COMPREHENSIVE TEST REPORT IN RESPECT OF QUALITY PARAMETERS OF COKING COAL SEAMS UNDER THE COMMAND AREA OF BHARAT COKING COAL LIMITED

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1.0 INTRODUCTION

M/s Central Mine Planning & Design Institute Ltd. (CMPDIL) was entrusted by CIL with the job of testing of quality parameters of 66 coking coal seams under the command area of BCCL vide Work Order no. 5700088041 dtd 22.04.2022 (copy enclosed as Annexure III). Work order of 66 seams of BCCL was issued but samples of only 64 seams were received. The samples from BCCL were received in following three sets:

i. 20 nos. of Coking coal samples were received vide from BCCL Letter no. BCCL/GM/QC/2022/422 dtd. 19.05.2022 (Copy enclosed as Annexure IV a)
ii. 24 nos. of Coking coal samples were received from BCCL vide Letter no. BCCL/GM/QC/2022/188 dtd. 03.06.2022 (Copy enclosed as Annexure IV b)
iii. 20 nos. of Coking coal samples were received from BCCL vide Letter no. BCCL/GM/QC/2022/606 (H) dtd. 11.07.2022 (Copy enclosed as Annexure IV c)

The coking coal test parameters carried for each seam is given below:

Table:1 Coking Coal quality parameters

Sl. No.	Particulars
1	Ash%
2	Moisture %
3	Volatile Matter%
4	Elemental analysis (C%, H%, N%, O%)
5	Sulphur %, Phosphorous %
6	Crucible Swelling Number/ Free swelling Index
7	Low Temperature Gray King (LTGK)
8	Maceral Composition % (Reactive Content)
9	Mean Maximum Reflectance (MMR%)
10	V- Type distribution

11	Maximum Fluidity
12	Ash Fusion Temperature
13	Total Alkalis

The job is comprised of the following:

i. Receiving of crushed RoM coal sample at CMP laboratory.

ii. Mixing and parting (coning and quartering) of received sample into five following parts:

a) Part- I (for proximate analysis (Ash%, Moisture%, Volatile matter%), Ultimate Analysis (Carbon%, Hydrogen%, Nitrogen% & Oxygen%) & determination of Sulphur% and Phosphorous%.

b) Part-2 (for determination of Total Alkali, Free Swelling Index (FSI), Low Temperature Gray King Assay (LTGK) and Ash Fusion Temperature Range (AFTR).

c) Part-3 (for determination of Maximum Fluidity).

d) Part-4 (for determination of Mean Maximum Reflectance (MMR% / Rr %).

e) Part-5 (reserve sample).

iii. Crushing, Pulverizing and sieving of Part-1 sample to 60# mesh size.

iv. Proximate Analysis (Ash%, Moisture%, Volatile matter%), Ultimate Analysis (Carbon%, Hydrogen%, Nitrogen% and Oxygen%) & determination of Sulphur% and Phosphorous% of Part-1 sample.

v. Crushing, pulverizing and sieving of Part-2 sample to 72# mesh size.

vi. Determination of Total Alkalis, Free Swelling Index (FSI), Low Temperature Gray King Assay (LTGK) and Ash Fusion Temperature Range (AFTR) of Part-2 sample.

vii. Crushing, pulverizing and sieving of Part-3 sample to 40# mesh size.

viii. Determination of maximum Fluidity of Part-3 sample.

ix. Screening of Part-4 sample at 6mm screen aperture.

x. Determination of Mean Maximum Reflectance (MMR% / Rr %) of Part-4 sample.

xi. Listing of Quality parameters block-wise and seam–wise indicating mines mentioned in II a, II b & II c.

2.0 TEST RESULTS

The test results are given in Table no.2 (attached as Annexure I) and 3 (attached as Annexure II).

