are picked and carried by the air current flowing through the mine workings. The water spraying in the mine is done to minimise air borne dust concentration and to dissolve and dilute the soluble mine gases.

Considerable amount of dust is produced by the coal handling plants. Though water sprays are incorporated at transfer points in the plant, even then sometimes fine air borne dust travels to greater distances depending upon the intensity of surface air current. This aerial pollution of dust would be controlled by planting tall, well spread leafy trees and also medium short height bushy plants in between the coal handling plant and service/residential buildings. These trees

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Bhatgaon Colliery

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Bhatgaon Colliery

and plants would act as filters and arrest the migration of dust. Further, in the area between the C.H.P. and other buildings, fountains would be built which would spray water in the atmospheric air around the CHP to arrest the suspended dust particles and [illegible] the ground. These foundains when worked in a particular sequence would also add to the scenic beauty of the mine surface. The dust problem is not severe in rainy season due to wet atmosphere and in winter due to dew formation and during the cooler part of the day but in summer it is at its maximum. Therefore these fountains would also help in keeping the surroundings temperature low during summer. Barricades would also be constructed from waste rock and trees, shrubs planted on them to increase the effectiveness of dust suppression. The residential colonies are located at a distance of 4 kms from the CHP therefore there would be no dust pollution hazard to persons living there.

16.5.4 NOISE POLLUTION:

Noise pollution is due to increase in noise level of the surroundings. It is caused by the running of main axial fan of the mine and at the operation of coal handling plant. The noise

Company Manager

Surveyor

from the fan cannot be suppressed but its dispersal to a greater distance would be controlled by providing dampeners. These dampeners would be a mixture of tall, well spread out leafy trees and medium height bushy plants. They would serve as noise curtain/barriers around the fan. In addition sound barrier bunds of waste rock would also be built around the fan to localise and trap the sound.

16.6 Preliminary information as required by the E.A.C. given in appendix D-1.

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Bhatgaon Colliery

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Bhatgaon Colliery

CHAPTER - XVII

PROJECT IMPLEMENTATION AND CONSTRUCTION PROGRAMME

17.0 PROJECT IMPLEMENTATION PROGRAMME:

The project was started in 1975. This report deals with the reorganisation and revision of production schedule. The project was initially planned for retreating longwall mining which was abandoned after permission was refused by D.G.M.S. to work longwall panels. The project is now being worked on manual Bord and Pillar system.

The target of one million tonnes of coal per annum proposed in the earlier report has been kept which is achievable with proper mechanisation of the underground workings.

Most of the mine development works like opening of inclines, installation of main fan, development of main dip has been completed. The major activities yet tobe completed are:-

(1) Coal Handling Plant.

(2) Railway Siding.

(3) Service & Residential Buildings.

Surveyor
Bhatgaon Collie

(4) Water supply & Sewerage arrangements.

(5) Road Construction.

(6) Sinking of two proposed air shafts.

(7) Development of other main dips.

(8) Development of production panels.

(9) Equipping of main trunk, gate and faces with proposed conveyor systems.

(10) Equipping of coal panels with production machinery.

(11) Completion of surface workshops and stores.

(12) Posting of proposed trained supervisors in all disciplines.

The yearwise requirement of resources such as plant and equipment, residential and service buildings, furniture and fittings, vehicles, manpower etc. has been given in the annexures appended with this report. This requirement of manpower and capital required for P & M, CHP, railway siding, capital outlay, civil construction and others is given below for achieving the estimated coal production programme as proposed in this report.

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Bhatgaon Colliery

19/9/24
Surveyor
Bhatgaon Colliery

The production programme and manpower requirement and capital phasing would be as follows:

Year	1983-84	84-85	85-86	86-87	87-88	88-89	89-90	90-91
Production M.tons.	0.31	0.36	0.42	0.51	0.65	0.72	0.81	1.00
Manpower	1300	1450	1600	1850	2250	2450	2600	2950
P & M	28080	44147	53584	54768	27832	8414	2[illegible]9	-
C.H.P.	5000	8000	5000	5493	-	-	-	-
Railway siding	15000	15000	12000	9600	-	-	-	-
Capital [illegible]elay in mines	2500	2500	2000	1530	-	-	-	-
Civil & Land	11800	11500	14500	11007	2000	3000	3490	-
Others	-	3000	3000	2000	2400	1308	-	-
Total	65380	90147	89084	84798	38140	11414	4659	-

Colliery Manager
Bhatgaon Colliery

17.1 PROJECT CONSTRUCTION PROGRAMME:

A consistant identification and monitoring of all jobs involved in the construction and development of the mine is a must to achieve the projected construction and production targets. This calls for a separate construction and monitoring cell which should be exclusively utilised for constructing the mine. This team would first get itself thoroughly briefed on all the works, equipments etc. required for achieving the target production within the estimated time and cost. The team leader should be in a position to remove bottlenecks and solve minor/major problems which may crop up at the work sites. He should have ample authority to take decisions within the specified project parameters or arrange to get them sanctioned expeditiously from the competent authority.

17.2 The Construction Team should consist of the following:

i)	Team leader ..	Dy.C.M.E. ..	One
ii)	Supdtg.Engineer(Civil)	..	one
iii)	Supdtg.Engineer(Mech.)	..	One
iv)	Supdtg.Engineer(Elec.)	..	One
v)	Sr.& Jr.Mining Engineers	..	Eight
vi)	Sr.E.E./ E.E. (Civil)	..	Four

Colliery Manager
Bhatgaon Colliery

Surveyor
Bhatgaon Colliery

17.1 PROJECT CONSTRUCTION PROGRAMME:

A permanent identification and monitoring of all jobs involved in the construction and development of the mine is a must to achieve the projected construction and production targets. This calls for a separate construction and monitoring cell which should be exclusively utilised for constructing the mine. This team would first get itself thoroughly briefed on all the works, equipments etc. required for achieving the target production within the estimated time and cost. The team leader should be in a position to remove bottlenecks and solve minor/major problems which may crop up at the work sites. He should have ample authority to take decisions within the specified project parameters or arrange to get them sanctioned expeditiously from the competent authority.

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iv)	Supdtg.Engineer(Elec.)	..	One
v)	Sr.& Jr.Mining Engineers	..	Eight
vi)	Sr.E.E./ E.E. (Civil)	..	Four

Colliery Manager
Bhatgaon Colliery

10/9/79

vii) Sr.E.E./E.E.(Elec.& Mech. .. Two

viii) Environmental Engineer .. One

The construction manpower has been provided in the project report. The works ofcivil nature are normally given on contract.

The above team would solely work for constructing the mine and should be diverted to other mine projects after the construction is completed here.

Colliery Manager
Bhatgaon Colliery

Mine Surveyor

CHAPTER - XVIII

CAPITAL INVESTMENT & ECONOMICS AND CONCLUSION

18.1 **CAPITAL INVESTMENT:**

The total estimated capital investment works out to Rs.4906.01 lakhs or Rs.488.60 per tonne of annual production of 1.00 m.t. The headwise provisions are shown in Appendix 'I'. Out of this Rs.1031.79 lakhs has already been spent upto 31.3.83.

18.2 **INVESTMENT ON PLANT & MACHINERY:**

The estimated investment on plant and machinery works out to Rs.2920.76 lakhs or Rs.292.08 per te. of annual target production. The details are shown in Appendix A.3.

18.3 **FOREIGN EXCHANGE REQUIREMENT:**

The total foreign exchange requirement has been estimated as Rs.358.05 lakhs. Details of provision are shown in Appendix A.3.1. The foreign exchange requirement is for import of a) Continuous Miners; b)Borer Drills; c) Lump Breakers; d) Battery operated locos.

Colliery Manager

Surveyor
Bellampalli Collieries

Irrespective of the estimates, if indigenous equipments for which Foreign Exchange requirement has been indicated are available at the time of purchase, the equipment should be procured indigenously.

18.4 PRICING OF P & M AND CIVIL WORKS:

The prices of P & M are based on the standard price list circulated by CMPDIL (HQ), Ranchi. Wherever such prices were not available in the list, the estimates have been based on updated prices available from reliable sources. Civil works have been estimated on the basis of Cost Index. The details of this are indicated in Appendix A.2.3.

18.5 PRODUCTIVITY:

The total provision of manpower at target production works out to 2995 inclusive of leave, sick etc. The O.M.S. at target production is 1.289. The O.M.S. has been calculated on the basis of number of working days for each surface and underground worker as 265 days and 26 respectively.

Colliery Manager
Bhatgaon Colliery

Surveyor
Bhatgaon Colliery

10.6 COST OF PRODUCTION:

The cost of production is estimated as Rs.167.00 per tonne at 100% capacity level. The E.M.S. is estimated as Rs.62.39. The E.M.S. is calculated on the mid-point of category/ scale.

10.7 The mine came on revenue in the month of April, 1982.

10.8 SALE PRICE:

The sale price has been estimated on the basis of gross useful heat value and calculated as follows:

a) Steam 'A' 60% @ Rs.203/- per tonne = 121.80
b) Slack 'C' 40% @ Rs.162/- per tonne = 64.80
Average of mine .. .. .. = 186.60

10.9 PROFIT & LOSS:

The profit per tonne at target production is Rs.19.60 at 100% level and the loss per tonne is Rs.7.03 per tonne at 85% production level.

10.10 CONCLUSION:

From the above economics it is observed that reorganisation of the mine is technically and economically justified.

Colliery Manager
Bhatgaon Colliery

Surveyor
Bhatgaon Colliery

Colliery Manager
Bhatgaon Colliery

...ction is estimat...
...e at 100% capacit... Rs.
...ated on Rs.62.39. The ...N.S.
...the mid-point of category/

...revenue in the domain of

...n been estimated on the basis
...t value and calculated as

...@ Rs.203/- per tonne = 121.80
...@ Rs.168/- per tonne = 84.80

... = 206.60

...ent towards protection is
...and not the liability at time of
...ation per tonne is Rs.

...ment of ...

Agent
Bhatgaon Colliery

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...3

...ROJECT REPORT ON ...

...STATEMENT SHOWING FIXED CAPITAL INVESTMENT

	Particulars	Total amount	Existing investment upto 31.3.85	Addl. Capital investment	Life in years	Depreciation
01	Land	10243	436	9807	13	...
02	Buildings:					
	a. Service			10778	13	829.1
	b. Residential(Initial)			34328	13	2639.4
	TOTAL(02)	52508	7402	45106		3468.5
03	Plant & Equipment	292076	48769	243307	3-28	32284.7
04	Furniture & fittings	1412	62	1350	20	69.2
05	Railway siding	84096	32496	51600	28	1842.9
06	Vehicles	1436	878	558	9-13	51.5
07	Prospecting & Boring			-	-	-
08	Development					
	001 Capital outlay in mines			8530	13	656.1
	002 Roads & culverts			3414	13	262.6
	003 Water supply arrangement	46050	10114	11040	13	849.2
	004 Pilot scheme, scientific research,etc.PR properties			3300	13	253.8
				27714		2304.7
09	Other expenditure(Expn. of Revn nature before opening Rev. A/c)					
	CAPITAL INVESTMENT(INITIAL)					

...Investment ... Depreciation ...
...investment ...

- ... Labour Subsidy:
- ... Rights.
- ... Water supply ... 7174
- ... Total ... 7174

...

APPENDIX-A.1

DRAFT REVISED PROJECT REPORT ON
REORGANISATION OF BHATGAON
COLLIERY

Statement showing estimated requirement of land

A/c head	Particulars	Area (Hectares)	Rate/ hectare	Total amount in Rs. (Cols)
0110	Land	980.68	Rs.10000/-	

Bhatgaon Colliery

Bhatgaon Colliery

Appendix A.2

DRAFT

REVISED PROJECT REPORT ON REORGANISATION OF

BHATGAON PROJECT

(Amt.in Rs.000)

Statement showing estimated capital expenditure on civil works in May,83.

