

भूवैज्ञानिक प्रतिवेदन : कोयला गवेषण  
बेगुनिया प्रखण्ड, रानीगंज कोयला-क्षेत्र  
जिला बर्द्धमान (प० बंगाल)

**GEOLOGICAL REPORT ON EXPLORATION FOR COAL**  
**Begunia Block, Raniganj Coalfield**  
**District : Bardhaman (W. Bengal)**

खंड - १ क  
( विषय वस्तु )

VOLUME - I A  
(TEXT)



खनिज गवेषण निगम लिमिटेड  
( भारत सरकार का उद्यम )  
मार्च १९८४

**MINERAL EXPLORATION CORPORATION LTD.**  
**( A Government of India Enterprise )**  
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GEOLOGICAL REPORT ON EXPLORATION  
FOR COAL, BEGUNIA BLOCK, RANIGANJ  
COALFIELD, DISTRICT: BARDHAMAN (W.B.)

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GEOLOGICAL REPORT ON EXPLORATION FOR COAL

BEGUNIA BLOCK, RANIGANJ COALFIELD

DISTT : BARDHAMAN (WEST BENGAL)

VOLUME III : DOCUMENTATION

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GEOLOGICAL REPORT & INFORMATION FOR COAL,  
 BEGUNIA BLOCK, RANIGANJ COALFIELD, DISTRICT  
 CT: BARDHAMAN, WEST BENGAL.

SALIENT FEATURES

1. NAME OF THE BLOCK : Begunia Block.
2. LOCATION : Western part of Raniganj coalfield, east of Barakar river bound approximately by co-ordinates. North latitude  $23^{\circ}43'8''$  &  $23^{\circ}44'4''$  East longitude  $86^{\circ}47'46''$  &  $86^{\circ}49'46''$  on toposheet no 73 I/14 of survey of India.
3. AREA : 4.1 Sq. Km.
4. QUANTUM OF WORK :
  - i) Survey including triangulation with the help of theodolite and topographic mapping on 1:4000 scale with 2m. contour interval in an area of 4.1 Sq.Km.
  - ii) Geological mapping of 4:1 Sq.Km.
  - iii) Drilling
    - a) By M.E.C.L : 11,373.05 in 23 boreholes
    - b) By G.S.I. : 2,824.40 in 5 boreholes.

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 14,197.45 in 28 boreholes.
5. DURATION OF FIELD OPERATION : Jan '80 to Nov., '82
6. OBJECTIVE :
  - a) To evaluate the lay and disposition of all persistent coal horizons of more than 0.50 thickness down to the Laikdih seam and to assess their quantity and quality.
  - b) to have an idea about the degree of pyrolytisation of coal seams.
  - c) also to have an idea of the occurrence of seams below Laikdih.
7. GEOLOGY : The Begunia Block is covered by the rocks of Barakar and Barron Measure formations of western Raniganj coalfield. The generalised sequence is given in table II-2. Barakar formation



: ii :

their intermediate facies and coal seams is exposed in the northern boundary of the block.

The exposures barren measures occupy a major portion of the block.

#### 8. STRUCTURE

- : The strike of the formations in Begunia block varies from WNW-ESE in western part to almost East-West in central part. The dips are southerly from  $4^{\circ}$  -  $5^{\circ}$  in the north to upto  $10^{\circ}$  in south.

Altogether 12 faults have been identified in the block on the basis of exploration. The details of which are given in table No. II-4.

#### 9. COAL SEAMS

- : Based on exploration, 13 coal horizons with thickness more than 0.50 m. have **been identified. Out of 13 coal seams** 7 have been discussed in detail and other remaining seam are described in a broad way due to paucity of exploration data for the horizons below Laikdih (Bottom).

#### 10. QUALITY:

- : Based on overall analysis (band by band and overall) the quality of the seam is assessed. The coal seams are graded as per Government of India Notification of 13th February 1981. The summarised **quality of coal seams in Begunia block** is given in table A.

#### 11. RESERVES:

- : The reserves (inband) upto Laikdih (D) seams have been calculated by Isochores method. The reserves for the seams occurring below Laikdih (Bottom), are calculated on average thickness basis and kept under inferred category. Both the category of the reserves are confined to the main block, and the summary of which is given below:

: iii :

: Summary of coal reserve  
(In million tonnes)

	Proved -	34.298
In-band coking	Inferred -	2.022
Non-coking	Inferred	110.110
	<hr/>	
	TOTAL	146.43

summary of the reserves is given in  
Table - B

## 12. PYROLITISATION

: 11 Coal seams out of 13 are partly or completely pyrolitised due to intrusion of Micapieridotite. Total reserves of Jhama up to Laikdih (bottom) seam are 49.35 m. tonnes.

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TABLE -A.  
SUMMARISED QUALITY OF COAL SEAMS OF  
BEGUNIA BLOCK R.NIGANJ CO/LFIELD,  
DISTRICT: BARDHAMAN, (WEST BENGAL)

S E A M	I N - B A N D		T H I C K N E S S (m)		C O K I N G (%)		G R A D E		T H I C K N E S S (m)		C O K I N G (%)		G R A D E	
	EX-BAND	IN-BAND	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
1 (above ch-Begunia)			0.00	1.05	17.00	32.20	Steel Gr.-II	W.Gr.-IV						
ch-Begunia (I)	Ex-band		0.00	1.04	17.00	3.20	-do-	W.Gr.-IV						
	In-band		0.00	3.53	13.5	24.2	Steel Gr.-I	W.Gr.-III						
ch-Begunia ial (B-VII/A)	Ex-band		0.00	3.53	13.5	24.2	-do-	-do-						
	In-band		0.00	1.20	19.5	36.6	W.Gr.-I	V.G.						
	Ex-band		0.00	1.20	16.8	33.6	Steel Gr.-II	W.Gr.-IV						
ad (B-VI/A)	In-band		0.00	1.15	23.4	33.1	W.Gr.-II	W.Gr.-IV						
	Ex-band		0.00	1.15	23.4	33.1	W.Gr.-II	W.Gr.-IV						
dh (Top) (I)	In-band		0.72	2.19	13.95	26.9	W.Gr.-III	Steel Gr.-IV						
	Ex-band		-	-	-	-	-	-						
dh 38T/ m combined	In-band		0.00	23.65	15.00	22.6	Steel Gr.-I	W.Gr.-II						
	Ex-band		0.00	23.57	15.00	22.6	-do-	-do-						
beam	In-band		4.10	7.80	15.55	24.4	Steel Gr.-II	W.Gr.-III						
	Ex-band		4.10	7.30	15.55	21.4	-do-	-do-						

: V :

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Local (above Gopinathpur)	In-band	-	-	-	-	-	-	-	1.00	3.06	32.20	37.07	-	-
	Ex-band	-	-	-	-	-	-	-	0.58	2.71	26.2	34.43	E	C
Gopinathpur (Top) (B-III)	In-band	-	-	-	-	-	-	-	0.57	0.52	26.1	33.65	-	-
	Ex-band	-	-	-	-	-	-	-	0.57	2.25	26.1	32.2	E	C
Gopinathpur (Bot)	In-band	-	-	-	-	-	-	-	1.12	2.40	29.11	45.7	-	-
	Ex-band	-	-	-	-	-	-	-	1.12	2.22	29.11	49.1	E	D
Local (above Salanpur)	In-band	-	-	-	-	-	-	-	0.62	6.15	32.6	44.0	-	-
	Ex-band	-	-	-	-	-	-	-	0.62	4.23	31.65	40.8	F	E
Salanpur Group														

x SEAM BOREHOLE TOP AND BOTTOM PORTIONS

W.G.P. = W/SHERY BR/DE.

: VI :  
TABLE B

SUMMARY OF COAL RESERVES IN BEHINDA BLOCK  
PARTICULAR COLLIERY, DISTRICT : BARDHAMAN, WEST BENGAL  
(Reserves in thousand tonnes)

C A T E G O R Y	S E C T O R				T O T A L
	S E C T O R - 01	S E C T O R - 02	S E C T O R - 03	S E C T O R - 04	
C O K I N G	PROVED 1680	11039	18901	1399	33019
	IN-BAND VIRGIN	1102	777	-	1279
	PROVED	-	-	-	-
	IN-BAND VIRGIN	1680	12141	19078	34298
	SUB TOTAL:				2022
COALING					
	INFERRED VIRGIN				36320
	SUB TOTAL :				110110
NON-COALING					
	INFERRED VIRGIN				110110
	SUB TOTAL:				110110
	GRAND TOTAL:				146630

0 + S/T : 146.63 MILLION TONNES.

GEOLOGICAL REPORT ON EXPLORATION FOR COAL, BEGUNIA  
BLOCK, RANIGANJ COALFIELD, DISTRICT: BARDHAMAN (W.B.)

CHAPTER - I

1.00.00 INTRODUCTION:

1.01.00 GENERAL:

1.01.01 The Raniganj Coalfield located in parts of Bardhaman District of West Bengal and Dhanbad District of Bihar is the most extensively developed coalfield in the country and also the predominant producer of medium coking coal.

1.01.02 The Begunia Block located in the western part of Raniganj coalfield contains several good quality medium coking coal seams as the present workings of Begunia and Laikdih seams in Begunia colliery are stopped against a major fault ( $F_1-F_1$ ) in the south, it needed immediate detailed exploration for the continuance of mines towards south of the fault.

1.01.03 The Mineral Exploration Corporation Limited (MECL) was entrusted with the task of detailed exploration and assessment of coal resources in Begunia block by the Central Mine Planning Design Institute (CMPDI).

1.01.04 The exploration by drilling in the area was commenced on 11.1.1980 and completed on 20.11.1982. The Programme included detailed geological interpretation of sub-surface data obtained from boreholes and mines and surface geological mapping.

1.01.05 The present report is based on the results of detailed exploration comprising large scale surveying, geological mapping, drilling logging and analysis etc. carried out by MECL in Begunia and adjoining Chanch Block. It also incorporates the drilling and analytical data of boreholes, drilled by the Geological Survey of India, falling within the area and colliery data.

## 1.02.00 LOCATION:

1.02.01 The Begunia Block, covering an area of 4.1 sq.km lies in the western part of Raniganj Coalfield and located in District: ~~Burdwan~~ . West Bengal and District: Dhanbad, Bihar. It falls between Latitudes  $23^{\circ}43'8''$  &  $23^{\circ}44'4''$  and Longitudes  $86^{\circ}47'46''$  &  $86^{\circ}49'46''$  and is included in Survey of India Topo Sheet No. 73 $\frac{I}{4}$ . It is also covered in sheet No.4 of Geological Map of Raniganj Coalfield published by the Geological Survey of India (DRS Mehta 51-53).

## 1.03.00 BLOCK BOUNDARY:

1.03.01 The Exploration Block of Begunia is bounded as detailed in Table I-1.

## BLOCK BOUNDARY

Table I - 1.

Direction	Limit
North	Northern boundary of Begunia Colliery.
West	Western boundary of Begunia Colliery.
East	Eastern boundary of Begunia Colliery.
South	Southern limit of the project as fixed by B.C.C.L. in Project report

## 1.04.00 COMMUNICATION:

1.04.01 The Begunia Block, which is about 45 Km from Dhanbad town, is well connected by rail and road. The National Highway No.-2 (Grand Trunk Road) is passing through the northern boundary of the block whereas the Grand Chord Line of Eastern Railway is located about 2Km to the north of the Area. Barakar Railway Station, the nearest Railway Station on Grand Chord Line, is located about 2 Km towards the north. The Barakar town of Burdwan Distt., West Bengal and Chirkunda Town of Dhanbad District, Bihar are located towards northern boundary of the block.

1.05.01 TOPOGRAPHY:

1.05.01 The area is marked by general undulating topography with gentle southerly and south westerly slope. The maximum ground elevation is observed at Triangulation Station BT-9 (RL 125.55m) whereas the minimum ground elevation varies from 120 m. to 100m above the mean sea level.

1.06.00 DRAINAGE:

1.06.01 DRAINAGE: Barakar River flowing from north to south through the western part of the block forms the main drainage of the area. In addition to the Barakar river, there is one more small nala flowing through eastern and southern part of the block and finally drainage into Barakar river.

1.07.00 CLIMATE:

1.07.01 The coalfield lies in the sub-humid region of West Bengal and Bihar. The maximum temperature during summer (April-mid-June) rises upto 42°C. During winter months (Late November to February) the temperature goes down to 15°C. The average annual rainfall in the area is about 142cm.

1.08.00 PREVIOUS WORK.

1.08.01 Raniganj Coalfield has distinction of having the first mining venture for coal in the country. Mining of coal in this coalfield dates back to 1774 A.D.

1.08.02 D.H. William, the Geological Surveyor of East India Company, carried out the first Geological Mapping of the field during 1845-46. Blandford and Wilson (Mem. G.S.I. Vol-III pt. 1, 1861) surveyed this Coalfield in 1858-60, Subsequently, Walker and Simpson (1915) used 1:15840 Maps (enlarged from 1:63,360 Maps) to revise the Geological Map. E.R. Geer surveyed the field during 1925-28 and his findings are published in Mem. G.S.I. Vol. LXI (1932).



- 1.08.03 During 1951-53, a revision Survey of Raniganj Coalfield was carried out by Mehta and others (Mem. G.S.I. Vol -84 pt. I-1956).
- 1.08.04 Since 1956, many areas of Raniganj Coalfield have been explored by regional drilling by the Geological Survey of India, and in detail by various agencies viz: Indian Bureau of Mines, National Coal Development Corporation, MECL and CMPDIL.
- 1.08.05 As a part of the systematic exploration programme for coal by the Geological Survey of India exploratory drilling was undertaken by G.S.I. in 1973 in Chanch-Begunia area, which includes Begunia exploration Block of MECL. The findings of this exploration is recorded in an unpublished report of G.S.I.
- 1.08.06 Based on available data, B.C.C.L. and CMPDIL prepared geological reports on Begunia Project in November 1974 and March 1981, respectively.
- 1.08.07 STATUS OF MINING: Out of 6 seams under detailed description in this report, only two seams, viz, Chanch-Begunia and Laikdih (Bottom and Top/Bottom combined) have been mined, that too, only in the northern part of the block, north of major fault  $F_1-F_1$ . In order to mine seam Chanch-Begunia south of fault  $F_1-F_1$  a drift has been driven through the fault which has not seam Chanch-Begunia in its down throw side.
- 1.09.00 OBJECTIVE AND SCOPE OF PRESENT WORK:
- 1.09.01 OBJECTIVES: The detailed exploration in Begunia Block was undertaken to prove lay and disposition of all the persistent seams of more than 0.50m. thickness down to Seam Laikdih and to assess their quantity and quality. As igneous activity is very much evident in the area, the degree of Pyrolitisation of Coal seams due to igneous intrusion was also to be determined in a broad way to arrive at the quality of mineable Coal from the heat affected seams. In the process of exploration, a few borehole were drilled

below seam Laikdih to have an idea of occurrence of lower seams.

1.09.02 SURVEYING:

The triangulation net work already laid in the MECL's Chanch Block, which is just West of Begunia Block, was extended to cover the Begunia Block. A total of 4.10 sq.km. area of Begunia Block has been triangulated and surveyed which includes mapping of surface feature on 1:4000 scale and contouring at 2m. interval. The reduced levels of the survey stations, borehole locations and pits are with respect to the Bench Mark at a Railway culvert on Kudhia river on Grand Chord line about 18 km west of the area and was connected to pits of Chanch & Begunia Collieries. The accuracy of levelling was found to be within 0.05 M/ft (where 'M' stands for Miles and 'ft' for feet). Magnetic bearing of the base line in Chanch Block was observed by prismatic compass and all the coordinates have been calculated on the basis of this bearing. The co-ordinates and reduced levels of Triangulation Stations, boreholes and mine pits are given in Appendices I-A & I-B (Survey plan: Plate-II).

1.09.03 GEOLOGICAL MAPPING:

The Geological Mapping was carried out on 1:4000 scale over an area of about 4.10 sq.km. by plane table and telescopic alidade. Various litho-units and structural details were recorded. For this purpose the survey plan of 1:4000 was taken as the base map (Geological Map:Plate-II)

1.09.04 DRILLING:

In this block, in all 14,197.45 m. of drilling has been carried out in 28 boreholes out of which MECL drilled 11,373.05 m. in 23 boreholes (RBG-1 to RBG-20 and RCB-7, 13 & 33) and rest of 2824.40 m. has been drilled by GSI in five boreholes (RKB-1A, 2, 4, 5 & 6). The deepest borehole drilled in the area is RBG-12(807.10m).

The data of all these boreholes as well as those drilled in adjoining blocks e.g. Chanch, have been considered for preparation of this Report.

1.09.05 LOGGING:

The entire drill cores recovered from the MECL boreholes were logged in detail for lithology, visible mineral assemblage and structural features. The detailed run-wise lithologs are included in Appendix-II. The Lithology and structural features recorded in all the boreholes are plotted in the graphic lithologs on 1:1000 R.F. (Plate IIIA to IIIE). A further precision in defining the floor and roof of the seam was introduced in the lithology after receipt of the analytical results of coal seams.

1.09.06 SAMPLING: The coal seams of thicknesses more than 0.50m., intersected in boreholes drilled by MECL were logged in detail, demarcating visible dirt bands and coal etc. The entire coal seam including dirt bands, wrapped in alkathene foils and packed in wooden boxes, were delivered to the analytical laboratories.

1.09.07 Out of 23 boreholes drilled by MECL, the coal seams of 13 boreholes (RBG-1 to 11 & RCB-7 and 13) were sent to Raniganj Coal Survey Laboratory (CFRI), for band-by-band and overall analysis. The coal seams from rest of the boreholes were sent to private analysts M/s ESCAPS (India) Pvt. Ltd. & SUPCO Pvt. Ltd. for band-by-band and overall analysis on the advice prepared by MECL in consultation with CMFDI.

1.09.08 ANALYTICAL DATA: The analytical data in respect of coal seams received from CSL and private analysts have been utilised in this Report. Till 30th April 1983, band-by-band analysis for all the boreholes were received from CSL and private analyst. Out of 13 boreholes Coal cores (RBG-1 to 11 and RCB-7, 13&35) sent to CSL, Raniganj, the overall analysis has been received only for 5 boreholes (RBG-3, 5, 9, 10 and RCB-7). For rest of

boreholes (RBG-1,2,4,6,7,8,11 and RCB-13) the overall quality has been determined from band-by-band analysis by weighted average. Out of 10 boreholes coal cores (RBG-12 to 20 and RCB-33), sent to private analysts the band by band and overall analysis of all the boreholes have been received except one (RBG-20). The analytical data and quality of coal seams is included in Appendices IV, V & VI. The seam structure of coal seams were prepared from band-by-band analysis (Plates VII-1 to VII-12).

- 1.09.09 WASHABILITY TESTS: M/S ESCAPS (INDIA) PVT. LTD. carried out washability tests on coal cores of RBG-18 for Chanch-Begunia seam only. The results of these tests are given in detailed description of Chanch-Begunia Seam.
- 1.09.10 PHYSICO MECHANICAL TEST: Test to determine Physico mechanical Properties of rocks from roof and floor of the Chanch-Begunia seam was carried out by Mining Laboratory of CMFRI (HQ) on cores of borehole RBG-18. The compressive strength, tensile strength, shear strength, protodyakonov strength index and bulk density of the rocks were determined and results of these are given in Chapter-VII.
- 1.10.00 LIMITATIONS:
- 1.10.01 The spacing of boreholes were generally attempted at 400 m. grid pattern. This however could not be strictly followed due to mine workings and topographical limitations.
- 1.10.02 The lay and disposition of the seams depict the structural geometry interpreted from boreholes and surface geological data.
- 1.10.03 Due to large spacing of boreholes it was not possible to correlate minor faults and slips between boreholes. As such the floor contours of the seams are drawn taking into account correlatable faults only. The faults with less than 10m. throw have not been normally considered unless there is positive proof from borehole or mine working data.

- 1.10.04            Incrop position of seams have been extrapolated on the basis of geological cross-sections floor and surface contour plans.
- 1.10.05            In the absence of any positive evidence, the dip of the faults have been assumed to be  $60^{\circ}$  in most of the cases.
- 1.10.06            The extent of pyrolitisation of coal seams is based on borehole data and is highly interpretative. As such, the extent of pyrolitisation as indicated in various seam folio plans should not be considered as firm.
- 1.10.07            Although the objectives of the exploration in Begunia Block was limited to the assessment of coal potentiality and quality of seams Laikdih and above, an attempt has been made to correlate and assess the quality and quantity of lower seams (below Seam Laikdih) also on the basis of limited available data. As such the reserves of these seams may be considered as tentative.

## CHAPTER - II

2.00.00 GEOLOGY:

2.01.00 REGIONAL GEOLOGY:

2.01.01 Raniganj Coalfield occupies an area of 1550 sq.km. out of which a small portion in the west separated by river Barakar lies within Dhanbad district of Bihar, while the rest of the coalfield lies in West Bengal. It is bounded in the north, west and south by Archeans. Its extension towards east is not precisely known as it is covered by laterite and alluvium.

2. .02 The general stratigraphic sequence of the Raniganj coalfield is given in Table No. : II-1.

TABLE: II-1.

**GEOLOGICAL SUCCESSION OF RANIGANJ COALFIELD**  
( After Geological Survey of India )

			Alluvium and sandy soil
Recent quaternary			Laterite, Lateritic gravel, clay and sand.
Upper Gondwana Group	Supra-panchet Formation		Red sandstone and clays mica-peridotite and dolerite intrusives.
Un-conformity			
		Panchet Formation	Green, grey and brownish and sandstones
Lower Gondwana Group	Damuda Sub-Group	Raniganj Formation	Coarse to fine grained micaceous and calcareous, sandstones, grey, sand and carbonaceous shale COAL SEAM
		Barren Measure Formation (Ironstone Shale Formation).	Dark grey arenaceous ferruginous and micaceous shale with clay, ironstone bands at places

Lower Gondwana Group	Demuda Sub-group	Barakar Formation	Coarse-to fine-grained feldspathic sandstone grey sandy and carb. shale and COAL SEAMS.
		Talchir Formation	Fine-to coarse-grained greenish sandstone, olive green shale and boulder bed.

Un-conformity

Archeans

Granite-gneiss, amphibolites and schists.

2.01.03

The oldest Gondwana member, the Talchir Formation is well developed in the north-western part of the area and passes under the Barakar Formation. It thins out towards southwest.

2.01.04

Barakar Formation, which overlies Talchir Formation is more than 600m. thick in places and contains mainly coarse-to fine-grained feldspathic sandstone, grey sandy and carb. shales and numerous coal seams, which are irregular in nature as far as their thickness and intervening partings are concerned.

2.01.05

The Barren Measure Formation, known as ironstone-shale Formation in Raniganj coalfield, overlies Barakar Formation and occupies well marked topography. These are devoid of coal seams and are overlapped by Raniganj Formation in the southwest.

2.01.06

The coal seam of Raniganj Formation is consistent in thickness and quality over large areas and is rarely affected by basic or ultra-basic intrusives. The proportion of coal to total thickness of strata is less in case of Raniganj Formation than Barakar Formation. The sandstones of Raniganj Formation are calcareous in nature.

2.01.07

The Panchet Formation occupies the basin in the middle of the field and extends to the southern margin.

2.01.08

The Supra-Panchet Formation, which belongs to Upper Gondwana Group unconformably overlies the

Panchet Formation and consists of very coarse to coarse-grained, red, yellow and grey quartzitic and quartzo-feldspathic sandstones, conglomeratic at places.

2.01.09 Ultrabasic intrusive bodies are mainly occurring in Barakar Formation where it has affected almost all the coal seams to a greater or lesser degree.