Table No. 2 Test Results of Proximate analysis, Ultimate Analysis, Ash Fusion Temperature Range,Phosphorous%, Total Alkali and Maximum Fluidity

ANNEXURE-I

Sl. No.	Area	Test Results																
		Mine	Seam	Proximate Analysis					Ultimate Analysis								Ash Fusion Temperature Range (°C)			
				M%	Ash%	V. M. %	LTGK	SI	C%	H%	N%	S%	O% (DMF)	P%	Total Alkali	Max. Fluidity (°C) (ddpm)	IDT	ST	HT	FT
1	Sijua	Tetulmari OCP	IV	0.60	27.90	17.50	F	1.50	60.78	3.20	1.27	0.40	4.57	0.08	0.31	381	1269	>1425	>1425	>1425
2		Tetulmari OCP	V/VI	0.70	27.50	17.60	F	1.50	59.81	3.12	1.28	0.40	6.55	0.08	0.31	312	1258	>1425	>1425	>1425
3		Nichitpur OCP	II	0.80	27.80	17.50	F	1.50	60.00	3.17	1.30	0.37	5.62	0.09	0.29	382	1325	>1425	>1425	>1425
4		Nichitpur OCP	IV (T)	0.80	33.40	16.50	E	1.00	53.51	2.77	1.17	0.34	7.59	0.05	0.41	312	1349	>1425	>1425	>1425
5		Nichitpur OCP	IV (B)	0.80	34.70	16.50	E	1.00	52.65	2.86	1.17	0.32	6.71	0.05	0.44	513	1239	>1425	>1425	>1425
6		Nichitpur OCP	VIII	0.80	33.70	16.60	E	1.00	55.23	2.89	1.12	0.37	4.18	0.05	0.42	321	1403	>1425	>1425	>1425
7		Kankanee OCP	XIV	0.80	24.30	18.50	F	1.50	62.69	3.32	1.40	0.44	6.50	0.08	0.31	415	1415	>1425	>1425	>1425
8		Kankanee OCP	XIII	0.80	24.00	18.70	F	1.50	64.39	3.38	1.45	0.49	4.38	0.08	0.33	343	1415	>1425	>1425	>1425
9	Katras	AKWM (AMALGAMATED KESHALPUR & WEST MUDIDIH), 2 incline	II (B)	0.70	29.80	18.70	E	1.00	58.99	3.18	1.09	0.44	4.37	0.15	0.37	503	1323	>1425	>1425	>1425
10		AKWM OCP	VIIIA	0.8	30.7	18.6	E	1	56.07	2.97	1.27	0.37	7.37	0.161	0.3914	282	1210	1410	1412	>1425
11		AKWM OCP	VII	0.7	29.9	18.5	E	1	58.19	3.12	1.21	0.42	5.35	0.141	0.3639	348	1378	>1425	>1425	>1425
12		AKWM OCP	IV	0.8	29.3	18.9	E	1	56.52	3	1.26	0.36	8.81	0.154	0.3554	502	1210	1403	1409	1420
13		AKWM OCP	V/VI	0.8	30.7	18.7	E	1	58.79	3.12	1.17	0.43	3.07	0.157	0.3785	315	1351	>1425	>1425	>1425
