

PRE-FEASIBILITY REPORT OF GIDDI-A OCP

1.1 BACKGROUND OF THE PROJECT

Giddi-A OCP is located in South Karanpura Coalfield of Central Coalfields Limited. The mine lies in the west of Religara OCP. Giddi-A colliery is a very old and taken over mine. Mining activities in this colliery was started in the year 1958 by both opencast and underground means. The mine has been extensively worked out by underground in seams Argada, Argada-A, Argada-B, Sirka, Bansgarha, Hatidhari and upper & lower Semana either through independent mine entries / inclines or drifts from one seam to another. Besides underground workings the mine has been worked out by opencast in different six patches viz- Quarry-1, Quarry-2, Quarry-3, Quarry-4, Quarry-5 and Quarry-6. All the quarries except Quarry-2, Quarry-3 are filled up with huge amount of water to maximum water level of 336.20 m and also connected to the underground workings of Seam Argada, Argada-A and Sirka.

1.2 LOCATION

Giddi-A OCP is located in east central part of South Karanpura Coalfield of Central Coalfields Limited in Jharkhand state. The area falls within latitude 23° 40' and 23° 42' N and longitude 85° 20' and 85° 23' E and covered under Topo Sheet of 73-E/6. Reliagra, Asnagarha and Associated Karanpura surround Giddi-A colliery.

1.3 PRESENT STATUS OF THE MINE / PROJECT

All the underground workings of Giddi-A colliery were stopped since March 1984. Presently the mine operation is limited to opencast working in Quarry no-3 with base seam Argada-A and has approached to near 60m from the underground working of Seam Argada-A. Previously the mine has been worked out by opencast in very unsystematic way at scattered locations especially in seam incrop zones. The OB so removed due to opencast mining has been dumped within the mine area over the older seams. This would involve rehandling of OB during exploitation of the older seams.

At present the mine is equipped with sufficient numbers of HEMMs, manpower and associated infrastructures. With such resources; the mine can produce at least 0.50 Mte of coal annually from the existing working area. Giddi-A has planned to produce 0.51 Mte coal with OB removal of 1.65 M Cum during 2015-16.

1.4 BRIEF GEOLOGY

Initially Geological Survey of India explored the Giddi-A block and based on the results of GSI exploration NCDC Ltd in association with IBM started drilling in Giddi-A block to explore the detailed structures of seam. The scope of exploration was limited to seam Argada-D.

The area / new patch; which has been transferred from Religara colliery to Giddi-A colliery was unexplored. The detailed exploration in this area has been taken up by CMPDI in the year 2011-12 and explored up to seam Argada-P.

Based on the available geological data of Giddi-A Block (explored up to Seam Argada-D) and new patch (explored upto Seam Argada-P), a combined geological model of Giddi-A has been prepared within the proposed area of mining and dumping. The geology of this area depicts that the lay and deposition of deposit is almost similar to the geological structure of entire Giddi-A block. Giddi-A block is detailed explored and correlated up to seam Argada-D and hence the seam structures have been established up to Argada-D. However, the underlying seams of Argada-D have encountered few bore holes, so their existence cannot be ruled out, but due to their scanty geological data; the correlation of the older seams have not been established and hence not considered in the present proposal.

1.4.1 Sequence of Coal Seams and Partings within the proposed area:

Detailed exploration in Giddi-A Block including new patch has confirmed the presence of 32 coal seams. Out of these 19 younger seams are well correlated from upper Nakari to Argada-D. The correlation of lower 13 seams from Argada-E to Argada-Q is somewhat tentative. The sequence of considered coal seams and parting with their range of thickness within the proposed mining area under this scheme is given below:

Table-1.1 Seam Sequence

Seam Name	Thickness Range (meter)		
	From	To	Average
Sirka	3.55	6.55	5.00
Parting	8.00	9.50	8.75
Sirka - A	2.20	4.50	3.35
Parting	13.50	15.80	14.65
Argada	14.50	16.30	15.40
Parting	23.20	28.50	25.85
Argada - A	6.50	10.80	8.65
Parting	4.50	19.50	12.10
Argada - B	4.50	7.85	6.20
Parting	5.00	10.40	7.70
Argada - C	2.00	3.95	3.00

Parting	2.00	3.50	2.75
Argada - D	2.50	5.15	3.85

1.4.2 Structural Setting within proposed area:

1.4.2.1 Dip and Strike:

The Geological structure of Giddi-A block with new patch is that of S-W plunging syncline. The general strike of the bed swings from North-West to South-East dipping towards south-east near bore hole KG-64. The amount of dip varies from 14° - 22° south westerly.