S.No.	Particulars	Total cost	Subsidy	Net cost	Re-marks
1.	Colony building	10776	-	10776	
2.	Residential buildings	24328	7174	27154	
	Total (1+2)	45106	7174	37932	
3.	Roads and culverts:				
	a) Colony roads and culverts.	2937	-	2937	
	b) Approach road, services & culverts.	507	-	507	
	Total (a+b)	-	-	-	
	Sub-total (3)	3444	-	3444	
4.	Water supply scheme	8496	2927	5569	
5.	Drainage, Sewerage & Bathe	3344	-	3344	
6.	GRAND TOTAL (1 to5)	60390	10101	50289	

Chief Manager
Bhatgaon Colliery

10/9/84
Bhatgaon Colliery

Appendix - A.C.I

DRAFT

REVISED PROJECT REPORT ON REORGANISATION OF

BHATGAON PROJECT

Statement showing the estimated capital expenditure on service buildings in May,83. (Permanent)

S.No.	Particulars	Nos.	Plinth area reqd. in sqm.	Plinth area existing in sq.m.	Addl. plinth area reqd. sq.m.	Rate per sq.m.	Amt. in Rs000
1.	2.	3.	4.	5.	6.	7.	8.
1.	Office of the Project Officer	1	461	-	[illegible]	[illegible]	477
2.	Manager's Office	1	282	282	-	-	-
3.	Pit Office	1	93	-	93	1034	96
4-	a) Store Office & Shed	1	1078	880	198	1276	253
	b) Boundary Wall		488	-	488	260	1269
5.	Workshop: a) Building	1	1667	1330	337	1508	508
	b) Bituminous pavement	-	1100	-	1100	77	85
	c) Boundary wall	-	127	-	[illegible]	260	33
6.	Substation	1	130	130	-	-	-
7.	Service Magazine	1	56	-	56	1276	71
8.	Pit head bath(type'D')	1	680	-	680	1083	736
9.	Canteen (100 seater)	1	266	266	-	-	-
10.	22 Bedded hospital	1	1190	-	1190	1085	1289
11.	Dispensary (type 'C')	1	365	[illegible]	[illegible]	[illegible]	162
12.	Officers' Club	1	350	-	350	862	309
13.	Workers Institute	1	341	211	130	862	115
14.	First aid centre	1	17	-	17	1083	18
15.	Primary School	1	277	277	-	-	-
16.	Secondary School	1	554	-	554	921	510
17.	Post Office	1	56	-	56	1035	58

..(ii)..

	3.	4.	5.	6.	7.	8.
19. Lavatories & urinals	2	60	-	60	1509	90
20. Officers rest house(Br ms)	1	380	380	-	-	-
21. Staff rest house	1	284	284			
22. Shopping centre	2	2x139	139	139	882	123
23. Group ... Centre	1	246	-	246	1083	266
24. Cap lamp room (1800 lamps)		242	-	242	1083	262
25. Rest Shelter	1	39	-	39	882	34
26. Scooter/cycle shed/Garages		1660	-	1660	545	905
[illegible]	1	LS				350
28. CDS General room	1	134	-	134	1083	145
29. Sampling Laboratory	-	-	-	-	1083	-
30. [illegible] Building	1	202	-	202	1083	219
31. [illegible] Station	1	100	-	100	1083	108
[illegible] ...ge ...ty room/Reception	1	15	-	15	1083	16
33. Check post	7	7x3=21	-	21	1083	23
34. Community centre/Auditorium	1	800		800	882	705
35. Bus stop shed	2	LS	-	-	-	20
36. Children parks &playground	2	LS	-	-	-	500
37. Soil investigation, land [illegible]ment and drainage [illegible]	-	LS	-	-	-	50
38. Swimming pool	1	LS	-	-	-	600
39. Township & services Maintenance office	1	30	-	30	1083	32
40. Telephone Exchange Office.	1	30	-	30	1083	32
40a. Play ground with ...			Existing			
[illegible]	-	-	-	-	-	1000
[illegible]	-	-	-	-	-	21
[illegible]	-	-	-	-	-	10775
43. G r a n d - t o t a l						

Colliery Manager
Bhatgaon Colliery

16/9/24
Surveyor
Bhatgaon Colliery

PART I

REVISED PROJECT REPORT OF REORGANISATION OF

IRRIGATION PROJECT

Statement showing the estimated capital requirement for residential building/permanent specifications).

Sl.No.	Cat/Scale	Type of Qtrs.	Plinth area in m2	No.of persons	% satisfaction	No.of Qtrs. reqd.	No.of extg. Qtrs.	Addl. Qtrs. reqd.	Unit cost Rs.	Total Cost R.000	Less subsidy for LCH/MCs R.000	Net cost R.000
1.	Cat.I to VI & Gr.B, C,D and E.	MQ	40.43	2487	50%	1244	350	894	26	23244	7174	16070
2.	404-412 to 508-860	A	35.78	225	75%	169-42=127	-	127	30	3810	-	3810
3.	572-644-722-1278&Gr.A	B	55.76	175	75%	131-32=99	40	59	46	2714	-	2714
4.	750-1350 & 800-1400	B	55.76	40	100%	40	-	40	46	1840	-	1840
5.	1100-1700&1400-1950	C	83.61	25	100%	1	10	15	70	1050	-	1050
6.	1600-2200 & above.	D	176.00*	3	100%		1	3	162	486	-	486
7.	T o t a l			2715		1538	400	1138	-	33144	7174	25970
8.	Hostel accommodation		20.00					74		1184	-	1184
9.	G R A N D - T O T A L				57.99%	16[illegible]	[illegible]0	212		34328	7174	27154

* This includes Guest room - 16 m^2 and Hostel quarters - 1[illegible].6 m^2.

D R A F T

Appendix-2.3

REVISED PROJECT REPORT ON FLOODING OF BHATGAON PEDI...

Statement showing Building Cost Index Calculations

Sl.No.	Description	Units	Rates as on 1.10.76 at Delhi.	Rates at Bhatgaon as on 1.7.83	Wage increase ratio between col.5&4.	Weightage	Cost Index
1.	2.	3.	4.	5.	6.	7.	8.
1.	Bricks	1000	106.15	250.00	2.36	16	37.76
2.	Sand @ 67% coarse, 33% fine	cu.m.	21.92	35.00	1.60	5	8.00
3.	Cement	Quintal	35.28	80.00	2.27	21	47.67
4.	Stone aggregate 50%40mm, 50%20mm	cu.m.	27.10	75.00	2.77	6.5	18.01
5.	Timber (sal/Bija sal)	cu.m.	2021.00	3800.00	1.88	18	33.84
6.	Mild steel/tor steel	qtl.	183.20	550.00	3.00	10	30.00
7.	Labour: a) Mason	each	9.89	25.00	2.53	8.5	21.51
	b) Carpenter	each	9.89	25.00	2.53	4	10.12
	c) Coolie	each	4.41	10.00	2.27	11	24.97
	Total	..	..	..	..	..	231.88 say 232.00

Executive Engineer
Bhatgaon Colleg...

Statement showing unit cost of BP Quarters based on the Cost Index

(Amt.in Rs.

11. TYPE 'A':

a) Plinth area = 36 m2 @ Rs.638/m2.	22968
b) Internal water supply & sanitary installations @ 15% of building cost.	3445
c) Internal electrification @ 10% of the building cost	2297
d) External service connections @ 5% of the building cost.	1148
e) Unit cost with permanent specifications in ordinary soil.	29858
	(say Rs.30 thousand)

12. TYPE 'B':

a) Plinth area = 56 m2 @ Rs.638/m2	35728
b) Internal water supply & sanitary installations @ 12½% ofbuilding cost.	4466
c) Internal electrification @ 10% of the building cost.	3573
d) External service connection @ 5% of thebuilding cost.	1786
e) Unit cost with permanent specifications in ordinary soil.	45553
	(Say Rs.45thousand)

Colliery Manager
Bhatgaon Colliery

10/9/24
Surveyor
Bhatgaon Colliery

1. Building cost index of Delhi as on 1.10.1976. .. 100

2. Plinth area rate for residential building (load bearing construction):

a) Plinth area for type A,B,C single storeyed, based on rates approved by CPWD for Delhi as on 1.10.76. .. Rs.275/m2

b) Plinth area rate for type 'D', single storeyed, based on rates approved by CPWD for Delhi as on 1.10.76. .. Rs.325/m2

Therefore plinth area rate at Bhatgaon based on cost index of 232 for (a) .. Rs.638/m2 say Rs.638/m2

Therefore plinth area rate at Bhatgaon based on cost index of 232 for (b) .. Rs.754/m2 say Rs.754/m2

3. Plinth area rate for garrage based on rates approved by CPWD for Delhi as on 1.10.76. .. Rs.235/m2

Therefore plinth area rate at Bhatgaon based on cost index of 232 .. Rs.545.2/m2 sayRs.545/m2

4. Plinth area rate for Scootor/Cycle shed based on rates approved by CPWD for Delhi as on 1.10.76 .. Rs.200/m2

Therefore plinth area rate at Bhatgaon based on cost index of 232 .. Rs.464/m2 say Rs.464/m2

Colliery Manager
Bhatgaon Colliery

15/7/78
15 Surveyor
Bhatgaon Colliery

Appendix-A.8.2.2

D R A F T

REVISED PROJECT REPORT FOR REORGANISATION OF

BHATGAON PROJECT

Statement showing expenditure on approach roads, service roads and culverts.

1.	a) Specifications:	
	i) 3.35 m wide and 15 cm thick boulder soling.	
	ii) 3.05 m wide and 15 cm thick metalling.	
	iii) 3.05 m wide and 2.5 cm thick bitumen carpet.	
	b) Length 2000 @ Rs.174/-	348
	c) Culverts (7.32m wide):	
	i) 4.57 m span RCC Slab culvert 1 nos. @ Rs.87000	87
	ii) 3.05 m span RCC Slab culvert 1 no. @ Rs.58000	58
	iii) 0.61 m diameter hume pipe culvert 2 nos. @ Rs.7200/-	14
	T O T A L	507

Colliery Manager
Bhatgaon Colliery

Appendix 4.9.3

D R A F T

REVISED PROJECT REPORT FOR REORGANISATION OF BHATGAON PROJECT

Statement showing forecast cost estimate for water supply arrangements at Bhatgaon Project.

Sl.No.	Particulars	Qty.	Unit	Rate (Rs)	Per Unit for 90000 ltr/day	
1.	2.	3.	4.	5.	6.	7.
1.	Intake well and raw water pump house with suitable raw water drawal arrangements.	600000	ltr.	0.39	ltr.	237
2.	Raw water booster pump set (centrifugal type) 45 HP.	2	each	90000	each	180
3.	Raw water rising main: i) 100 mm dia ii) Add 7½% for saddle supports, valves, bends etc.	6000	M	490	M	2940 221
4.	Raw water treatment plant with aerator, chemical house, clariflocculator, rapid gravity filter, chlorinator etc.	1330000	ltr.	0.65	ltr.	807
5.	Ground water reservoir after treatment plant (for storage of clear water)	103500	ltr.	1.51	ltr.	150
6.	Clear water pumps (centrifugal type) 10 HP.	2	each	20000	HP	40
7.	Clear water rising main i) 200 mm dia. ii) Add 7½% for saddle supports, valves, bends etc.	1000	M.	490	M	490 37

Colliery Manager
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Bhatgaon Colliery

APPENDIX-A.....1

DRAFT REVISED PROJECT REPORT ON REORGANISATION OF BHATGAON COLLIERY

Statement showing capital requirement under Capital outlay in mines

(Amount in Rs.'000s)

Particulars	Length of drivage	Rate of drivage	Total capital
Airshaft No.'A'	Dia.4.0m Depth:40M	30.0	1200
Airshaft No.'B'	Dia.4.0m Depth:60M	30.0	1800
Staple shaft for coal transport	Dia.4.0M Depth:4-6M	10.0	60
Permanent support of roadways in plans & at transfer points			500
Misc. making of sumps, pump houses, misc.work like excavation of foundation tipplers, crusher,haulage houses, UG first aid rooms, latterines,etc.			5000
TOTAL:			8530

Colliery Manager
Bhatgaon Colliery

10/9/24

Surveyor
Bhatgaon Colliery

Appendix A.8.c.1

D R A F T

REVISED PROJECT REPORT FOR REORGANISATION OF

BHUTGAON PROJECT

Statement showing expenditure on colony roads & culverts

COLONY ROADS & CULVERTS: (Rs.000)

a) Grade 'A' Road:

i) Specification:

3.35 m wide, 15 cm thick boulder soling.