2.02.00 GEOLOGY OF BEGUNIA BLOCK:

2.02.01 The block under consideration occurs in the western part of Raniganj Coalfield and is completely covered with alluvium except at a few places where rocks of Barron Measures Formation are exposed. The general stratigraphic sequence in this part of the coalfield is given in Table-II-2.

TABLE : II-2.

GENERAL STRATIGRAPHIC SEQUENCE IN BEGUNIA BLOCK, RANIGANJ COALFIELD.

Lower Gondwana Group	Damuda Sub-Group	Barron Measure Formation	Thick, dark grey to black ferruginous laminated shale with clay and ironstone bands at places.
		Barakar Formation.	Very coarse-grained, conglomeratic sandstones to finegrained feldspat sandstones, grey sandy and carb. shales and coal seams
		Talcher Formation	Fine-grained greenish sandstones.
		Un-conformity	
		Archaean	Granite-gneiss, Amphibolites and schists.

2.02.02 The Barron Measure Formation, which was earlier called Iron-Stone Formation by Gee and which occupies major portion of the block on surface is identified by the typical lithology of monotonous black, micaceous shale weathering to brown with numerous thin bands of hard clayey Iron-Stone projecting out and breaking into fragments. It is devoid of any coal seams.



2.02.03

The Barakar Formation, which underlies Barron Measure Formation with its sandstones, shales and coal seams, is exposed towards the northern boundary of the block. The passage from the Barron Measure Formation to the Barakar Formation is gradational everywhere and the transition is characterised by 5-m. to 10-m. thick laminated shale and sandstone. The Barakars are predominantly arenaceous with thick beds of different types of sandstones shales and coal seams. This is the only formation in this part of coalfield which contains coal seams. A generalised sequence of coal seam and their intervening parting is given in Table :II-3.

TABLE:II-3.

Generalised sequence of coal seams and their intervening parting occurring in Barakar Formation of Begunia Block, Raniganj Coalfield.

(Based on Borehole data)

Coal seam/ Parting	No. of full in- ter sec- tion in boreholes	Range of thi- ckness		Remarks
		Mini- mum	Maxi- mum	
1	2	3	4	5
Local above Chanch-Be- gunia	20	0.30	1.05	Mainly Coal ex- cept around borehole RBG-10 where it is Jh. & M.P.
Parting	15	56.72	78.85	
Chanch-Be- gunia (B-VII).	22	2.25	4.15	Mainly coal ex- cept at a few places where it is Jh. & M.P.
Parting	16	56.15	75.99	
Chanch-Begu- nia Special (B-VIIA)	21	0.64	2.01	Coal, Jhama, M.P.
Parting	14	78.55	97.32	

1	2	3	4	5
Jograd (B-VIA)	18	0.05	1.15	Coal, Jhama, M.P.
Parting	17	44.00	81.11	
Laikdih (Top) (B-VI)	8	3.50	6.55	Jh.+M.P. Except in RBG-20 where it is Coal+Jh. M.P.
Parting	6	-	39.86	
Laikdih Bot- tom and Top/ Bottom (B-V)	19	18.50	32.03	Coal, Jhama, M.P.
Parting	3	48.45	65.50	
New Seam (B-VIA) (Ramakrishna Seam)	6	11.55	18.20	Jh, M.P., Coal
Parting	2	65.88	91.55	
Local	4	1.00	3.06	Coal
Parting	4	4.12	16.65	
Gopinathpur (Top) (B-IV)	8	1.17	2.93	Coal, Jhama, M.P.
Parting	8	2.12	20.14	
Gopinathpur (Bottom) (B-IV)	8	1.12	3.03	Coal, Jhama, M.P.
Parting	8	5.90	68.72	
Brindawanpur Group (B-III)	5	14.95	19.46	Contains 4 to 7 horizons of coal bends. The range of thi- ckness given in the total thi- ckness of all the bands.
Parting	4	14.80	39.62	
Local	4	0.62	6.15	Coal
Parting	4	11.84	50.01	
Kalimati/Salanpur group (B-II)	5	21.87	33.02	C, Jh, M.P. in borehole RCB-7, it is found to split into three.

2.02.04 Talchirs which occurs below Barakar Formation is not exposed any where within the block. Only in one borehole (RBG-10) it has been intersected at a depth of 674.85m. where it is light green, fine-grained sandstone.

2.03.00 GEOLOGICAL STRUCTURE:

2.04.00 REGIONAL GEOLOGICAL STRUCTURE:

2.04.01 The structure of Raniganj Coalfield is comparatively simple, with dip<sup>s</sup> in the greater part of the area towards the south. The dips in the north are usually  $5^{\circ}$  rarely exceeding  $10^{\circ}$  towards south. There are several large faults in the field along the northern boundary with the general NW-SE trend and generally having down throw towards north-east. Located towards south of the basin, the main boundary fault, consisting of a series of large en-echelone faults, limits the preservation of Gondwanas. It has a throw of about 2,700m. in the vicinity of Panchet hills. The northern limit of the basin is of natural deposition and represents the undulating Archean surface during deposition. There are many crossfaults, some of them of considerable throw, which disturb the northern boundary and continue southwards for great distance within Gondwanas.

2.05.00 GEOLOGICAL STRUCTURE OF BEGUNIA BLOCK:

2.05.01 STRIKE AND DIP:

The strike of the formation in Begunia Block varies from WNW-ESE in the western part to almost East-West in central part. The dip, which is always southerly, is observed to be comparatively higher in the southern area where it is  $10^{\circ}$  than in the northern part of the Block where it is  $4^{\circ}$ - $5^{\circ}$  only.

2.05.02 FAULTS:

Based on the borehole data, geological mapping and study of mine working plans, all together twelve faults has been identified within the block, all of which are more or less curvilinear and oblique fault. These twelve faults are

grouped in eight, because two faults  $F_1-F_1$  and  $F_2-F_2$  splits into three faults each which again merges within the block. These splits of the fault have been numbered as  $F_{-1a}$ ,  $F_{-1b}$ ,  $F_{-1c}$ , and  $F_{-2a}$ ,  $F_{-2b}$ , and  $F_{-2c}$ , just to indicate that these are splitted faults from faults  $F_1$  and  $F_2$ . Most of these faults are dipping towards south or south-east except three,  $F_3$ ,  $F_7$  and  $F_8$  which dips towards north and north-west. The detailed description of faults is given in the Table : II.3.

- 2.05.03 STRATUM CONTOURS AND GEOLOGICAL CROSS-SECTIONS:  
2.05.04           Stratum Contour Plans of five seams, viz. Local above Chanch - Begunia, Chanch - Begunia, Chanch - Begunia Special, Jograd and Laikdih (Bottom and Top/Bottom) have been prepared on 1:4000 scale, based on sub-surface data of the MECL and GSI borcholes and also available mine data of the worked seams. The floor contours have been drawn at 10m. intervals. The plans are given in Plates VI-1 to VI-5.
- 2.05.05           A series of Geological Cross Sections have been prepared on 1:4000 scale and these have been incorporated in plates-V.

TABLE : II - 4

DETAILED DESCRIPTION OF FAULTS IN BEGUNIA BLOCK, RANIG/NJ COALFIELD

FAULTS	LOCATION AND LINEAR EXTENSION	STRIKE & DIP	THROW	INTERSECTION IN BOREHOLES		EVIDENCE
				No. OF B.H.	APPROX DEPTH	
F <sub>1</sub>	400 m. west of RCB-13, passess south of RCB-7 and splits into two F <sub>1a</sub> & F <sub>1b</sub> at about 200 m. west of RBG-14 and again merges together at about 120m north of RBG-20 and also merge with Fault F-2 and continue eastward.	ENE-WSW 60° towards south.	4 60m. in the west to 130m towards the east.	5 RCB-13 RBG-20	6 560m 180m	7 Seam Laikdih & New Seam faulted. Seam above Laikdih faulted due to combined effect of F <sub>-1</sub> & F <sub>-2</sub> .
F <sub>1a</sub>	Splits from fault F <sub>-1</sub> at about 200m west of RBG-14 passes 220m. north of RKB-4 and merges with fault F <sub>-1b</sub> at about 120m north of RBG-20 to form fault F <sub>-1</sub> .	ENE-WSW 60° due South.	20m near RBG-14 and increase to 70m near RBG-2 (320m north of borehole)	RBG-14 RKB-4 RKB-2	245 m. 362.95m 410 m	Parting between Seams Chanch-Begunia special and Jograd faulted. Floor of Laikdih Seam faulted. Seam Laikdih and New Seam faulted due to combined effect of F <sub>-1a</sub> and F <sub>-1b</sub> .

1	2	3	4	5	6	7
F-1b-F-1b	Splits from F-1b about 200m west of RBG-14, passes 160m north of RKB-4 and runs more or less parallel to Fault F-1b and merges with it at about 120m north of RBG-23. This fault itself splits into two, F-1b and F-1c with depth near RKB-4.	ENE-WSW 60°	90m near RBG-14 and decrease to 30m towards east.	RBG-14 RKB-2	220m 410m	Seam Chanch-Begunia Faulted. Seam Laikdih and New Seam faulted to combined effect of Fault F-1b.
F-1c	This fault splits from fault F-1b at depth near RKB-4 and again merges with it north of RKB-2. It is not outcropping on surface.	ENE-WSW 45°		RKB-4 RBG-2	250m 386m	Chanch-Begunia Special seam is floor of Laikdih Seam faulted due combined effect of fault 1b & 1c.
F-2-F-2	130m south east of RKB-6, passes 60m south east into three faults, F-2a at 50m south of RBG-19, which passes North of RKB-2 and again merges together as well as with Fault F-1 at about 120m north of RBG-20.	ENE-WSW to -240m	165m to	RBG-1 RBG-2 RKB-4	320 m 316m 240m	Parting between Chanch-Begunia at Jograd faulted. Seam Jograd faulted. Chanch-Begunia special faulted combined effect of fault 1b to 1c.
				RBG-7 RBG-9 RBG-20 RBG-12	285m 317m 175m 547m	Local above Chanch-Begunia and Begunia seams faulted. Seam Local above Chanch-Begunia faulted. Seams above Laikdih (Top) faulted to combined effect of faults F-1a to F-1c. Seam Jograd to Laikdih and part New Seam faulted.

	1	2	3	4	5	6	7
F-2a-F-2a	Splits from fault NE-SW to ENE-WSW to south of RBG-19, wards east passes 260m north-60° due south west of RK3-5, 220m east. north of RK3-2 and merges with fault F-2b, F-2c and F-1 at about 120m north of RBG-20.			100 m. to 110 m.	RK3-2 RK3-5	365m 385m	Jograd seam is faulted. Seam Chanch-Begunia Jograd fault due to combined effect of F-2a, F-2b and F-2c.
F-2b-F-2b	Splits from fault NE-SW to ENE-WSW to south of RBG-19, wards east passes 240m north 60° due south west of RK3-5, 190m east. north RK3-2 and merges with fault F-1 at about 120m north of RBG-20.			100m to 110m.	RK3-2 RK3-5	285m 380m	Chanch-Begunia seam faulted. Seam Chanch-Begunia to Jograd fault due to combined effect of F-2a, F-2b and F-2c.
F-2c-F-2c	Splits from fault NE-SW to ENE-WSW to south of RBG-19, wards east passes 250m west 60° due south of RK3-5, 160m east. north of RK3-2 and merges with fault F-1 at about 120m north of RBG-20.			115m.	RK3-2 RK3-5	219 m. 375m	Seams from Chanch-Begunia to Jograd fault due to combined effect of F-2a, F-2b and F-2c.

1  
2  
3  
4  
5  
6  
7

F-3-F-3  
Originates 360m north-west of RBG-14, passes 300m north-west of RBG-8 and 100m north west of RBG-13.

NE-SW, 60° due north-west  
0.30m. Incline towards north-east

RBG-10  
244m.

1) Parting Laikdih and New seam faulted in between RBG-10.  
2) Encountered in the working of Chanch-Begunia Seam in Begunia Colliery (Begunia Seam working).

F-4-F-4  
Located in the western part of the block, passes 100m west of RBG-7, 75m west of RBG-11, 120m. west of RBG-10 and 10m. west of RC3-33.

NNE-SSW to NE-SW. 60°  
40m in north to 60m towards south.

RCB-7  
RBG-11  
178m  
110

Local above Chanch-Begunia faulted along with part of Barron Measure. Seams from Chanch-Begunia to Jograd faulted due to combined effect of F-5 and F-6.

F-5-F-5  
Located almost parallel to F-4-F-4 towards west, passes 115m, west of RC3-7, 90m west of RBG-11, 130m west of RBG-10 and 85m west of RC3-33.

NNE-SSW to NE-SW 60°  
50.55m.

RBG-10  
RCB-7  
RBG-11  
RBG-10  
RC3-33  
222m  
220m  
120m  
222.35m  
149m

Jograd Seam faulted.  
Seam Chanch-Begunia Special faulted to Seam Chanch-Begunia to Jograd fault due to combined effect of F-4, F-5, F-6.  
Roof of Laikdih seam faulted.  
Jograd Seam faulted due to combined effect of F-5 and F-6.



	1	2	3	4	5	6	7
F-6--F-6	Located almost parallel to fault F-4 and F-5, passes 120m west of RCG-11, 200m west of RCG-10 and 100m west of RCG-33.	NNE-SSW to NE-SW, 60° due east.	50m to 70m, due increases towards south.	RCG-33	155m	Jograd seam faulted due to combined effect of F-5 and F-6	
				RCG-11	155m	Chanch-Begunia to Jograd seams faulted due to combined effect of F-4 and F-6.	
				RCG-10	328m	Parting between New seam and Gopi pur faulted.	
				RCG-7	390m	New seam faulted.	
F-7--F-7	Located South of the Block, passes 470m south of RCG-13, the south of RCG-15 and 200m south of RCG-9.	NE-SW, in the west to almost east-west, 60° due west.	10m in the east to 50m in the west.	RCG-9	355m	Parting between Chanch-Begunia and Chanch-Begunia special seams faulted.	
				TKB-6	268m	Seam Local above Chanch-Begunia faulted.	
F-8--F-8	Located south of RCG-6.	ENE-WSW 60° due north.	C-5m	RCG-6	275m.	1) Parting between Chanch-Begunia and Chanch-Begunia Special faulted. 2) Encountered in the main drift Begunia Colliery.	

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## CHAPTER - III

- 3.00.00 COAL SEAMS :
- 3.01.00 GENERAL :
- 3.01.01 The detailed exploration for coal in Begunia Block has revealed the existence of as many as 13 coal horizons with thickness more than 0.50m from Salanpur to Local above Chanch-Begunia. All these seams are confined within Barakar Formation. The local nomenclature of seams presently in practice in the area has normally been accepted and used in this report except in a few cases where minor modification has been made.
- 3.02.00 SEAM CORRELATION:
- 3.02.01 For the seam correlation, established criteria such as thickness and quality of the seam, persistence of the development, thickness and lithology of the intervening parting between seams, roof and floor of the seam and marker horizons have been considered.
- 3.02.02 While attempting the correlation of the various seams, due care has been taken to identify and correlate each coal horizon in different boreholes including these in the adjoining area. As the objective of exploration was to assess the quality and quantity of seam from top to Laikdih, the maximum number of boreholes were drilled upto Seam Laikdih only. Because of the availability of data and persistence of seam thickness, it was easier to correlate the seam Laikdih and above. Correlation of Lower Seams posed problem mainly due to paucity of data and as such, instead of correlating each and every coal horizon of seams lower to Laikdih, it has been identified in groups.
- 3.02.03 The seam has been considered as split, where the intervening parting persistently exceeds 0.30m.
- 3.02.04 The correlation chart of the coal seam is given in Plate IV. while graphic seam correlation is given in Plate IVB.

3.03.00 COKING AND NON-COKING COAL:

3.03.01 After careful study of quality and coking properties of the seam, the following seam have been considered as Medium coking and non-coking.

Seam Local above Chanch-Begunia } Medium coking  
to Now seam }

Seams below Now Seam Non-coking

3.04.00 BASIS FOR THE THICKNESS AND QUALITY DETERMINATION

3.04.01 The assessment of the thickness, quality and general characteristics of the coal seam have been arrived at, based on the analytical results of the coal core samples supplied by Coal Survey Laboratory (Raniganj), CFRI, Raniganj, and private analysts viz M/s Escaps India (Pvt.) Limited and SUPCO.

3.04.02 While determining the quality of the coal seam, bands containing ash upto 35% has been considered as 'COAL', with ash content between 35-50% are considered as 'Shaly Coal' whereas between 50-75% it is considered as carbonaceous Shale. In case of coking coal bands with more than 35% ash and 0.05 thickness has been taken as 'Dirt Band', while in case of non-coking coal, the bands with more than 50% Ash and 0.05m. thickness has been considered as dirt.

3.04.03 While determining the in-band thickness of the coal seams, carbonaceous shale and shale bands alone upto 0.30m. thickness have been considered within the seam.

The coal bands occurring close to a seam and having thickness more than the intervening parting of dirt band upto 0.30m in thickness are included within the seam.

3.04.04 The analytical data on 'Overall Analysis' of various coal seams, excluding dirt bands of more than 35% Ash and 0.05m thickness, have been supplied by Raniganj Coal Survey Laboratory in respect of 5 boreholes i.e. RBG-1, 5, 9 & 10 and RCB-7 and

from Private Analyst it is available for 10 boreholes i.e. RBG-12 to 19 and RCB-13 and 33. For rest of the borehole, the overall analysis of the seam is calculated on 'Weighted average' basis, from band-by-band proximate analysis.

3.04.05 The coking properties of the seams have been determined by the ~~OSL~~ and Private Analyst for some of the boreholes which have been used in this report.

3.04.06 The volatile matter content (on Unit Coal Basis) has been calculated by the formula.

$$\text{UVM}\% = 100 - \frac{\text{Fixed Carbon} \times 100}{100 - (1.1 \text{ Ash} + \text{Moisture})}$$

3.05.00 SEAM STRUCTURE:

3.05.01 Seam structure of the seams has been drawn on 1:50 scale, based on the analytical results as received from the ~~OSL~~ M/s ESCAPS and SUPCO private Ltd. The roof and floor details, based on visual lithologs have been included in the seam structure. The seam structure includes 'Band-by-Band' analytical data on Moisture, Ash, Volatile Matter and fixed Carbon content (on air dried basis) as received from the ~~OSL~~ /Analysts. Alongwith the seam structure is also included 'Overall' data of the seam.

3.05.02 The seam structure of various seams is given in Plates VII-1 to VII-12.

3.06.00 SEAM FOLIO:

3.06.01 As the number of dirt bands in all the seam from Laikdih and above are negligible, only ~~in~~-band seam folio plans have been prepared for individual seams from seam Local Above Chanch-Begunia to Laikdih. These seam Folio Plan include Isochores (0.50m., 0.90m., 1.20m., 2.00m., 4.00m., 6.00m., 10.00m. and above), Isoash (15%, 18%, 21%, 24% & 28%), Horizonlines (R.L.'s 0.00 m. (-) 100m, (-) 200m, (-) 300m., (+) 400m., (-) 500m.) and Isovols (20%, 22%, 25 and 30%) based on ex-bands results only. In-band data

wherever available have been given in Parenthesis.

3.06.02 In case of pyrolitised seam, composite 'In-band seam folio plans have been prepared for coal and Jhama by assuming gradual baking effect of the intrusives. Following norms are used for fixing the limits of part Jhama and full Jhama zone

a) In adjacent boreholes where in one only full Coal and in the other full Jhama has been intersected the limits between coal, the transitional mixed coal & Jhama zone and the Jhama have been assumed by dividing the distance between the boreholes in three equal parts.

b) Where either full coal or full Jhama and part Jhama has been intersected in the adjacent boreholes the boundary between the two is taken half way between the two boreholes.

Based on the above criteria, the 'Zero' thickness lines of coal and Jhama have been fixed and seam folio plans prepared. Isochore for Jhama have not been drawn either in full Jhama or partial Jhama zones. Partial Jhama zone contains the Isochore, Isoash, Isovals and horizon of non-pyrolitised coal only.

3.06.03 The 'Grade' of the coal indicated is as per the Notification dated the 13th February 1981 of the Ministry of Energy (Department of coal).

3.06.04 Seam Folio Plans are included in Plates VIII-1 to VIII\_5.

## CHAPTER - IV.

### 4.00.00 DESCRIPTION OF COAL SEAMS:

#### 4.01.00 GENERAL

4.01.01 In all 13 correlatable Coal horizons have been identified in the Barakar Formation of Begunia Block. In the following paragraphs the seams and their quality are described in detail from Seam Local above Chanch-Begunia to Laikdih. Due to paucity of data for seams below Laikdih, an attempt has been made to describe these seams and their quality broadly.

#### 4.02.00 SEAM LOCAL (ABOVE CHANCH-BEGUNIA) :

##### 4.02.01 GENERAL

4.02.02 The Seam Local Above Chanch-Begunia is the youngest seam of the Barakar Formation in Begunia Block occurring normally within 10 m. to 15 m. below Barakar-Barren Measure contact. This seam has been intersected in 20 boreholes drilled in the block, while in six other boreholes this was observed to be faulted.

##### 4.02.03 THICKNESS:

4.02.04 The thickness of the seam including pyrolitised portion varies from 0.30 m. (RKB-13) to 1.05m. (RKB-14). The seam is completely pyrolitised in borehole RBG-10, hence thickness of the coal portion of seam, including bands varies from Nil to 1.05m. (RKB-14) where as excluding bands, it varies from Nil to 1.04 m. (RBG-17).

##### 4.02.05 DIRT BAND:

4.02.06 The seam is practically devoid of any dirt band. Out of 20 boreholes in which this seam was intersected, the dirt bands were observed only in two (RBG-1 and RKB-14). The number and total thickness of dirt band in these boreholes are as follows:-

<u>B.H. No.</u>	<u>No. of Dirt bands</u>	<u>Total thickness of dirt bands.</u>
RBG-1	1	0.11 m
RKB-14	2	0.11 m

## 4.02.07 ROOF AND FLOOR:

4.02.08 In the eastern part of the block the roof is normally sandstone (fine-grained to coarse-grained) whereas in the rest of the area it is either shale, shale arenaceous or intercalation of shale and sandstone. The floor in central and eastern part of the block is predominantly intercalation of shale and sandstone whereas in western part it is shale.

## 4.02.09 QUALITY:

4.02.10 The quality of seam (Local Above Chanch-Begunia) (Coal portion excluding Jhama, where present). is given in Table: IV-1.

TABLE : IV-1  
Quality of Seam Local (Above Chanch - Begunia)

Parameter	No. of Borehole considered	RANGE		Remarks
		Min.	Max.	
<u>IN. BAND</u>				
Thickness (m)	20	0.00	1.05	
Ash (%)	18	17.00	32.20	
Grade	18	Steel Gr. II	Washery Gr. IV	
<u>EX. BAND</u>				
Thickness (m)	19	0.00	1.04	
Moisture (%)	18	1.10	2.10	
Ash. (%)	18	17.00	32.20	
Grade	18	Steel Gr. II	Washery Gr. IV	
V.M. (%)	18	22.8	25.8	
V.M. (%) (On Unit Coal)	17	28.4	32.8	
F.C. (%)	17	44.1	57.4	
Calorific value (Kcal/Kg)	1	6050		
CO <sub>2</sub> (%)	1	0.21		
Caking Index	2	19	27	
Coke type	2	G	G-4	
Swelling Index	2	5	6½	

4.02.11            Though the Ash% excluding and including bands varies from 17.00% to 32.20%, in major part of the block, it's variation is confined between 24% to 28%.