1.4.2.2 Fault Description:

The block is structurally complicated. The Giddi-A block has encountered so many faults and so far 26 faults have been delineated. The trends of the faults is normally NW to SE. Within the proposed area of mining five faults have traversed the deposit. The throw of the faults ranges from less than 5m to maximum 70m in varying fashion causing the repetition of incropping of seams.

1.5 PRESENT PROPOSAL (OBJECTIVE)

The Pre-Feasibility Report for working in Giddi-A colliery has been prepared in the area of existing working in different seams of Quarry no-2 and Quarry no-3 of Giddi-A along with new patch transferred from Religara Colliery at North East of Quarry no-3. This report envisages working in Giddi-A colliery with a safety condition that the proposed patch of working should be at least 60m away from the old / abandoned underground and opencast workings.

Since both the working areas as indicated above are adjacent to each other so, considering the lay and deposition of deposit and its geological set up i.e highly structurally disturbed deposit, steep seam gradient etc. both the working areas have been amalgamated to facilitate the mining operation and to maximize the coal recovery to the maximum possible extent.

1.6 MINE BOUNDARY

The proposed working area under FPR is restricted from all sides. In the North and East it is limited by existing Giddi Railway Siding. The southern part of the proposed area has already been extensively worked out by underground in different seams and filled up with considerable amount of water. The western part is bounded by nala, underground working of seam Argada-A, and project magazine.

1.6.1 Boundary of the Proposed Mining Area

Considering the above surface and underground limitations, the boundary of the proposed mining area has been fixed in the following manner.

Eastern Boundary:

The surface boundary in the east has been fixed keeping a surface barrier of at least 50m from the existing Giddi railway siding.

Western Boundary:

The surface boundary in the west has been fixed keeping a surface barrier of at least 20m from the existing nala, and 60m from waterlogged underground working of Seam Argada-A.

Northern Boundary:

The surface boundary in the north has been fixed keeping a surface barrier of at least 50m from the existing Giddi railway line.

Southern Boundary:

The surface boundary in the south has been fixed keeping a surface barrier of at least 60m from waterlogged underground workings of Seam Argada and Argada-A.

1.7 MINING STRATEGY

Giddi-A colliery is an existing mine, which is presently working with base seam Argada-A. The average strike of the present working is about 450m with dip-rise length of 150m. The floor of the mine has almost touched the up thrown fault F1, and quarry surface has approached to near 60m from the waterlogged underground workings.

Considering the continuation of mining operation of present working up to the workable limit; the entire proposed area under this scheme has been divided into two working sections viz. **Eastern Section and Western Section**. The Eastern Section is the area transferred from Religara OCP and Western Section is the present working area. The proposed area has been planned to work with base seam Argada-B up to the fault F1 and onwards with Argada-D. Seam Argada-B will be approached by Eastern section and will advance in dip side covering both the sections. Due to very restricted dip rise length of the proposed working area and high initial depth; accessibility to the Seam Argada-C & D is practically difficult, hence not considered in this scheme up to the Fault F1. From safety point of view, the dip side boundary of both the Sections has been kept 60m away from the waterlogged underground workings.