3.05 m wide, 11.25 cm thick metalling and 2 coats of bitumen painting.

Length of road = 7200 @ Rs.142/- 1022

b) Grade 'B' Road:

i) Specifications:

3.05m wide, 15 cm thick boulder soling with 7.5 cm thick moorum top.

ii) Length of road = 4800 @ Rs.74/- 355

c) Culverts (7.32 m w.b.):

i) 4.57 m span RCC Slab culvert = 3 nos. @ Rs.87000 261

ii) 3.05 m span RCC Slab culvert = 3 nos. @ Rs.58000 174

iii) 1.83 m span RCC Slab culvert = 3 nos. @ Rs.34800 104

iv) 1.22 m span RCC Slab culvert = 3 nos. @ Rs.23200 70

v) 0.61 m diameter hume pipe culvert = 12 @ Rs.7200 86

d) Drains:

i) 22.5cm x 30 cm length=3000 RM @ Rs.65/- 195

ii) 30 cm x 45 cm length = 2400RM @ Rs.132/- 317

iii) 60 cm x 90 cm length 1200 RM @ Rs.241/- 289

e) Tree guards 400 nos. @Rs.72/- 35

f) RCC Slab for drain crossing:

0.91 m x 0.61 m x 7.5 cm=480 nos. @Rs.60/- 29

G R A N D T O T A L = 2937

Bhutgaon Colliery

4. 2 Nos for the trunk belt conveyors. (For details please see Appendix ...)	LS	LS	LS		1400	LS	350
5. Endless Haul ... 50 KV comple... wit. PLC electricals &... starter	3	3					
6. Direct haulage ... with electri... starter for motor ... supply only.	2	2					
7. Trolley for ... supply	10	-	30				
		50	60				
		In te.	112te.	78te.			
		3	LS				
		Km	6.5Km				

Chief Manager (Electrical) Cellular Cables

Signature

Signature

Colliery Manager
Bhatgaon Colliery

Supdt. of Mines
Bhatgaon Colliery

DRAFT REVISED PROJECT REPORT ON REORGANISATION OF BHATGAON COLLIERY

APPENDIX-...5
(Ref. to ... para)

Statement showing estimated capital expenditure on vehicles

Sl. No.	Particulars	Requirement	Existing	Addl. requirement	Unit cost	Total cost	Life	Depreciation
1.	Diesel Trucks	3	3	-	-	-	9	-
2.	Tipping trucks	2	2	-	-	-	9	-
3.	School bus	2	1	1	250	250	9	27.8
4.	Explosive van	1	1	-	-	-	9	-
5.	Jeeps	4	3	1	80	80	13	6.2
6.	Ambulance	1	1	-	-	-	-	-
7.	Cash van	1	-	1	100	100	13	7.7
8.	Motor car	1	-	1	100	100	13	7.7
9.	Motor cycles	2	-	2	14	28	13	2.1
						558		51.5

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Colliery Manager
Bhatgaon Colliery

Surveyor

Appendix A.2

DRAFT

REVISED PROJECT REPORT ON REORGANISATION OF

BHATGAON PROJECT

Statement showing estimated capital expenditure on railway sidings.

S.No.	Particulars	Qty.	Total cost in Rs.000	Remarks
1.	Railway siding from Karonji Rly.Stn. to Bhatgaon colliery.	Approx 15 km.	45000	
2.	Siding yard for handling Bhatgaon u/g coal.	approx. 2.2 km.	6600	
	T o t a l		51600	

Colliery Manager
Bhatgaon Colliery

Bhatgaon Colliery

APPENDIX-A.3.6

DRAFT REVISED PROJECT REPORT ON
REORGANISATION OF BHATGAON COLLY

Statement showing the requirement of
Foreign Exchange

(Amount in Rs.'000.)

Sl. No.	Particulars	Total cost	Foreign Exchange reqd.	Expected source of supply
1.	Continuous miner	17,250	12,075	UK, Germany, France, US, etc.
2.	Borer Drills	12,250	8,575	-do-
3.	Lump breaker	7,650	5,355	-do-
4.	Battery operated scoops	14,000	9,800	-do-
	TOTAL:	51,150	35,805	

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Colliery Manager
Bhatgaon Colly.

Supdt.
Bhatgaon Colly.

APPENDIX-

DRAFT REVISED PROJECT REPORT ON
UNDERGROUNDISATION OF BHATGAON COLLY

Statement showing estimated capital expenditure for Furniture & Fittings

(Amount in Rs.'000)

S/c No.	Head of Accounts	No. of items	Total
010	General furniture & fittings	LS	200
020	Office Equipments	LS	250
030	Air Conditioning Equipment	LS	200
040	Fire Arms	LS	100
050	Misc. equipments	LS	100
060	Canteen equipment & School furniture	LS	500
	TOTAL:		1350

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Colliery Manager
Bhatgaon Colliery

10/9/24
Surveyor
Bhatgaon Colliery

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
8.	Belt conveyor 1000 mm wide, 1200 m long, 1[illegible]0tph(peak),cap. 2m/sec. belt speed 90 KW drive, FLP, 550V.Elect.& starters etc.								
	a) Drive head,tail end,take up, structurals etc.	1set	-	1set	810	810	16	45.00	Trunk conveyor no.9
	b) Idlers	LS	-	LS	0.96	1200	3	400.00	
	c) Belting (PVC)	2640 m	-	2640m	0.868	2290	3	763.40	
9.	Belt conveyor 800 mm wide,800 m long, 150 tph (peak),1.5 m /sec. belt speed 55 KW drive, FLP,550V, electricals and starters etc.			LS					
	a) Drive head,tail end,take up, structurals etc.	8sets		St.&		3500	18	194.50	Gate conveyors
	b) Idlers	LS		idlers	LS	3900	3	1300.00	
	c) Belting (PVC)	14080m		for2000m long conv.	9660	6205	3	2063.30	
				4400 m					
10.	Belt conveyor 1000 mm wide,90KW drive,FLP, 550V,electricals & structurals.								
	a) Drive head,tail end,take up structurals etc.	2sets	1 set	1set	640	640	18	35.60	As spare
	b) Idlers.	LS		LS	0.96	760	3	253.30	
11.	Belt conveyor 800 mm wide.55KW, drive, FLP,550V electricals and starters etc.								
	a) Drive head,tail end,take up structurals etc.	1set	-	1set	470	470		26.10	As spare
	b) Idlers	LS	-	LS	0.81	520	3	173.30	
	T o t a l	..		..	..	14830	..	11828.30	

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
	a) Drive head, tail end, take up structurals etc.	1set	-	1 set	95	595	18	33.10	Trunk conveyor no.5.
	b) Idlers(carrying,return and impact.)	LS	-	LS	0.96	700	3	233.52	
	c) Belting (PVC)	1500m	-	1500 m	0.868	1305	3	435.00	
	Belt conveyor no.6, 1000 mm wide, 1850 m long, 150 tph(peak) capacity, 2m/sec. belt speed, 90 KW drive, FLP 550V elect.& starters etc.								Trunk conveyor no.6
	a) Drive head, tailend, take up, structurals etc.	1set	-	1set	660	660	18	36.72	
	b) Idlers	LS	-	LS	0.96	850	3	283.50	
	c) Belting (PVC)	1850 m	-	1850m	0.868	1605	3	535.00	
6.	Belt conveyor no.7, 1000 mm wide, 600 m long, 150 tph (peak) cap. 2m/sec. beltspeed, 55 KW drive FLP, 550V electricals & starters etc.								
	a) Drive head, tailend, take up structurals etc.	1 set	-	1set	475	475	18	31.40	Trunk conveyor no.7
	b) Idlers	LS	-	LS	0.96	620	3	206.70	
	c) Belting (PVC)	1320 m	-	1320 m	0.868	1145	3	381.70	
7.	Belt conveyor : 1000mm wide, 1280 m long, 150 tph(peak) cap. 2 m/sec. belt speed, 55x2 drive, FLP 550V, elect.& starters etc.								
	a) Drive head tail end, take up, structurals etc.	1set	-	1set	900	900	18	50.00	Trunk conveyor no.8
	b) Idlers	LS	-	LS	0.96	1275	3	25.00	
	c) Belting (PVC)	2020	-	2020 m	0.868	2450	3	16.70	

Colliery Manager
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DRAFT

REVISED PROJECT REPORT ON MODERNISATION OF COAL HANDLING PLANT

Annexure 6.2.2

Statement showing capital required on Belt Conveyor Drive Head, idlers and beltihg.

Production - 1 m.t/yr.
Life - 24 years.

S.No.	Details	Reqd.	Existing	Balance reqd.	Unit price Rs.000	Total price Rs.000	Life in years	Depre-ciation	Remarks
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1.	Belt conveyor 1000 mm wide, 315 m long, 400 tph(peak) capacity 2 m/sec belt speed, 90x2 KW drive, FLP, 550V, elect. and starters etc.								
	a) Drive head, tail end, takeup, structurals etc.	1 set			630	630	10	35.0	Main trunk conv.no.1
	b) Idlers (carrying, returns&impact)	LS	LS	-	0.96				
	c) Belting (PVC)	695 m	LS	-	0.368				
2.	Belt conveyor 1000 mm wide, 1000m long, 250 tph(peak), cap.2m/sec. belt speed, 90 KW drive, FLP, 550V elec. & starters etc.								
	a) Drive head, tail end, take up, structurals etc.	1 set	-	1set	725	725	10	40.30	Trunk con-
	b) Idlers (carrying, return&impact)	[illegible]	-	LS	0.96	730	3	350.00	veyor, no.2
	c) Belting (PVC)	2200 m	-	2200m	0.868	1910	3	636.70	
3.	Belt conveyor 1000 mm wide, 1000m long, 250 tph(peak) cap.2m/sec. belt speed 90x2 KW drive, FLP elect. starters etc.								
	a) Drive head, tail end, take up, structurals etc.	1 set	-	1set	905	[illegible]	10	[illegible]	Tripper con-
	b) Idlers (carrying, return and impact).	LS	-	LS	0.96	2072	3	690.00	veyor, no.3
	c) Belting (PVC)	4400 m	-	4400	0.868	3820	3	1273.30	
4.	Belt conveyor 1000mm wide, 680m long, 150 tph(peak) cap.2m/sec. belt speed, 90 KW drive, FLP, 550V, electricals & starters etc.								

Appendix-VII

DRAFT

REVISED PROJECT REPORT ON REORGANISATION OF

BHATGAON PROJECT

Statement showing estimates of plant and machinery & civil/structurals for Coal Handling Plant.