14		AGKC(AMALGAMATED GASLITAND KATRAS CHOITUDIH) OCP	XIV/Geo XVIA/XVI	0.8	21.5	22.3	F	2	62.32	3.56	1.51	0.56	10.21	0.28	0.3633	1223	1257	1370	1378	1403
15		AGKC OCP	13/XV (Geo)	0.9	23.5	22.4	F	2	62.12	3.6	1.49	0.55	7.65	0.159	0.3403	1131	1137	1262	1279	1309
16	Kusunda	ADHC(AMALGAMATED DHANSR-INDUSTRY COLLIERY) , Area H OCP	V/VI/VII/VIII (Comp)	0.7	28	18.4	F	1.5	60.98	3.36	1.27	0.45	3.69	0.14	0.2834	1007	>1425	>1425	>1425	>1425
17		ADHC OCP Patch-J	IV (B)	0.6	29.4	18.4	F	1	60.07	3.33	1.46	0.13	3.13	0.164	0.3146	1025	1322	>1425	>1425	>1425
18		GKKG(GONDUDIH-KHAS KUSUNDA), Quarry	VIII	0.8	29.6	18.2	E	1	57.57	3.11	1.33	0.43	6.43	0.141	0.2975	321	1214	>1425	>1425	>1425
19		GKKG, Quarry	V/VI	0.8	28.8	18	F	1.5	56.64	2.97	1.28	0.4	9.35	0.141	0.3108	415	1340	>1425	>1425	>1425
20		Ena OCP	IX/X	0.9	28	18.4	F	1.5	59.24	3.13	1.39	0.46	6.11	0.138	0.2951	421	1310	>1425	>1425	>1425
21	Eastern Jharia	Amalgamated	III	2.9	31	27	E	1.5	51.39	3.3	1.47	0.72	9.94	0.49	0.672	301	1210	1311	1322	1358
22		Sudamdih	IV(T)	1.3	28.9	22.4	E	1.5	53.54	3.09	1.12	0.4	5.69	0.051	0.371	725	1183	>1425	>1425	>1425
23		Patherdih Mine	IV(B)	1.6	29	22.7	E	1.5	56.66	3.33	1.47	0.6	6.86	0.228	0.588	712	>1425	>1425	>1425	>1425
24		Chandan Project	VI	1.1	27.8	21.2	F	1.5	59.03	3.37	1.54	0.61	5.7	0.13	0.595	730	1277	>1425	>1425	>1425
25		OCP Patch X2	VII	1.3	28.7	21.5	F	1.5	56.75	3.2	1.69	0.61	7.45	0.159	0.55	571	1239	>1425	>1425	>1425
26			VIII	1.9	29.7	24	F	2	55.57	3.32	1.45	0.62	7.3	0.285	0.606	510	1230	>1425	>1425	>1425
27			IX/X Local Seam	1.2	21.5	23.2	F	2	64.57	3.69	1.54	0.63	6.45	0.106	0.378	1031	1375	>1425	>1425	>1425
28	Lodna	Amalgamated NTST	III	0.7	36.1	17.3	D	1	51.77	2.86	1.15	0.29	6	0.06	0.462	-	1334	>1425	>1425	>1425
29		Jeenagora OCP	IV(B)	0.7	35.8	17.3	D	1	49.8	2.99	1.1	0.3	9.66	0.063	0.465	-	1308	>1425	>1425	>1425
30			IV(T)	0.8	34.7	17.5	E	1	51	3.07	1.2	0.4	8.91	0.195	0.693	405	1222	>1425	>1425	>1425