1.8 MINING SEQUENCE

Two working sections have been envisaged in this scheme. Western section being an existing working section is working with base seam Argada-A. The Eastern Section is a green field area, where a box cut at +370m will be made to access the base seam Argada-B at FRL of +300m as shown in the Final Stage Quarry Plan. Once the seam floor is touched the mine will open its strike and advance in dip direction. Both the sections have been proposed to work simultaneously. As the present working has already reached in upthrown area so, transport of coal and OB from Western Section will be carried out through the batter's road as shown in the Final stage Quarry Plan. In Eastern section; coal of Seam Argada-B and its parting (upto the Fault F1) will be transported through floor and flank roads (+300 to +370m) to the surface; whereas coal & OB from overlying seams will be transported through inter bench ramps and quarry batter's roads of both the sections. The quarry batter's road of Western section will be kept maintained to facilitate the transport of coal and OB from Eastern working section.

1.9 MINEABLE RESERVES

Within the proposed mining area of both the Sections, seven coal seams namely Seam Sirka, Sirka-A, Argada, Argada-A, Argada-B, Argada-C, and Argada-D have been considered for mining. All the coal seams are potential for opencast mining within the proposed quarriable area. While calculating the reserves, area having less than a meter seam thickness has been excluded for all seams. Most of the seams are generally devoid of any major dirt bands.

The combined mineable reserves of Eastern and Western Sections within the proposed mining area have been estimated as 3.70 Mte with corresponding OB removal of 7.00 Mcum (including rehandling of about 0.40 Mcum of existing OB dump) at an average stripping ratio of 1.90 cum/te. Out of 3.70 Mte coal and 7.00 Mcum overburden; 2.60 Mte coal & 5.35 Mcum OB is from Eastern Section and 1.10 Mte coal & 1.65 Mcum OB is from Western Section respectively. While calculating the mineable reserve a geological loss of 10% and mining loss depending upon the seam thickness have been considered to arrive at the net mineable reserve. The following average specific gravity of coal seams based on the Report of Geology & Coal Resources of Giddi-A Block, SKCF , GSI, Sept' 1958 has been considered in reserve calculation:

i)	Sirka	-	1.43
ii)	Sirka-A	-	1.44
iii)	Argada	-	1.47
iv)	Argada-A	-	1.48
v)	Argada-B	-	1.51
vi)	Argada-C	-	1.54
vii)	Argada-D	-	1.52

1.10 ASSUMPTIONS & CONSIDERATIONS:

- All the surface features including alignment of Giddi Railway Siding, extent of existing and old quarries, position of existing OB dumps, course of Nala and bore holes locations on national grid have been taken from colliery working plan and same has been considered as reference of working in all plans.
- Reserve of all old worked out quarries, existing opencast workings and quantity of OB dumped within proposed mining area have been calculated on the basis of the colliery working plan and data supplied from colliery authority.
- For calculating the extracted reserve from old worked out quarries, pit has been considered vertical; where separate quarry floor and quarry surface lines as well as different exposed coal seam horizons are not shown on the colliery plan.
- Assessment for volume of existing OB dumps has been done on the basis of available dump RLs and dump toe-crest lines as shown in the plan supplied. The assessed volume of OB to be rehandled within the proposed mining area is subject to the accuracy of relevant data and plan related to existing dumps so supplied.
- The dump site as proposed by the colliery authority lies within the coal bearing area. Though this area has been partly quarried out earlier in seams Sirka, Argada, Argada-A and Argada-B, still substantial amount of coal is left within the proposed dumping area. The quantity of insitu coal (Geological reserve) that will be blocked by dumping operation within the required dumping area is about 4.50 Mte with base seam Argada-D. This quantity has been assessed considering the extent of excavation of worked out seams within old Quarry no-4.
- The extent of all Underground workings in different seams have been taken from combined UG working plan supplied from Giddi-A colliery and the same has been considered during pit formulation strategy.
- Considering the mine safety as prime concern; surface boundary of the proposed mining area has been kept at least 60m away from the extent of underground workings where required.

1.11 CALENDAR PROGRAMME OF EXCAVATION

The mining schedule has been formulated based upon the adopted sequence of mine development. For making the section wise calendar programme of excavation; the reserves of coal and volume of OB have been calculated in different sectors or horizons.