4.02.12            PYROLITISATION:

4.02.13            The seam is found to be unaffected from igneous intrusion in major portion of the block except around borehole RBG-10, near the western boundary of the block, where it is completely pyroclitised due to micaperidotite intrusion.

4.02.14            RESERVES:

4.02.15            The summary of the coal reserves of seam Local (Above Chanch - Begunia) is given below :

( Reserves in thousand tonnes )

Coking        - Virgin        - 2076  
(INBAND)

4.03.00            SEAM CHANCH-BEGUNIA (B-VII):

4.03.01            GENERAL :

4.03.02            Seam Chanch-Begunia, which is also correlated as seam B-VII in this report, is the most important seam of this area and occurs below seam (Local Above Chanch-Begunia) after parting of 56.72 m. to 78.85 m. This seam has already been worked in the northern part of the block, as Begunia seam by Begunia colliery. It has been intersected in 22 boreholes drilled in the Block and in six boreholes, it is observed to be faulted. Out of 22 boreholes in which this seam has been intersected, it has passed through stowed goaf in two boreholes, i.e. RBG-8 and RBG-10.

4.03.03            THICKNESS:

4.03.04            The thickness of the seam varies from 2.25 m. (RBG-10) to 4.15 m. (RBG-13). It is completely pyroclitised due to mica-peridotite intrusion in three boreholes (RBG-16, RKB-4 and RKB-6), and hence the thickness of coal portion of seam including and excluding bands varies from Nil to 3.53 m.



## 4.03.05 DIRT BAND:

4.03.06 The seam is normally free from any dirt band. Out of 22 boreholes intersections, one number of dirt band is observed in four boreholes BEG-1, BEG-6, BEG-9 and BEG-33 where its thickness varies from 0.05 m. to 0.12m.

## 4.03.07 ROOF AND FLOOR :

4.03.08 The roof of the seam in major part of the area is fine to coarse grained sandstone with intercalation of shale and sandstone, shale arenaceous or shale in remaining portion. The floor in central and eastern part of the block is shale or carbonaceous shale whereas in western part it is either intercalation of shale and sandstone or fine grained to medium grained sandstone.

## 4.03.09 QUALITY:

4.03.10 Chanch-Begunia Seam is a good quality medium coking coal with low to moderate ash content. The quality of the seam (coal portion excluding Jhama, where present) is given in table : IV - 2.

TABLE: IV.2.

## QUALITY OF SEAM CHANCH - BEGUNIA

Parameter	No. of borehole Considered	RANGE		Remarks
		Minimum	Maximum	

IN-BAND

Thickness (m)	22	0.00	3.53	
Ash. (%)	17	13.5	24.2	
Grade	17	Steel Gr.I	Washery Gr.III	

EX-BAND

Thickness (m)	20	0.00	3.53	
Moisture (%)	17	0.80	2.00	
Ash. (%)	17	13.50	24.20	
Grade	17	Steel Gr.I	Washery Gr.III	
V.M. (%)	17	20.1	30.7	
V.M. (Unit coal)	17	23.0	36.2	
Fixed Carbon%	17	50.1	61.1	
Calorific Value (K.Cal/Kg)	4	6050	6940	
CO <sub>2</sub> (%)	8	0.21	1.15	
Caking Index	5	13	23	

4.03.12 PYROLITISATION :

4.03.13 In western part of the block, the seam is partially or completely pyrolytised due to mica-peridotite intrusion. It is found to be completely pyrolytised in three boreholes (RBG - 16, RWB - 4 and 6) where as in two boreholes (RBG - 13 and RBG - 15) it is partially pyrolytised.

4.03.14 RESERVES :

4.03.15 The summary of the coal reserves in respect of seam Chanch - Begunia is given below:

( Reserves in thousand tonnes )

Coking -	Virgin	- 632 <del>3</del>
(INBAND)		
Coking -	Developed	- 357
(INBAND)	TOTAL :	<u>668<del>0</del></u>

4.03.16 WASHABILITY :

4.03.17 Washability tests were carried out by M/s ESCAPS (India) Private Limited for seam Chanch - Begunia on coal cores of RBG - 18. The results of the tests show that this seam gives good response to the washing, yielding 72.9% of cleans with ash content only 13.1%, 21.9% of middling and an 52% of rejects. The results of the tests are given in Table : IV - 3, IV - 3A and IV - 3B.

TABLE : IV - 3.

Cleaning Possibility of Seam Chanch - Begunia  
(Test carried out on coal cores of RBG - 18).

Depth from surface and thickness.	Ash% of Raw Coal	Cleans at 1.5 Sp. Gr.		Middling at 1.50 - 1.80 Sp. Gr.		Reject at 1.80 Sp. Gr.	
		Wt%	Ash%	Wt%	Ash%	Wt%	Ash%
202.70-205.35 (2.65)	20.1	72.9	13.1	21.9	35.6	5.2	60.6

TABLE : IV-4A

PROPERTIES OF WASHED PRODUCTS OF SEAM GIANCH-BEGUNIA  
(Test carried out on Coal Cores of Borehole BEG-18)

	Proximate analysis		C.I.	I. I. Swelling Index.	Ultimate analysis			MgO (%)	Fe (%)	Ash fusion Temperature in OC (in Milding reducing Temperature)	Initial Hemispherical point.	Flow point.	CO <sub>2</sub>				
	M. %	Ash. %			Hydro-Gen %	Sulphur %	Carbon %							Mitrogen %	Oxygen (by diff. iron) %		
seams	0.7	13.1	28.9	21	G	5	87.71	5.23	0.56	2.05	4.45	0.067	-	-	-	0.83	
bedding	0.7	35.6	21.7	-	-	-	88.25	5.10	0.65	1.96	4.04	-	1220°	1350°	1400° (Over)	-	0.95
reject	-	60.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TABLE : IV-4B

Properties of Wash products (middlings) of seam Gianch-Begunia  
(Test carried out on coal cores of Borehole BEG-18.)

	Calorific Value		SiO <sub>2</sub>	Al <sub>2</sub> O <sub>3</sub>	Fe <sub>2</sub> O <sub>3</sub>	TiO <sub>2</sub>	Ash Analysis			MgO	SO <sub>3</sub>	Alkalies (by Difference)
	Gross	Net					P <sub>2</sub> O <sub>5</sub>	CaO	SiO <sub>2</sub>			
bedding	2180	4990	53.83	28.78	7.76	2.03	0.72	3.13	1.37	0.55	-	1.85

4.04.00 SEAM CHANCH-BEGUNIA SPECIAL (B-VIIIA):

4.04.01 GENERAL :

4.04.02 Seam Chanch - Begunia Special or Seam B-VIIIA, occurs 56.15 m. to 75.99 m. below seam Chanch - Begunia. It has been intersected in 21 boreholes drilled within the Begunia Block, out of which, in 10 boreholes it is found completely pyroclitised due to mica-peridotite intrusion, whereas in 4 boreholes it is partially pyroclitised. In five boreholes this seam was found to be faulted. This is a virgin seam in the block.

4.04.03 THICKNESS:

4.04.04 The thickness of seam Chanch - Begunia Special varies (including pyroclitised portion) from 0.64 m. (RBG-9) to 2.01 m. (RBG-17). The including bands and excluding bands thickness of Coal portion of the seam varies from Nil to 1.20 m. (RBG-13).

4.04.05 DIRT BAND:

4.04.06 One number of dirt band has been observed only in three borehole, i.e., RBG-15, RCB-13 and RCL-33, where it's total thickness varies from 0.10 m. to 0.35m. In rest of the borehole it is found free from the dirt bands.

4.04.07 ROOF AND FLOOR :

4.04.08 The roof of the seam is mainly shale or shale arenaceous though in some cases, intercalation of shale and sandstone and sandstone has also been observed as roof. The floor of the seam is either intercalation of shale and sandstone or shale arenaceous and shale.

4.04.09 QUALITY :

4.04.10 The quality of the seam Chanch-Begunia Special (Coal portion excluding jhama, where present) is summarised in Table : IV - 5.

TABLE : IV - 5

## QUALITY OF SEAM CHANCH - BEGUNIA SPECIAL

Parameter	No. of boreholes considered.	R A N G E		Remarks
		Minimum	Maximum	
<u>IN - BAND</u>				
Thickness (m)	21	0.00	1.20	
Ash (%)	10	19.5	36.6	
Grade	10	Washery Gr. I	Ungraded	
<u>EX - BAND</u>				
Thickness (m)	20	0.00	1.20	
Moisture (%)	10	0.7	2.3	
Ash (%)	10	16.8	33.6	
Grade	10	Steel Gr. II	Washery Gr. IV	
V.M. (%)	10	22.0	28.2	
V.M. (%) (Ch Unit Coal)	10	27.4	34.4	
Fixed Carbon (%)	10	42.2	53.0	
Calorific Value (K.Cal/Kg.)	1	6140		
CO <sub>2</sub> (%)	1	0.75		
Caking Index	1	23		
Coke Type	1	G/G <sub>1</sub>		
Swelling Index	1	4½		

## 4.04.11 PYROLITISATION:

4.04.12 The Seam is completely or partially pyrolitised in the major part (Central and eastern portion) of the block and found to be unaffected by mica-peridotite intrusion only in seven boreholes i.e., RBG-8, RBG-10, RBG-13 and RGE-33 located in the northwestern part of the block and RBG-15, RBG-16 and RKB-6 located in its southwestern part.

## 4.04.13 RESERVES:

4.04.14 The Summary of the coal reserves of seam Chanch - Begunia Special is given below:

( Reserves in thousand tonnes )

Coking - Virgin - 1732  
(IN-BAND)

4.05.00 SEAM JOGRAD:

4.05.01 GENERAL :

4.05.02 Seam Jograd, (B-VI A), which occurs 78.55 m. to 97.32 m. below seam Chanch - Begunia Special seam is the fourth workable seam in the sequence from top in Barakar Formation of Begunia Block and has been intersected in 18 boreholes drilled within the block. In 7 boreholes, this seam could not be intersected due to faulting. Out of 18 boreholes in which this seam is intersected, its thickness is less than 0.50 m. in 9 borehole and as such their analysis is not available.

4.05.03 THICKNESS:

4.05.04 The thickness of seam, including pyroclitised portion varies from 0.05 m. (RBC-13) to 1.15 m. (RCB-7). The including and excluding bands thickness of coal portion of the seam varies from Nil. to 1.15 m. The seam is having workable thickness of 0.50 m. and more in the south western part of the block.

4.05.06 DIRT BAND:

4.05.07 In the area, where seam is workable and for which analysis is available, it is completely devoid of any dirt band.

4.05.08 The floor of the seam is medium to coarse grained sandstone while its roof is mainly sandstone except around borehole RCB-7, where it is intercalation of shale and sandstone.

4.05.09 QUALITY:

4.05.10 The quality of the seam Jograd (coal portion excluding Jhama where present) is summarised in Table: IV-6.

TABLE : IV-6.  
QUALITY OF SEAM JOGRAD

Parameter	No. of boreholes considered	R A N G E		Remarks
		Minimum	Maximum	
<u>IN BAND:</u>				
Thickness (m)	18	0.00	1.15	
Ash. (%)	5	23.4	33.1	
Grade	5	Washery Gr.II	Washery Gr.IV	
<u>EX BAND:</u>				
Thickness (m)	9	0.00	1.13	
Mixture (%)	5	1.13	2.1	
Ash. (%)	5	23.4	33.1	
Grade	5	Washery Gr.II	Washery Gr.IV	
V.M. (%)	5	22.9	24.1	
V.M. (%) (on unit coal)	5	29.9	32.7	
Fixed Carbon (%)	5	41.8	51.0	

## 4.05.11 PYROCLITISATION:

4.05.12 Jograd is found to be completely affected by micapieridotite intrusion in 4 boreholes RBG-1, RBG-4, RBG-6 and RKB-4 located in the central portion of the block. In rest of the area it is unaffected.

## 4.05.13 RESERVES:

4.05.14 The summary of the coal reserves in respect of seam Jograd is given below:

( Reserves in thousand tonnes )

Coking - Virgin - 744  
(INBAND)

## 4.06.00 SEAM LAIKDIH (TOP):

4.06.01 Seam Laikdih (Top) or Seam (E-VI), which occurs 44.00 m. to 81.11m. below seam Jograd, has been intersected in 8 boreholes located in the eastern part of the Block. This seam is the upper split of seam Laikdih which splits into two (Top and Bottom) portion towards eastern part of Beguria block. Out of 8 boreholes (RBG-1, 7, 9,

17 and 20, RKB-1A, 2 and 5), in which this seam is intersected, it is found to be completely pyroclitised due to mica-peridotite intrusion in 7 boreholes while in one borehole RBC-20, only middle portion of the seam is pyroclitised. In borehole RBC-12, located in the eastern part of the Begunia Block, this seam could not be found due to faulting. The thickness of seam varies from 3.50m to (RKB - 6) to 6.55m (RKB-2)

4.06.02 QUALITY:

4.06.03 The quality of unburnt portion of seam Laikdih (top) as observed in borehole RBC-20 is given in Table : IV-7.

TABLE : IV-7.  
QUALITY OF SEAM LAIKDIH (TOP) IN RBC-20

Parameter	Top portion	Bottom portion
Thickness (m)	0.72	2.19
Moisture (%)	-	1.8
Ash. (%)	26.9	13.95
Grade	Washery Gr.III	Steel Gr.I
V.M. (%)	-	27.63
V.M. (%) (on unit coal)	-	31.7
Fixed Carbon	-	56.62

4.07.00 SEAM LAIKDIH (BOTTOM AND TOP AND BOTTOM COMBINED):

4.07.01 GENERAL:

4.07.02 Seam Laikdih (Seam E-V), which occurs as a single seam in the western part of the Begunia Block, splits into two (Top and Bottom) in the western part. Where the seam splits. The maximum parting observed between Top and Bottom portion is 39.86 m. The seam Laikdih (Bottom) and Laikdih (Top and Bottom combined) is described together in this report. The complete thickness seam is intersected in 19 boreholes drilled in the area. In two boreholes (RKB-2 and RBC-12) it is found to be completely faulted; which in three others (RBC-2, 10 and RKB-4), it is partially faulted. The seam is partially or completely affected by mica-peridotite intrusives in almost all the boreholes.



## 4.07.03 THICKNESS:

4.07.04 The seam Laikdih (Bottom and Top/Bottom combined) is the thickest seam in the upper horizon of Barakar Formation in Begunia Block. Its thickness including pyrolitised portion varies from 18.50 m. (RKB-5) to 32.03m (RCE-7). The including bands thickness of coal portion of the seam varies from Nil (Where the seam is completely pyrolitised) to 23.65 m. (RBC-15), while excluding bands, it varies from Nil to 23.57 m. (RBC-15).

## 4.07.05 DIRT BANDS:

4.07.06 Only one number of dirt band with thickness of 0.08m. has been observed in borehole No. (RBC-15). In other boreholes, it is free from dirt bands.

## 4.07.07 ROOF AND FLOOR:

4.07.08 In major part of the area, shale or shale arenaceous forms the roof of the seam, though in some cases, sandstones or intercalation of shale and sandstone is also observed as roof. The floor of the seam is sandstone, shale or intercalation of shale and sandstone.

## 4.07.09 QUALITY:

4.07.10 The quality of coal portion of the seam is summarised in the Table : IV-3.

TABLE : IV-3

## QUALITY OF SEAM LAIKDIH (BOTTOM AND TOP/BOTTOM COMBINES)

Parameter	No. of boreholes considered	RANGE		Remarks
		Minimum	Maximum	
<u>IN BAND</u>				
Thickness (m)	19	0.00	23.65	
Ash. (%)	15	15.00	22.6	
Grade	15	Steel Gr.-I	Washery Gr.II	
<u>EX. BAND:</u>				
Thickness (m)	19	0.00	23.57	
Moisture (%)	15	0.8	2.4	
Ash. (%)	15	15.00	22.6	
Grade	15	Steel Gr.I	Washery Gr.II	

Parameter	No. of borehole considered.	RANGE		Remarks
		Maximum	Minimum	
V.M. (%)	15	19.5	29.3	
V.M. (%) (On unit Coal)	15	23.3	34.2	
Fixed Carbon (%)	15	52.81	59.0	
Calorific Value (K. Cal./Kg.)	4	6670	7070	
CO <sub>2</sub>	3	1.30	2.00	
Caking Index	7	13	25	
Coke Type	5	F to G <sub>2</sub>	G <sub>4</sub>	
Swelling Index	5	3	6	

## 4.07.11 PYROLITISATION:

4.07.12 The seam is invariably associated with mica-peridotite intrusion which has either partially or completely pyroclitised the seam in the area. It is found completely pyroclitised around boreholes RBG - 4, RBG - 8, RKB - 14 and RBG - 17 located in the central or eastern part of the Block. The major part of the seam is found to be unaffected by intrusion mainly in the southern part of the area that is around borehole RBG - 15, 16, 5, 7, 9 and RKB - 6 and also around RBG - 20 in north eastern corner of the Block.

## 4.07.13 RESERVES:

4.07.14 The summary of the reserves of the seams Laikdih Top and Bottom Combined and Laikdih Bottom is given below:

(Reserves in thousand tonnes)

## Laikdih Top and Bottom Combined

Coking	-	Virgin	-	13208
(INBAND)	-	Developed	-	298
TOTAL :				13506

## Laikdih Bottom

Coking	-	Virgin	-	8936
(INBAND)	-	Developed	-	624
TOTAL :				9560

## 4.08.00 NEW SEAM:

## 4.08.01 GENERAL:

4.08.02 New Seam or Seam B - VL, which occurs 48.45 m. to 65.50 m. below Laikdih (Bottom and Top and Bottom), has been

The seam is affected by mica-peridotite intrusion in all the boreholes.

In borehole RBC-20, located in the north eastern corner of the block, the seam splits into two with intervening parting of 6.28 m. The seam may also be called as Ramakrishna Seam due to its occurrence in Ramakrishna Village.

4.08.03 THICKNESS AND QUALITY:

4.08.04 The thickness of the seam including pyritic coal portion varies from 11.55 m. (RBC-2) to 18.20 m. (RBC-10). The seam is found to be partially pyritic in two boreholes only i.e. RBC-16 and RBC-20, where the unaffected coal portion is found to be free from any dirt band. The thickness of the coal portion in the boreholes varies from 4.10 m. to 7.80 m.

4.08.05 The Quality of the coal of New Seam (Coal portion only) is summarised in Table : IV-9.

TABLE : IV-9.

QUALITY OF NEW SEAM.

Parameter	No. of borehole considered	RANGE	
		Minimum	Maximum
<u>IN-BAND &amp; EX-BAND:</u>			
Thickness (m)	2	4.10	7.80
Moisture (%)	2	0.8	2.75
Ash. (%)	2	15.55	24.4
V.M. (%)	2	21.2	24.7
Fixed Carbon (%)	2	53.6	57.04
U.V.M. (%)	2	25.3	28.8
Grade	2	Steal Gr. II	Washery Gr. III
Caking Index	1	21	—
Coke Type	1	G <sub>1</sub>	—
Swelling Index	1	5½	—
CO <sub>2</sub> (%)	1	0.82	—

4.08.06 RESERVES:

4.08.07 The summary of reserves of the New Seam are given below:

(Reserves in Thousand tonnes)

Coking - Inferred - 2022  
(VIRGIN)

## 4.09.00 SEAM LOCAL (ABOVE GOPINATHPUR):

## 4.09.01 GENERAL:

4.09.02 This Local Seam, which occurs between New Seam and Gopinathpur (Top) after an intervening parting of 65.38 m. to 91.55 m. from New Seam, has been intersected in 4 boreholes, while it is found to be faulted in one, i.e., RKB-4. This seam is completely free from pyroclitisation.

## 4.09.03 THICKNESS AND QUALITY :

4.09.04 The thickness of the seam including bands varies from 1.00 m. (RCB-13 RCB-20) to 3.06 m. (RCB-12) whereas excluding bands it varies from 0.58 m. (RCB-7) to 2.71 m. (RCB-12). Out of 4 boreholes, in which this seam is intersected, it is free from dirt bands in one i.e., RCB-20, while in others one to two numbers of dirt bands of more than 50% and 0.05 m. thickness have been observed. The total thickness of these dirt bands varies from 0.09 m. to 0.47 m.

4.09.05 The Quality of the seam Local (Above Gopinathpur) is given in Table : IV-10.

TABLE : IV-10  
QUALITY OF SEAM LOCAL ( ABOVE GOPINATHPUR)

Parameter	No. of borehole considered	RANGE	
		Minimum	Maximum
<u>IN. BAND:</u>			
Thickness (m)	4	1.00	3.06
Ash. (%)	4	32.20	37.07
<u>EX. BAND:</u>			
Thickness (m)	4	0.58	2.71
Moisture (%)	4	0.7	2.02
Ash. (%)	4	26.2	34.43
V.M (%)	4	19.8	20.9
Fixed Carbon (%)	4	44.02	51.7
U.H.V. (K. Cal/Kg.)	4	3867	5119
Grade	4	E	C.

4.09.06

## RESERVES:

4.09.07

The summary of the reserves of seam Local (Above Gopinathpur) is given below:

( Reserves in thousand tonnes )

Non-Coking - Inferred - 1301  
(VIRGIN)

## 4.10.00 SEAM GOPINATHPUR(TOP):

## 4.10.01 GENERAL:

4.10.02 Seam Gopinathpur (Top) or Seam:B-III, occurs 4.12 m. to 16.65 m. below the Local Seam and is intersected in 8 boreholes drilled in the area. It is found to be partially affected due to micaperidotite intrusion in three boreholes (RBC-2, 12 and RCB-13), while in rest of the borehole it is free from pyroclitisation.

## 4.10.03 THICKNESS AND QUALITY:

4.10.04 The thickness of the seam, including Jhama portion, varies from 1.17 m. (RCB-7) to 2.93 m. (RBC-2). The thickness of the coal in seam Gopinathpur(Top) including and excluding bands varies from 0.57m to 2.25m. Dirt band in this seam has been observed only in one borehole i.e., RCB-7 where one number of 0.10 m. thick dirt band was found.

4.10.05 The quality of seam Gopinathpur(Top) is given in Table : IV-11.

TABLE : IV-11.

QUALITY OF SEAM GOPINATHPUR (TOP)

Parameter	No. of borehole considered.	R A N G E	
		Minimum	Maximum
<u>IN BAND:</u>			
Thickness (m)	8	0.57	2.52
Ash (%)	7	26.1	33.65
<u>EX BAND:</u>			
Thickness (m)	7	0.57	2.25
Moisture (%)	7	0.8	2.21
Ash (%)	7	26.1	32.2
V.M. (%)	7	18.6	22.70
Fixed Carbon (%)	7	47.5	50.9
U.H.V(K.Cal/Kg.)	7	4286	5133

4.10.06 RESERVES

4.10.07 The summary of the reserves of the seam Gopinathpur (Top) is given below:

		( Reserves in thousand tonnes )	
	Non-Coking	- Inferred	- 7466
	(VIRGIN)		
4.11.00	SEAM GOPINATHPUR (BOTTOM):		

4.11.01 GENERAL

4.11.02 Seam Gopinathpur (Top) is underlain by seam Gopinathpur (Bottom) after parting of 2.12 m. to 16.74m. This seam has also been intersected in 8 boreholes in Begunia Block, out of which it is found partially pyroclitised due to mica-peridotite intrusion, in two boreholes RCB-7 and RCB-13, both located in the western part of the block.

4.11.03 THICKNESS AND QUALITY:

4.11.04 The thickness of seam Gopinathpur (Bottom) including its pyroclitised portion, varies from 1.12m. (RCB-12) to 3.03 m. (RCB-7). The including bands thickness of the coal of the seam varies from 1.12m. to 2.40 m. while, excluding bands its variation is between 1.12 m. to 2.22m. Out of 8 boreholes, in which this seam is intersected it is free from dirt bands in 4 boreholes (RBC-2, 12, 20 and RCB-13). In other boreholes (RBC-10, RKB-2,5 and RCB-7), one to three dirt bands having a total thickness of 0.06 m. to 0.42m. were observed.