31			V/VI/VII	0.7	31.9	18.1	E	1	56.97	3.07	1.21	0.3	4.23	0.54	0.424	391	1248	>1425	>1425	>1425
32		Kujama Mine OCP	IX/X	1.2	18.6	24.1	F	2	64.69	3.93	1.49	0.7	9.79	0.047	0.221	1201	1230	>1425	>1425	>1425
33	Bastacolla	Bastacolla Chandmari Section, 3/4 incline	III(T)	0.9	27.2	17.6	E	1	59.59	2.94	1.39	0.29	7.33	0.174	0.499	317	1202	>1425	>1425	>1425
34		Dobari OCP	I	1.1	20.2	20.8	E	1.5	63.44	3.53	1.67	0.5	9.96	0.052	0.246	351	1347	>1425	>1425	>1425
35	Bastacolla	Kuya OCP	III(T)	0.6	34.5	15.8	D	1	54.22	2.84	1.14	0.33	4.86	0.09	0.41	-	1327	>1425	>1425	>1425
36			III(B)	0.7	34.6	16	D	1	54.68	2.81	1.55	0.41	3.06	0.093	0.415	-	1304	>1425	>1425	>1425
37			IV(B)	0.6	34.2	15.9	D	1	54.23	2.89	1.1	0.39	5.26	0.088	0.41	-	1324	>1425	>1425	>1425
38	Bastacolla	ROCP/S Jharia	III(Top)	0.6	31.4	17.1	E	1	57.2	2.9	1.45	0.38	4.63	0.165	0.372	302	1241	1404	1407	>1425
39			III(Bot)	0.7	25.7	17.4	E	1	61.05	3.02	1.29	0.54	7.37	0.01	0.217	299	>1425	>1425	>1425	>1425
40			IV(Top)	0.7	34.8	15.7	D	1	57.85	3.32	1.45	0.6	5.69	0.199	0.637	-	1274	>1425	>1425	>1425
41			IV(Bot)	0.7	34.4	15.7	D	1	54.02	2.84	1.12	0.36	5.2	0.092	0.407	-	1332	>1425	>1425	>1425
42			VII/VIII(Comb)	0.9	24	19.3	F	1.5	62.7	3.4	1.56	0.39	6.5	0.052	0.264	997	1388	>1425	>1425	>1425
43	Kusunda	Ena OCP	XIII	0.7	23.2	19.3	F	1.5	64.18	3.41	1.53	0.36	5.92	0.137	0.231	1103	1271	>1425	>1425	>1425
44			XIV	0.7	29.8	17.4	E	1	57.68	3.01	1.03	0.32	6.83	0.138	0.318	493	1293	>1425	>1425	>1425
45	Chanch Victoria	Damagoria OCP Borira Patch	Laikdih (Top)	1.7	19.7	25.5	F	2	63.09	3.62	1.48	0.32	10.68	0.036	0.283	660	1153	1291	1308	1336
46			Laikdih (Middle)	1.7	18.9	26.3	F	2	64.1	3.75	1.47	0.29	10.27	0.0359	0.281	685	1178	1341	1349	1374
47			Laikdih (Bottom)	1.9	19.3	25.8	F	2	64.1	3.75	1.5	0.35	9.42	0.039	0.274	701	1164	1333	1344	1370
48			Salanpur - C	1.7	21.2	24.7	E	1.5	60.33	3.4	1.39	0.16	1.41	0.046	0.272	525	1103	1152	1170	1190
49		Basantimata	Brindabanpur (T)	1.4	27.9	23.1	E	1	55.97	3.21	1.24	0.19	10.8	0.11	0.436	352	1138	1259	1272	1287
50		Dahibari OCP	Brindabanpur (B)	1.3	27.8	23.3	E	1	60.48	3.25	1.31	0.26	4.22	0.11	0.416	331	1210	1330	1350	1370
51	Govindpur	New Akashkinaree 3 seam incline	II	0.6	25.2	20.2	E	1	57.55	3.11	1.36	0.41	13.02	0.038	0.359	361	1147	1265	1281	1293
52		New Akashkinaree OCP	V/VI/VII (Comb)	0.7	31.9	18.3	E	1	52.35	2.9	1.3	0.37	11.47	0.079	0.619	368	1250	>1425	>1425	>1425
53		Block IV OCP	V/VI/VII (Comb)	0.8	33.1	18	E	1	53.14	2.95	1.3	0.37	8.14	0.086	0.615	365	1195	>1425	>1425	>1425
54		Block IV 10 seam OCP	IX	0.7	23.5	20.8	G	2.5	64.11	3.36	1.52	0.41	5.63	0.035	0.331	1102	1116	1211	1245	1273
55		Jogidih 2/1 Incline	I	0.6	24	20.6	G	2.5	63.8	3.33	1.53	0.39	5.52	0.034	0.342	1093	1230	1400	>1425	>1425
56	Block II	Amalgamated Block II OCP Mine	V/VI/VII (Comb)	0.6	31.1	16.4	D	1	52.65	2.72	1.16	0.3	12.91	0.076	0.446	-	1162	1323	1334	1368
57			VIII	0.4	26.5	16.3	E	1	58.28	2.89	1.25	0.3	11.06	0.15	0.263	306	1139	1266	1281	1297
58			IX/X	0.5	25.8	16.3	E	1	58.21	2.86	1.2	0.32	12.09	0.143	0.253	287	1129	1291	1306	1316
59	Barora	Amalgamated Muraidih	V/VI/VII (Comb)	0.8	33.1	16.4	D	1	50.41	2.76	1.23	0.32	12.95	0.205	0.484	-	1228	>1425	>1425	>1425
60		Phularitand Colliery OCP	VIII (A)	0.6	32.8	16.5	D	1	56.79	2.84	1.33	0.34	3.3	0.232	0.491	-	1204	>1425	>1425	>1425
61		Amalgamated Muraidih Phularitand Colliery Pure Benidih Incline	III	0.6	29.4	17	E	1	57.64	2.85	1.34	0.42	7.3	0.23	0.437	273	1222	>1425	>1425	>1425
62	Pootki Balihari	Gopalichuk Phase – III OCP	XV	0.9	15.9	19	F	1.5	71.55	3.56	1.69	0.59	5.31	0.018	0.258	984	1260	>1425	>1425	>1425
63	Western Jharia	Moonidih Project Shaft 1 & 2	XVI (T)	1.6	16.2	22.3	G2	3	64.59	3.66	1.85	0.51	14.08	0.106	0.404	1601	1164	1363	1372	1396
64			XV	1	15.4	21.9	G2	3	66.75	3.63	1.94	0.52	9.73	0.096	0.333	1561	1153	>1425	>1425	>1425