Table-1.2: Summarised Calendar Programme of Excavation

YEARS OF OPERATION	1	2	3	4	5	6	TOTAL
EASTERN SECTION							
COAL (Mte)	0.20	0.40	0.50	0.50	0.50	0.50	2.60
OB (M cum)	0.60	0.89	1.12	1.06	0.86	0.82	5.35
WESTERN SECTION							TOTAL
COAL (Mte)	0.20	0.60	0.30	Western Section Exhausted			1.10
OB (M cum)	0.21	0.97	0.59				1.65
TOTAL COAL (Mte)	0.40	1.00	0.80	0.50	0.50	0.50	3.70
TOTAL OB (M cum)	0.81	1.86	1.71	1.06	0.86	0.82	7.00

1.12 STRIPPING RATIO AND LIFE

Table-1.3: Stripping Ratio & Life

Particulars	Eastern Section	Western Section	Combined
Coal (Mte)	2.60	1.10	3.70
OBR including rehandling (Mcum)	5.35	1.65	7.00
Stripping Ratio (Cum/te)	2.10	1.50	1.90
Life (Years)	6	3	-

1.13 DUMPING STRATEGY

Dumping is one of the major constraints in mine development, as Giddi-A colliery is surrounded by either coal bearing area or important surface features. Due to steep dip nature of deposit, concurrent internal dumping is not possible during mining. The entire volume of OB would be dumped externally. In past, Giddi-A colliery has been worked out in patches and the excavated OB was dumped on the coal bearing area of older seams. There are altogether four existing dumps viz-Dump-1, 2, 3 and 4 falling within the proposed working area as shown in the Final Stage Dump Plan, which are required to be rehandled partly or fully during the mine operation. On the basis of colliery working plan dated: 2/12/2015 showing the extent and RLs of existing dumps, the quantity of OB to be rehandled has been assessed.

The total volume of OB to be removed from the proposed working area is estimated as 7.00 Mcum (including 0.40 Mcum OB as rehandling volume). As stated above there is acute shortage of free

land in Giddi-A colliery for external dumping. However the mine authority has identified a coal bearing area and proposed there for OB dumping. This area has been previously worked out in seam Sirka, Argada, Argada-A and Argada-B to limited extent. As a result, substantial quantity of coal in tune of 4.50 Mte (Geological reserve) with base seam Argada-D will be blocked due to dumping operation within the proposed area of dumping. The proposed area for OB dumping is old Quarry no-4; which is filled up with considerable amount of water. From safety point of view, it is suggested to dewater the Quarry no-4 to the safe limit before start of dumping and maintain it; while dumping is in progress.

Presently OB dumping is going on near the proposed area of dumping. About 7.10 Mcum OB can be accommodated in the left out voids of Quarry no-4 (proposed area of dumping) to maximum dump level of +375m. Near Nala and River Damodar, backfilling in the old Quarry no-4 will be done to the average ground level of +345m. The upper / final level dumping (+375m) will be carried out keeping its toe at least 100m away from the bank of nala / river as shown in the Final Stage Dump Plan.

1.14 LAND DETAILS

Total Land within the proposed project is 151.35 Ha. Change in the land use is expected due to mining operation & infrastructure development. The proposed land use during mining within the project area of 151.35 Ha. is as follows.

SL NO	PARTICULARS	TOTAL Area in Ha.
1	Quarry	32.20
3	External OB Dump	16.90
4	Stock Yard	1.50
5	Nala & Railway Track	5.00
6	Vacant/ Waste land	64.62
7	Safety zone	13.13
8	Infrastructure	18.00
	Total Area	151.35

The detail of type of land is as given below.

SI No.	Particulars	Area (in Ha)
1.	Govt. Land & GMA (Acquired)	63.56
2.	Tenancy Land (Acquired)	47.75
3.	Tenancy Land (Not Acquired)	1.23

4.	Forest Land	38.81
	Total	151.35

1.15 SAFETY MEASURES

1.15.1 SAFETY ASPECT OF WORKMEN & HEMM

Special precaution should be taken while deploying workers in the mine. Before employing any labour to the mine proper vocation training should be imparted and recommendations of VIII Safety Conference should be strictly followed. Some of the major aspects are as follows:-

A) FOR PERSONS

- i) No persons shall be deployed unless he is trained at VTC
- ii) Records in Form-B Form-D shall be maintained.
- iii) Records of Vocational training Certificate and driving license of operators shall be kept by competent authority and shall be made readily available for inspection by management.
- iv) No person shall be employed unless person holds VTC. A record of it shall be maintained.
- v) Adequate supervision shall be maintained by qualified competent persons only.