4.11.05 The quality of seam Gopinathpur (Bottom) is summarised in Table : IV-12.

TABLE : IV-12.

QUALITY OF SEAM GOPINATHPUR (BOTTOM)

Parameters	No. of borehole considered	R A N G E	
		Minimum	Maximum

IN-BAND:

Thickness (m)	8	1.12	2.40
Ash. (%)	8	29.11	45.7

Parameter	No. of borehole considered	R A N G E	
		Minimum	Maximum
<u>EX. BAND:</u>			
Thickness (m)	8	1.12	2.22
Moisture (%)	8	0.7	1.1
Ash. (%)	8	29.11	47.00
V.M (%)	5	18.1	21.34
Fixed Carbon (%)	5	45.3	49.1
U.H.V. (K. Cal/Kg.)	5	3714	4662
Grade	5	E	D
Caking Index	1	18	
Coke Type	1	G <sub>5</sub> /G <sub>6</sub>	
Swelling Index	1	6	

## 4.11.06 RESERVES:

4.11.07 The summary of the reserves of the Seam Gopinathpur (Bottom) is given below:

( Reserves in thousand tonnes )

Non-Coking - Inferred - 3455  
(VIRGIN)

## 4.12.00 BRINDAWANPUR GROUP OF SEAMS:

## 4.12.01 GENERAL:

4.12.02 After an intervening parting of 5.90 m. to 63.22m. below Seam Gopinathpur (Bottom) there is a Group of seam consisting of 4 to 7 horizons of coal bands emplaced within a strata of 46.9 m. to 54.08m. This group has been identified and correlated as Brindawanpur Group (B-III). The group has been completely intersected in five boreholes (RBC-10, 12, 20, RKB-20 and RCL-7), whereas in borehole RBC-2, RKB-5 and RCL-13, it is partially intersected.

## 4.12.03 THICKNESS AND QUALITY:

4.12.04 The thickness of individual seam in the Group varies from 0.55m. to 11.68 m. whereas total thickness of all the seam in group varies from 14.95m. (RCL-2) to 19.46 m. (RBC-20). The grade of the seams

varies from F to D. The detailed quality of individual bands intersected in different boreholes is given in Appendix - V, page 21 and 22.

4.12.06 RESERVES:

4.12.07 The summary of the reserves of the seam Brindawanpur Group is given below:

Non-Coking (VIRGIN)	Inferred	-	71620
------------------------	----------	---	-------

4.13.00 SEAMS LOCAL (ABOVE SALANPUR):

4.13.01 GENERAL:

4.13.02 Between Brindawanpur Group of Seams and Salanpur, one or two local coal bands occur after an intervening parting of 14.80 m. to 39.62 m. It has been intersected in 5 boreholes (RBC-10, 12, 20 RRB-4 and 7) drilled in the Begunia Block. In RBC-12 and 20, located in the eastern part of the block, two local seams are found while in others, only one is found to be developed. These are free from pyrolitisation everywhere.

4.13.03 THICKNESS AND QUALITY:

4.13.04 The thickness of the individual Local Coal Seam varies from 0.62 m. (RBC-7) to 6.15 m. (RBC-10). In borehole RBC-10 and RBC-20, three and one number of dirt bands, having a thickness of 0.46 m. and 0.07m. respectively, has been observed while in others it is free from dirt bands.

4.13.05 The quality of the Local Seams (Above Salanpur) is given in Table : IV-13.

TABLE : IV-13  
QUALITY OF LOCAL SEAMS ( ABOVE SALANPUR)

Parameter	No. of boreholes considered	R A N G E	
		Minimum	Maximum

IN BAND:

Thickness (m)	5	0.62	6.15
Ash. (%)	5	32.6	44.0



1	2	3	4
<u>EX. BAND:</u>			
Thickness (m)	5	0.62	4.23
Moisture (%)	5	0.6	1.06
Ash. (%)	5	31.65	40.8
V.M. (%)	4	16.2	18.0
F.C. (%)	4	42.2	50.3
U.H.V. (K. Cal/Kg)	4	2740	4113
Grade	4	F	E
Calcing Index	2	10	27
Coke Type	1	G <sub>4</sub> -G <sub>6</sub>	-
Swelling Index	1	6-7	-
G.V. (K. Cal/Kg)	2	4725	5230

## 4.13.06 RESERVES:

4.13.07 The summary of the reserves of the seam Local (Above Salanpur) is given below:

( Reserves in thousand tonnes )

Non-Coking - Inferred - 16353  
(VIRGIN)

## 4.14.00 SEAM KALIMATI/SALANPUR GROUP:

## 4.14.01 GENERAL:

4.14.02 Seam Salanpur or Kalimati Group (B-II) which is the lower most seam in Baguria Block, occurs as a single combined seam in entire Baguria Block except in borehole RCB-7, located in the western part, where it is found to be split in three. This seam (or group of seams) which occurs 11.84 m. to 50.01 m. below local seam is intersected in five borehole (RBC-10, 12, 20, RKB-2 and RCB-7) out of which it is found to be completely pyrolytised in two (RBC-10 and RKB-2) while in others it is partially pyrolytised.

## 4.14.03 THICKNESS AND QUALITY:

4.14.04 The thickness of seam including it's pyrolytised portion, varies from 21.87 m. (RBC-12) to 33.02m (RBC-20). The including bands thickness of coal varies

from 2.77 m. to 14.09 m. whereas excluding bands this variation is between 2.61 m. to 13.92 m. one number of dirt band is observed in borehole REC-20 and RCB-7, where it's thickness is 0.17 m. and 0.16 m. respectively. The quality of the seam Salanpur is given in Appendix-V. page-25.

4.14.05 RESERVES:

4.14.06 The summary of the reserves of the Salanpur seam is given below:

( Reserves in thousand tonnes )

Non-Coking	- Inferred	- 4915
( VIRGIN )		

## CHAPTER : V

### 5.00.00 RESERVES:

#### 5.01.00 GENERAL:

5.01.01 The detailed studies of the exploration data has lead to the evolution of a three dimensional stratigraphic and structural model of Begunia Block, depicting the lay and disposition of strata including coal seams in the Barakar Measures of Western part of Raniganj Coal Field.

5.01.02 The detailed exploration in Begunia Block has revealed the presence of 13 correlatable and laterally persistent coal seams and their merged sections. In order of superposition, these seams are Salanpur Group (B-II), Local (above Salanpur), Brindawanpur Group, Gopinathpur (Bottom), Gopinathpur (Top), Local (above Gopinathpur), New Seams, Laikdih (Bottom), Laikdih (Top and Bottom combined), Laikdih (Top), Jograd, Chanch-Begunia Special, Chanch-Begunia, and seam Local (above Chanch-Begunia).

5.01.03 The structural model depicting the lay and disposition of coal seam, are presented with various floor contour plans for the different seams and geological cross sections. The dimensional model with quality overlays are presented in individual (Seam Folio and Seam Structure Plate.)

5.01.03 Out of the 13 coal horizons proved in Begunia Block, only 6 seams and their merged sections (upto Laikdih Bottom) have been considered for reserve estimation under proved category.

5.01.04 In case of lower seams where the intersections are less, the reserves are kept in inferred category.

#### 5.02.00 AREA CONSIDERED FOR RESERVES ESTIMATION :

5.02.01 The surface boundary of the Block has already been discussed in Chapter-I Para 1.03.00 of the Report. The reserve of the seam in the block is grouped in Main Block Area which is further sub-divided into sectors.

5.02.02 MAIN BLOCK AREA: The boundary of the Main Block Area for a seam, as discussed with C.M.P.D.I.L., is as follows:-

- I) North : The northern boundary of the Begunia Colliery.
- II) South : The Southern boundary of the Begunia Colliery forms the southern limit.
- III) East : Eastern boundary of the Colliery.
- IV) West : Western limit of the Begunia Colliery.

5.02.03 SECTOR: The Main Block Area is subdivided into four sectors based on position of major faults.

- SECTOR 01 : Area West of fault  $F_6 - F_6$  and western boundary of the block.
- SECTOR 02 : Area Between faults  $F_4 - F_4$  and  $F_1 - F_1$  and northern boundary of the block.
- SECTOR 03 : Area between faults  $F_1 - F_1$  and  $F_2 - F_2$  and southern boundary of the block.
- SECTOR 04 : Area between fault  $F_2 - F_2$  and Eastern boundary of the block.

5.02.04 SUB-SECTOR: In case of seam Chanch - Begunia, sector 02 and Sector 03 are further sub-divided into sub-sectors 01 & 02 to indicate reserves of the seam within and out side the draught plane drawn at  $60^\circ$  angle towards east from surface after leaving a barrier of 60 m. from high-flood level of river Barakar. The area west of draught plane is taken in subsector 01 and east of draught plane is taken in sub-sector-02.

5.03.00 METHOD OF RESERVE ESTIMATION:

5.03.01 The reserves of seam Local (above Chanch-Begunia) to Laikdih have been estimated by methods described in following paragraphs.

5.03.02 Isocore method has been used for the estimation of volume in the different sector for different seams on seam folio plans.

5.03.03 Isocore line are drawn of seam folios for 0.50m., 0.90 m., 1.20m., 2.00 m., 4.00 m., and 6.00 m. thickness.

- 5.03.04 The tonnage for the given range of thickness, grade, (Ash content) U.V.M. content and horizon has been calculated by multiplying the Volume with Sp.gravity, calculated with the average Ash content within the Area.
- 5.03.05 The reserves have been estimated for the seam within the Ash contents upto 15%, 15% to 18%, 18% to 21%, 21% to 24%, 24% to 28%, 28% to 35% and over 35% in conformity with the grade of coal as per Government of India Notification of 13.2.1982.
- 5.03.06 The reserve have been estimated for U.V.M. ranges of less than 22%, 22% to 25%, 25% to 30% and over 30%.
- 5.03.07 The reserve have also been grouped according to the horizons above 0.00, 0.00 to -100 m. R.L., - 100m. to -200m. R.L., -200 m. to -300 m. R.L., -300 m. to -400m. R.L. and below -400m. R.L.
- 5.03.08 GENERAL: In case of the seam which have been mined, the reserve have been computed for 'Devaloped' and 'Virgin' areas separately
- 5.03.09 The Sectors have been subdivided into segments wherever necessary for the conveniance of area measurements on seam folios.
- 5.03.10 For seams below seam Laikdih, the reserves of coal have been estimated on average area and average thickness basis for the whole block and the reserves have been grouped under inferred category. This has been done based on limited data available, just to give a rough idea of coal reserves which may be available in the block.
- 5.04.00 BASIC CONSIDERATIONS:
- The following basic consideration have been taken into account for the estimation of reserves of coal of seams Local (above Chandi-Begunia) to Laikdih.
- 5.04.02 THICKNESS: The minimum in-band thickness of any undeveloped workable seam has been considered as 0.50 m.
- 5.04.03 For the area falling between two Isocore lines the average of two Isocore value have been taken as the mean thickness for the area.
- 5.04.04 In a segment where there is only one Isocore, the average of Isocore value and the thickness of the seam in the controlling borehole/boreholes within the area has been taken as thickness of the seam.

5.04.05 In case of the 'Developed' area either the thickness of the seam intersected in the borehole or value of the Iso-core in the adjacent area has been taken into consideration.

5.04.06 ASH CONTENT: The average Ash value of the 'Iso-Ash lines' within a segment has been taken as the Ash content of the seam within area.

5.04.07 SPECIFIC GRAVITY: In case of Coking Coal Sp. Gravity has been calculated from the mean Ash value by the formula.

$$\text{Specific Gravity} = 1.28 + (0.01 \times \text{Ash}\%)$$

5.04.08 HEAVE ZONE:

The area falling within Heave Zones of the fault has been excluded from reserve estimation.

5.04.09 DEVELOPED AREA: The goaf areas have been excluded from the reserves.

5.04.10 DEDUCTION ON VARIOUS ACCOUNTS:

i) A deduction from 'Gross Reserves' has been made on account of percentage of extraction for the areas where underground mining has been done. These deductions are made on the basis of mining data available.

ii) A deduction of 10% of the 'Gross Reserves' of coal has been made on account of normal geological variations like structural disturbances, pyrolytisation of the seam etc. and unaccountable and unforeseen data gaps, to arrive at 'Net Reserves'.

5.05.00 PYROLITISED SEAM:

In case of heat affected coal gradual baking effect on the coal has been assumed as discussed in para 3.06.02. The Jhama has been excluded from the seam while considering the coal thickness and quality.

5.06.00 COAL RESERVES:

5.06.01 The summary of total reserves of coal in Beguria Block is given in table : V-1.

TABLE : V - 1.

SUMMARY OF COAL RESERVES IN BEHUNIA BLOCK,  
RANIGANI COAL FIELD, DISTRICT : BARDHAMAN, WEST BENGAL.

( Reserves in thousand tonnes )

L A T E G O R Y	S E C T O R			T O T A L
	SECTOR - 01	SECTOR - 02	SECTOR - 03	
PROVED	1680	11039	18901	33019
IN - BAND				
VIRGIN				
PROVED	-	1102	177	1279
IN - BAND				
VIRGIN				
SUB TOTAL :	1680	12141	19078	34298
INFERRED				
VIRGIN				2022
SUB TOTAL :				36320
GRAND TOTAL :				110110
GRAND TOTAL :				110110
GRAND TOTAL :				146130

OR SAY : 146.13 MILLION TONNES

5.06.02

As mentioned in paragraph 5.02.04, the coal reserves of seam Chanch - Begunia is estimated separately for the area falling east and west of draught plane drawn at an angle of  $60^{\circ}$  towards east from surface after leaving a barrier of 60 m. from high flood level of eastern bank of river Barakar. These reserves are given below:

SEAM : CHANCH - BEGUNIA

( Reserves in thousand tonnes )

A.	Area west of draught plane (inside draught plane)	Virgin	SECTOR	SECTOR	SECTOR	SECTOR	TOTAL
			-01	-02	-03	-04	
		Virgin	6	1048	1910	-	2964
		Developed	-	27	164	-	191
B.	Area east of draught plane (outside draught plane)	Virgin	-	1107	1337	915	3359
		Developed	-	153	13	-	166
TOTAL :			6	2335	3424	915	6680

5.06.03

The detailed break-up of reserves of coal in Begunia Block is given in Text Annexure, Table : 1 to 6.



## CHAPTER - VI.

6.00.00 JHAMA (PYROLITISED COAL) :

6.01.00 GENERAL:

6.01.01 As mentioned earlier, the present exploration is mainly confined upto Laikdih seam only. The details of seam intersections in boreholes reveal that except seam Local (Above Chanch - Begunia) which is pyrolitised only in a small area around RDG - 10, all other seams (Chanch - Begunia, Chanch - Begunia Special, Jograd, Laikdih Top & Laikdih Top & Bottom combined) are affected by mica-peridotite intrusion in comparatively large area of the block. The effect of pyrolitisation is observed to be more in seam Laikdih. The boreholewise details of Pyrolitisation of these seams are given in table: VI - 1. The data on seams below Laikdih, for which only limited borehole intersection are available, reveals that those seams are also affected by mica-peridotite intrusion except seam Local (Above Salanpur) which is found to be free from pyrolitisation in entire block. The maximum effect of intrusion is observed in New Seam and Salanpur Seam.

6.01.02 The pyrolitisation portions of coal have been logged in detail and the thickness of individual litho-units viz. Jhama, Jhama with mica-peridotite and mica-peridotite have been recorded. In most of the cases, Jhama and Jhama with veins of mica-peridotite have been analysed for Ash% and V.M%. The seam wise thickness of different litho-units of Pyrolitised coal is given in table : VI - 1.

6.02.00 RESERVES:

6.02.01 The reserves of pyrolitised coal have been assessed for full Jhama and partial Jhama zone for the seams upto Laikdih.

6.02.02 The basis of distribution of 'Full' and 'Partial' Jhama zones have been described earlier in Chapter - III. Para 3.06.02.

6.02.03 The reserves have been computed for various seams as follows:

Reserves = Area (sq.Km.) X Average thickness X Specific Gravity.

6.02.04 Average thickness of Jhama has been calculated based on intersected thickness of Jhama in the controlling boreholes.

6.02.05 Specific gravity of Jhama has been assumed to be 1.70

6.03.00 THICKNESS AND RESERVES OF JHAMA:

The seam-wise and borehole-wise thickness of Jhama and seam-wise reserves of Jhama in full and partial pyrolitised zone of a particular seam are given in table:  
VI - 1.

T A B L E : V I - 1  
 STATEMENT SHOWING PYROLITISATION OF COAL SEAMS AS  
 INTERSECTED IN BOREHOLES, AND RESERVES OF JHAMA.

1	B. H. No.	Total thickness of seam.	P Y R O L I T I S A T I O N				7	8	9	Reserves in million tonnes.
			T H I C K N E S S (M.)		Total	3				
			Jhama	Jhama + M.P.						
	2	3	4	5	6	7	8	9	10	
ABOVE	RE-10	0.90	0.75	0.15	-	0.90	North-western	Full	0.199	
BELOW	REGU-14 REG-15	4.00	1.10	1.56	0.04	2.70	Central, southern & South-western.	Partial	4.618	
	REG-16	3.75	1.50	2.25	-	3.75	-	Full		
	RKB-4	3.04	3.04	-	-	-	-	Full		
	FKB-6	3.70	-	3.70	-	-	-	Full		
	RCB-13	4.15	0.60	1.74	1.81	4.15	-	Full		
BELOW	REG-1	1.23	0.13	-	1.10	1.23	Southeastern central to western	Full	1.188	
BELOW	REG-2	0.70	0.08	-	0.05	0.13	-	partial		
	REG-3	1.55	0.76	0.09	0.70	1.55	-	Full		

Chenop- Begonia Special Contd. from Front page.

1	2	3	4	5	6	7	8	9	10
CHANGE-BEGONIA SPECIAL	RBG- 4	1.96	0.44	0.60	0.92	1.96	Southern central to western	Full	
	RBG-5	2.00	-	2.00	-	2.00	-	Full	
	RBG-6	1.73	-	0.77	0.96	1.73	-	Full	
	RBG-7	0.70	0.70	-	0.24	0.34	-	Partial	
	RBG-9	0.64	-	0.64	-	0.64	-	Full	
	RBG-12	1.44	-	1.44	-	1.44	-	Full	
	RBG-14	1.12	-	1.12	-	1.12	-	Full	
	RBG-17	2.01	-	2.01	-	2.01	-	Full	
	RCP-14	0.75	-	-	-	-	-	-	
	RCP-2	1.80	-	-	-	-	-	-	
	RCP-13	1.75	0.55	0.30	0.15	1.00	-	Partial	
JORDAN	RBG- 1	0.36	-	-	0.36	0.36	Central to North Western	Full	0.386
	RBG- 4	1.06	-	1.06	-	1.06	-	Full	
	RBG- 6	0.94	-	0.94	-	0.94	-	Full	
	RBP- 4	0.52	-	-	0.52	0.52	-	Full	
LARKIN TOP & BOTTOM COMBINED	RBG- 1	23.45	6.77	3.33	1.70	11.30	Entire Area	Partial	23.624
	RBG- 3	29.67	7.17	4.13	6.39	17.69	-	Partial	

	1	2	3	4	5	6	7	8	9	10
LAKKIDH TOP AND BOTTOM COMBINED										
RBC-4	23.85	20.88	0.47	1.80	23.15	Entire Area	Full			
RBC-5	22.42	5.68	2.01	0.78	8.47	-	Partial			
RBC-6	31.06	12.52	12.06	1.13	25.71	-	Full			
RBC-8	28.15	7.20	13.64	7.31	28.15	-	Full			
RBC-10	20.59	8.21	4.57	3.82	16.60	-	Partial			
RBC-11	29.90	14.23	4.57	0.49	19.29	-	Partial			
RBC-13	26.90	9.55	9.16	4.79	23.5	-	Partial			
RBC-14	27.18	8.33	8.47	1.79	18.59	-	Partial			
RBC-15	23.65	3.57	0.69	0.74	5.00	-	Partial			
RBC-16	27.79	6.42	2.91	1.21	10.54	-	Partial			
RBC-6	24.03	9.69	-	-	9.64	-	Partial			
LAKKIDH BOTTOM										
RBC-20	22.70	0.40	0.12	-	0.52	Entire Area	Partial		9.268	
RBC-17	23.73	17.19	3.93	2.61	23.73	-	Full			
RBC-14	22.11	-	-	-	22.11	-	Full			
RBC-5	18.50	-	16.20	-	16.20	-	Full			
RBC-7	24.05	0.78	-	0.40	1.18	-	Partial			
RBC-9	22.48	1.42	0.29	0.52	2.23	-	Partial			

: 57 :

1	2	3	4	5	6	7	8	9	10
ALKNDIH (TOP)	REG - 1	4.90	2.22	0.96	1.72	4.90	Full		
	REG - 7	5.60	1.45	1.95	2.20	5.60	Full		
	REG - 9	5.68	1.02	3.88	0.78	5.68	Full		
	REG - 17	3.95	3.49	0.20	0.26	3.95	Full		
	REG - 20	4.05	0.86	0.28	-	1.74	Partial		
	REG - 14	3.65	3.65	-	-	3.65	Full		
	REG - 2	6.55	-	6.55	-	6.55	Full		
	REG - 5	3.50	-	3.50	-	3.50	Full		
								Entire Area	10.07

TOTAL : 49.35

-0-0-0-0-

REPORT ON PHYSICO-MECHANICAL PROPERTIES OF ROOF  
& FLOOR ROCK CORE SAMPLES OF BEGUNIA SEWM ENCOURT  
TERED IN BOREHOLE NO. RBG-18 OF BEGUNIA PROJECT, BCL.

Job No.

060 066

Customer :

Regional Institute - II  
CMPDI, Dhanbad.  
for Begunia Project, BCL.

Reference :

Letter No. RI-2/Bd-4/009/4359  
dt. 2-7-1983 from Dy. Chief of  
Geology, RI-II, CMPDI, Dhanbad.

Date of receiving

March - April, 1983.

samples with  
lithology.

Date of which  
testing work  
started

20th April, 1983.

Date/Month in  
which report  
is being  
submitted

July, 1983.

Report on physico-mechanical testing of roof and floor rocks of Begunia seam in Begunia Project, BCCL.

7.01.00 INTRODUCTION

Longwall coal faces are being planned in Begunia seam of Begunia Project by CMPDI regional institute II. For this purpose knowledge of physico-mechanical properties of roof and floor rocks of the seam was essential. With this view 30 metres length of roof rock cores and 2.20 metres length of floor rock cores of 2.65 metres thick Begunia coal seam as encountered in borehole No. RBG - 18 were sent to the mining laboratory of CMPDI (HQ) for determination of physico-mechanical properties.

This report presents the results of the tests conducted alongwith a brief outline of the testing procedure followed by general analysis of the results.

7.02.00 Experimental design and test procedure

1. Uniaxial compressive strength of dry sample
2. Brazilian tensile strength
3. Shear strength
4. Young's modulus of Elasticity.
5. Protodyakonov strength
6. Bulk density

7.02.01 Specimen preparation for compressive and tensile strength test :

Cores free from surface irregularities were cut by diamo. and saw using water as coolant. The specimen finished as closely as possible to the tolerance specified by the draft standard of the International Society of Rock Mechanics Committee on Laboratory Test. To remove the moisture introduced at the time of cutting finished specimen were kept at room temperature for 5 - 7 days before testing.