Abbreviations used:

M% -Moisture%, V.M%-Volatile Matter%, LTGK- Low Temperature Gray King Assay , SI- Swelling Index, C%- Carbon %, H%- Hydrogen%, N%-Nitrogen %, S%- Sulphur%, O%- Oxygen%,

IDT: Initial deformation temperature, ST: sphere temperature HT: hemisphere temperature, FT: flow temperature

Table No. 3 Test results of Petrography Analysis **ANNEXURE-II**

Petrography Test Results

Sl. No.	Area	Mine	Seam	Maceral composition %				Maceral composition (vmmf%)			MMR%	V-type distribution %
				Vit%	lipt%	int%	vmm%	Vit%	lipt%	int%		
1	Sijua	Tetulmari OCP	IV	47.4	Trace	28.1	24.6	62.8	-	37.2	1.36	V-13= 85% V-14= 15%
2		Tetulmari OCP	V/VI	38.6	Trace	17.5	43.9	68.8	-	31.2	1.37	V-12= 15% V-13= 53% V-14=32%
3		Nichitpur OCP	II	46	Trace	31	23	59.8	-	40.2	1.35	V-12= 10% V-13= 76% V-14=14%
4		Nichitpur OCP	IV (T)	41.4	0.6	24.3	33.7	62.5	0.9	36.6	1.36	V-12= 12% V-13= 64% V-14=24%
5		Nichitpur OCP	IV (B)	53.4	Trace	24.1	22.5	68.9	-	31.1	1.36	V-12= 16% V-13= 60% V-14=24%
6		Nichitpur OCP	VIII	45.5	1	13.9	39.7	75.4	1.6	23	1.37	V-13= 76% V-14=24%
7		Kankanee OCP	XIV	49.7	Trace	26.9	23.4	64.9	-	35.1	1.27	V-11= 12% V-12= 60% V-13=28%
8		Kankanee OCP	XIII	46.9	Trace	15	38.1	75.7	-	24.3	1.31	V-11= 10% V-12= 25% V-13=65%
9	Katras	AKWM (AMALGAMATED KESHALPUR & WEST MUDIDIH), 2 incline	II (B)	55.6	Trace	18	26.5	75.5	-	24.5	1.24	V-11= 20% V-12= 80%
10		AKWM OCP	VIIIA	42.6	Trace	16	41.5	72.7	-	27.3	1.18	V-10= 20% V-11= 35% V-12=45%
11		AKWM OCP	VII	46.2	Trace	17.2	36.6	72.9	-	27.1	1.19	V-9= 5% V-10= 20% V-11= 15% V-12=60%
12		AKWM OCP	IV	50.3	Trace	20.4	29.3	71.1	-	28.9	1.23	V-11= 31% V-12= 57% V-13=12%
13		AKWM OCP	V/VI	44.4	Trace	23.9	31.8	65.1	-	34.9	1.2	V-11= 46% V-12= 54%
14		AGKC(AMALGAMATED GASLITAND KATRAS CHOITUDIH) OCP	XIV/Geo XVIA/XVI	50.3	Trace	22.6	27.1	69	-	31	1.22	V-11= 29% V-12= 71%
15		AGKC OCP	13/XV (Geo)	47.6	Trace	22.1	30.3	68.3	-	31.7	1.25	V-11= 10% V-12= 80% V-13=10%