B) FOR MACHINERIES

Provisions of Coal Mines Regulation and DGMS Cir. (Tech.) 1 of 1999 should be strictly adhered to along with the following:

- i) All machinery and plant used in connection with working of a mine shall be of good design, sound construction, and suitable material, adequate strength, free from patent defect and properly maintained.
- ii) The owner, agent and manager shall provide adequate training facilities and ensure proper training of persons employed for operation and maintenance of machinery and plant.
- iii) No person except an engineer or other competent person under his supervision shall undertake any work on machinery and plant in which technical knowledge or experience is required.
- iv) All the machineries to be deployed in mines shall be so designed as to afford the operator clear and uninterrupted vision all around.
- v) Every heavy earth moving machineries, including trucks and tippers, used in mine shall be fitted with adequate safety features or devices as specified by DGMS. All equipment shall

be provided with audiovisual alarms, proper light for use at night and fitted with suitable type of the fire extinguishers.

- vi) Truck mounted drill machines designed for tube well drilling for sources of water shall not be used and only proper type of blast hole drill machine, especially designed for mining purpose, shall be used in the mine.
- vii) Every heavy earth moving machinery shall be under the charge of a competent person (Operator or Driver), authorized in writing by the Manager.
- viii) All persons employed or to be employed to operate heavy earth moving machinery shall be trained and their competency shall be evaluated by a Board constituted by the management, who shall be persons who are not connected with imparting of training.
- ix) A proper record of repair and maintenance along with inspection done by competent authority and defect pointed out shall be maintained and signed by authorized person.
- x) Only such fitters or mechanics possessing driver's or operator's license, shall be allowed to carry out test-run of heavy earth moving machineries.
- xi) No person other than the operator or the driver or any person so authorized in writing by the manager shall be allowed to ride on a heavy earth moving machinery

1.15.2 STABILITY OF BENCHES, QUARRY HIGHWALLS & SPOIL DUMPS

During quarry operations, it is necessary to adopt required mining parameters for the stability of benches, highwalls and spoil dumps. It is also mandatory to examine systematically the fencing of mine workings, landslides and cracks between benches. It is required to maintain well-graded and wide roads on benches keeping the width of working areas sufficient for spreading of blasted rock and movement of the mining and transport equipment.

During actual mining operation, systematic observations of the condition of benches, high wall slopes and spoil dumps should be carried out and the dimensions be modified if necessary to suit the local conditions. To ascertain the optimum slope angles for stability of quarry benches, highwalls and spoil dumps, scientific study of slope stability along with hydro-geological study of the area needs to be undertaken. Provisions laid down under Coal Mines regulation shall be strictly adhered to for the safety of quarry and OB/ spoil dumps. In addition to this, the following precaution should be considered:

- i) The spoil dump height should not exceed 90m from immediate surface level with an overall slope of 28° or less. In the event of encountering steep floor gradient, floor blasting should be done and the area properly levelled by dozer before spoil dumping.
- ii) No working or construction should be allowed within the 60m toe of the OB dump.

- iii) Before dumping the OB on the floor of seam, at least 10m length all along the strike length should be made horizontal at every 50 meter by floor dinting/blasting.
- iv) Dump should be created in such a way that there is no chance of accumulation of water in and around the base of dump as it will adversely affect the shear strength of the base material of dump. It must be ensured that there is no stagnant water at the toe of dump and the top of the dump.
- v) The toe and face of the dump should not be eroded or cut at any point of time to avoid slope failure.
- vi) Formation of dumping should be done in square or circular or any regular shape as far as possible.
- vii) Proper drainage system should be provided to bring down rain water by construction of inclined drain on dump face and catch drain on all benches.
- viii) During active period of dump, all rain water should be diverted away from mining site as far as possible.
- ix) Sump and pumping capacity should be sufficient to accommodate peak surface run-off and seepage of water.
- x) Gabion wall and garland drain should be constructed and maintained to trap the surface run-off and sludge coming from dump.
- xi) Plantation and grassing should be done on top and slope of the dump respectively.
- xii) Regular monitoring is required for development of tension crack, gullies, movement of soil mass, stagnation of water and any other unusual occurrence. In case of dump movement, rate of movement of dump should be monitored. Special attention should be given at curve area/turning area of the dump.