7.02.02 Compressive Strength :

Attempts were made to test the rock/coal samples at a length dia ratio of 2:1 but due to non-availability of longer cores, the test



ratio varying from 1.25 to 2.00. However, to maintain uniformity the compressive strength results reported were normalised to length-diameter ratio of 2. The following formula, suggested by Obert and Duvall (1946) was employed for the purpose.

$$C1 = \frac{C}{0.778 + 0.222 \left( \frac{D}{L} \right)}$$

$$C1 = \frac{C2}{0.778 + 0.222 \left( D1/L1 \right)}$$

Where

C1 = Compressive Strength of the specimen with  
L/D = 1

C = Compressive Strength of the specimen with  
L/D = 1

D = Diameter of specimen

L = Length of specimen

C2 = Compressive Strength of specimen with  
L/D = 2

$$D1/L1 = 0.5$$

The specimen were loaded perpendicular to the bedding planes on a 200 tonne hydraulic compression testing machine. The stress rate was kept at 5 - 10 kgf per  $\text{Cm}^2$  per second.

#### 7.02.03 Tensile Strength :

The Brazilian disc method was employed for this test. Specimens were prepared as described in 2.1 with length diameter ratio of 0.5.

The specimen were tested on the same compression machine. Load was applied parallel to the bedding planes at a rate of around 20 kgf per second.

Wherever it was possible attempts were made to test five specimens from each lithological section.

7.02.04 Shear strength :

The method employed was direct shear test using a double shear box.

Cylindrical specimen of not less than 50 mm length was pierced by a 20 mm thick shear piece. Load was applied by the same compression machine at a rate of around 20 kgf per second.

7.02.05 Protodyakonov Strength Index :

Five test specimens weighing 50 gm comprising irregular pieces of samples in size range of 10 to 25 mm were pounded separately in a cylinder of 76 mm internal diameter by a 2.4 kg drop weight falling through a height of 0.6 m. The samples were subjected to 5 to 10 impacts depending upon their structure.

Fines below 0.5 mm size produced by the five specimens were combined and the total height of the fines column in a volumeter of 23 mm internal diameter was measured.

The P S I was determined by the formula

$$\text{Protodyakonov Index (f)} = \frac{20 \times \text{No. of drops}}{\text{Height of Column of fines (Mm)}}$$

Five tests were conducted for each lithological section.

7.02.06 Bulk density :

The specimens prepared for tensile strength test were weighed and their volume calculated by measuring their length and diameter by vernier calipers.

Density was determined by calculating the weight per unit volume.

7.03.00 Test results :

Summarised data of test results on the rock/coal properties tested for each lithological section of core from borehole No. REG - 18 are shown in Table : 1.

RESULTS OF PHYSICO-MECHANICAL TESTS CONDUCTED ON CORE SAMPLES  
FLOOR + ROOF OF BEGUNIA SEAM IN CORE HOLE NO. RBG-18 OF BEGUNIA  
PROJECT, DDCL.

NOTE-COMPRESSIVE STRENGTH VALUES ARE NORMALISED FOR LENGTH-DIA. RATIO=2

SAMPLE NO	FROM MTR.	TO MTR.	THICK MTR.	ROCK TYPE	BULK DENSITY	COMP STRENGTH DRY	COMP STRENGTH WET	TENSILE STRENGTH			SHEAR STRENGTH	YOUNGS MODULUS 10 <sup>3</sup> 4	PSI
								KG/SGCM	KG/SGCM	KG/SGCM			
*1	2	3	4	5	6	7	8	9	10	11			
RBG-18/001	172.70	174.30	1.60	SHALE	2.571 **0.035 *	0.0 0.0 0	0.0 0.0 0	92.1 26.4 5	0.0 0.0 0	0.000 0.000 0		5.025	
RBG-18/002	174.30	177.30	3.00	SHALE	2.584 **0.142 *	0.0 0.0 0	0.0 0.0 0	103.9 10.3 4	36.5 6.6 5	0.000 0.000 0		5.120	
RBG-18/003	177.30	180.30	3.00	SHALE	2.486 **0.037 *	903.9 152.3 2	0.0 0.0 0	91.1 8.0 6	34.7 4.3 4	9.054 2.058 2		5.172	
RBG-18/004	180.30	183.30	3.00	SHALE	2.577 **0.097 *	994.3 0.0 1	0.0 0.0 0	107.4 19.4 5	45.6 27.0 4	0.000 0.000 0		5.329	
RBG-18/005	183.30	183.69	0.39	SHALE	2.000 **0.000 *	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	21.0 4.0 2	0.000 0.000 0		5.054	
RBG-18/006	183.69	186.35	2.66	SHALE AREN ACIOUS	2.620 **0.092 *	930.0 410.2 6	0.0 0.0 0	123.9 32.8 5	53.4 25.9 4	6.240 0.907 2		5.703	
RBG-18/007	186.35	187.54	1.19	SANDSTONE ARGILLAR GELUS	2.605 **0.031 *	1070.5 0.0 1	0.0 0.0 0	111.4 21.4 6	60.0 22.0 4	0.000 0.000 0		5.200	

	1	2	3	4	5	6	7	8	9	10	11
RDG-18/008	137.54	138.89	0.54	INTERC.L.A. TED SANDSTONE NE+SHALE	0.000 **0.000 *	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	90.4 74.7 3	0.000 0.000 0
RDG-18/009	138.89	139.40	1.32	SHALE	2.530 **0.037 *	720.6 119.6 2	0.0 0.0 0	0.0 0.0 0	89.1 18.2 5	43.2 18.6 5	8.440 1.020 2
RDG-18/010	139.40	191.44	2.04	SHALE	2.418 **0.094 *	612.4 153.5 3	0.0 0.0 0	0.0 0.0 0	73.0 16.8 6	50.1 29.8 5	5.724 1.560 2
RDG-18/011	191.44	192.40	0.96	SANDSTONE CGD	2.319 **0.003 *	572.2 112.9 5	0.0 0.0 0	0.0 0.0 0	50.0 7.0 5	143.1 31.1 3	8.272 1.829 3
RDG-18/012	192.40	195.45	3.05	SANDSTONE CGD	2.404 **0.031 *	603.7 263.3 5	0.0 0.0 0	0.0 0.0 0	125.0 13.1 5	181.2 32.7 5	11.064 7.076 2
RDG-18/013	195.45	190.45	3.00	SANDSTONE CGD	2.472 **0.028 *	764.0 111.6 6	0.0 0.0 0	0.0 0.0 0	02.3 6.0 5	103.6 20.9 5	6.055 3.172 3
RDG-18/014	190.45	199.14	0.69	SANDSTONE CGD	2.565 **0.025 *	935.0 196.1 3	0.0 0.0 0	0.0 0.0 0	96.4 4.2 4	158.7 16.2 2	8.170 0.752 2
RDG-18/015	199.14	200.04	1.70	SANDSTONE CGD WITH SHALE L.A. MINAE.	2.688 **0.032 *	905.3 88.2 5	0.0 0.0 0	0.0 0.0 0	107.3 9.0 5	141.8 20.2 4	12.161 2.304 2
RDG-18/016	200.84	201.50	0.66	INTERC.L.A. TED SAND- STONE + SHALE	2.631 **0.002 *	656.3 53.7 2	0.0 0.0 0	0.0 0.0 0	96.1 17.4 5	0.0 0.0 0	8.166 0.393 2

	1	2	3	4	5	6	7	8	9	10	11
RDG-10/017	201.50	202.36	0.06	SANDSTONE MGD WITH SHALE LAMI- N/AE	2.549 **0.095 *	5	676.4 102.6 3	0.0 0.0 0	107.1 23.0 5	60.4 0.0 1	10.803 0.954 2
RDG-10/016	202.36	202.55	0.19	SANDSTONE MGD WITH C-SANDS	0.000 **0.000 *	0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.000 0.000 0
RDG-10/019	202.55	202.63	0.08	SANDSTONE MGD SIDERL- TIG WITH C SAND	0.000 **0.000 *	0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.000 0.000 0
RDG-10/020	202.63	202.70	0.07	SANDSTONE MGD	0.000 **0.000 *	0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.000 0.000 0
RDG-10/021	205.35	205.96	0.61	INTERCALA- TED SAND- STONE AND SHALE	0.000 **0.000 *	0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.0 0.0 0	0.000 0.000 0
RDG-10/022	205.96	207.55	1.59	SANDSTONE CGD	2.404 **0.031 *	5	565.7 106.3 5	0.0 0.0 0	52.5 11.5 5	61.6 34.0 5	9.267 1.257 2

\*\* IS STANDARD DEVIATION \* IS NO OF SPECIMENS TESTED  
 0.0 INDICATES TEST NOT CONDUCTED/NOT APPLICABLE

RESULTS OF PHYSICO-MECHANICAL TESTS CONDUCTED ON CORE SAMPLES FLOOR+ ROOF  
OF BEGUNIA SEAM IN BORE HOLE NO. RBG-18 OF BEGUNIA  
PROJECT, B.C.C.L.

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NOTE-COMPRESSIVE STRENGTH VALUES ARE  
NORMALISED FOR LENGTH-DIA RATIO=2

SAMPLE NO. - RBG-18/001

ROCK TYPE - SHALE

CORE LENGTH 1.60 METRES FROM 172.70 TO 174.30 METRES

LENGTH CM	DI.A CM	MASS GMS	LOAD KGF	ID/ND 0.01 MM	LOD KGF	BULK DENSITY GMS/CC	COMP STRENGTH DRY KGF/SQCM	COMP. STRENGTH WET KGF/SQCM	TENSIL STRENGTH KGF/SQCM	SHEAR STRENGTH KGF/SQCM	YOUNGS MODULUS 10E4KGF/SQCM
5.503	4.740	112.000	1800	-	-	2.537	-	-	96.6	-	-
2.430	4.750	111.700	1520	-	-	2.595	-	-	83.9	-	-
2.120	4.740	96.200	930	-	-	2.573	-	-	58.9	-	-
2.220	4.740	102.400	2180	-	-	2.615	-	-	132.0	-	-
2.290	4.735	102.250	1520	-	-	2.537	-	-	89.3	-	-
MEAN -						2.571	0.0	0.0	92.1	0.0	0.000
STAND. DEV. -						0.035	0.0	0.0	26.4	0.0	0.000
NO OF SPECIMEN TESTED -						5	0	0	5	0	0
PROTODY. KONOV INDEX =									5.825		

SAMPLE NO - PDG. 10/002  
 ROCK TYPE - SHALE  
 CORE LENGTH 3.00 METRES FROM 174.30 TO 177.30 METRES

LENGTH CM	DIAM CM	MASS GMS	LOAD KGF	ID/ND	LOAD KGF	BULK DENSITY GMS/CC	COMP. STRENGTH DRY KGF/SQCM	COMP. STRENGTH WET KGF/SQCM	TENSILE STRENGTH KGF/SQCM	SHEAR STRENGTH KGF/SQCM	YOUNG'S MODULUS 10E4KGF/S
2.360	4.745	111.200	1730	-	-	2.666	-	-	98.4	-	-
2.180	4.740	101.200	1800	-	-	2.632	-	-	111.0	-	-
2.415	4.740	113.500	2050	-	-	2.665	-	-	114.1	-	-
2.275	4.735	95.000	1560	-	-	2.373	-	-	92.2	-	-
-	4.730	-	1200	-	-	-	-	-	-	34.2	-
-	4.740	-	1240	-	-	-	-	-	-	35.2	-
-	4.740	-	1700	-	-	-	-	-	-	48.2	-
-	4.735	-	1160	-	-	-	-	-	-	33.0	-
-	4.740	-	1130	-	-	-	-	-	-	32.0	-

MEAN-	STANDARD DEVIATION -	NO OF SPECIMEN TESTED -	PROTODYAKONOV INDEX = 5.120 <sup>4</sup>
2.534	0.0	0.0	103.9
0.142	0.0	0.0	10.3
		0	4
		0	5
		0	0

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SAMPLE NO - R3G-18/003  
 ROCK TYPE - SHALE  
 CORE LENGTH 3.00 METRES FROM 177.30 TO 180.30 METRES.

LENGTH CM	DIA CM	MASS GMS	LOAD KGF	TD/ND 0.01 MM	LOG KGF	BULK DENSITY GMS/CC	COMP. STRENGTH DRY KGF/SQCM	COMP STRENGTH WET KGF/SQCM	TENSILE STRENGTH KGF/SQCM	SHEAR STRENGTH KGF/SQCM	YOUNG'S MODULUS 10E+4KGF
9.000	4.740	-	17960	-	-	-	1011.6	-	-	-	7.633
0.090	4.740	-	14160	479	6400	-	796.3	-	-	-	-
-	4.735	-	1390	522	6000	-	-	-	-	29.0	-
-	4.730	-	1240	525	7200	-	-	-	-	39.5	-
-	4.740	-	1210	527	7600	-	-	-	-	35.3	-
2.615	4.735	115.500	1600	529	-	2.510	-	-	-	35.2	-
2.610	4.740	114.000	1660	349	-	2.476	-	-	82.3	-	-
2.570	4.740	111.200	1650	336	8400	2.453	-	-	95.0	-	-
2.645	4.735	115.050	2000	397	8000	2.471	-	-	86.3	-	-
2.750	4.740	123.700	1720	309	9200	2.550	-	-	101.7	-	-
2.570	4.740	111.300	1350	391	9600	2.455	-	-	84.0	-	-
									96.7		

MEAN- STANDARD DEVIATION- NO OF SPECIMEN TESTED-	2.436 0.037 6	903.9 152.3 2	0.0 0.0 0	91.1 0.0 6	34.7 4.3 4	9.654 2.350 2
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PROCDYAKONOV INDEX = 5.172



SAMPLE NO. - RDG-10/004  
 ROCK TYPE - SH/L  
 CORE LENGTH 3.00 METRES FROM 100.30 TO 103.30 METRES.

LENGTH CM	DIA CM	MASS GMS	LO/D KGF	ID/ND 0.01 MM	LOJ KGF	BULK DENSITY GMS/CC	COMP. STRENGTH DRY KGF/SQCM	COMP STRENGTH WET KGF/SQCM	TENSILE STRENGTH KGF/SQCM	SHEAR STRENGTH KGF/SQCM	YOUNGS MODULUS 10E4KGF/SQ
-	4.740	-	3020	-	-	-	-	-	-	85.6	-
-	4.740	-	1160	-	-	-	-	-	-	32.9	-
-	4.740	-	1300	-	-	-	-	-	-	36.9	-
-	4.735	-	950	-	-	-	-	-	-	27.0	-
9.390	4.740	-	17560	-	-	-	994.3	-	-	-	-
2.560	4.745	124.250	2600	-	-	2.746	-	-	136.3	-	-
2.565	4.740	114.000	2100	-	-	2.520	-	-	110.0	-	-
2.475	4.740	112.290	2000	-	-	2.570	-	-	108.6	-	-
2.500	4.740	115.400	1900	-	-	2.536	-	-	99.0	-	-
2.555	4.740	113.200	1530	-	-	2.512	-	-	83.1	-	-

MEAN -  
 STANDA. DEVIATION -  
 NO OF SPECIMEN TESTED -  
 PROTDY. KGNV INDEX = 5.329

2.577	994.3	0.0	107.4	25.6	0.000
0.097	0.0	0.2	19.4	27.0	0.000
5	1	0	5	4	0

SAMPLE NO- RBG-18/005  
 ROCK TYPE- SHALE  
 CORE LENGTH 0.39 METRES FROM 183.30 TO 183.69 METRES

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LENGTH CM	DIA CM	WISS GMS	LOD KGF	TD/ND 0.01 MM	LOD KGF	BULK DENSITY GMS/CC	COMP STRENGTH DRY KGF/SQCM	COMP. STRENGTH WET KGF/SQCM	TENSILE STRENGTH KGF/SQCM	SHEAR STRENGTH KGF/SQCM	YOUNG'S MODULES
-	4.730	-	050	-	-	-	-	-	-	-	10E4KGF
-	4.735	-	630	-	-	-	-	-	-	-	-
MEAN-											
STANDARD DEVIATION-											
NO OF SPECIMEN TESTED-											
PROF. YAKONOV INDEX= 5.054											
						0.000	0.0	0.0	0.0	21.0	0.000
						0.000	0.0	0.0	0.0	4.5	0.000
						0	0	0	0	2	0

SAMPLE NO - JCG-10/006

ROCK TYPE - SHALE ARGONACIOUS

CORE LENGTH 2.66 METRES FROM 103.69 TO 106.35 METRES

1	2	3	4	5	6	BULK DENSITY	COMP STRENGTH	COMP. STRENGTH	TENSILE STRENGTH	SHEAR STRENGTH	YOUNG'S MODULUS
LENGTH CM	DIA CM	MASS GMS	LOAD KGF	TD/ND 0.01 MM	LOAD KGF	gms/cc	KGf/sqcm	KGf/sqcm	KGf/sqcm	KGf/sqcm	10 <sup>4</sup> KGf/sqcm
-	4.735	-	920	-	-	-	-	-	-	26.1	-
-	4.740	-	3000	-	-	-	-	-	-	97.3	-
-	4.735	-	1520	-	-	-	-	-	-	43.2	-
-	4.735	-	2000	-	-	-	-	-	-	56.0	-
9.605	4.740	-	17600	-	-	-	1000.5	-	-	-	-
9.705	4.740	-	13000	299	-	-	739.2	-	-	-	-
				347	6000						
				349	6400						
				352	6000						
				354	7200						
9.070	4.735	-	12600	281	-	-	712.0	-	-	-	6.945
				336	5000						
				330	6200						
				341	6600						
				343	7000						

5.550

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	1	2	3	4	5	6	7	8	9	10	11	12
9.535	4.745	-	30000	-	-	-	-	1693.4	-	-	-	-
9.685	4.740	-	0650	-	-	-	-	491.7	-	-	-	-
9.660	4.735	-	17400	-	-	-	-	991.1	-	-	-	-
2.610	4.740	120,590	2000	-	-	-	2,613	-	-	107.1	-	-
2.545	4.740	113,000	1400	-	-	-	2,517	-	-	78.1	-	-
2.550	4.740	118,400	2842	-	-	-	2,602	-	-	147.9	-	-
2.560	4.745	119,050	2400	-	-	-	2,631	-	-	125.0	-	-
2.550	4.745	125,000	3050	-	-	-	2,773	-	-	160.6	-	-

MEAN-  
 STANDARD DEVIATION-  
 NO OF SPECIMEN TESTED-

PROTODY/KONOV INDEX = 5.703

2.620 930.0 0.0 123.9 53.4 6.240  
 0.092 410.2 0.0 32.0 25.9 0.907  
 5 6 0 5 4 2

SAMPLE NO - R3G-19/007  
 ROCK TYPE - SANDSTONE ARGILLACEOUS  
 CORE LENGTH 1.19 METRES FROM 106.35 TO 107.54 METRES

LENGTH CM	DIA CM	MASS GMS	LOAD KGF	ID/ND 0.01 MM	LOD KGF	DULK DENSITY	COMP STRENGTH DRY KGF/SQCM	COMP STRENGTH WET KGF/SQCM	TENSILE STRENGTH KGF/SQCM	SHEAR STRENGTH KGF/SQCM	YOUNG'S MODULUS 10E4KGF/S
-	4.740	-	1200	-	-	-	-	-	-	34.0	-
-	4.740	-	1000	-	-	-	-	-	-	53.3	-
9.565	4.740	-	19000	-	-	-	1070.5	-	-	-	-
2.595	4.740	119.200	2050	-	-	2.503	-	-	106.2	-	-
2.565	4.745	117.000	1600	-	-	2.501	-	-	83.7	-	-
2.600	4.740	119.400	2050	-	-	2.562	-	-	106.0	-	-
2.425	4.740	113.200	2060	-	-	2.647	-	-	114.2	-	-
2.590	4.740	110.700	2100	-	-	2.599	-	-	109.0	-	-
2.515	4.740	117.200	2000	-	-	2.642	-	-	149.6	-	-
-	4.740	-	3130	-	-	-	-	-	-	00.7	-
-	4.740	-	2250	-	-	-	-	-	-	63.0	-

MEAN- 2.605 1070.5 0.0 111.4 60.0 0.000  
 STANDARD DEVIATION- 0.031 0.0 0.0 21.4 22.0 0.000  
 NO OF SPECIMEN TESTED- 6 1 0 6 4 0

PRODUCY.KONOV INDEX = 5.203.



SAMPLE NO - DDG-19/009  
 ROCK TYPE - SHALE  
 CORE LENGTH 1.32 METRES FROM 100.00 TO 109.40 METRES.

LENGTH CM	DIA CM	MASS GMS	LOAD KGF	ID/ND 0.01 MM	LOD KGF	BULK DENSITY GMS/CC	COMP. STRENGTH WET KGF/SQCM	COMP. STRENGTH WET KGF/SQCM	TENSILE STRENGTH KGF/SQCM	SHEAR STRENGTH KGF/SQCM	YOUNG'S MODULUS
9.325	4.740	-	11240	252	-	-	636.0	-	-	-	10E4KGT/S
				260	4000						
				292	5400						
				295	6000						
				299	6600						
9.700	4.740	-	14160	133	-	-	805.1	-	-	-	7.161
				169	6200						
				172	6000						
				174	7450						
				177	8000						
2.475	4.745	113.700	1000	-	-	2.599	-	-	102.0	-	9.735
2.500	4.740	113.750	1660	-	-	2.570	-	-	86.5	-	-
2.575	4.750	115.400	1860	-	-	2.530	-	-	96.9	-	-
2.505	4.745	115.400	1600	-	-	2.526	-	-	83.1	-	-
2.445	4.740	109.400	1400	-	-	2.537	-	-	76.9	-	-
	4.743	-	1350	-	-	-	-	-	-	30.2	-
	4.740	-	1660	-	-	-	-	-	-	47.1	-
	4.737	-	1500	-	-	-	-	-	-	42.6	-
	4.730	-	2460	-	-	-	-	-	-	70.0	-
	4.740	-	640	-	-	-	-	-	-	10.1	-

MEAN-	STANDARD DEVIATION-	NO OF SPECIMEN TESTED-	PROBABILITY INDEX = 4.354
2.536	0.037	5	2
720.6	119.6	2	0
0.0	0.0	0	0
89.1	10.2	5	5
43.2	10.6	5	5
0.448	1.020	2	2

SAMPLE NO - FBG-18/  
 ROCK TYPE - SHALE  
 CORE LENGTH 2.04 METRES FROM 109.40 TO 191.44 METRES.

LENGTH CM	DIA CM	MASS GMS	LCAD KGF	ID/ND 0.01 MM	LTG KGF	DULK DENSITY	COMP. STRENGTH DRY KGF/SQCM	COMP. STRENGTH WET KGF/SQCM	TENSILE STRENGTH KGF/SQCM	SHEAR STRENGTH KGF/SQCM	YOUNG'S MODULUS 10E4KGF
9.700	4.740	-	13600	120	-	-	773.3	-	-	-	-
				170	6200						
				181	6000						
				184	7400						
				188	8000						
9.330	4.740	-	10600	503	-	-	599.8	-	-	-	6.033
				577	4400						
				562	5000						
				566	5600						
				570	6000						
8.075	4.740	-	8420	-	-	-	467.3	-	-	-	4.615
2.415	4.745	104.700	1440	-	-	2.453	-	-	80.0	-	-
2.595	4.735	115.000	1900	-	-	2.510	-	-	93.3	-	-
2.530	4.730	114.550	1700	-	-	2.523	-	-	89.7	-	-
2.545	4.735	105.400	1280	-	-	2.353	-	-	67.7	-	-
2.550	4.740	104.300	920	-	-	2.319	-	-	48.5	-	-
2.625	4.735	107.900	1260	-	-	2.336	-	-	64.6	-	-
-	4.737	-	3320	-	-	-	-	-	-	94.2	-
-	4.730	-	1320	-	-	-	-	-	-	37.6	-
-	4.730	-	1340	-	-	-	-	-	-	29.6	-
-	4.737	-	800	-	-	-	-	-	-	22.7	-
-	4.733	-	2340	-	-	-	-	-	-	66.5	-

MEAN -	STAND. DEV. -	NO OF SPECIMEN TESTED -	PROTODYAKONOV INDEX = 4.104
2.410	0.094	6	613.4
2.410	0.094	6	153.5
0.000	0.000	0	0.0
73.8	16.3	6	73.8
50.1	29.0	5	50.1
5.724	1.560	2	5.724

\*\*\*\*\*



SAMPLE NO - PG-10/011  
 ROCK TYPE - SANDSTONE CGB  
 CORE LENGTH 0.96 METRES, FROM 191.44 TO 192.40 METRES.