16	Kusunda	ADHC(AMALGAMATED DHANSR-INDUSTRY COLLIERY) , Area H OCP	V/VI/VII/VIII (Comp)	53	Trace	15.3	31.7	77.6	-	22.4	1.23	V-11= 28% V-12= 62% V-13=10%
17		ADHC OCP Patch-J	IV (B)	47.2	1.1	16.5	35.2	72.8	1.8	25.4	1.25	V-11= 12% V-12= 75% V-13=13%
18		GKKG(GONDUDIH-KHAS KUSUNDA), Quarry	VIII	44.3	Trace	23.2	32.5	65.6	-	34.4	1.24	V-11= 20% V-12= 70% V-13=10%
19		GKKG, Quarry	V/VI	48.8	Trace	22.3	28.9	68.6	-	31.4	1.26	V-11= 8% V-12= 72% V-13=20%
20		Ena OCP	IX/X	49.9	Trace	26.7	23.4	65.2	-	34.8	1.35	V-12= 11% V-13= 76% V-14=13%
21	Eastern Jharia	Amalgamated	III	49.7	1.66	22.2	26.5	67.6	2.2	30.1	1	V-8= 10% V-9= 25% V-10=65%
22		Sudamdih	IV(T)	55.7	0.5	18.9	24.9	74.2	0.7	25.2	1	V-8= 10% V-9= 26% V-10=64%
23		Patherdih Mine	IV(B)	55.7	1	18.6	24.7	73.9	1.3	24.8	1.01	V-8=8% V-9=19% V-10=73%
24		Chandan Project	VI	57.5	1.7	18.9	22	73.7	2.1	24.2	1.13	V-10= 20% V-11=80%
25		OCP Patch X2	VII	50.7	0.7	22.7	25.9	68.4	1	30.6	1.09	V-9= 5% V-10= 50% V-11=45%
26			VIII	55.2	1.9	14.3	28.6	77.3	2.7	20	0.97	V-8= 20% V-9= 40% V-10=40%
27			IX/X Local Seam	50	-	30.8	19.2	61.8	-	38.2	1.08	V-9= 14% V-10=42% V-11=44%
28	Lodna	Amalgamated NTST	III	44.6	-	20.6	34.8	68.4	-	31.6	1.15	V-10= 4% V-11=96%
29		Jeenagora OCP	IV(B)	48.3	-	21.7	30	69	-	31	1.15	V-10= 12% V-11= 72% V-12=16%
30			IV(T)	30	6.9	34.8	28.3	41.9	9.6	48.5	1.19	V-10=14% V-11= 32% V-12=54%
31			V/VI/VII	37.6	1.8	34.5	26.1	50.9	2.5	46.6	1.2	V-10= 8% V-11= 28% V-12=64%
32		Kujama Mine OCP	IX/X	45.4	-	38	16.6	54.4	-	45.6	1.12	V-10= 28% V-11= 72%
33	Bastacolla	Bastacolla Chandmari Section, 3/4 incline	III(T)	31.7	1.8	32.5	34	48	2.8	49.2	1.15	V-10= 18% V-11=64% V-12=18%
34		Dobari OCP	I	40.8	1.1	38.9	19.2	50.5	1.3	48.2	1.1	V-10= 48% V-11= 52%
35	Bastacolla	Kuya OCP	III(T)	22.2	-	46.3	31.5	32.5	-	67.5	1.31	V-12= 48% V-13= 40% V-14=12%
36			III(B)	41.3	-	29.8	28.8	58.1	-	41.9	1.31	V-11= 12% V-12=16% V-13=72%

