



CENTRAL COALFIELDS LIMITED

A Minister Company

Fuelling Sustainable Growth

(Govt, of India Undertaking) OFFICE OF THE PROJECT OFFICER TETARIAKHAR OCP, RAJHARA AREA, CHANDWA Dist.:- LATEHAR, JHARKHAND, 829203 Contact No. 9931334287 Website: www.centralcoulfields.in CIN NO. U10200.0111956GO1000581 e-mail - potetariakharocp@gmail.com

चुनाव का पट DESH KA GARV

Ref No.: PO (TTK)/Env/EC Compliance/RO/2024-25/ 1759

Date: 11/12/2024

To

The Regional Officer Regional Office (EZC) MOEF & CC Shvamli, Doranda Ranchi, Jharkhand

Subject: Submission of Six-Monthly Compliance Report in respect of Tetariakhar OCP, CONTRACTOR OF THE RECEIPTOR FOR THE PARTY OF Rajhara Area.

Dear Sir.

With reference to above mentioned subject matter, we are enclosing herewith duly signed Six monthly Compliance in respect of Tetariakhar OCP for the period April 2024 to September 2024. This is for your kind perusal and record please.

C. N	Name of the Project	Details of EC		
5.10.	Name of the Project	Ref No.	ML Area (Ha)	P. Capacity (MTPA)
2	Tetariakhar OCP	J-11015/318/2009/1A. II(M)	155.58	2.0.2.5

With Regards,

Yours' Sincerely

Project Officer Tetariakhar OCP Project Officer Telariakhar OCP

Copy to: -

1. The Regional Officer, JSPCB, Ranchi

Nodal Officer (Env.), Rajhara Area . . 2.

3. Office Copy

COMPLIANCE REPORT

For Environment Clearance

Vide ref. no.

[J-11015/318/2009/-IA. II (M)] Approved on 07/05/2013

April 2024 to September 2024



TETARIAKHAR OPENCAST PROJECT RAJHARA AREA

CENTRAL COALFIELDS LIMITED (A Minisatra Company) Status of compliance of the terms and conditions given in the Environmental clearance letter No. J-11015/318/2009/-IA. II(M) dated 07.05.2013 issued by MOEF, Govt of India, New Delhi for Tetariakhar opencast coalmine (Nominal capacity 2.0 MTPA with a peak capacity of 2.5 MTPA) in a total ML area of 155.58 Ha for the period of October- 23 to March-24.

	EC Conditio	ns
(A)	Specific Conditions	
	FC is to be obtained for the 0.85 ha forestland earmarked for safety as per para 4 in EC.	The said area of 0.85 ha is kept outsid the Mine lease Area of Tetariakhar OCP
ii	No mining operations shall be undertaken in 52.04 ha of forest land which does not have FC, as per para 5 of EC.	There will be no mining operations in any forest land without prior approval o Forest Clearance (FC).
HI	Peak Production from mine shall not exceed 2.5 MTPA without prior Environmental Clearance.	The peak production from the mine had not exceeded 2.5 MTPA. The peak production of the mine is 1.34 MTY in the FY 2015-16. The production detail of last ten years is enclosed as Annexure I .
İv	Mining shall be carried out as per statute at a safe distance from streams/ Nalas flowing within lease and maintain the safe distance from the nalas flowing adjacent to the lease boundary.	Mining is carried out at a safe distance from the nearby flowing Nala adjacent to the lease boundary.
v	A distance of 100 m between the toe of the external OB and Bhutia nala shall be maintained and retaining wall of 1m width and 1.5 m height shall be constructed between the toe of the dump and bank of Bhutia Nala to prevent silting of nala during monsoon. The nala should not be choked due to untreated mine water discharge.	A distance of 100 m is kept between the toe of OB dump and Bhutia Nala. A toe wall is constructed at the toe of OB to avoid the siltation of Bhutia Nala. The dimension of toe wall is of 1 m wide and 1.5 m in height. A retaining wall is also constructed around the OB dump along the Mine entry. The pictures of Toe wall constructed between toe of OB dump and adjacent Nala are enclosed as Annexure II.
.vi	No washery shall be constructed within the ML Area without prior Environmental Clearance from the ministry.	There is no plan to construct washery at the Mine lese area of the project.
		Project Officer Totariakhar OCP