(Ref.Drg.No.MS:00219)

S.No.	Depreciation	Qty.	Total amount Rs.000	Life in years	Depreciation Rs.000	Remarks
1.	Plant and Machinery (including cost of weighbridge)	LS	10500	9/13/18/20	585.10	
2.	Idlers and belting	LS	2268	3	756.00	
3.	Civil and Structurals.	LS	10645	13	818.90	
	T o t a l		23493		2160.00	

Colliery Manager
Bhatgaon Colliery

Bhatgaon Colliery

Appendix A.2.2

DRAFT

REVISED PROJECT REPORT ON REORGANISATION OF

BHATGAON PROJECT

Statement showing estimated capital expenditure for Pumps, Pipe fittings, Valves etc.

Description	Total qty. reqd.	Existing	Addl. requt.	Unit cost Rs000	Cost Rs000
1.	2.	3.	4.	5.	6.	7.	8.
1. Main pumps 60 l.p.s. 100 m head, 90KW, flame proof 550V electricals	10	-	10	130	1300
2. * Intermediate pumps, 30 lps, 75 m head, 37kw, flame proof, 550 v electricals.	14	11*	3	50	150
3. * Face pumps, 20 lps, 30 m head, 11KW, flame proof, 550V electricals	16	12*	4	35	140
4. Face pumps, 11 lps, 30m head, 11 KW flame-proof 550V electricals.	4	-	4	30	120
5. a) GI Pipe 150 mm	-	-	600M	0.212	127
b) GI Pipe 80 mm	-	-	1200M	.105	126
c) GI Pipe 65 mm	-	-	800 M	0.085	68
6. Pipe fittings, valves etc.	-	-	LS	-	45
T o t a l	..	..	..	..	2055

* Note: The specifications indicated is for additional equipment. Before taking procurement action for additionnal eqpt. the exact availability may be ascertained for existing equipment istobe considered.

Colliery Manager
Bhatgaon Colliery

Surveyor
Bhatgaon Colliery

1.	2.	3.	4.	5.	6.
VIII.	COMMON EQUIPMENTS:				
1.	EOT Crane floor operated cap. 3 to.	160	1	160	
2.	Elec.hoist cap.3/5 to.	50	1	50	
3.	Pulley block cap. 5 to.	5	2	10	
4.	[illegible] crane [illegible]	-	1	-	Existing
5.	Time clock and card punching m/c.	12	1	12	
6.	Elec. siren range 5 kms.	3	1	3	
7.	Elect. clock	2	2	4	
8.	Air compressor cap.2.5m3/ min per 7kg/cm2.				
9.	Misc. equipment.	LS	LS	100	
	Total	..	..	369	
	TOTAL I to VIII	..	..	2943	
	Add: Freight, insurance, installation charges at the rate of 10.5% of total	..	..	310	
	T O T A L	..	..	3253	

Colliery Manager
Bhatgaon Colliery

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Bhatgaon Colliery

1.	2.	3.	4.	5.	6.
	VI. CARPENTRY SHOP:				
	1. Heavy duty band saw n/c wheel dia 900 mm, power 15 KW.	18	1	18.	
	2. Carpentry tools, benches vices.	LS	LS	"	
	T o t a l	..	..	23	
	VII. LIGHT VEHICLE SHOP:				
	1. High precision washing n/c, complete with electricals with double gun max.20kg/cm2 power = 2.25 KW.	12	1	12	
	2. Hydraulic vehicle lift, cap. 50 tes.	20	1	20	
	3. Air compressor 10 HP	-	1	-	Existing
	4. Bench drill, drilling cap. 20 mm in steel, power of motor 0.75 KW	12	1	12	
	5. Portable hand drill, drilling cap. 13 mm.	4	1	4	
	6. Flexible shaft grinder.	4	1	4	
	7. Valve seat grinder	10	1	10	
	8. Oxy-acetylene gas cutting and brazing set.	8	1	8	
	9. Elec. vulcanizing unit for repair of inner tubes.	3	1	3	
	10. Grease guns servicing tool kit hand operated testing equipments for injectors and fuel pumps etc.	LS	LS	30	
	T o t a l	..	..	103	

Colliery Manager

Surveyor
Bhatgaon Colliery

1.	2.	3.	4.	5.	6.
	IV. STRUCTURAL SHOP:				
1.	Profile cutting m/c.	10	1	10	
2.	Motor generator welding set, max. welding current 450 amp.	22	1	22	
3.	Transformer welding set max. welding curr[illegible] 400 amps.	12	3	36	
4.	Oxy-acetylene gas cutting and heating set.	7	3	21	
5.	Heavy duty plate shearer size of the plate cut=1200 x 700 mm, power of motor = 7.5 H.P.	60	1	60	
6.	Hand operated plate shearing m/c plates upto 8 mm thickness.	5	1	5	
7.	Flexible shaft grinder wheel dia 100 mm.	4	3	12	
8.	Portable hand drill, drilling cap. 13 mm.	4	3	12	
9.	Tools and other implements.	LS	LS	15	
	T o t a l	..	..	193	
	V. SMITHY SHOP:				
1.	Pneumatic power hammer, wt. of falling parts - 100 kg. power of motor = 30 KW.	180	1	180	
2.	Oil fired forge furnace complete with controls. size 1200 mm x 900 mm max. temp. 1350°C.	60	1	60	
3.	Hearth with elec. blower power 1.1 KW	18	1	18	
4.	Anvil, swage blocks, blacksmith tool kits.	LS	LS	15	
	T o t a l	..	..	273	

Appendix A.3.2 contd.

1.	2.	3.	4.	5.	6.
15.	Cable fault detector	12	1	12	
16.	Cable vulcaniser	-	2	-	Existing
17.	Elec. tool kit, meters, meggers, gauges, vices and other implements.	LS	LS	40	
	T o t a l	..	..	505	

III. MINING EQUIPMENT REPAIR SHOP:

1.	Hydraulic press, 100 te.	150	1	150	
2.	- do - jack 10 te.	5	2	10	
3.	Pulling and lifting m/c. cap. 3/5 te.	5	1	5	Two reqd.but One is existing
4.	Skid pallet of 1.5 te.	2	4	8	
5.	Bench Drill, drilling cap. 13 mm in steel 0.37KW motor.	8	1	8	
6.	Portable hand drill, drilling capacity 13 mm.	4	2	8	Three required but One is existing
7.	Flexible shaft grinder, wheel dia 100 mm	4	3	12	
8.	Washing machine	20	1	20	
9.	Transformer welding set cap. 400amp.	12	1	12	
10.	Oxy-acetylene gas cutting and brazing set.	7	1	7	
11.	Hydraulic equipment repair, testing, calibrating eqpt., tools and other implements.	LS	LS	50	
12.	Tools and other implements.	LS	LS	15	
	T o t a l	..	..	305	

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Bhatgaon Colliery

1.	2.	3.	4..	5.	6.
11.	Hacksaw machine	-	1	-	Existing
12.	Grinder heavy duty with accessories.	-	2	-	Existing
13.	Bench Grinder	-	1	-	Existing
14.	Surface plates, tools, gauges etc.	LS	LS	25	-
	Total	..	..	1172	

... Electrical Repair Shop:

1.	Automatic coil winding m/c	20	2	40	
2.	Streamline type oil filteration m/c cap.500 ltrs/hr. (protable).	30	1	30	
3.	Vaccum impregnation m/c.	60	1	60	
4.	Transformer oil dielectric strength kit and stop gauge, 4mm cap. 0 to 60 kv	8	1	8	
5.	Motor drying furnace temp. range 0 to 200°C, internal dimensions 3mx1mx2m.	50	1	50	
6.	- do - with internal dimensions 2mx1mx2m.	30	1	30	
7.	Bench drill, dwilling cap. in steel 13 mm c.p.7 KWmotor	8	1	8	
8.	Air metric blower with suction [illegible] cap. [illegible] cum/min.	3	1	3	
9.	Battery charging set, cap. 12/24V, 3 to 5 amps.	12	2	24	
10.	Hydraulic pulling and lifting machine cap. 3/5 tonne.	-	2	-	Existing
11.	Mechanical jacks of various capacity 5 to 10 ts.	5	2	10	
12.	Transformer and current [illegible] set.	150	1	150	
13.	Motor testing panel upto 90KW	20	1	20	
14.	H.V.Testing kit	20	1	20	

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Colliery Manager
Bhatgaon Colliery

Bhatgaon Colliery

Appendix A.2.2

DRAFT

REVISED PROJECT REPORT ON REORGANISATION OF

BHATGAON PROJECT

Statement showing the estimated capital expenditure in colliery workshop and equipment.

Production 1.0 m.t/yr.

S.No.	Description	Unit cost ₹.000	Qty. in nos.	Total cost ₹.000	Remarks
1.	2.	3.	4.	5.	6.
	1. MACHINE SHOP:				
	Heavy duty centre lathe, 330mm (Dia) x3000 mm DBC, power of main motor 15 KW.	410	1	410	
	Medium duty centre lathe, 260mm (Dia) x 2000 mm DBC power of main motor 11 KW.	200	1	200	
	Medium duty centre lathe HMT with complete accessories, 7.5 KW motor.	-	1	-	Existing
	Shearing m/c 2.2 KW motor	-	1	-	Existing
	Light duty lathe, 190 mmDIAx1000 mm DBC power of main motor 3.75 KW.	60	2	120	
	Universal milling m/c table size, 310mm x 1350mm, power of motor 5.5 KW.	190	1	190	
	Radial drilling m/c, cap.of drilling 50 mm max.drilling radius 1190 mm, power of motor = 3.9 KW.	140	1	140	
	Pillar drilling m/c, cap.25mm	-	1	-	Existing
	Bench drill cap.of drilling 12mm	12	1	12	
	Universal screw threading m/c. max. threading dia for pipes = 200 mm.	75	1	75	

Colliery Manager
Bhatgaon Colliery

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Appendix - A.2 Contd....

	2					7	8	9	10	11	12	13		15	16	17	18	
	[illegible]strumentation survey, environmental monitoring equipment which include thermometers, [illegible]meters, anemometers, [illegible] nitric dust [illegible]lers, etc.		LS		-	100	LS	25	LS	50	LS	25						
4.	[illegible] lamps (r[illegible]	40	5	-	0.9	14	5	5	5	5	5	4						
5.	Gas detector, methanometers	LS	LS	LS		100	LS	25	LS	[illegible]	LS	25						9
6.	Cap lamps with charger	400	200	1200	0.5	1100	400	200	400	[illegible]	[illegible]	300	400	200	400	300		9
7.	Survey equipment	LS	LS	LS	LS	300	LS	100	LS	[illegible]	[illegible]	100						3
8.	Underground safety boring machine	1	-	2	150	300	1	150					1	150				3
9.	Fire fighting equipment	LS	LS	LS	LS	200	LS	50	LS	[illegible]	LS	50	LS	50				9
10.	Underground boring machine for proving lower seams	1	-	1	200	200			1	200								17
	Sub-Total..					23814		7085		8155		8004		200		200		
(D)	PUMPING & DRAINAGE :																	
1.	Main pumps 40 LPS, 100 m head, 90 KW FLP, 550 V electricals.	10	-	10	130	1300	2	230	4	520	4	520						20
2.	Intermediate pumps, 30 LPS, 75 m head, 37 KW, FLP, 550 V electricals	14	11	3	50	150			2	100	1	50						19
3.	Face pumps, 20 LPS, 30 m head, 11 KW, FLP, 550 V electricals	16	12	4	32	140			2	70	2	70						18
4.	Face pumps, 11 LPS, 30 m head, 11 KW, FLP, 550 V electricals	4	-	4	30	120					2	60	2	60				12
5.	Pipes fitting, valves etc. (For details, please see A(?.2.3.3)	LS	LS	LS	-	345	LS	100	LS	100	LS	100	LS	45				18
	Sub-Total..					[illegible]		500		[illegible]		800		103				
(E)	Electricals :-	-	LS	LS	LS	[illegible]	LS	2000	[illegible]	4000	LS	4000	LS	1000	LS	1000		14-2
(1)	Coal handling Plant (As per App. A.2.4)	[illegible]	LS	13	LS	13455	LS	5000	[illegible]	[illegible]	LS	5000	LS	5493				3-8
(2)	Workshop Equipment :-	[illegible]	LS	3	LS	[illegible]	LS	1763										10

Appendix A.3.2

DRAFT

REVISED PROJECT REPORT ON REORGANISATION OF

BHATGAON PROJECT

Statement showing the estimated capital expenditure in colliery workshop and equipment.