LENGTH CM	DIA CM	W/SS GMS	LC/D KGF	ID-ND 0.01 MM	LCJ KGF	DULK DENSITY	COMP. STRENGTH DRY KGF/SQCM	COMP. STRENGTH WET KGF/SQCM	TENSILE STRENGTH KGF/SQCM	SHEAR STRENGTH KGF-SQCM	YOUNG'S MODULUS 10E4KGF/S
9.565	4.750	-	12600	175	-	-	712.0	-	-	-	10E4KGF/S
				212	5000						
				214	6200						
				215	6600						
				216	7000						
9.525	4.750	-	8520	217	-	-	431.2	-	-	-	0.669
				242	3000						
				243	4200						
				244	4600						
				245	5000						
9.500	4.750	-	10220	155	-	-	577.6	-	-	-	6.277
				130	4200						
				132	4800						
				134	5400						
				136	6000						
9.375	4.750	-	8020	-	-	-	-	-	-	-	9.871
9.635	4.742	-	11800	-	-	-	455.2	-	-	-	
2.570	4.745	105.400	1000	-	-	-	670.4	-	-	-	
2.550	4.740	104.200	1200	-	-	-	-	-	-	-	
2.535	4.745	104.750	980	-	-	-	-	-	-	-	
2.560	4.750	105.350	1200	-	-	-	-	-	-	-	
2.525	4.750	103.550	920	-	-	-	-	-	-	-	
	4.743	-	5960	-	-	-	-	-	-	-	
	4.747	-	3040	-	-	-	-	-	-	-	
	4.750	-	5300	-	-	-	-	-	-	-	
MEAN-											
STANDARD DEVIATION-											
NO. OF SPECIMEN TESTED-											
TEST FOR PROTOYAKNOV INDEX COULD NOT BE CONDUCTED											
							2.319				0.272
							0.003				1.629
							5				3

SAMPLE NO - RDG-10/012  
 ROCK TYPE - SANDSTONE CSD  
 CORE LENGTH 3.05 METRES FROM 192.40 TO 195.45 METRES

LENGTH CM	DIA CM	MASS GMS	LOAD KGF	LV/MD 0.01 MM	LOAD KGF	BULK DENSITY GMS/CC	COMP STRENGTH DRY KGF/SQCM	COMP STRENGTH WET KGF/SQCM	TENSILE STRENGTH KGF/SQCM	SHEAR STRENGTH KGF/SQCM	YOUNG MODUL
9.745	4.745	-	1420	433	-	-	306.1	-	-	-	-
				500	6400						
				503	7000						
				506	7600						
				502	8200						
				322	8600						
				332	9000						
				333	9400						
				334	9800						
				335	9000						
9.915	4.745	-	10600	-	-	-	1062.6	-	-	-	5.495
9.865	4.750	-	11800	-	-	-	699.3	-	-	-	16.600
9.825	4.750	-	7720	-	-	-	437.7	-	-	-	-
10.140	4.750	-	7780	-	-	-	442.8	-	-	-	-
2.430	4.750	103.250	2.000	-	-	2.515	-	-	110.4	-	-
2.235	4.750	96.950	1.440	-	-	2.449	-	-	86.4	-	-
2.305	4.750	104.900	2.000	-	-	2.403	-	-	116.9	-	-
2.615	4.750	116.450	2.240	-	-	2.514	-	-	114.9	-	-
2.390	4.750	103.960	1.720	-	-	2.456	-	-	96.5	-	-
-	4.743	-	7020	-	-	-	-	-	-	221.4	-
-	4.750	-	7100	-	-	-	-	-	-	202.1	-
-	4.747	-	4960	-	-	-	-	-	-	140.2	-
-	4.750	-	5600	-	-	-	-	-	-	150.1	-
-	4.750	-	6520	-	-	-	-	-	-	104.1	-

MEAN -  
 ST. DEV. DEVIATION -  
 NO OF SPECIMEN TESTED -

PHOTOYANKONOV INDEX = 2.650

2.404	603.7	0.0	105.0	101.2	11.06
0.031	263.3	0.0	13.1	32.7	7.07
5	5	0	5	5	



CONTD. FROM PREVIOUS PAGE

MEAN-	STANDARD DEVIATION-	NO OF SPECIMEN TESTED-	PROTODY.KONOV INDEX = 0.005
2.472	764.0	5	0.0
0.028	111.4	6	0.0
			0.0
			02.3
			6.0
			5
			133.6
			20.9
			5
			6.055
			0.170
			3

SAMPLE NO - RDG-18/014  
 ROCK TYPE - SANDSTONE  
 CORE LENGTH 9.69 METRES FROM 198.45 TO 199.14 METRES

GTH	DIA CM	MASS GMS	LC/D KGF	ID/ND 0.01 MM	LOD KGF	BULK DENSITY GMS/CC	COMP. STRENGTH DRY KGF/SQCM	COMP. STRENGTH WET KGF/SQCM	TENSILE STRENGTH KGF/SQCM	SHEAR STRENGTH KGF/SQCM	YOUNGS MODULUS KGF/SQCM
045	4.715	-	10480	313	-	-	1052.3	-	-	-	10E4KGF/SQCM
370	4.745	-	12560	400	-	-	709.5	-	-	-	7.630
65	4.740	-	19300	410	-	-	-	-	-	-	-
85	4.755	112.000	1700	413	6200	2.539	1945.2	-	91.6	-	8.701
85	4.750	110.500	1920	416	6800	2.593	-	-	99.3	-	-
70	4.750	116.050	1920	95	9400	2.550	-	-	100.2	-	-
20	4.750	119.560	1040	120	10000	2.576	-	-	94.2	-	-
	4.740	-	6000	132	-	-	-	-	-	170.1	-
	4.743	-	5200	135	-	-	-	-	-	147.2	-
				130	7000	-	-	-	-	-	-

STANDARD DEVIATION -  
 SPECIMEN TESTED -  
 TEST FOR PROTOBYAKONOV INDEX COULD NOT BE CONDUCTED

2.565	935.3	0.00	96.4	150.7	8.170
0.025	196.1	0.00	4.2	16.2	0.752
4	3	0	4	2	2

SAMPLE NO-RDG-10/015  
 ROCK TYPE - SANDSTONE OGD WITH SILE LAMINAE  
 CONE LENGTH 1.70 METRES FROM 199.14 TO 200.04 METRES

: 81 :

LENGTH CM	DIA CM	W/SS GMS	LO/D KGF	ID/ND 0.01 MM	LOD KGF	BULK DENSITY GMS/CC	COMP. STRENGTH DRY KGF/SQCM	COMP. STRENGTH WET KGF/SQCM	TENSILE STRENGTH KGF/SQCM	SHEAR STRENGTH KGF/SQCM	YOUNG MODUL
9.420	4.750	-	17760	247	-	-	1001.7	-	-	-	10E4K
				279	3400						
				280	3000						
				282	9200						
				284	9600						
9.525	4.745	-	17000	151	-	-	1012.1	-	-	-	13.790
				194	0400						
				196	0000						
9.535	4.745	-	19320	199	2600	-	1093.0	-	-	-	10.531
9.695	4.745	-	15000	198	9200	-	850.9	-	-	-	-
9.835	4.740	-	17000	-	-	-	960.2	-	-	-	-
2.550	4.741	116.070	1000	-	-	2.501	-	-	-	-	-
2.565	4.745	110.850	2120	-	-	2.615	-	-	-	-	-
2.490	4.740	115.000	2000	-	-	2.619	-	-	-	-	-
2.555	4.745	119.750	2260	-	-	2.652	-	-	-	-	-
2.595	4.740	117.700	1840	-	-	2.572	-	-	-	-	-
-	4.740	-	5350	-	-	-	-	-	-	-	-
-	4.746	-	5600	-	-	-	-	-	-	-	-
-	4.743	-	5660	-	-	-	-	-	-	-	-
-	4.743	-	3520	-	-	-	-	-	-	-	-

ME.N-  
 STANDARD DEVIATION  
 NO OF SPECIMEN TESTED

PROBABILITY INDEX = 5.693

2.600	905.3	0.0	107.3	141.0	12.161
0.032	30.2	0.0	9.8	20.2	2.304
5	5	0	5	4	2

SAMPLE NO. - REC-18/016  
 ROCK TYPE - INTERCALATED SANDSTONE + SHALE  
 CORE LENGTH 0.66 METRES FROM 200.04 TO 201.50 METRES.

LENGTH CM	DIA CM	MASS GMS	LOAD KGF	ID/ND 0.01 MM	LOD KGF	BULK DENSITY GMS/CC	COMP. STRENGTH DIRY KGF/SQCM	COMP. STRENGTH WET KGF/SQCM	TENSILE STRENGTH KGF/SQCM	SHEAR STRENGTH KGF/SQCM	YOUNGS MODULUS 10E4KGF/SQCM
9.510	4.740	-	10900	159	-	-	610.3	-	-	-	10E4KGF/SQCM
				184	4300						
				136	5200						
				138	5600						
				191	6200						
9.765	4.740	-	12200	139	-	-	694.3	-	-	-	7.009
				177	5600						
				178	6000						
				180	6400						
				181	6800						
2.600	4.740	115.400	1525	-	-	2.517	-	-	78.6	-	0.444
2.570	4.745	127.150	1640	-	-	2.694	-	-	82.5	-	-
2.215	4.740	100.500	1720	-	-	2.573	-	-	104.3	-	-
2.520	4.745	119.500	2200	-	-	2.603	-	-	121.5	-	-
2.500	4.740	122.400	1000	-	-	2.690	-	-	93.0	-	-
MEAN-											
STAND. AD DEVIATION-											
NO OF SPECIMENT TESTED-											
PROTODYKONOV INDEX = 4.644											
		2.631				656.3		0.0	96.1		0.166
		0.002				53.7		0.0	17.4		0.393
		5				2		0	5		2

SAMPLE NO - R36-18/017  
 ROCK TYPE - SANDSTONE BED WITH SHALE LAMINAE  
 CORE LENGTH 0.06 METRES FROM 201.50 TO 202.36 METRES

LENGTH CM	DIA CM	MASS GMS	LOAD KGF	ID/ND 0.01 MM	LOD KGF	DULK DENSITY GMS/CCM	COMP STRENGTH DRY KGF/SQCM	COMP. STRENGTH WET KGF/SQCM	TENSILE STRENGTH KGF/SQCM	SHEAR STRENGTH KGF/SQCM	YOUNGS MODULU 10E4KGS
9.700	4.750	-	10720	300	-	-	607.4	-	-	-	10E4KGS
				414	5000						
				416	5400						
				410	5000						
				420	6200						
9.170	4.750	-	11160	701	-	-	627.3	-	-	-	10.209
9.865	4.750	-	14200	729	6600		794.6				
				731	7000						
				733	7400						
				734	7000						
2.595	4.745	110.400	2100	-	-	2.502	-	-	112.8	-	-
2.605	4.745	121.500	2100	-	-	2.639	-	-	100.2	-	-
2.575	4.745	112.100	1500	-	-	2.463	-	-	82.4	-	-
2.541	4.745	110.000	02600	-	-	2.620	-	-	141.6	-	-
2.615	4.750	112.750	1760	-	-	2.434	-	-	90.3	-	-
	4.750	-	2140	-	-	-	-	-	60.4	-	-

MEAN-  
 STANDARD DEVIATION--  
 NO OF SPECIMEN TESTED--

PROBODY/KONOV INDEX = 4.412

2.549	676.4	0.0	107.1	60.4	10.833
0.095	12.8	0.0	23.0	0.0	0.954
5	3	0	5	1	2



SAMPLE NO - RSG-18/018  
 ROCK TYPE - SANDSTONE HSB WITH C SANDS  
 CORE LENGTH 0.19 METRES FROM 202.36 TO 202.55 METRES

LENGTH CM	DI/A CM	MASS GMS	LO/D KGF	ID/ND 0.01MM	LOD KGF	BULK DENSITY	COMP. STRENGTH DRY	COMP. STRENGTH WET	TENSILE STRENGTH	SHEAR STRENGTH	YOUNG'S MODULUS
						GMS/CC	KGF/SQCM	KGF/SQCM	KGF/SQCM	KGF/SQCM	10E4KGF/SQCM

NON OF THESE TESTS COULD BE CONDUCTED  
 PROTODYAKONOV INDEX = 4.705

SAMPLE NO - RSG-18/019  
 ROCK TYPE - SANDSTONE HGD SIDERITIC WITH C SAND  
 CORE LENGTH 0.00 METRES FROM 202.55 TO 202.63 METRES.

LENGTH CM	DI/A CM	MASS GMS	LO/D KGF	ID/ND 0.01MM	LOD KGF	BULK DENSITY	COMP. STRENGTH DRY	COMP. STRENGTH WET	TENSILE STRENGTH	SHEAR STRENGTH	YOUNG'S MODULUS
						GMS/CC	KGF/SQCM	KGF/SQCM	KGF/SQCM	KGF/SQCM	10E4KGF/SQCM

NON OF THESE TESTS COULD BE CONDUCTED  
 TEST FOR PROTODYAKONOV INDEX COULD NOT BE CONDUCTED

SAMPLE NO - RBG-18/020  
 ROCK TYPE - SANDSTONE MGD  
 CORE LENGTH 0.07 METRES FROM 202.63 TO 202.70 METRES

LENGTH CM	DIA CM	MASS GMS	LOAD KGF	ID/ND 0.01MM	LOD KGF	BULK DENSITY	COMP. STRENGTH DRY	COMP. STRENGTH WET	TENSILE STRENGTH	SHEAR STRENGTH	YOUNGS MODULUS
						GMS/CC	KGF/SQCM	KGF/SQCM	KGF/SQCM	KGF/SQCM	10E4KGF/SQCM

NON OF THESE TESTS COULD BE CONDUCTED  
 TEST FOR PROTODYV.KONOV INDEX COULD NOT BE CONDUCTED.

SAMPLE NO - RBG-18/021  
 ROCK TYPE - INTERCALATED SANDSTONE AND SHALE  
 CORE LENGTH 0.61 METRES FROM 205.35 TO 205.96 METRES.

LENGTH CM	DIA CM	MASS GMS	LOAD KGF	ID/ND 0.01MM	LOD KGF	BULK DENSITY	COMP. STRENGTH DRY	COMP. STRENGTH WET	TENSILE STRENGTH	SHEAR STRENGTH	YOUNGS MODULUS
						GMS/CC	KGF/SQCM	KGF/SQCM	KGF/SQCM	KGF/SQCM	10E4KGF/SQCM

NON OF THESE TESTS COULD BE CONDUCTED  
 PROTODYV.KONOV INDEX = 3.327

SAMPLE NO. - RBG-18/022  
 ROCK TYPE - SANDSTONE CGD  
 CORE LENGTH 1.59 METRES FROM 205.96 TO 207.55 METRES.

LENGTH CM	DIA CM	MASS GMS	LOAD KGF	ID/ND 0.01MM	LOD KGF	BULK DENSITY GMS/CC	COMP. STRENGTH DIVY KGF/SQCM	COMP. STRENGTH JET KGF/SQCM	TENSILE STRENGTH KGF/SQCM	SHEAR STRENGTH KGF/SQCM	YOUNG MODULUS 10E4KGF/SQCM
9.565	4.730	-	11960	3	5400	-	631.9	-	-	-	-
9.025	4.735	-	10600	30	5000	-	605.0	-	-	-	10.856
9.600	4.730	-	10960	32	5400	-	625.2	-	-	-	-
				34	6200						
				36	6600						
9.675	4.730	-	8760	75	5000	-	500.2	-	-	-	9.078
9.805	4.730	-	7230	77	5400	-	416.3	-	-	-	-
2.560	4.725	108.750	1000	79	5800	2.424	-	-	52.7	-	-
2.600	4.725	107.700	800	81	6200	2.364	-	-	41.5	-	-
2.580	4.735	106.750	1250	-	-	2.395	-	-	65.2	-	-
2.575	4.730	110.600	1200	-	-	2.446	-	-	62.8	-	-
2.590	4.720	108.400	700	-	-	2.393	-	-	40.6	-	-
	4.740	-	1900	-	-	-	-	-	53.9	-	-
	4.740	-	880	-	-	-	-	-	24.9	-	-
	4.733	-	1900	-	-	-	-	-	51.2	-	-
	4.736	-	2140	-	-	-	-	-	60.8	-	-
	4.730	-	4120	-	-	-	-	-	117.3	-	-

MEAN-  
 STANDARD DEVIATION-  
 NO OF SPECIMEN TESTED:-

PHOTOBY/KONGV INDEX = 2.700

2.404	565.7	0.0	52.5	61.6	9.967
0.031	106.3	0.0	11.5	34.0	1.257
5	5	0	5	5	2

## CHAPTER - VIII.

### 8.00.00 SUMMARY AND CONCLUSION:

8.00.01 The detailed exploration of Begunia Block, District: Bardhaman, West Bengal, involving large scale Geological mapping and surveying in an area of 4.1 sq. km. (1:4000 R.F.), drilling of 14,197.45 m. in 23 boreholes, has established the presence of 13 coal seams of more than 0.50 m. thickness from Salanpur (B - II) to Local (Above Chanch - Begunia) in the Barakar measures of western Raniganj Coalfield.

8.00.02 The geological structure of the area as deduced from the surface and sub-surface data indicate the presence of 12 faults. These faults are grouped in eight because two faults  $F_1 - F_1$  and  $F_2 - F_2$  split into three faults which again merge within the Block. Most of the faults are dipping towards south or southwest except  $F_3$ ,  $F_7$  and  $F_8$  which dips towards North and Northeast. The strike of formation in Begunia block varies from WNW - ESE in the western part to almost E - W in central part. The dip which is always southerly, varies from  $4^\circ - 5^\circ$  in northern part to  $10^\circ$  in the south.

8.00.03 In all, 13 coal seams and their merged sections have been considered for studies and reserves estimation. These seams in ascending order are Salanpur (B - II), Local (Above Salanpur), Bindawanpur Group, Gopinathpur (Bottom), Gopinathpur (Top), Local (Above Gopinathpur), New Seam and Laikdih (Bottom), Laikdih (Top) and (Bottom) Combined, Laikdih (Top), Jograd, Chanch - Begunia Special Chanch - Begunia and Seam Local (Above Chanch - Begunia). Out of these 13 seams only 7 seams from Local (Above Chanch - Begunia) to Laikdih Top and Bottom Combined and Laikdih Bottom have been considered for the classification of reserves under proved category. The remaining 6 seams or group of seams where the borehole intersection are limited, the reserves are classified under inferred category.

8.00.04 Due to high U.V.M. contents and Caking properties, all the seams upto Laikdih Bottom and New Seam are considered Coking in the entire area, whereas the lower seam are considered as Non-Coking.

8.00.05 The reserves of the seam in the block is grouped in Main block area which is further sub-divided into four sector i.e., 01, 02, 03 and 04 respectively.

8.00.06 Reserves of coal including band for the different seams upto seam Laikdih have been estimated in detail, by considering Isocores, Isograde, Isoval and horizon line on seam folios.

8.00.07 The summary of the reserves of coal in Begunia block.

( In million tonnes )

		<u>TOTAL</u>
COOKING (IN-BAND)	PROVED -	34.258
	INFERRED -	2,022
NON-COOKING (IN-BAND)	INFERRED	110.110

8.00.08 In Begunia block, 11 seams out of 13 seams are partially or completely affected by intrusions resulting in formation of Jhama within the seam. The total proved reserves of Jhama upto Laikdih (Bottom) are 49.35 m. tonnes.

भूवैज्ञानिक प्रतिवेदन : कोयला गवेषण  
बेगुनिया प्रखण्ड, रानीगंज कोयला-क्षेत्र  
जिला बर्द्धमान (प० बंगाल)

GEOLOGICAL REPORT ON EXPLORATION FOR COAL  
Begunia Block, Raniganj Coalfield  
District : Bardhaman (W. Bengal)

खंड - १ ख  
( विषय वस्तु परिशिष्ट )

VOLUME - I B  
(TEXT ANNEXURES)



खनिज गवेषण निगम लिमिटेड  
( भारत सरकार का उद्यम )  
मार्च १९८४

MINERAL EXPLORATION CORPORATION LTD.  
( A Government of India Enterprise )  
March 1984

LIST OF ABBREVIATION USED FOR  
SEAM NOMENCLATURE IN RESERVES  
TABLES :

ABBREVIATION	FULL NAME
1. LOCAL	LOCAL ABOVE CHANCH - BEGUNIA
2. CHANCH - BEG.	CHANCH - BEGUNIA
3. CHANCH - BEGSP	CHANCH - BEGUNIA SPECIAL
4. JOGRAD	JOGRAD
5. LAIKDIH COMB.	LAIKDIH TOP AND BOTTOM COMBINED
6. LAIKDIH BOT.	LAIKDIH BOTTOM.

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BEGONIA BLOCK

RESERVES TABLE -- 1

STATEMENT SHOWING SE.M.I.S.E, SECTOR-WISE AND HORIZON-WISE  
NET PROVED RESERVES OF COOKING COAL SE.M.S  
(INCLUDING SANDS)



M.C.C.LTD.

BEGUNIA BLOCK, PANIGANJ COALFIELD, DISTT. BARDHAMAN, (WEST BENGAL)

STATEMENT SHOWING SEAM-WISE, SECTOR-WISE AND HORIZON-WISE NET PROVED RESERVES OF COKING COAL SEAMS

IN-DANE

(RESERVES IN '000 TONNES)

H O R I Z O N - R A N G E S

SEAM NO	SECTOR	DEVELOPED	* ABOVE	* 0 TO	* -100 TO	* -200 TO	* -300 TO	* -400 TO	* -500 TO	* -600	* TOTAL

02	VIRGIN	0	0	64	157	40	0	0	0	0	261
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03	VIRGIN	0	0	0	5	284	52	0	0	0	341
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	VIRGIN	0	0	64	162	324	52	0	0	0	744
	TOTAL	0	0	64	162	324	52	0	0	0	744

LAIRDH COMB

01	VIRGIN	0	623	819	0	0	0	0	0	0	1442
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02	VIRGIN	0	0	1710	1218	459	0	0	0	0	3387
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02	DEVELOPED	0	0	298	0	0	0	0	0	0	298
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02	SUB-TOTAL	0	0	2008	1218	459	0	0	0	0	3685
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SEAM TOTAL

03	VIRGIN	0	0	0	0	116	8093	170	0	0	8379
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	VIRGIN	0	623	2529	1218	575	8093	170	0	0	13206
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	DEVELOPED	0	0	298	0	0	0	0	0	0	298
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	TOTAL	0	623	2827	1218	575	8093	170	0	0	13504
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LAIRDH BOT

02	VIRGIN	0	0	3652	112	0	0	0	0	0	3764
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02	DEVELOPED	0	0	624	0	0	0	0	0	0	624
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02	SUB-TOTAL	0	0	4276	112	0	0	0	0	0	4388
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SEAM TOTAL

03	VIRGIN	0	0	0	0	1811	3248	29	0	0	5088
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04	VIRGIN	0	0	0	0	55	29	0	0	0	84
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	VIRGIN	0	0	3652	112	1866	3277	29	0	0	8936
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	DEVELOPED	0	0	624	0	0	0	0	0	0	624
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	TOTAL	0	0	4276	112	1866	3277	29	0	0	9560
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W.E.C.LTD.