1.15.3 OTHER PRECAUTIONS AND SAFETY MEASURES IN SPOIL DUMPING

With increasing size of opencast mine, the quantity of OB removal is also increasing. The dumping of OB can be external, internal or both. The stability of spoil dump is the main concern for an opencast mine. Poor management of overburden dump results the instability of dump slope in opencast mine. In few decades destabilizations especially internal dumps have taken place in coal mines, therefore, it has become necessary to adopt the scientific methodology for spoil dumping along with the following statutory steps / measures.

- a) The width of any bench in waste dumps shall not be less than its height and a scientific study is to be made, in case the planned height of the dump is beyond 30m.

- b) In case of any existence of any road nearby, dumping shall be done in such a way that the distance between the toe of the dump and road is not less than twice the overall dump height. If it is inevitable, arrangement shall be made for diversion of road; so that it is away from the stated safe distance.
- c) The top soil and sludge shall not be dumped at the floor to create the base of the dump.
- d) For reducing the ground water pressure in the dump rock above phreatic surface, effective drainage system shall be provided both inside and outside the overburden dump. In this regard, the guidelines provided in DGMS Circular (Tech) No-2 of 2001 in designing pit slope shall be followed.
- e) The dump area shall be substantially fenced, in accordance with the CMR, to prevent inadvertent entry of any person to the dump.
- f) Precautions shall be taken to prevent spontaneous heating and fire in the carbonaceous shale and coal dumped along with overburden.
- g) Gabion walls, wherever required shall be provided round the periphery of dump for prevention of floor heaving and to facilitate the drainage of water accumulated near toe of external dump. It also acts as retaining wall to some extent.
- h) Internal dumping on the seam floor having steeper gradient shall not be carried out unless, it is ensured that the dump stability factor of safety is well within the allowable range. For this a scientific study on slope stability of dump considering the geo-engineering/mining parameters must be carried out and dumping shall be done in accordance with guidelines as suggested in the study report.

In addition to the above precautions and measures, it is also necessary to comply the statutory guidelines issued by DGMS or any statutory/safety bodies from time to time regarding OB dumping in opencast mines.

1.15.4 PRECAUTIONS AGAINST DANGER OF INUNDATION

Following are the precautions required to be taken against danger of inundation from surface water and old waterlogged underground workings:

- a) Adequate protection against any danger of inrush of surface water into the mine or part shall be provided and maintained to the satisfaction of DGMS, whose decision shall be final.

- b) The entrance into the mine shall be so designed, constructed and maintained that its lowest point (which means the point at which a body of rising water on surface can enter the mine) shall not be less than 3.0 meters above the highest flood level at that point.
- c) Every year, during the rains constant watch shall be kept on the flood levels on the surface of the mine and if at any time the levels cross the highest levels earlier recorded, such levels shall be marked by permanent posts along the edges of water and the new highest levels thus observed shall be recorded with the date as the highest flood level on the plans by an actual survey.
- d) If water dams or reservoirs are built across rivers and water courses on the upstream side of the mine, arrangements shall be made for communication between appropriate authorities for the purpose of ascertaining the quantity and timing of water released from the dams which is likely to endanger safety of the mine and arrangement for similar communication shall be made when water level rises on the upstream side which is likely to endanger the mine.
- e) The highest flood levels and danger levels at least 1.2 meters below the highest flood level, shall be permanently marked at appropriate places on the surface and whenever water rises towards the danger level at any place, all persons shall be withdrawn from the mine sufficiently in advance and for this purpose adequate arrangements of quick communication to all parts of the mine by effective systems shall be provided and maintained.
- f) No working shall be made in the mine at any spot lying within a horizontal distance of 15 meters from either bank of a river or nala.
- g) A competent person shall, once at least in every fourteen days during the rainy season and once at least in every thirty days during other periods of the year, examine every protective measure provided under Regulations-149, whether in use or not, for their stability, and a report of every such examination shall be recorded. The protective measures and workings shall also be inspected, once at least in every quarter by the Manager personally.
- h) A careful assessment is to be made against the danger from surface water before the onset of rainy season. The necessary precautions should be clearly laid down and implemented. A garland drain needs to be provided to drain away the surface rainwater from coming into the mine.
- i) Construction of embankments against Nakari nalas has been proposed of height at least 3m above the HFL of respective nala. The embankment should be of proper design and adequate strength, so that in the event of sudden increase in water flow, it can withstand