Production 1.0 m.t/yr.

S.No.	Description	Unit cost Rs.000	Qty. in nos.	Total cost Rs.000	Remarks
1.	2.	3.	4.	5.	6.
	I. MACHINE SHOP:				
1.	Heavy duty centre lathe, 330mm (CH) x3000 mm DBC, power of main motor 15 KW.	410	1	410	
2.	Medium duty centre lathe, 260mm (CH) x 2000 mm DBC power of main motor 11 KW.	200	1	200	
3.	Medium duty centre lathe HMT with complete accessories, 7.5 KW motor.	-	1	-	Existing
4.	Shaping m/c 2.2 KW motor	-	1	-	Existing
5.	Light duty lathe, 190 mmCHx1000 mm DBC power of main motor 3.75 KW.	60	2	120	
6.	Universal milling m/c table size, 310mm x 1350mm, power of motor 5.5 KW.	190	1	190	
7.	Radial drilling m/c, cap.of drilling 50 mm max.drilling radius 1190 mm, power of motor = 3.9 KW.	140	1	140	
8.	Pillar drilling m/c, cap.23mm	-	1	-	Existing
9.	Bench drill cap.of drilling 13mm	12	1	12	
10.	Universal screw threading m/c. max. threading dia for pipes = 200 mm.	75	1	75	

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1	2				6	7	8	9	10	11	12	14	15	16	17	18	19	20	21	22
3.	Ventilation survey / environmental monitoring equipment which include thermometers, manometers, anemometer, gravimetric dust samples, etc.		LS		-	100	LS	25	LS	25	LS	25								5.8
4.	Safety lamps (reliable type)	10	5		0.9	14	5	5	5	5	5	4								
5.	Gas detector, methanometer	LS	LS	LS		100	LS	25	LS	50	LS	25							9	1.6
6.	Cap lamps with charger	200	200		200	0.5	1100	400	200	400		300	400	300	400	300			9	11.1
7.	Survey equipment	LS	LS	LS	LS	300	LS	100	LS		LS	100							3	366.7
8.	Underground safety boring machine	2	-	2	150	300	1	150					1	150					18	16.7
9.	Fire fighting equipment	LS	LS	LS	LS	200	LS	50	LS	50	LS	50	LS	50					9	33.3
10.	Underground boring machine for proving lower seams	1	-	1	200	200			1	200									18	11.1
	Sub-Total..					23814		7055		8155		9004		200		200			9	22.2
(C)	PUMPING & DRAINAGE :-																			1645.7
1.	Main pumps 80 LPS, 100 m head, 90 KW FLP, 550 V electricals.	10	-	10	130	1300	2	260	4	520	4	520							18	72.2
2.	Intermediate pumps, 50 LPS, 75 m head, 37 KW, FLP, 550 V electricals	14	11	3	50	150			2	100	1	50							18	8.3
3.	Face pumps, 20 LPS, 30 m head, 11 KW, FLP, 550 V electricals	16	12	4	35	140			2	70	2	70							18	7.8
4.	Face pumps, 11 LPS, 30 m head, 11 KW, FLP, 550 V electricals	4	-	4	30	120					2	60	2	60					18	6.7
5.	Pipes fitting, valves, etc.(For details, please see Apn.3.3.4)	LS	LS	LS	-	345	LS	100	LS	100	LS	100	LS	45					18	19.2
	Sub-Total..					2055		360		840		800		105						1124.2
(E)	Electricals :-	LS	LS	LS	LS	12000	LS	3000	LS	4000	LS	4000	LS	1000	LS	1000			18-36	500.0
(I)	Coal Handling Plant (As per Apn.3.3.4)	LS	LS	LS	LS	23493	LS	5000	1	10000	LS	5000	LS	5493					3-6	2160.0
(J)	Workshop Equipment :-	LS		LS	LS	1500	LS	1765											18	160.7

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
4.	Load haul dumper of 6.5 t with GEC, 100 m trailing cable FLP electricals, capable of working in seam thickness 2.5m and above.	2	-	10	1400	14000	4	5600	4	5600	4	5600									
5.	Side discharge loader crawler mounted 0.60 m3 capacity with FLP electricals.	6	2	14	1400	19600					4	5600	6	8400	4	5600				1	8177.8
4.	Roof bolter with FLP electricals	8		8	1700	13600			2	3400	4	6800	2	3400						9	1511.1
5.	Roof bolting equipment like reods, etc.	15		15	-	50			15	15	14	20	15	15						3	15.7
6.	Hydraulic props, 21 T/ 3500 mm range	500		500	7.1	3550					50	355	150	1065	200	1420	100	710		9	394.4
7. (a)	Light duty chain conveyors 40t/hr., length 100 m, with FLP electricals & 15 KW motor	50	-	50	180	9000						1800		1800		3600		1800		9	1000.0
(b)	Spare drive heads	10	-	10	55	550							4	220	4	220	2	110		18	30.6
8. (a)	Medium duty chain conveyors 100 m length 100 to/hr. with FLP electricals, 2x15 KW motor	15	5	10	650	6500					2	1300	2	1300	4	2600	2	1300		3	722.
(b)	Spare drive heads	2	-	2	136	272					1	136	1	136	1	136				1	15.1
9.	Battery operated scoop for material transport in thin zone	5	-	5	2000	10000							2	4000	3	6000				2	1111.1
10.	Battery charging station for above	3	-	3	120	720							3	360	3	360				1	240.0
11.	Coal cutting machine, skid mounted, 9,2, bonos, 100 m trailing cable with FLP electr cable, 550 V.	6	6																		
12.	Wall held rotary drill with single unit drill stand, 100 m trailing cable with FLP electricals, 125 V.	28	28																		
13.	Axy. fans forcing type, with 37 KW motor and FLP																				

Colliery Manager
Bhatgaon Colliery

APPENDIX- A.2

REVISED PROJECT REPORT FOR [illegible]

Statement showing estimated Revised Capital Expenditure on Machinery

Sl. No.	Details of Plant & Machinery	Required	Existing	Balance required	Unit Price	Total Price	1983-84 Unit Price	1983-84 Total Price	1984-85 Unit Price	1984-85 Total Price	1985-86 Unit Price	1985-86 Total Price	Depreciation
1	2	3	4	5	6	7	8	9	10	11	12	13	14
	Primary Development for seam thickness less than 2.5 m :												
1(a)	Continuous miner, capable of cutting from 2.5-3.5 m height with FLP electricals.	2	-	2	7500	15000							9 1565.7
( )	Spares for the above @ 15%	15		15	15	7250			15 500	15 750	15 1000	3	750.0
2.	Extensible belt conveyor 200 m long, 800 mm wide, 30 KW motor :	2 sets		2 sets									
	a) Idlers				140	280							2 93.3
	b) Structurals, drive & tail ends				175	350							12 [illegible]
	c) Belting only				317	634							7 211.3
3.	Roof bolter with FLP electricals	2	-	2	1700	3400			2 3400				[illegible]
4.	Battery operated loco for material supply	1	-	1	3000	4000			1 4000				[illegible]
	Ventilation & Pumping system :												
5(a)	Exhaust fan 6-7 m3/sec., 200-250 mm WG, 1000 rpm dia., 16.5 kW motors	2	-	2	219	438							[illegible]
(b)	Forcing fan 5-7 m3/sec., 25 mm WG, 500 mm duct dia, bifurcated 15 KW mot.	2	-	2	96	192			2 192				[illegible]
(c)	Ducting 1000 mm dia, 1000 m length	15		15	15	300			15 350	15 350			[illegible]
(d)	Ducting 500 mm dia., 200 m length	15		15	15	60			15 20				[illegible]
( )	Manifold 1000 x 500,	15		15		6							[illegible]
	Total (A)..					1000				24500			
B.	MINE EQUIPMENT :												
1.	Power drill machine if												

Colliery Manager

C. GARRAGE:

a) Plinth area=18 sq.m. @Rs.545/sq.m. 9810

b) Unit cost with permanent specification. —

9810

GRAND TOTAL OF (A) (B) & (C) = 161816

(say Rs.162 thousand).

5. MINERS QUARTERS:

a) Rate for Miners' (Quarters under New Housing Scheme at Cost Index 100. 11325

b) Rate for Miners' Quarters based on Cost Index of 232. 26274

(say Rs.26thousand)

6. HOSTEL TYPE ACCOMMODATION:

(Adopt the plinth area rate and specifications as per type 'A').

a) Plinth area = 20 m2 @Rs.638/m2. 12760

b) Internal water supply, sanitery, internal electrification and external service connections etc. @ 25% of building cost. 3190

c) Unit cost with permanent specifications. 15950

(say Rs.16 thousand)

Colliery Manager
Khottadih Colliery

17/9/79

Appendix A.2.3 contd.

3. TYPE 'C':

a) Plinth area = 84 m2 @ Rs.638/m2.	53592
b) Internal water supply & sanitary installations @ 12.5% of the building cost.	6699
c) Internal electrification @ 12.5% of the building cost.	6699
d) External service connections @5% of the building cost.	2680
e) Unit cost with permanent specifications in ordinary soil.	69670

(say Rs.70 thousand)

4. TYPE 'D':

a) Plinth area = 139 sq.m.@Rs.754/m2	104806
b) Internal water supply & sanitary installations @ 12.5% of the building cost.	13100
c) Internal electrification @ 12.5% of the building cost.	13100
d) External service connections @5% of the building cost.	5240
e) Unit cost with permanent specifications in ordinary soil.	136248

(say Rs.136 thousand)

5. Servant's quarters (adopt the plinth area rate and specifications as per type 'A')

a)Plinth area=19 sq.m.@ Rs.638/m2	12122
b) Internal water supply,& sanitary installations @15% of the building cost.	1818
c) Internal electrification @10% of the building cost	1212
d) External service connection @5% of the building cost	606
e) Unit cost with permanent specifications in ordinary soil.	15758

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Bhatgaon Colliery

Surveyor
Bhatgaon Colliery

Appendix - A.8.2.A

D R A F T

REVISED PROJECT REPORT FOR REORGANISATION OF BHATGAON PROJECT

Statement showing expenses on sewerage disposal scheme of colony and service buildings.

(A) COLONY:

Total no.of houses proposed in the colony.	1612
Cost of sewerage disposal scheme per house at cost index 100	Rs.750/-
Therefore total cost of sewerage disposal scheme of colony at CI 232	Rs.2804880
T o t a l	Rs.2804880

(B) SERVICE BUILDINGS:

Total cost of service buildings	Rs.10778000
Cost of sewerage disposal scheme @ 5% of above.	Rs. 538900
T o t a l	Rs.538900
G R A N D - T O T A L (A) & (B)	Rs.3343780
	say Rs.3344(in'000s)

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Bhatgaon Colliery

19/12

In Survey
Bhatgaon Colliery

Appendix - 4.8.2.

D R A F T

REVISED PROJECT REPORT FOR REORGANISATION OF

BHATGAON PROJECT

Statement showing expenses on sewerage disposal scheme of colony and service buildings.