BEGUNIA BLOCK/RANIGANJ COALFIELD, DIST. BARDHAMAN, (WEST BENGAL)

STATEMENT SHOWING TOTAL SECTOR-WISE AND HORIZON-WISE NET PROVED RESERVES OF COKING COAL SEAMS (RESERVES IN '000 TONNES) IN-BAND

H O R I Z O N - R A N G E S  
 SEAM NO SECTOR DEVELOPED \* ABOVE \* 0' \* TO \* -100 TO \* -200 TO \* -300 TO \* -400 TO \* -500 TO \* -600 \*  
 TOTAL ALL SECTORS

SEAM NO	SECTOR DEVELOPED	01	02	03	04	TOTAL ALL SECTORS
	VIRGIN	96	765	819	0	1680
	DEVELOPED	2678	767	5589	1506	11039
	SUB-TOTAL	2858	767	6511	1506	12141
	VIRGIN	0	1713	2760	488	48901
	DEVELOPED	0	94	83	0	177
	SUB-TOTAL	0	1807	2843	488	19078
	VIRGIN	0	0	161	825	1399
	DEVELOPED	2774	3245	9329	2815	33019
	TOTAL	180	94	1005	0	1279
	TOTAL ALL SEAMS	2954	3339	10334	2815	34298

M.E.C.LTD.

REGUNIA BLOCK/RANIGANJ COALFIELD/DISTI. BARDHAMAN, (WEST BENGAL)

STATEMENT SHOWING SEAM-WISE, SECTOR-WISE AND THICKNESS-WISE NET PROVED RESERVES OF COKING COAL SEAMS

IN-BAND

(RESERVES IN '000 TONNES)

THICKNESSES - RANGES (IN METS)

SEAM NO SECTOR DEVELOPED \* 0.5 TO \* 0.5 TO \* 1.2 TO \* 2.0 TO \* 4.0 TO \* 4.0 TO \* MORE THAN \* TOTAL

\* 0.9 \* 1.2 \* 2.0 \* 4.0 \* 6.0 \*

02	VIRGIN	144	117	0	0	0	0	0	0	261
03	VIRGIN	309	32	0	0	0	0	0	0	341
	VIRGIN	533	149	62	0	0	0	0	0	744
	TOTAL	533	149	62	0	0	0	0	0	744

SEAM TOTAL

01	VIRGIN	7	10	37	105	221	1062	1442
02	VIRGIN	34	54	98	462	454	2285	3387
02	DEVELOPED	0	0	0	0	0	298	298
02	SUB-TOTAL	34	54	98	462	454	2583	3685
03	VIRGIN	11	15	43	167	300	7843	8379
	VIRGIN	52	79	178	734	975	11190	13208
	DEVELOPED	0	0	0	0	0	298	298
	TOTAL	52	79	178	734	975	11488	13506

LAIKDIN BOT

02	VIRGIN	2	4	7	26	36	3689	3764
02	DEVELOPED	0	0	0	0	0	624	624
02	SUB-TOTAL	2	4	7	26	36	4313	4388
03	VIRGIN	22	36	87	166	365	4410	5088
04	VIRGIN	3	3	4	24	50	0	84
	VIRGIN	27	45	98	216	451	8099	8936
	DEVELOPED	0	0	0	0	0	624	624
	TOTAL	27	45	98	216	451	8723	9560

SEAM TOTAL

01	VIRGIN	7	10	37	105	221	1062	1442
02	VIRGIN	34	54	98	462	454	2285	3387
02	DEVELOPED	0	0	0	0	0	298	298
02	SUB-TOTAL	34	54	98	462	454	2583	3685
03	VIRGIN	11	15	43	167	300	7843	8379
	VIRGIN	52	79	178	734	975	11190	13208
	DEVELOPED	0	0	0	0	0	298	298
	TOTAL	52	79	178	734	975	11488	13506
02	VIRGIN	2	4	7	26	36	3689	3764
02	DEVELOPED	0	0	0	0	0	624	624
02	SUB-TOTAL	2	4	7	26	36	4313	4388
03	VIRGIN	22	36	87	166	365	4410	5088
04	VIRGIN	3	3	4	24	50	0	84
	VIRGIN	27	45	98	216	451	8099	8936
	DEVELOPED	0	0	0	0	0	624	624
	TOTAL	27	45	98	216	451	8723	9560

M.F.C.LTD.

BAGUNIA BLOCK, BANIGANJ COALFIELD, DIST. BARDAHAN, (WEST BENGAL)

STATEMENT SHOWING TOTAL SECTOR-WISE AND THICKNESS-WISE NET PROVED RESERVES OF COOKING COAL SEAMS

IN-DANO

(RESERVES IN '000 TONNES)

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*****
THICKNESSES - RANGES (IN MTS)
*****
SEAM NO  SECTOR DEVELOPED * 0.5 TO * 0.9 TO * 1.2 TO * 2.0 TO * 4.0 TO * 6.0 TO * MORE THAN* TOTAL
*****
TOTAL ALL SECTORS
    
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SEAM NO	SECTOR DEVELOPED	0.5 TO	0.9 TO	1.2 TO	2.0 TO	4.0 TO	6.0 TO	MORE THAN	TOTAL
01	VIRGIN	139	48	99	111	221	1062	1680	
02	VIRGIN	784	559	779	2453	490	5574	11039	
	DEVELOPED	4	8	22	146	0	922	1102	
	SUB-TOTAL	788	567	801	2599	490	6896	12141	
03	VIRGIN	1858	624	519	2982	665	12253	18901	
	DEVELOPED	0	0	1	174	0	0	177	
	SUB-TOTAL	1858	624	520	3158	665	12253	19078	
04	VIRGIN	111	295	4	935	50	0	1399	
	VIRGIN	2892	1526	1401	6485	1426	19289	33019	
	DEVELOPED	4	8	23	322	0	922	1279	
	TOTAL	2896	1534	1424	6807	1426	20211	34298	

M.F.C.LTD.

EEGUNIA BLOCK, RANIGANJ COALFIELD, DIST. BAROHAPAN, (WEST BENGAL)

STATEMENT SHOWING SEAM-WISE, SECTOR-WISE AND THICKNESS-WISE NET PROVED RESERVES OF COKING COAL SEAMS

IN-RAND

(RESERVES IN '000 TONNES)

THICKNESSES - RANGES (IN MTS)

SEAM NO SECTOR DEVELOPED \* 0.5 TO \* 0.9 TO \* 1.2 TO \* 2.0 TO \* 4.0 TO \* 6.0 TO \* MORE THAN \* TOTAL

LOCAL

02	VIRGIN	135	0	0	0	0	0	0	0	135
03	VIRGIN	1235	304	0	0	0	0	0	0	1541
04	VIRGIN	108	292	0	0	0	0	0	0	400
SEAM TOTAL		VIRGIN	1478	598	0	0	0	0	0	2076
		TOTAL	1478	598	0	0	0	0	0	2076

CHANCH-BEG

01	VIRGIN	0	0	0	0	0	0	0	0	0
02	VIRGIN	8	13	169	1965	0	0	0	0	2155
02	DEVELOPED	4	8	22	144	0	0	0	0	180
02	SUB-TOTAL	12	21	191	2111	0	0	0	0	2335
03	VIRGIN	110	128	360	2645	0	0	0	0	3247
03	DEVELOPED	0	0	1	176	0	0	0	0	177
03	SUB-TOTAL	110	128	361	2825	0	0	0	0	3424
04	VIRGIN	0	0	0	915	0	0	0	0	915
SEAM TOTAL		VIRGIN	118	141	529	5535	0	0	0	6323
		DEVELOPED	4	8	23	322	0	0	0	357
		TOTAL	122	149	552	5857	0	0	0	6680

CHANCH-BEGSP

01	VIRGIN	52	38	0	0	0	0	0	0	90
02	VIRGIN	461	371	505	0	0	0	0	0	1337
03	VIRGIN	171	105	29	0	0	0	0	0	305
SEAM TOTAL		VIRGIN	684	514	534	0	0	0	0	1732
		TOTAL	684	514	534	0	0	0	0	1732

JOGRAH

01	VIRGIN	80	0	62	0	0	0	0	0	142
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H.F.C.LTD.

BEGUNIA BLOCK, RANIGANGH COALFIELD, DIST. FARIDHABAD, (WEST BENGAL)

STATEMENT SHOWING SEAM-WISE, SECTOR-WISE AND U.V.M.-WISE NET PROVED RESERVES OF OPENING COAL SEAMS

IN-BAND

(RESERVES IN '000 TONNES)

U - V - R - R A N G E S

SEAM NO	SECTOR DEVELOPED	U	V	R	TOTAL			
		15-20	20-22	22-25	25-30	30-35	GTN 35	TOTAL

02	VIRGIN	0	0	0	0	261	0	261
03	VIRGIN	0	0	0	112	229	0	341
	VIRGIN	0	0	0	112	432	0	744
	TOTAL	0	0	0	112	432	0	744

SEAM TOTAL

01	VIRGIN	0	0	0	0	1442	0	1442
02	VIRGIN	0	0	437	2622	328	0	3387
02	DEVELOPED	0	0	0	298	0	0	298
02	SUB-TOTAL	0	0	437	2920	328	0	3685
03	VIRGIN	0	0	0	0	8379	0	8379
	VIRGIN	0	0	437	11001	1770	0	13208
	DEVELOPED	0	0	0	298	0	0	298
	TOTAL	0	0	437	11299	1770	0	13506

SEAM TOTAL

LAIKOH NOT

02	VIRGIN	0	0	0	0	3764	0	3764
02	DEVELOPED	0	0	0	0	624	0	624
02	SUB-TOTAL	0	0	0	0	4388	0	4388
03	VIRGIN	0	0	0	0	5088	0	5088
04	VIRGIN	0	0	0	0	84	0	84
	VIRGIN	0	0	0	0	8936	0	8936
	DEVELOPED	0	0	0	0	624	0	624
	TOTAL	0	0	0	0	9560	0	9560

SEAM TOTAL

02	VIRGIN	0	0	0	0	3764	0	3764
02	DEVELOPED	0	0	0	0	624	0	624
02	SUB-TOTAL	0	0	0	0	4388	0	4388
03	VIRGIN	0	0	0	0	5088	0	5088
04	VIRGIN	0	0	0	0	84	0	84
	VIRGIN	0	0	0	0	8936	0	8936
	DEVELOPED	0	0	0	0	624	0	624
	TOTAL	0	0	0	0	9560	0	9560

H.F.C.LTD.

BEGUNIA BLOCK, RAHIGANJ COALFIELD, DIST. BARDAHAN, (WEST BENGAL)

STATEMENT SHOWING TOTAL SECTOR-WISE AND U.V.M.-WISE NET PROVED RESERVES OF COKING COAL SEAMS (RESERVES IN '000 TONNES)

U - V - M - R A N G E S

SEAM NO	SECTOR	BEVELCPD	LEO 15	15-20	20-22	22-25	25-30	30-35	OTH 35	TOTAL
TOTAL ALL SECTORS										

01	VIRGIN	0	0	0	0	0	0	1680	0	1680
02	VIRGIN	0	0	0	437	0	6512	4009	81	11039
	DEVELCPD	0	0	0	0	0	922	126	54	1102
	SUB-TOTAL	0	0	0	437	0	7434	4135	135	12141
03	VIRGIN	0	0	0	0	0	14213	4570	118	18901
	DEVELCPD	0	0	0	0	0	0	88	89	177
	SUB-TOTAL	0	0	0	0	0	14213	4658	207	19078
04	VIRGIN	0	0	0	0	0	84	1315	0	1399
	DEVELCPD	0	0	0	437	0	20809	11574	199	33019
	TOTAL	0	0	0	437	0	21731	11788	342	34298
TOTAL ALL SEAMS										

P.F.-C-LTD. BEGUNIA BLOCK, RAHIGANJ COLFIELD, DISTT. BARDHAMAN, (WEST BENGAL)

STATEMENT SHOWING SEAM-WISE, SECTOR-WISE AND ASH-WISE NET PROVED RESERVES OF COKING COAL SEAMS (RESERVES IN '000 TONNES) IN-BAND

AS H - R A N G E S

SEAM NO	SECTOR DEVELOPED	LEA 15	15-18	18-21	21-24	24-28	28-35	GTN 35	TOTAL
VIRGIN /									
LOCAL									

SEAM TOTAL

02 VIRGIN	0	0	0	0	0	79	56	0	135
03 VIRGIN	0	7	31	206	1080	217	0	0	1541
04 VIRGIN	0	0	0	2	340	58	0	0	400
VIRGIN	0	7	31	208	1499	331	0	0	2076
TOTAL	0	7	31	208	1499	331	0	0	2076

CHANCH-BEG

01 VIRGIN	0	0	0	6	0	0	0	0	6
02 VIRGIN	344	1017	522	272	0	0	0	0	2155
DEVELOPED	0	111	69	0	0	0	0	0	180
SUB-TOTAL	344	1128	591	272	0	0	0	0	2335
03 VIRGIN	585	1017	1536	109	0	0	0	0	3247
DEVELOPED	0	78	99	0	0	0	0	0	177
SUB-TOTAL	585	1095	1635	109	0	0	0	0	3424
04 VIRGIN	502	270	143	0	0	0	0	0	915
VIRGIN	1431	2304	2201	387	0	0	0	0	6323
DEVELOPED	0	189	168	0	0	0	0	0	357
TOTAL	1431	2493	2369	387	0	0	0	0	6680

CHANCH-BEGSP

01 VIRGIN	0	0	0	31	35	24	0	0	90
02 VIRGIN	0	0	666	426	164	81	0	0	1337
03 VIRGIN	0	0	0	60	96	127	22	0	305
VIRGIN	0	0	666	517	295	232	22	0	1732
TOTAL	0	0	666	517	295	232	22	0	1732

JAGRAD

01 VIRGIN	0	0	0	0	0	99	43	0	142
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#E.C.L10-

BEGUNIA BLOCK, BANIGANJ COALFIELD, DIST. BARDHAMAN, (WEST BENGAL)

STATEMENT SHOWING SEAM-WISE, SECTOR-WISE AND ASH-WISE NET PROVED RESERVES OF COKING COAL SEAMS

IN-BAND

(RESERVES IN '000 TONNES)

A S H - P A N C E S

SEAM NO	SECTOR DEVELOPED	LEO 15	15-18	18-21	21-24	24-28	28-35	GTW 35	TOTAL
02	VIRGIN	0	0	0	43	216	2	261	
03	VIRGIN	0	0	44	247	50	0	341	
SEAM TOTAL		0	0	44	290	365	45	744	
VIRGIN		0	0	44	290	365	45	744	
TOTAL		0	0	44	290	365	45	744	

LAIKDIRH COMB

01	VIRGIN	0	5	1437	0	0	0	1442	
02	VIRGIN	0	1425	1548	414	0	0	3387	
02	DEVELOPED	0	219	79	0	0	0	298	
02	SUB-TOTAL	0	1644	1627	414	0	0	3685	
01	VIRGIN	0	7405	974	0	0	0	8379	
SEAM TOTAL		0	8835	3959	414	0	0	13208	
VIRGIN		0	219	79	0	0	0	298	
DEVELOPED		0	9054	4038	414	0	0	13506	
TOTAL		0	9054	4038	414	0	0	13506	

LAIKDIRH BOT

02	VIRGIN	0	3376	388	0	0	0	3764	
02	DEVELOPED	0	624	0	0	0	0	624	
02	SUB-TOTAL	0	4000	388	0	0	0	4388	
03	VIRGIN	0	3332	1756	0	0	0	5088	
04	VIRGIN	0	84	0	0	0	0	84	
SEAM TOTAL		0	6792	2144	0	0	0	8936	
VIRGIN		0	624	0	0	0	0	624	
DEVELOPED		0	7416	2144	0	0	0	9560	
TOTAL		0	7416	2144	0	0	0	9560	

M.E.C.LTD.

BEGUNIA BLOCK, PANIGANJ COALFIELD, DIST. BARDHAMAN, (WEST BENGAL)

STATEMENT SHOWING TOTAL SECTOR-WISE AND ASH-WISE NET PROVED RESERVES OF COKING COAL SEAMS (RESERVES IN '000 TONNES)

ASH-RANGES

SEAM NO	SECTOR	DEVELOPED	LEG 15	15-18	18-21	21-24	24-28	28-35	OTH 35	TOTAL
TOTAL ALL SECTORS										

01	VIRGIN	0	5	1437	37	35	123	43	1686
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02	VIRGIN	344	5818	3124	1112	286	353	2	11039
	DEVELOPED	0	954	148	0	0	0	0	1102
	SUB-TOTAL	344	6772	3272	1112	286	353	2	12141

03	VIRGIN	585	11761	4297	419	1423	394	22	18901
	DEVELOPED	0	78	99	0	0	0	0	177
	SUB-TOTAL	585	11839	4396	419	1423	394	22	19078

04	VIRGIN	502	354	143	2	340	58	0	1399
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TOTAL ALL SEAMS										
	VIRGIN	1431	17938	9001	1570	2084	928	47	33019	
	DEVELOPED	0	1032	247	0	0	0	0	1279	
	TOTAL	1431	18970	9248	1570	2084	928	47	34298	

H.E.C.LTD. BURNIA BLOCK, PANIGANJ COLFIELD, DISTT. BAROHAPAN, (WEST BENGAL)

STATEMENT SHOWING SECTOR-WISE, HORIZON-WISE, THICKNESS, ASH & U.V.N-WISE NET PROVED RESERVES IN (000 TONNES)

SECTOR/	HORIZON	AREA IN U.V.N.	ASH	T H I C K N E S S -	R A N G E S	(IN PTS)	TOTAL		
SECTECT	SG MTS	RANGT	RANGE	0.5-0.9	0.9-1.2	1.2-2.0	2.0-4.0	4.0-6.0	> 6.0

SECTOR ABOVE '0'		SECTOR 30-35		SECTOR 24-28		SECTOR 28-35		SECTOR TOTAL	
49440	30-35	24-28	42	2	0	0	0	0	42
		28-35	2	0	0	0	0	0	2
		TOTAL	44	0	0	0	0	0	44

SECTOR '0' TO -100		SECTOR 100-200		SECTOR 200-300		SECTOR 30-35		SECTOR TOTAL	
106880	30-35	24-28	37	0	0	0	0	0	37
		28-35	52	0	0	0	0	0	52
		TOTAL	89	0	0	0	0	0	89

SECTOR '0' TO -100		SECTOR 100-200		SECTOR 200-300		SECTOR 30-35		SECTOR TOTAL	
842566	25-30	24-28	42	0	0	0	0	0	42
		28-35	2	0	0	0	0	0	2
		TOTAL	44	0	0	0	0	0	44

SECTOR '0' TO -100		SECTOR 100-200		SECTOR 200-300		SECTOR 30-35		SECTOR TOTAL	
642566	25-30	24-28	42	0	0	0	0	0	42
		28-35	2	0	0	0	0	0	2
		TOTAL	44	0	0	0	0	0	44

SECTOR '0' TO -100		SECTOR 100-200		SECTOR 200-300		SECTOR 30-35		SECTOR TOTAL	
673440	25-30	24-28	42	0	0	0	0	0	42
		28-35	2	0	0	0	0	0	2
		TOTAL	44	0	0	0	0	0	44

SECTOR '0' TO -100		SECTOR 100-200		SECTOR 200-300		SECTOR 30-35		SECTOR TOTAL	
673440	25-30	24-28	42	0	0	0	0	0	42
		28-35	2	0	0	0	0	0	2
		TOTAL	44	0	0	0	0	0	44

SECTOR '0' TO -100		SECTOR 100-200		SECTOR 200-300		SECTOR 30-35		SECTOR TOTAL	
673440	25-30	24-28	42	0	0	0	0	0	42
		28-35	2	0	0	0	0	0	2
		TOTAL	44	0	0	0	0	0	44

SEAP- LOCAL IN-BAND CORING VIRGIN

T H I C K N E S S - F A S C E S (IN PTS)

SECTOR/ HORIZON AREA IN U.V.M. ASH RANGE 0.5-0.9 0.9-1.2 1.2-2.0 2.0-4.0 4.0-6.0 6.0  
 SUBSECT 50 PTS RANGE RANGE

03 -100 TO -200 67344C 30-35 24-28 364 18 0 0 0 0 0 382  
 28-35 10 0 0 0 0 0 10

TOTAL 445 43 0 0 0 0 508  
 HORIZON TOTAL 532 43 0 0 0 0 595

03 -200 TO -300 544C 25-30 15-18 3 0 0 0 0 0 3  
 18-21 1 0 0 0 0 0 1  
 TOTAL 4 0 0 0 0 0 4

HORIZON TOTAL 4 0 0 0 0 0 4

SECTICE TOTAL 1235 306 0 0 0 0 1541

04 -100 TO -200 12432C 30-35 24-28 15 146 0 0 0 0 161  
 TOTAL 15 146 0 0 0 0 161

HORIZON TOTAL 15 146 0 0 0 0 161

04 -200 TO -300 1560C 30-35 21-24 0 2 0 0 0 0 2  
 24-28 35 144 0 0 0 0 179  
 28-35 58 0 0 0 0 0 58

TOTAL 93 146 0 0 0 0 239

HORIZON TOTAL 93 146 0 0 0 0 239

SECTICE TOTAL 102 252 0 0 0 0 400

SEAP TOTAL 1478 598 0 0 0 0 2076





SEARCH - CHANCH-BEG IN-EARD CONING VIRGIN

SECTOR/ HORIZON AREA IN U.V.P. ASH THICKNESS - RANGE S (IN PTS)  
 SUBJECT SQ MTS RANGE RANGE 0.5-0.9 0.9-1.2 1.2-2.0 2.0-4.0 4.0-6.0 > 6.0 TOTAL

02 02 -200 TO -300 960 25-30 21-24 1 7 111 42 0 0 161  
 HORIZON TOTAL

03 01 -100 TO -200 212480 30-35 >35 1 0 0 0 0 0 1  
 HORIZON TOTAL

03 01 -100 TO -200 212480 30-35 >35 13 166 920 0 0 1107  
 SUBSECTOR TOTAL

03 01 -100 TO -100 212480 30-35 >35 13 165 1965 0 0 2155  
 SECTOR TOTAL

03 01 -100 TO -200 212480 30-35 >35 15-18 0 0 0 442 0 442  
 18-21 0 0 0 172 0 172  
 TOTAL 0 0 0 109 0 109

03 01 -100 TO -200 212480 30-35 >35 15-18 0 0 0 723 0 723  
 18-21 0 0 0 12 0 12  
 TOTAL 0 0 0 735 0 735

03 01 -100 TO -200 212480 30-35 >35 15-18 0 0 0 140 0 140  
 18-21 0 0 0 701 0 701  
 TOTAL 0 0 0 255 0 255

03 01 -100 TO -200 212480 30-35 >35 15-18 0 0 0 1096 0 1096  
 18-21 0 0 0 18 0 18  
 TOTAL 0 0 0 15 0 15

03 01 -200 TO -300 7840 30-35 >35 15-18 0 0 0 1129 0 1129  
 18-21 0 0 0 32 0 32  
 TOTAL 0 0 0 32 0 32

03 02 -00 TO -100 17920 30-35 >35 15-18 0 0 0 1896 0 1896  
 18-21 0 0 0 11 0 11  
 TOTAL 0 0 0 32 0 32

03 02 -00 TO -100 17920 30-35 >35 15-18 0 0 0 1910 0 1910  
 18-21 0 0 0 36 0 36  
 TOTAL 0 0 0 32 0 32

03 02 -00 TO -100 17920 30-35 >35 15-18 0 0 0 1910 0 1910  
 18-21 0 0 0 36 0 36  
 TOTAL 0 0 0 32 0 32

SEAN- CHARCH-BEG IN-BAND COMING VIRGIN

SECTOR/ HORIZON AREA IN U.V.M. ASH THICKNESSES - RANGES (IN MTS) TOTAL  
 SUBJECT 50 MTS RANGE RANGE 0.5-0.9 0.9-1.2 1.2-2.0 2.0-4.0 4.0-6.0 > 6.0

03 02 -100 TO -200 356960 30-35  
 HORIZON TOTAL  
 TOTAL 3 4 18 11 0 0 36  
 15-18 0 0 5 5 114 0 0 119  
 18-21 22 34 162 0 0 0 830  
 21-24 19 13 5 0 0 0 37  
 TOTAL 41 47 172 726 0 0 986  
 18-21 3 5 17 11 0 0 36  
 TOTAL 3 5 17 11 0 0 36

03 02 -200 TO -300 191040 25-30  
 HORIZON TOTAL  
 TOTAL 3 4 18 11 0 0 36  
 <=15 3 0 0 0 0 0 3  
 18-21 43 55 101 5 0 0 204  
 21-24 6 12 38 0 0 0 60  
 TOTAL 52 71 139 5 0 0 267  
 30-35 11 1 0 0 0 0 12  
 21-24 11 1 0 0 0 0 12  
 TOTAL 11 1 0 0 0 0 12  
 HORIZON TOTAL 63 72 139 5 0 0 279  
 SESECTOR TOTAL 110 128 344 753 0 0 1337  
 SECTOR TOTAL 110 128 360 2649 0 0 3247

04 02 -200 TO -300 148960 30-35  
 HORIZON TOTAL  
 TOTAL 0 0 0 0 0 0 0  
 <=15 0 0 0 0 0 0 0  
 15-18 0 0 0 0 0 0 0  
 TOTAL 0 0 0 0 0 0 0  
 HORIZON TOTAL 0 0 0 0 0 0 0  
 SESECTOR TOTAL 110 128 344 753 0 0 1337  
 SECTOR TOTAL 110 128 360 2649 0 0 3247

04 02 -300 TO -400 89920 30-35  
 HORIZON TOTAL  
 TOTAL 0 0 0 0 0 0 0  
 15-18 0 0 0 0 0 0 0  
 18-21 0 0 0 0 0 0 0  
 TOTAL 0 0 0 0 0 0 0  
 HORIZON TOTAL 0 0 0 0 0 0 0  
 SECTOR TOTAL 0 0 0 0 0 0 0  
 SEAR TOTAL 118 141 529 535 0 0 633

HORIZON TOTAL  
 SECTOR TOTAL  
 SEAR TOTAL

R.E.C.LTD.