the pressure of water flow. Inspections for any accumulation of rainwater, obstruction in normal drainage and weakening in the embankment should be made.

- j) Giddi-A mine has been extensively worked out by underground as well as open cast method. It is evident from combined old working plan that the old underground workings in seam Sirka, Argada and Argada-A are interconnected. The old Quarry no-1 and 5 filled up with water to maximum water level of +336.20m are also connected to underground workings of seam Argada. Water retained in the developed or depillared underground bord & pillar workings may be released suddenly due to blasting or outburst under excessive water pressure (head), due to level difference or trapped water body, causing inundation. It is therefore, necessary to take necessary precaution while approaching near underground waterlogged workings. Therefore, it is proposed that:

(a) The surface boundary of proposed working sections should always be kept maintained at least 60m from old waterlogged underground and opencast workings.

(b) In case, any symptoms of abnormal seepage of water is observed in the proposed working area, dewatering of existing developed or depillared mine workings and old quarries connected to such UG workings should be carried out keeping the mine workings / operations stopped till stoppage of seepage of water or the water level gets lowered to the safe limit.

(c) Necessary precautions against danger of inundation as laid down in CMR 1957 and DGMS circulars shall also be adhered too.

- k) Standing order for withdrawal of working persons in case of apprehended danger. During heavy rain inspection of vulnerable points is essential. In case of any danger persons are to be withdrawn to safer places.

1.15.5 PROTECTION OF EQUIPMENT DEPLOYED AT BOTTOM HORIZONS FROM FLOODING

During the heavy monsoon period, the mining operation in the lower-most bench may have to be stopped. Therefore, it is proposed to drown the lower-most bench, which would work as a sump. The water will be pumped out and discharged into the nearby Nallah / River.

For ensuring safety of the equipment while working out bottom horizons with no access to surface profile, the following measures should be taken:

- (a) Drivage of initial trenches if any and coal cutting on bottom benches should be done during the dry period of the year.

- (b) Ramps should be made for quick shifting of equipment from bottom horizons, liable to be flooded during monsoon period, to the top horizons.

1.15.6 PRECAUTIONS AGAINST DANGER FROM BLASTING

Following measures should be taken while drilling and blasting operations in the quarry:

- a) Drilling and Blasting in quarry should be done in accordance with the provisions of Mines Safety Act, rules and regulations.
- b) Adequate safety measures have to be taken during blasting operation in the quarry so that men / machine are not affected.
- c) Blasting pattern and area to be blasted should be carefully evolved for best results and the blasted coal should be loaded as early as possible.
- d) Controlled or muffled blasting will be practiced near the important surface infrastructures and also within 100m of the vacant land. Besides this, necessary safety precautions should be clearly laid down and implemented whenever, any important surface features like public roads, rail, civil infrastructures / buildings etc. fall within radius of the blasting zone.

1.16 ENCLOSURES

Following plans are enclosed along with the Report of Scheme:

1. Final Stage Combined Working Sections Plan.
2. Final Stage Dump Plan.
3. 3rd Year Stage Plan of Combined Working Sections.
4. Cross Section along 1-1', 2-2' and 3-3'.