(A) COLONY:

Total no.of houses proposed in the colony.	1612
Cost of sewerage disposal scheme per house at cost index 100	Rs.750/-
Therefore total cost of sewerage disposal scheme of colony at CI 232	Rs.2804880
T o t a l	Rs.2804880

(B) SERVICE BUILDINGS:

Total cost of service buildings	Rs.10778000
Cost of sewerage disposal scheme @ 5% of above.	Rs. 538900
T o t a l	Rs.538900
G R A N D - T O T A L (A) & (B)	Rs.3343780
	say Rs.3344(in'000s)

Surveyor
Bhatgaon Colliery

1.	2.	3.	4.	5.	6.	7.
8.	Canal storage: a) RCC Overhead tank - for clear water.	460000 ltr.		2.55	ltr.	1173
	b) RCC Overhead tank - for industrial water.	46000ltr.		2.55	ltr.	117
9.	Investigation for: a) Hydrogeological data b) collection & testing of raw water samples (Physico-chemical & bacteriological analysis).	----------		LS	------	
10.	Distribution system: A. New Distribution system to new houses:					
	i) 100 mmdia main	1500	m	216	m	324
	ii) 80 mm dia main	1500	m	174	m	
	iii) Add 7½% for saddle, support, valves, bends etc.	----------		LS	------	
	B. Industrial water distribution system:					
	i) 100 mm dia main	1500	m	216	m	324
	ii) 80 mm dia main	1500	m	174	m	261
	iii) Add 7½% for saddle, supports, valves, bends, etc.	----------		LS	------	
11.	Electrical installation: a. Transformer & switchgear. b. Overhead line.	----------		LS	------	
	T O T A L					8496
	Less: anticipated subsidy from CMWO					2927
	NET CAPITAL INVESTMENT TOBE MADE BY WCL					5569

15/9/94

APPENDIX-A.C.I

DRAFT REVISED PROJECT REPORT ON
REORGANISATION OF BHATGAON COLLY

Statement showing the capital expenditure for Pilot Scheme, Scientific Research and Project Report preparation

(Amount in [illegible])

Sl. No.	Particulars	Amount
1.	Scientific Research, Pilot Scheme, etc.	500
2.	Project Report ✓	9400
	TOTAL:	9900

Note

Colliery Manager
Bhatgaon Colliery

[illegible]/1/84
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Bhatgaon Colliery

APPENDIX-'C'

DRAFT REVISED PROJECT REPORT ON
REORGANISATION OF BHATGAON COLLY

Statement showing unit cost estimate & Profitability

Sl. No.	Particulars	Total cost/to (Rs)	Variable cost/to (Rs)	Fixed cost/to (Rs)
1.	C.M.S(To)	1.288		
2.	S.M.S(Rs.)	62.39		
3.	Wages & salaries	40.31	-	40.31
4.	Stores	18.00	14.97	3.03
5.	Power	6.68	1.67	5.01
6.	Misc. exp. incl. W.S.Debit	9.00	2.90	6.10
7.	Admn. charges	4.89	-	4.89
8.	Depreciation	51.06	-	51.06
9.	Int. on working capital @ 19%	5.51	0.05	1.46
10.	Int. on loan capital @ 12%	26.17	-	26.17
	TOTAL:	169.75	16.09	153.67

		At 100%	At 85%
1.	Cost of prodn.	169.75	190....
2.	Present av. selling price (Rs.)	186.60	186.60
3.	Profit/loss/to(Rs)	16.85	(-)13.27

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APPENDIX-V

DRAFT REVISED PROJECT REPORT ON
RECONSTRUCTION OF BHATGAON COLLY

Statement showing unit cost estimate and profitability(considering life of the project as 19 yrs.)

Sl. No.	Particulars	Total cost/te (Rs)	Variable cost/te (Rs)	Fixed cost/te (Rs)
1.	O.M.S(Te)	1.200		
2.	A.M.S(Rs.)	62.39	-	48.34
3.	Wages & salaries	30.46	-	7.19
4.	Stores	18.00	10.55	5.01
5.	Power	6.60	1.67	6.10
6.	Misc. exps.incl. S/D	9.00	2.90	3.89
7.	Adm. charges	4.09	-	40.31
8.	Depreciation	40.31	-	0.55
9.	Int. on working capital @ 12%	5.51	0.96	26.17
10.	Int. on loan capital @ 12%	26.17	-	
	TOTAL:	167.00	16.00	150.92

Sl. No.		At 100%	At 95%
1.	Cost of prodn./te(Rs)	167.00	193.63
2.	Present av. selling price/te(Rs)	186.60	186.60
3.	Profit/loss/te (Rs)	19.60	(-)7.03

Bhatgaon Colliery

1	2	3	4	5
1100-1700	18	405522	220802	634324
1400-1950	7	180803	115716	296519
1600-2200	2	57058	31859	88917
1900-2500	1	32129	16897	49026
TOTAL-SURFACE	746	3582410	4380776	12963186

MANPOWER ANALYSIS

	Nos	Salaries and Wages	Manshift
UNDERGROUND	2209	35478446	578758
SURFACE	746	12963186	197690
TOTAL -	2955	48441632	776448

O.M.S (Te) 1.288
O.M.S (C) 60.39
Wages/Cent/te(M) 40.44

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APPENDIX-B

DRAFT REVISED PROJECT REPORT ON RECONSTRUCTION OF BHATGAON PROJECT

Statement showing category/scalewise manpower requirement and their wages & benefit

Category/Scale	Strength	Wages	Benefits	Total
1	2	3	4	5
A. UNDERGROUND				
I	490	4610900	2178050	6788950
II	505	4924255	2300780	7225035
III	467	4814770	2214047	7028817
IV	201	2253512	1111530	3345042
V	64	783104	372480	1155584
VI	188	2635384	1180640	3816024
P.R	175	2352875	1089200	3442075
508-860	25	334075	152600	[illegible]
572-1008	28	419328	192160	[illegible]
640-1160	50	832450	347650	1180100
722-1278	16	290736	117520	408256
TOTAL - U/G	2209	24231389	11247057	35478446
B. SURFACE				
I	115	1007285	395650	1402935
II	111	1006326	490065	1496391
III	58	553941	265930	820871
IV	58	596762	310764	907526
V	39	440700	219336	660036
VI	16	206432	96760	303192
404-512	44	400400	200112	600512
440-581	25	225952	120474	346426
460-636	14	144298	75110	219408
460-652	20	208300	107880	316180
508-606	63	742329	362502	1104831
508-860	36	436752	210528	647280
572-944	22	288750	134420	423170
572-1008	11	149094	68453	217547
640-1084	16	232304	103600	335904
640-1160	11	165319	72954	238273
722-1278	21	343791	146349	490140
800-1400	40	757160	304227	1061387

..ii

Colliery Manager
Bhatgaon Colliery

Surveyor

ENVIRONMENTAL IMPACT OF MINING OPERATION

QUESTIONNAIRE - I PRELIMINARY INFORMATION

Part 'A' General Information about Mining Operation:

1. General:

1.1 Name and Address of the Mines:

Place .. Bhatgaon
District. Surguja
State .. Madhya Pradesh
Phone .. 28 Bisrampur
Cable .. WESTCOAL

Name & Address of Owner: Western Coalfields Ltd.

1.3 Date of Opening of Mines .. 1.4.1975

2. Mineral Exploitation Details.

2.1 Reserves (proved and estimated) in the above location of each mineral/ore (in tonnes):

S.No.	Mineral/ore	Reserves (m.tes)	
		Proved	Estimated
1.	Coal	20.21	13.085

2.2 Average daily production of various minerals. If it is less than the planned production, time phasing for achieving full production capacity.

S.No.	Mineral/Ore	Avg. Daily Prodn.
1.	Coal	3333 tonnes

Production phasing(m.tes)	03-04	04-05	05-06
	0.31	0.42	0.51

2.3 Nature of Mining Operation: Underground

2.5 For underground Mines only:

2.5.1 Depth of the workings(Attach typical vertical section of the working showing lithology) Attached

2.5.2 Mode of Entry: Inclines.

Colliery Manager
Bhatgaon Colliery

Surveyor
Bhatgaon Colliery

Appendix - D.1cont.

2.5.3	Details of machinery used		Underground
	At face	..	CCM,Side Loaders,LHD.
	For Transportation	..	Chain Conveyors,endless haulage,belt conveyor, direct haulage.
2.5.5	For underground coal mines:		
2.5.5.1	Method of Mining	..	Bord and Pillar
2.5.5.2	Method of depillaring		Caving
	Are you carrying out ancilliary operation for processing of the minerals/ores mined. If so, please specify.		
	Screening of Coal into steam and slack fractions. Picking of shale and stones.		

PART 'B' ENVIRONMENT

1.	General:		
1.1	Location	..	Baikunthpur Area,WCL
1.1.1	Total lease area(in hectares)	..	3641.32
1.1.2	Elevation above M.S.L.	..	550.35 m to 570 m.
1.1.3	Indicate general topography of the land	..	undulating plain.
1.1.4	Area based for mining	..	1209.551 hectares.
1.1.5	Features existing within the area of the mine site	..	Human settlements, agricultural land, grazing land,nallahs, streams,rivers,forests, state/district highway.
1.2	Climatic:		
1.2.1	Rainfall- yearly avg.range	..	1400 mm.
1.3	Manpower Employed		Below ground Otherwise
1.3.1	Avg.no.of persons employed every day.		2209 746
1.3.2	Population of the township/ housing colony for employees	..	8060
1.3.3	Distance from township to mines	..	4 kms.

Colliery Manager
Bhatgaon Colliery

10/9/24
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Bhatgaon Colliery

2. Pollution:

2.1 Water

2.1.1	Source of water	..	Mine water
2.1.2	Approximately quantity of water consumed.	..	1.52×10^6 litres/day
2.1.3	Waste water discharges per day from:		
	Mines	..	51.8×10^6 litres/day
	Township	..	1.216×10^6 litres/day
	T o t a l	..	53.016×10^6 litres/day
2.1.4	Point of final discharges:		Fallow land/agricultural land.
2.1.5	Do you treat waste water before discharging	..	No
2.1.6	Characteristics of the discharging water	..	Sent for analysis.
	Solid wastes	..	Not applicable

2.3 Air:

2.3.1 Are there any emissions of dust or gases (CO, CO2, SO2, NOx, CH4, 24C) from your mining & processing operations into the atmosphere? If yes, specify nature and concentration and steps to control/abate such air pollution. — Not applicable (please see text)

2.4 Health Hazards:

2.4.1 Is there any potential health hazard from dust or gases in u/g mine atmosphere? If yes, specify nature of such hazards and measures to prevent exposure of workers. — No

2.5 Other types of pollution:

2.5.1 Do various operations in mines/plant cause noise pollution or any other type of pollution? — Not appreciable (please see text)

Colliery Manager
Bhatgaon Colliery

Surveyor
Bhatgaon Colliery
10/9/82

2.6	Management:	
2.6.1	Have you had your mine monitored for environmental pollution hazards at any time.	Gas/ventilation Survey.
2.6.2	Do you propose to reclaim exavated/subsided area after completion of mining operations? If yes, indicate, general features of the scheme.	Yes. Filling of surface cracks. In case of loss of trees in subsided area tobe made up with plantation of sapling. (pl.see text).

Colliery Manager
Bhatgaon Colliery

Surveyor
Bhatgaon Colliery

Appendix-D.2

DRAFT

REVISED PROJECT REPORT ON REORGANISATION OF

BHATGAON PROJECT

Report on Physico-Chemical Analysis of Water sample of Incline No.1 (Tested by NEERI,Nagpur)

NEERI Ref.No.	..	WD/1448
Party's ref.No.	..	BHAT/74/79/2263-66 dated 7/8th April,1979.
Party's address	..	Office of the Supdt.of Mines, Bhatgaon Colliery, Western Coalfields Ltd., P.O.Bhatgaon, Dist.Surguja-M.P.
Source of sample	..	Incline no.1
Date of Collection	..	3.4.79.