BEGUNIA BLOCK, BANIGANJ COALFIELD, DIST. BARDHAMAN, (WEST BENGAL)

STATEMENT SHOWING SECTOR-WISE, HORIZON-WISE, THICKNESS, ASH & U.V.W-WISE NET PROVED RESERVES IN (000\* TONNES)

SEARCH- CHANCH-BEG IN-BAND CKING DEVELOPD

THICKNESSES - RANGES (IN MTS)

SECTOR/ HORIZON AREA IN U.V.W- ASH RANGE RANGE 0.5-0.9 0.9-1.2 1.2-2.0 2.0-4.0 4.0-6.0 > 6.0 TOTAL

02 01 ABOVE \*0\* 28000 30-35 15-18 0 0 0 27 0 0 27

TOTAL 0 0 0 27 0 0 27

HORIZON TOTAL 0 0 0 27 0 0 27

SECTOR TOTAL 0 0 0 27 0 0 27

02 02 ABOVE \*0\* 22400 30-35 15-18 0 0 0 77 0 0 77

18-21 2 4 5 11 0 0 22

TOTAL 2 4 5 88 0 0 99

03 01 \*0\* TO -100 30880 30-35 15-18 0 0 0 5 0 0 5

18-21 2 4 15 26 0 0 47

TOTAL 2 4 17 31 0 0 54

HORIZON TOTAL 4 8 22 119 0 0 153

SECTOR TOTAL 4 8 22 119 0 0 153

SECTOR TOTAL 4 8 22 146 0 0 180

SECTOR TOTAL 4 8 22 146 0 0 180

03 01 \*0\* TO -200 31680 30-35 15-18 0 0 0 54 0 0 54

18-21 0 0 0 47 0 0 47

TOTAL 0 0 0 47 0 0 47

HORIZON TOTAL 0 0 0 81 0 0 81

SECTOR TOTAL 0 0 0 81 0 0 81

SECTOR TOTAL 0 0 0 81 0 0 81

03 01 \*0\* TO -200 31680 30-35 15-18 0 0 0 54 0 0 54

18-21 0 0 0 24 0 0 24

TOTAL 0 0 0 29 0 0 29

HORIZON TOTAL 0 0 0 29 0 0 29

SECTOR TOTAL 0 0 0 29 0 0 29

SECTOR TOTAL 0 0 0 29 0 0 29

SEAR- CHANCH-BEG IN-BAND COXING DEVELOPD

SECTOR/ HORIZON AREA IN U.V.M. ASH T H I C K N E S S - P A N G E S (IN RTS) TOTAL  
 SUBSECT SO RTS RANGE RANGE 0.5-0.9 0.9-1.2 1.2-2.0 2.0-4.0 4.0-6.0 > 6.0

HORIZON TOTAL 0 0 0 83 0 0 83  
 SUBSECTOR TOTAL 0 0 0 164 0 0 164  
 03 02 \*0\* T0 -100 5920 >35 18-21 0 0 0 12 0 0 12  
 TOTAL 0 0 0 12 0 0 12

HORIZON TOTAL 0 0 0 1 1 1 12 0 0 13  
 SUBSECTOR TOTAL 0 0 0 1 1 1 12 0 0 13

SECTOR TOTAL 0 0 0 1 1 1 176 0 0 177  
 SEAN TOTAL 4 8 23 322 0 0 357

SEAN TOTAL 4 8 23 322 0 0 357

P.E.C.LTD.

BEGUNIA BLOCK/RANIGANJ COALFIELD, DIST. BARDHAMAN, (WEST BENGAL)

STATEMENT SHOWING SECTOR-WISE, HORIZON-WISE, THICKNESS/ASH & U.V-WISE NET PROVED RESERVES IN (CGG\* TONNES)

SEARCH- CHANCH-BEGSP IN-BAND CORING VIRGIN

THICKNESS - RANGES (IN PTS)

SECTOR/ HORIZON AREA IN U.V.M. ASH RANGE 0.5-0.9 0.9-1.2 1.2-2.0 2.0-4.0 4.0-6.0 > 6.0 TOTAL

SUBJECT SQ MTS RANGE

01 ABOVE \*0\* 41740 30-35 21-24 28 2 0 0 0 0 0 21

24-28 3 32 0 0 0 25

28-35 21 3 0 0 0 24

TOTAL 52 38 0 0 0 90

HORIZON TOTAL 52 38 0 0 0 90

SECTOR TOTAL 52 38 0 0 0 90

02 ABOVE \*0\* 525280 30-35 18-21 158 0 0 0 0 0 0 528

21-24 62 28 133 0 0 0 223

TOTAL 220 28 503 0 0 0 751

HORIZON TOTAL 220 28 503 0 0 0 751

SECTOR TOTAL 220 28 503 0 0 0 751

02 \*0\* TO -100 444240 30-35 18-21 105 31 2 0 0 0 0 138

21-24 109 54 0 0 0 0 263

24-28 9 154 0 0 0 0 163

28-35 0 64 0 0 0 0 64

TOTAL 223 343 2 0 0 0 568

HORIZON TOTAL 223 343 2 0 0 0 568

SECTOR TOTAL 223 343 2 0 0 0 568

02 -200 TO -300 22560 25-30 30-35 24-28 28-35 1 11 0 0 0 0 11

TOTAL 12 12 0 0 0 0 12

HORIZON TOTAL 12 12 0 0 0 0 12

SECTOR TOTAL 12 12 0 0 0 0 12

03 -200 TO -300 142560 25-30 21-24 5 0 0 0 0 0 5

24-28 32 16 0 0 0 0 48

28-35 8 40 0 0 0 0 48

TOTAL 45 56 0 0 0 0 101

HORIZON TOTAL 45 56 0 0 0 0 101

SECTOR TOTAL 45 56 0 0 0 0 101

SECTOR TOTAL 461 371 505 0 0 0 1337

HORIZON TOTAL 18 18 0 0 0 0 18

TOTAL 223 343 2 0 0 0 568

SECTOR TOTAL 223 343 2 0 0 0 568

SEAM- CHANCH-BEGSP IN-BAND CORING VIRGIN

SECTOR/ HORIZON AREA IN U-V-M- ASH T H I C K N E S S - R A N G E S (IN PTS) TOTAL  
 SUBJECT SQ PTS RANGE RANGE 0.5-0.9 0.9-1.2 1.2-2.0 2.0-4.0 4.0-6.0 > 6.0

03 -200 TO -300 142560 30-35 21-24 36 19 0 0 0 0 0 0 55  
 24-28 6 4 0 0 0 0 12

TOTAL 42 25 0 0 0 0 67

HORIZON TOTAL 87 81 0 0 0 0 168

03 -300 TO -400 117280 25-30 24-28 6 24 0 0 0 0 0 0 30  
 28-35 50 0 29 0 0 0 79  
 >35 22 0 0 0 0 0 22

TOTAL 78 24 29 0 0 0 131

30-35 24-28 6 0 0 0 0 0 0 6  
 TOTAL 6 0 0 0 0 0 6

HORIZON TOTAL 84 24 29 0 0 0 137

HORIZON TOTAL 0 0 0 0 0 0 0

SECTOR TOTAL 171 105 29 0 0 0 305

SEAM TOTAL 684 514 534 0 0 0 1732

M.E.C.LTD.

REGUNIA BLOCK, BANIGANJ COALFIELD, DIST. BARDHAMAN, (WEST BENGAL)

STATEMENT SHOWING SECTOR-WISE, HORIZON-WISE, THICKNESS ASH & U V W-WISE NET PROVED RESERVES IN (000\* TONNES)

		SEAM- JOGRAD		IN-BAND		COKING		VIRGIN			
				T H I C K N E S S - F A N G E S (IN MTS)							
SECTOR/	HORIZON	AREA	IN U.V.W.	ASH	0-5-0.9	0.9-1.2	1-2-2.0	2-0-4.0	4-0-6.0	> 6.0	TOTAL
SUBJECT		SG MTS	RANGE	RANGE							
01	*0* TO -100	107040	30-35	28-35							
				>35	37	0	62	0	0	0	59
					43	0	0	0	0	0	43
				TOTAL	80	0	62	0	0	0	142
				HORIZON TOTAL	80	0	62	0	0	0	142
				SECTOR TOTAL	80	0	62	0	0	0	142
02	-100 TO -200	79360	30-35	28-35							
				>35	2	0	0	0	0	0	2
					64	0	0	0	0	0	64
				TOTAL	66	0	0	0	0	0	66
				HORIZON TOTAL	66	0	0	0	0	0	66
				SECTOR TOTAL	66	0	0	0	0	0	66
03	-200 TO -300	126400	30-35	24-28							
				28-35	80	44	0	0	0	0	124
					0	33	0	0	0	0	33
				TOTAL	80	77	0	0	0	0	157
				HORIZON TOTAL	80	77	0	0	0	0	157
				SECTOR TOTAL	80	77	0	0	0	0	157
02	-300 TO -400	26880	30-35	24-28							
				28-35	0	10	0	0	0	0	10
					0	30	0	0	0	0	30
				TOTAL	0	40	0	0	0	0	40
				HORIZON TOTAL	0	40	0	0	0	0	40
				SECTOR TOTAL	0	40	0	0	0	0	40
03	-200 TO -300	6400	30-35	28-35							
					5	0	0	0	0	0	5
				TOTAL	5	0	0	0	0	0	5
				HORIZON TOTAL	5	0	0	0	0	0	5
				SECTOR TOTAL	5	0	0	0	0	0	5
03	-300 TO -400	36880	25-30	21-24							
				24-28	43	0	0	0	0	0	43
					69	0	0	0	0	0	69
				TOTAL	112	0	0	0	0	0	112
				HORIZON TOTAL	112	0	0	0	0	0	112
				SECTOR TOTAL	112	0	0	0	0	0	112

SEAM- JOCRAD IN-BAND CGRNG VIRGIN

SECTOR/ HORIZON AREA IN U.V.M. ASH THICKNESSES - RANGES (IN FTS) TOTAL  
 SUBJECT SG FTS RANGE RANGE 0.5-0.9 0.9-1.2 1.2-2.0 2.0-4.0 4.0-6.0 > 6.0

03 -300 TO -400 308800 30-35 21-24 1 0 0 0 0 0 0 1  
 24-28 154 3 0 0 0 0 0 157  
 28-35 14 0 0 0 0 0 0 14

TOTAL 169 3 0 0 0 0 0 172  
 HORIZON TOTAL 281 3 0 0 0 0 0 284

03 -400 TO -500 44160 30-35 24-28 20 1 0 0 0 0 0 21  
 28-35 3 28 0 0 0 0 0 31  
 TOTAL 23 29 0 0 0 0 0 52

HORIZON TOTAL 23 29 0 0 0 0 0 52

SECTOR TOTAL 309 32 0 0 0 0 0 341

SEAM TOTAL 533 149 42 0 0 0 0 744



P.C.C.LTD.

REGUNIA BLOCK/RANIGANJ COALFIELD/DIST. BARDHAMAN/(WEST BENGAL)

STATEMENT SHOWING SECTOR-WISE, HORIZON-WISE, THICKNESS,ASH & U V W-WISE NET PROVED RESERVES IN (000\* TONNES)

SEARCH-LAIKIDH CORP IN-BAND COKING VIRGIN THICKNESS-RANGE (IN MTS)

SECTOR/ HORIZON AREA IN U-V-W-ASH SQ MTS RANGE RANGE 0.5-0.9 0.9-1.2 1.2-2.0 2.0-4.0 4.0-6.0 > 6.0 TOTAL

01 0\* TO -100 70240 30-35 18-21 3 4 17 21 45 533 623

01 -100 TO -200 169120 30-35 15-18 1 2 0 2 0 0 0 5

01 01 -100 TO -200 7520 30-35 18-21 0 0 0 0 0 0 0 0

02 -100 TO -200 263680 22-25 18-21 1 0 0 0 0 0 0 0

02 -200 TO -300 267840 25-30 15-18 3 3 4 10 41 76 520 654

02 -300 TO -400 267840 25-30 18-21 3 3 7 7 24 37 162 236

02 -400 TO -500 267840 25-30 18-21 8 8 11 25 52 68 104 268

02 -500 TO -600 267840 25-30 21-24 7 8 8 30 15 68 164 328

02 -600 TO -700 267840 25-30 15-18 3 3 4 10 41 76 520 654

02 -700 TO -800 267840 25-30 18-21 3 3 7 7 24 37 162 236

02 -800 TO -900 267840 25-30 18-21 8 8 11 25 52 68 104 268

02 -900 TO -1000 267840 25-30 21-24 7 8 8 30 15 68 164 328

02 -1000 TO -1100 267840 25-30 15-18 3 3 4 10 41 76 520 654

02 -1100 TO -1200 267840 25-30 18-21 3 3 7 7 24 37 162 236

02 -1200 TO -1300 267840 25-30 18-21 8 8 11 25 52 68 104 268

SEAF- LAIKOH COMB IN-BAND CORING VIRGIN

SECTOR/ HORIZON AREA IN U.V.M. ASH RANGE RANGE 0.5-0.9 0.9-1.2 1.2-2.0 2.0-4.0 4.0-6.0 > 6.0 TOTAL  
 SUBJECT SECTS RANGE RANGE

02 -300 TO -400 83840 25-30 15-18 21 26 72 132 181 786 1218  
 HORIZON TOTAL  
 TOTAL 5 6 16 90 158 184 459

03 -300 TO -400 39040 25-30 15-18 5 6 16 90 158 184 459  
 HORIZON TOTAL  
 SECTOR TOTAL 34 54 92 462 454 2285 3387  
 TOTAL 5 6 16 90 158 184 459

03 -400 TO -500 475360 25-30 15-18 6 9 24 101 270 4869 7279  
 HORIZON TOTAL  
 TOTAL 6 9 24 101 270 814 216

03 -500 TO -600 8000 25-30 15-18 0 0 0 0 0 0 0 10 160 160  
 HORIZON TOTAL  
 SECTOR TOTAL 11 15 43 167 300 7843 8379  
 SEAF TOTAL 52 79 178 734 975 11190 13208

HORIZON TOTAL  
 SECTOR TOTAL 11 15 43 167 300 7843 8379  
 SEAF TOTAL 52 79 178 734 975 11190 13208

HORIZON TOTAL  
 SECTOR TOTAL 11 15 43 167 300 7843 8379  
 SEAF TOTAL 52 79 178 734 975 11190 13208

HORIZON TOTAL  
 SECTOR TOTAL 11 15 43 167 300 7843 8379  
 SEAF TOTAL 52 79 178 734 975 11190 13208

HORIZON TOTAL  
 SECTOR TOTAL 11 15 43 167 300 7843 8379  
 SEAF TOTAL 52 79 178 734 975 11190 13208

HORIZON TOTAL  
 SECTOR TOTAL 11 15 43 167 300 7843 8379  
 SEAF TOTAL 52 79 178 734 975 11190 13208

R.F.C.LTD.

DEGUNA BLOCK, RAHIGANJ COALFIELD, DIST. BAROHAMAN, (WEST BENGAL)

STATEMENT SHOWING SECTOR-WISE, HORIZON-WISE, THICKNESS, ASH & U V W-WISE NET PROVED RESERVES IN (000\* TONNES)

SECTOR/ SUBJECT	HORIZON	AREA SQ MTS	IN U.V.W. RANGE	ASH RANGE	T H I C K N E S S - F A N C E S (IN MTS)					TOTAL	
					0-5-0-9	0-9-1-2	1-2-2-0	2-0-4-0	4-0-6-0		
02	-100 TO -200	36420	25-30	15-18	0	0	0	0	0	219	219
				18-21	0	0	0	0	0	79	79
				TOTAL	0	0	0	0	0	298	298
HORIZON TOTAL											
					0	0	0	0	0	298	298
SECTOR TOTAL											
					0	0	0	0	0	298	298
SEAF TOTAL											
					0	0	0	0	0	298	298

P.F.C.LTD.

BELUNIA BLOCK, BANIGANGI COALFIELD, DIST. BARDHAMAN, (WEST BENGAL)

STATEMENT SHOWING SECTOR-WISE, HORIZON-WISE, THICKNESS/ASH & U.V.N-WISE NET PROVED RESERVES IN (GGA TONNES)

SECTOR/ SUBSECT	HORIZON	AREA SQ MTS	IN U.V.N. RANGE	ASH RANGE	THICKNESS RANGES (IN MTS)				TOTAL		
					0.5-0.9	0.9-1.2	1.2-2.0	2.0-4.0		4.0-6.0	> 6.0
SEARCH LAIKDIP BOT IN-BAND CORING VIRGIN											
02	-100 TO -200	171840	25-30	15-18	1	2	3	11	18	3229	3264
				18-21	0	0	0	0	0	388	388
				TOTAL	1	2	3	11	18	3617	3652
HORIZON TOTAL											
					1	2	3	11	18	3617	3652
02	-200 TO -300	172600	25-30	15-18	1	2	4	15	18	72	112
				TOTAL	1	2	4	15	18	72	112
HORIZON TOTAL											
					1	2	4	15	18	72	112
SECTOR TOTAL											
					2	4	7	26	36	3689	3764
03	-300 TO -400	242880	25-30	15-18	22	38	87	152	258	1214	1811
				TOTAL	22	38	87	152	258	1214	1811
HORIZON TOTAL											
					22	38	87	152	258	1214	1811
03	-400 TO -500	172160	25-30	15-18	0	0	0	14	47	1440	1521
				18-21	0	0	0	0	0	1727	1727
				TOTAL	0	0	0	14	47	3167	3248
HORIZON TOTAL											
					0	0	0	14	47	3167	3248
03	-500 TO -600	1280	25-30	18-21	0	0	0	0	0	29	29
				TOTAL	0	0	0	0	0	29	29
HORIZON TOTAL											
					0	0	0	0	0	29	29
SECTOR TOTAL											
					22	38	87	166	365	4410	5088
04	-300 TO -400	15840	25-30	15-18	3	3	4	15	30	0	55
				TOTAL	3	3	4	15	30	0	55
HORIZON TOTAL											
					3	3	4	15	30	0	55
04	-400 TO -500	5280	25-30	15-18	0	0	0	9	20	0	29
				TOTAL	0	0	0	9	20	0	29

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*****
***** SEAP- LARKIN BOT IN-BAND          COING          VIRGIN
*****
SECTOR/ HORIZON AREA IN U.V.M. ASH          T H I C K N E S S - R A N G E S (IN PTS)
SUBJECT  SQ NIS RANGE RANGE          0-5-0.9  0-9-1.2  1-2-2.0  2-0-4.0  4-0-6.0  > 6.0
*****
*****
***** HORIZON TOTAL          *****
TOTAL          0          0          0          9          20          29
*****
***** SECTCP TOTAL          *****
TOTAL          3          3          4          24          50          84
*****
***** SEAP TOTAL          *****
TOTAL          27          45          98          216          451          8099          8936
*****

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R.E.C.LTD.

BEGUNIA BLOCK, BANIGANJ COALFIELD, DIST. BARDHAMAN, (WEST BENGAL)

STATEMENT SHOWING SECTOR-WISE, HORIZON-WISE, THICKNESS, ASH & U V R-WISE NET PROVED RESERVES IN (000\* TONNES)

SEAR- LAIKDIH BOT IN-BAND COKING DEVELOPD  
 THICKNESS - RANGES (IN MTS)

SECTOR/ HORIZON AREA IN U.V.M. ASH 0.5-0.9 0.9-1.2 1.2-2.0 2.0-4.0 4.0-6.0 > 6.0 TOTAL  
 SUBJECT SQ MTS RANGE RANGE RANGE RANGE RANGE RANGE

02 -100 TO -200 64000 25-30 15-18 0 0 0 0 0 624 624  
 TOTAL 0 0 0 0 0 624 624

HORIZON TOTAL

SECTOR TOTAL

SEAR TOTAL

624 624 624 624 624 624 624

STATEMENT SHOWING SEAM-WISE IMPROVED RESERVES OF COAL SEAMS  
 BECHUA BLOCK, RANGIANT COLFIELD, DIST: BARDHAMAN, WEST BENGAL.

TABLE - 6

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Sl. No.	Y	S	E	A	M	Y	T	Y	P	E	Y	VIRGIN/DEVELOPED	Y	RESERVES IN THOUSAND TUNNES
1.												VIRGIN		2022
2.												VIRGIN		1301
3.												VIRGIN		7466
4.												VIRGIN		8455
5.												VIRGIN		71620
6.												VIRGIN		16353
7.												VIRGIN		4915
														<u>112132</u>

*for*

or say 112.132 million tonnes

110.112