37			IV(B)	46.7	1.2	24.9	27.2	64.2	1.6	34.1	1.28	V-12= 70% V-13=30%
38	Bastacolla	ROCP/S Jharia	III(Top)	35.6	-	33.8	30.6	51.4	-	48.6	1.27	V-12= 78% V-13=22%
39			III(Bot)	31.5	0.6	37.6	30.3	45.2	0.8	54	1.32	V-11= 8% V-12= 19% V-13=73%
40			IV(Top)	47.3	-	23.9	28.8	66.4	-	33.6	1.29	V-12= 65% V-13= 25% V-14=10%
41			IV(Bot)	48.2	-	25.5	26.3	65.4	-	34.6	1.3	V-11= 9% V-12= 45% V-13=18% V-14=27%
42			VII/VIII(Comb)	51	-	28.6	20.5	64.1	-	35.9	1.27	V-11= 22% V-12= 36% V-13=42%
43	Kusunda	Ena OCP	XIII	53.5	-	22.5	24	70.4	-	29.6	1.31	V-12= 50% V-13= 40% V-14=10%
44			XIV	49.2	-	20	30.8	71.1	-	28.9	1.3	V-11= 5% V-12= 35% V-13=60%
45	Chanch Victoria	Damagoria OCP Borira Patch	Laikdih (Top)	39.2	13.3	37.1	10.5	43.8	14.8	41.4	1	V-8=10% V-9=52% V-10=20% V-11=18%
46			Laikdih (Middle)	32.9	7.7	49.6	9.8	36.5	8.5	55	1.01	V-8=12% V-9=18% V-10=70%
47			Laikdih (Bottom)	40.8	16.6	33.5	9.1	44.9	18.3	36.9	1	V-8=12% V-9=40% V-10=48%
48			Salanpur - C	38.5	7.7	33.5	20.3	48.3	9.7	42	1	V-8=7% V-9=40% V-10=53%
49		Basantimata	Brindabanpur (T)	30.1	11.2	37.4	21.3	38.2	14.2	47.6	1.04	V-9=12% V-10=88%
50		Dahibari OCP	Brindabanpur (B)	15	13.4	51.2	20.5	18.8	16.8	64.4	1.03	V-9=24% V-10=76%
51	Govindpur	New Akashkinaree 3 SEAM incline	II	39.5	3.8	33.1	23.6	51.7	5	43.3	1.2	V-10=10% V-11=30% V-12=60%
52		New Akashkinaree OCP	V/VI/VII (Comb)	37.9	0.6	39.1	22.5	48.9	0.8	50.4	1.18	V-11=70% V-12=30%
53		Block IV OCP	V/VI/VII (Comb)	36.3	2	36.3	25.4	48.7	2.7	48.7	1.12	V-10=26% V-11=74%
54		Block IV 10 seam OCP	IX	41.4	2.7	34.8	21.1	52.5	3.4	44.1	1.22	V-10=8% V-11=14% V-12=78%
55		Jogidih 2/1 Incline	I	37.2	2.6	40.1	20.1	46.6	3.3	50.2	1.25	V-11=28% V-12=40% V-13=32%
56	Block II	Amalgamated Block II OCP Mine	V/VI/VII (Comb)	33.4	0	46.9	19.7	41.6	0	58.4	1.27	V-11=14% V-12=48% V-13=38%
57			VIII	26.5	0.7	46.1	26.7	36.2	1	62.9	1.37	V-12=20% V-13=44% V-14=36%
58			IX/X	33	0	50	17	39.8	0	60.2	1.33	V-12=31% V-13=56% V-14=13%
59	Barora	Amalgamated Muraidih	V/VI/VII (Comb)	25.5	0	47.5	27	34.9	0	65.1	1.35	V-12=16% V-13=67% V-14=17%
60		Phularitand Colliery OCP	VIII (A)	31.5	0.8	44.4	23.3	41.1	1	57.9	1.33	V-12=24% V-13=76%
61		Amalgamated Muraidih Phularitand Colliery Pure Benidih Incline	III	30.6	0.9	45.1	23.4	39.9	1.2	58.9	1.38	V-12=9% V-13=52% V-14=39%
62	Pootki Balihari	Gopalichuk Phase – III OCP	XV	48	3	38	11	53.9	3.4	42.7	1.38	V-13=68% V-14=32%
63	Western	Moonidih Project Shaft 1 & 2	XVI (T)	52.5	0.8	38.9	7.8	56.9	0.9	42.2	1.31	V-11=11% V-12=18% V-13=71%
64	Jharia		XV	53.4	1.2	33.6	11.8	60.5	1.4	38.1	1.27	V-11=14% V-12=48% V-13=38%

Abbreviations used: Vit: Vitrinite, Lipt: Liptinite, Int: Inertinite, Rr. Random Vitrinite Reflectance, Vmm: Visible Mineral Matter. Vmmf: Visible mineral matter free basis