PHYSICAL CHARACTERISTICS

Appearance	..	HAZY	PH	..	6.5
Colour	..	NONE	Langelier Index	..	- 2.7
Turbidity units	..	15	Conductivity ms/cm	..	75

CHEMICAL CHARACTERISTICS

(All values shown below are in mg/ l)

Dissolv solids	..	75	Sodium, as Na	..	3.0
P-alkalinity*	..	0	Potassium as K	..	2.0
M-alkalinity*	..	15	Iron as Fe	..	0.1
Total hardness*	..	18	Manganese as Mn	..	0
Alkaline hardness*	..	15	Chlorides as Cl	..	2.0
Non-alkaline hardness	..	3.0	Sulphates as SO4	..	7.0
Free Co2 *	..	21	Flourides	..	0.1
Permagnate value**	..	0	Nitrates as N	..	3.4
Calcium, as Ca	..	6.0	Phosphate as PO4	..	0
Magnesium, as Mg	..	0.8	Silica as SiO2	..	37

Colliery Manager
Bhatgaon Colliery

10/9/79
Surveyor
Bhatgaon Colliery

PROBABLE COMPOSITION OF RESIDUE

CaCO3	15	CaSO4	0	CaCl2	0	Ca(No3)2	0
MgCO3	0	MgSO4	4	MgCl2	0	Mg(NO3)2	0
Na2CO3	0	Na2SO4	6	NaCL	3	NaNO3	0
K2CO3	0	K2SO4	0	KCl	0	KNO3	10

Si02	35
Fe203	0.14
Mn203	0
Al203	

** as Oxygen, 4 hrs. at room temperature
* as CaCO3

REMARKS

Refer to the following numbers overleaf

15, 8 & 17

Sd/-
Analyst
Water Division

Sd/-
Head
Water Division

Sd/-
Director
NEERI

Rs.375/-

8. The sample is soft and corrosive.
15. A corrective treatment may be necessary.
17. Heavy metals as mg/l.

Colliery Manager
Bhatgaon

10/9/79
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Bhatgaon Colliery

D.	FACE TRANSPORTATION		
1.	L.D.C.C. operator	III	88
2.	[illegible] Operator	III	35
3.	Chain cleaner/general mazdoor	I	49
	Sub-total		172
...	...ATION OF FACE (UNDERGROUND)		
A.	TRANSPORTATION		
1.	[illegible] khalasi	III/IV	40
2.	Trammer/Clipman	III/IV	136
3.	Scoop Operator	VI	21
4.	Scoop Operator helper	II	21
5.	Friction roller mazdoor	I	18
6.	Line mistry	IV/V	18
7.	Line mistry helper	II	36
8.	Belt conveyor operator	III	56
9.	Belt cleaning mazdoor/general mazdoor	I	112
10.	General Mazdoor/Material supply gang	I	49
11.	Transfer point cleaner/chute cleaner	I	30
	Sub-total		537
B.	UNDERGROUND MAINTENANCE		
1.	Mechanical fitter	V/VI	48
2.	Mech. fitter helper	I	40
3.	Elect. fitter	V/VI	48
4.	Elect. fitter helper	I	48
5.	Timber mistry	IV	10
6.	Timber Mazdoor	II	20
7.	Sub-Stn. attendant	III	24
8.	Rope splicer	III	7
	Sub-total		255
C.	VENTILATION & PUMPING		
1.	Mason	IV	15
2.	Mason Mazdoor.	II	30
3.	Mazdoor for spraying & drain cutting	I	56
4.	Pump Khalasi	III	45
5.	Sump cleaning/bailing mazdoor	I	25
6.	Air sampler	II	9
7.	Sampling in-charge	640-1160	1
8.	Dust in-charge	640-1160	1
9.	Fan attendant	III	35
10.	Ventilation mazdoor	I	35
	Sub-total		252

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Colliery Manager
Bhatdeo Colliery

Surveyor
Bhatgaon Colliery

APPENDIX 'A'

DRAFT REVISED PROJECT REPORT ON REORGANISATION OF BHATGAON PROJECT

Statement showing categorywise/jobwise Requirement of manpower

Sl. No.	Designation	Cat/Scale	Annual
1	2	3	4
A.	CUTTING & LOADING		
1.	Continuous miner operator	VI	7
2.	Continuous miner operator helper	II	14
3.	Borer drill operator	VI	14
4.	Borer drill operator helper	II	7
5.	Coal cutting machine operator	V	14
6.	Coal cutting machine operator helper	III	28
7.	Load haul dump operator	VI	28
8.	Load haul dump operator helper	II	14
9.	Side discharge loader operator	VI	14
10.	Side discharge loader operator helper	II	28
11.	P.R. Loader	PR	112
	Sub-total		175
B.	DRILLING & BLASTING		
1.	Shotfirer	508-860	25
2.	Shotfirer helper cum explosive carrier	II	44
3.	Driller	IV	88
4.	Driller helper	II	75
5.	Dressers	III	88
	Sub-total		320
C.	SUPPORT		
1.	Roof bolter operator	VI	28
2.	Roof bolter operator helper	II	28
3.	Timber Mistry	IV	56
4.	Timber mazdoor	II	84
	Sub-total		196

Surveyor
Bhatgaon Colliery

1	2	3	4
8.	Machinist	IV/V/VI	10
9.	Turner	IV/V/VI	9
10.	Band jaw operator	V/VI	2
11.	Band jaw operator helper	II	2
12.	Armature winder	VI	2
13.	Armature winder helper	II	2
14.	Auto electrician	V	1
15.	Auto Mechanic	V	1
16.	Auto Mechanic helper	II	1
17.	Fitter Supplier	III	3
18.	Carpenter	IV	3
19.	Carpenter helper	II	3
20.	Welder	V	6
21.	Welder helper	II	6
22.	Blacksmith	IV	6
23.	Hammerman	IV	2
24.	Symbol Mazdoor	V	1
25.	Symbol Cu	IV	18
26.	Workshop mazdoor	I/II	9
27.	Store Issuer	II	1
28.	Mobile crane operator	VI	2
	Sub-total		128
C.	COAL HANDLING & DESPATCH		
1.	Foreman-in-charge	722-1278	1
2.	Foreman	640-1160	2
3.	Technical Inspector	640-1160	1
4.	Weighbridge Clerk	508-860	2
5.	Loading/despatch Inspector	508-860	3
6.	Control Room Operator	V/VI	2
7.	Fitter	IV	3
8.	Truck driver	508-860	1
9.	Mechanical fitter	IV/V	4
10.	Electrical fitter	IV/V	3
11.	Helpers	II	9
12.	Welder	V	1
13.	Conveyor Operator	III/IV	5
14.	Scraper haulage operator	III/IV	5
15.	Feeder Operator	III/IV	5
16.	Shale pickers	I	10
17.	General Mazdoors	I	6
	Sub-total		71

...V

Colliery Manager
Bhatgaon Colliery

12/9/22
Surveyor
Bhatgaon Colliery

1	2	3	4
D.	SAFETY & PERSONNEL		
1.	Overman	640-1160	2
2.	Nazdoor for dusting & cleaning	I	2
	Sub-total		
E.	UNDERGROUND SUPERVISION		
1.	Sr.Overman	722-1278	6
2.	Overman	640-1160	23
3.	Mining sirdar	572-1008	20
4.	Foreman-in-charge	[illegible]	1
5.	Foreman	640-1160	14
	Sub-total		90
	UNDERGROUND PERSONNEL - TOTAL		2709
III.	SURFACE		
A.	PRODUCTION SERVICE		
1.	Conveyor operator	III	3
2.	Haulage Driver	II	7
3.	Trammer	III	25
4.	M.T.K	[illegible]-808	1
5.	Magazine clerk	[illegible]-808	1
6.	Body searcher	II	7
7.	Sub-station attendant	I	1
8.	Lamp Room Incharge	572-944	2
9.	Lamp fitter	460-636	7
10.	Lamp cleaner	I	7
11.	Lamp Issuer	460-636	
12.	Telephone Mechanic(CDS)	V	2
13.	Tel. Mech. helper	II	2
14.	Magazine issuer	III	4
	Sub-total		66
B.	WORKSHOP & MAINTENANCE		
1.	Foreman-in-charge	722-1278	2
2.	Foreman	640-1160	3
3.	Tracer	640-1160	1
4.	Mechanical fitter	IV/V	10
5.	Mech. fitter helper	II	10
6.	Electrician	V/VI	4
7.	Electrician helper	II	4

Colliery Manager
Bhatgaon Colliery

Bhatgaon Colliery

1	2	3	4
D.	WORKING EXPENSES		
1.	Dy.Chief Mining Engineer	1900-2500	1
2.	Supdt. of Mines	1600-2200	1
3.	Colliery Manager	1400-1950	2
4.	Asstt.Colliery Manager	1100-1700	-
5.	Safety Officer	1400-1950	1
6.	Ventiletion Officer	1100-1700	1
7.	Under Manager	800-1400	16
8.	Supdtg.Engineer(E&M)	1600-2200	1
9.	Sr.Ex.Engineer(E&M)	1400-1950	3
10.	Ex.Engineer(E&M)	1100-1700	1
11.	Engineer(E&M)	800-1400	11
12.	Sr.Ex.Engineer(Civil)	1400-1950	1
13.	Ex.Engineer(Civil)	1100-1700	2
14.	Engineer(Civil)	800-1400	2
15.	Overseer	572-1008	3
16.	Chemist	508-860	1
[illegible]	[illegible] Executive Officer	800-1400	1
18.	Office Supdt.	722-1278	1
19.	Sr.Clerk	640-1084	6
20.	Upper Division Clerk	572-944	6
21.	LDC/Typist	508-808	37
22.	Sr.Finance Officer	1100-1700	1
23.	Finance Officer	800-1400	2
24.	Accountant	722-1278	7
25.	Sr.Steno/PA	640-1084	1
26.	Jr.Stenographer	572-944	1
27.	Chief Cashier	640-1084	1
28.	Pay clerks	572-944	1
29.	Driver (H.V)	508-860	7
30.	Driver (L.V)	460-652	13
31.	Cleaner	II	16
32.	Peon	II	1
33.	Central Despatch Operator	508-860	1
34.	Mali	II	4
	Sub-total		197
E.	STORES		
1.	Asstt.Controller of Stores	1100-1700	1
2.	Chief Store Keeper	722-1278	1
3.	Store Keeper	640-1084	2
4.	A.S.K/Store Issuer	508-808	6
5.	LDC/Typist	508-808	4
6.	Store Mazdoor	[illegible]	18
	Sub-total		32

1	2	3	
F.	SECURITY		
1.	Security Officer	800-1400	1
2.	Security Inspector	572-1008	2
3.	Security Guard	440-584	2
4.	Watchman	440-512	32
5.	Armed Guard	440-584	6
	Sub-total		43
G.	SURVEYING		
1.	Survey Officer	800-1400	1
2.	Head surveyor	722-1278	2
3.	Surveyor	722-1279	3
4.	Asstt.Surveyor	640-1160	4
5.	Tracer/Ferro Printer	460-652	1
6.	Chainman	440-584	15
7.	Diman	572-1008	4
	Sub-total		32
H.	WELFARE		
1.	Welfare Officer	1100-1700	1
2.	Labour Welfare Officer	800-1400	2
3.	Canteen Supervisor	508-808	1
4.	Canteen Clerk	508-808	2
5.	Canteen Cook	XII	2
6.	Canteen boys	I	2
7.	Canteen sweepers	I	1
8.	Pithead bath Attendant	I	4
	Sub-total		27
I.	MEDICAL & SANITATION		
1.	Sr.Medical Officer	1100-1700	1
2.	Medical Officer	800-1400	2
3.	Lady Medical Officer	800-1400	1
4.	Specialist	1100-1700	1
5.	Compounder	508-860	2
6.	Dresser	404-512	2
7.	Nurse	508-860	14
8.	Ward boy	404-512	7
9.	Sanitary Inspector	572-1008	2
10.	Asstt.Store Keeper	508-808	1
11.	Sweeper	I	24
12.	Ambulance driver	460-652	3
	Sub-total		61

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Colliery Manager
Bhatgaon Colliery

19/9/24
Surveyor
Bhatgaon Colliery

1	2	3	4
J.	VOCATIONAL TRAINING		
1.	Vocational Training Officer	800-1400	1
2.	Instructor	722-1278	3
3.	Demonstrator	[illegible]-1006	[illegible]
4.	L.D.C.	568-808	1
5.	Peon	404-512	1
	Sub-total		7
K.	WATER SUPPLY & BLDG. MAINTENANCE		
1.	Raw water pump attendant	III	4
2.	Filter Operator	III	4
3.	Clean water pump operator	III	4
4.	Plumber	V	2
5.	Plumber helper	II	2
6.	Valveman	II	8
7.	Chemical Mazdoor	I	4
8.	Masons	V	3
9.	Mason Mazdoor	I/II	6
10.	Carpenter	V	2
11.	Carpenter Helper	I/II	2
12.	General Mazdoor	I	4
	Sub-total		45
L.	ENVIRONMENT & ECOLOGY		
1.	Agronomist/Horticulturist	[illegible]-1083	1
2.	Gardner	II	2
3.	General Mazdoor	I	11
	Sub-total		14
	TOTAL	Surface	746
		Underground	2209
	GRAND TOTAL		2955

including 4 leave reserve additional

2995

mrk

Colliery Manager
Bhatgaon Colliery

Bhatgaon Colliery

Appendix - D.2

DRAFT

REVISED PROJECT REPORT ON REORGANISATION OF

BHATGAON PROJECT

Report on Physico-Chemical Analysis on Water Supply of Mahan River (Bhatgaon)(Tested by NEERI, Nagpur.)

NEERI Ref. No.	..	MD/1147
Party's Ref. No.	..	BMA/74/79/2263-66 dt.7/8th April, 1979.
Party's Address	..	Office of the Supdt.of Mines, Bhatgaon Colliery, Western Coalfields Ltd.,PO:Bhatgaon Dist.Surguja-M.P.
Source of the sample	..	MAHAN RIVER (BHATGAON) Distance along the road from Mine. Distance upto [illegible]
Date of collection	..	8.4.1979.

PHYSICAL CHARACTERISTICS

Appearance	.. CLEAR	Ph	.. 7.7
Colour	.. NONE	Langolier Index	-0.4
Turbidity,units	.. 5	Conductivity	174

CHEMICAL CHARACTERISTICS

(All values shown below are in mg/l)

Dissolved solids	..	110	Sodium, as Na	..	10
P - alkalinity*	..	0	Potassium as K	..	4.0
M - alkalinity*	..	72	Iron as Fe	..	0
Total hardness*	..	60	Manganese as Mn	..	0
Alkaline hardness*	..	60	Chlorides as Cl	..	5.0
Non-alkaline Hardness*		0	Sulphates as SO4	..	7.0
pH*	..	7.0	Fluorides as F	..	0.2
Permanganate value**	..	0.8	Nitrates, as N	..	0.5
Calcium, as Ca	..	16	Phosphates, as PO4	..	0
Magnesium as Mg	..	1.9	Silica as SiO2	..	17

..(i)..

Surveyor
Bhatgaon Colliery

Appendix D.3 contd.

PROBABLE COMPOSITION OF RESIDUE

CaCO3	.. 40	CaSO4	.. 0	CaCl2	.. 0	Ca(NO3)2	.. 0
MgCO3	.. 17	MgSO4	.. 0	MgCl2	.. 0	MgCl2	.. 0
Na2CO3	.. 12	Na2SO4	.. 9	NaCl	.. 5	NaNO3	.. 0
K2CO3	.. 0	K2SO4	.. 0	KCl	.. 5	KNO3	.. 4

* CaCO3

** as oxygen 4 hrs. at room temperature.

SiO2	.. 17
Fe2O3	.. 0
Mn_2O_3	.. 0
Al_2O_3	.. 2

REMARKS

Refer to the following numbers overleaf.

15, 8 & 17

Sd/-
Analyst
Water Division

Sd/-
Head
Water Division

Sd/-
Director
NEERI

8) The sample is soft and corrosive.

15) A corrective treatment may be necessary.

17) Heavy metals as mg/1 :

Arsenic as As	.. 0
Cadmium as Cd	.. 0
Chromium as Cr	.. 0
Copper as Cu	.. 0
Lead as Pb	.. 0
Zinc as Zn.	.. 0

Colliery Manager
Bhatgaon Colliery

Survey
Bhatgaon Colliery

23/9/29

Annexure 'I'

DRAFT

REVISED PROJECT REPORT FOR REORGANISATION OF BHATGAON PROJECT

Copy of letter no.WCL/DP/931 dated 7.8.79 from T.V.Lakshmanan, Technical Director, Western Coalfields Ltd., Nagpur, addressed to

The General Manager,
Saikunthpur.

Sub: Method of work at Bhatgaon and Katkona.

....

Dear Sir,

The method of work proposed at Bhatgaon project as per the project report is longwall system of mining. In view of the fact that most of the property is lying at a shallow cover less than 60 metres, Longwall system of mining is likely to pose problem of roof control and the DGMS is relactant to grant permisions for longwall mining at shallow depth. The matter was discussed in the meeting held on 31.7.79 under the Chairmanship of CMD when RD/CMPDI and GM(Plng) were also present. It has been decided that the Project Report calls for revision in view of the proposed change in method of mining.

In order to fulfil the production targets till the alternative method of mining is given in the revised project report, you are requested to go ahead with the development and depillaring by conventional Bord and Pillar system. The inputs required for achieving the production targets may please be intimated to the undersigned for doing the needful.

Yours faithfully,

Sd/-

(TV Lakshmanan)
Director(Technical)

cc: 1.RD,CMPDI
2.GM(Plg).
3.Secretary to CMD.

Colliery Manager
Bhatgaon Colliery

Surveyor
Bhatgaon Colliery

Annexure-'E'Contd.

Copy of Record Note of discussions held in the CMD's Chamber on 31st July, 1979.

****

The following were present:

1. Sri [illegible] Gupta, CMD.
2. Sri TV Lakshmanan, Director(Technical).
3. Sri JV Sarkar, CMS(HQ)
4. Sri BNS Bhatnagar, General Manager(Plg).
5. Sri SP Mathur, Regional Director, CMPDI.
6. Sri PN Mathur, Addl.CMS, CMPDI.
7. Sri G.a.Jha, Materials Manager.
8. Sri MKL Joise, SE.(P&M)(Plg).
9. Sri KC Vij, TS to DT.

BAIKUNTHPUR AREA:

1. Bhatgaon - method of work provided in the project report is longwall. In view of the shallow cover in most of the property, it was decided that we should go for Bord and Pillar method. The Director(Technical) will issue his approval to the GM for working in the mine on Bord and Pillar panel and RD,CMPDI, has been requested to revise the project report.

2. For Kathkona Project the method of work provided in the project report in Seam No.I is room and Pillar with scraper and for Seam No.III is longwall. It was decided that Director (Tech) will send a letter to GM, Baikunthpur for working No.III seam with conventional Bord and Pillar as the property is highly faulted and there is too much variation in the seam thickness.

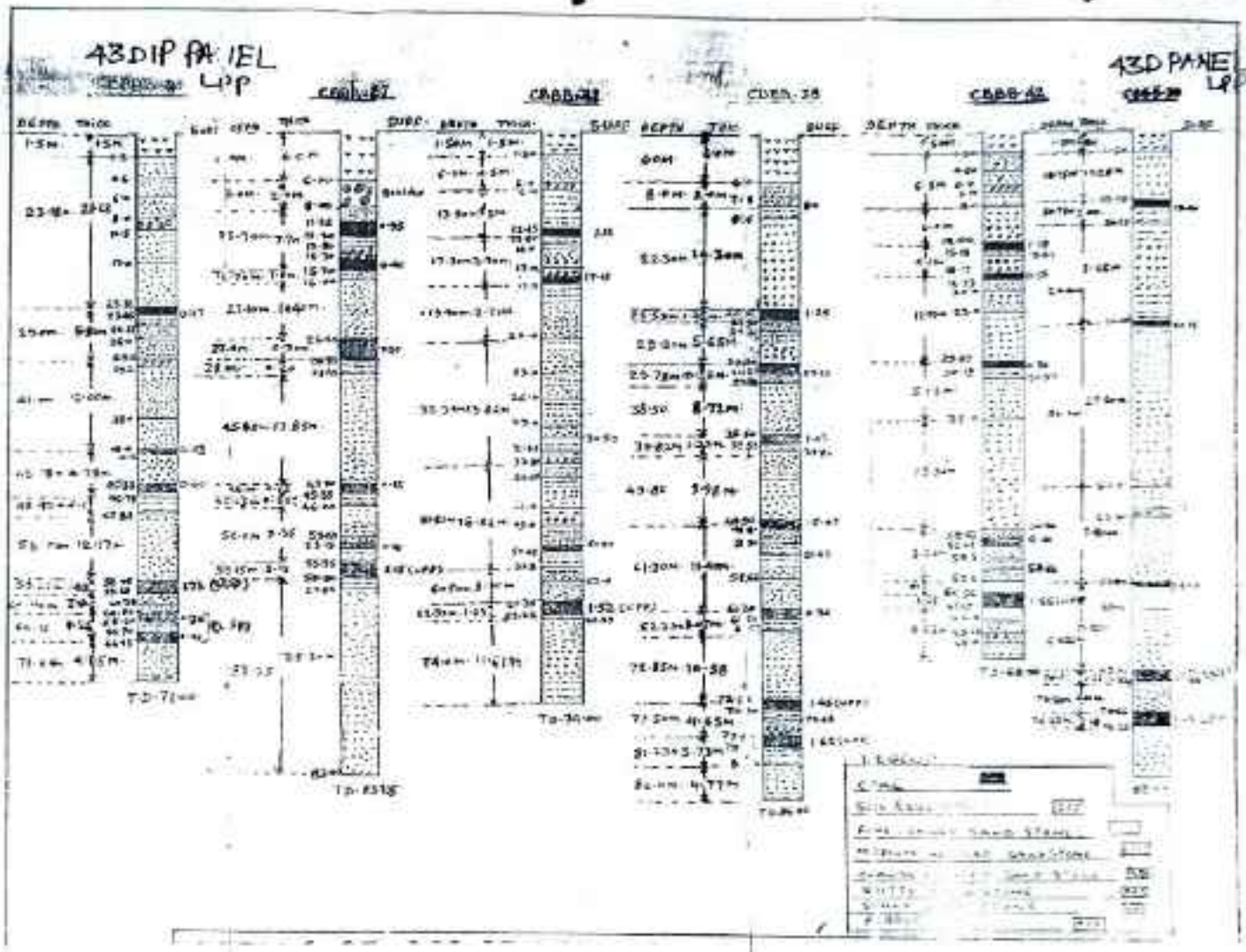
Sd/-
(TV Lakshmanan)
Director(Technical)

No.WCL/DT/40/939
dt.7/10.8.79

Distribution:

1. MD,CMPDI
2. Addl.CMS,Nagpur/CMPDI.
3. CMS(HQ).
4. GM(Plg)
5. CMM
6. Addl.CE(P&M)
7. Sri GK Jha,MM.
8. Sri MKL Joise
9. GM, Pathakhera
10. GM, Kanhan.
11. GM, Korba
12. GM,Baikunthpur.
13. GM, Jhagrakhand.
14. GM, IB Valley.

General Manager
Bhatgaon Colliery


43DIP PANEL
43D PANEL
UP SEAM
CROSS-SECTION