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Iİ	Top Soil, should be stacked and should be handled properly at the embarked site and should not kept active and shall be used for reclamation and development of green belt.	A top soil storage site has been earmarked to dump the excavated top Soil. The removed top soil is being stored at an earmarked location and it will be further used for biological reclamation and development of green belt. The Picture of Top Soil Storage site is enclosed as Annexure III.
.111	Of the total OB 16.84 Mm ³ will be generated, 13 Mm ³ of OB being dumped externally shall be dumped at earmarked area of 54.34 ha area of max. height of 60 m. Of the total 2.7 Mm3 OB shall be re- handled from the external OB dump at the post mining stage. No additional OB shall be dumped on the existing OB Dump. The ultimate slope shall not exceed 28 degrees. Monitoring and management of existing reclaimed dumpsite shall continue until vegetation becomes self-sustaining. Compliance status shall be submitted to ministry of Environment and Forests and its regional office located at Bhubaneswar on yearly basis.	The height of the OB is maintained at 60 m and the slope is below 28 degrees. The de-coaled area will be reclaimed after extraction of bottom most seam of the mine. However: the biological reclamation through seed has been carried out in 3.15 Ha of OB dump and plantation has also been done at bottom bench of the OB. The pictures of the biological reclamation of OB dump and plantation at the bottom of OB dump are enclosed as Annexure IV . The tender for the work. Bamboo plantation and plantation on the OB dump of Tetariakhar OCP is located and it will be awarded soon.
ix.	Catch drains and siltation ponds of appropriate size should be constructed to arrest silt and sediments flowing from soil, OB and mineral dumps. The water so collected should be utilized for watering the mine area, roads, green belt development etc. The drain should be properly de-silted and maintained properly.	Catchment drains is constructed around the OB dump to arrest silt materials. Also, siltation Pond is constructed for collection of water from the catch drains. The water so collected is used for sprinkling of water for dust suppression. The pictures of catch drains and Siltation Pond are enclosed as Annexure V.
8.	Garland drains (size, gradient and length) and sump capacity shall be designed keeping 50 % safety margin over and above peak sudden rainfall and maximum discharge in the area adjoining the mine site. Sump capacity shall also provide adequate retention period to allow proper silting of silt material.	Garland drains with sump is constructed within the ML Area to provide adequate retention period to allow proper silting of silt material. The proposal for construction of Pueca Garland drain between OB dump and Bhutia Nala is approved and executed in
		Project Officer Tetariakhar OCP

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		the FY 2024-25.
		The Picture of Garland drain with Sump is enclosed as Annexure VI.
xi.	Dimension of the retaining wall at the toe of the dumps and OB benches within the mine to check runoff and siltation shall be based on the rainfall data.	The dimension of retaining wall at the toe of the dumps and OB benches within the mine to check runoff and siltation is based on rainfall data. The picture of retaining wall constructed at the mine is enclosed as Annexure VII.
xii.	Mineral transportation from the road, from mine to CHP and to 45 tripping trucks to railway siding located at the distance of about 29 km from the mine shall use truck of minimum capacity of 20 T. All internal road and approach road, roads for colony shall be black topped. A 3-tier green belt comprising of a mix species shall be developed on both sides of roads. Green belt shall be developed and maintained along the proposed railway siding. Plantation should be provided near the dust generation points.	Vehicles are regularly being maintained to control the emissions. Coal transportation is being carried out in covered trucks. At present, no coal is being transported at Railway siding. However: these conditions will be implemented while transportation through railway siding. The work for Construction of Coal Transportation Road has been awarded to the party. The 3-tier plantation will be developed along this road. The Tori railway siding is not being used by Tetariakhar OCP.
xiii.	High efficiency water sprinkling system shall be provided to check fugitive dust emission at the transfer points, haulage roads, etc. shall be provided at crushing and loading operations for dust control in the CHP.	 Sufficient numbers of movable water sprinklers are being used to arrest fugitive dust emissions from various dust generating locations of the mine as mentioned below. i) 28kL mobile water sprinkler truck with mist control facility- 2 No ii) 12 kl Water Sprinkler-Outsourcing- 1 No. The Fixed Water Sprinkler Arrangement is also made at Tetariakhar OCP at Coal Transportation Road for dust suppression. The Pictures of sprinkling through movable water sprinklers is enclosed as Annexure VIII. The pictures of Fixed Water Sprinkler
	4	Project Officer

		are enclosed as Annexure IX.
iv.	Drills should be wet operated.	All drills are wet operated.
iv.	Controlled blasting for OC operations should be practiced day time with the use of delay detonators. The mitigative measures for control of ground vibrations and to arrest the fly rocks and boulders should be implemented.	Controlled blasting techniques are being adopted; blasting is being done in day time only (14.00 - 15.00 hrs.) and NONEL is being used.
cvi.	A progressive afforestation plan shall be implemented. Of the total 208.47 ha, an area not less than 111.01 ha, which includes 21.7 ha backfilled quarry area. 54.34 ha external OB dump, 11.71 ha long infrastructure, 7 ha along roads, 15.35 ha of green belt and 2.61 ha in safety zone shall be developed with plantation by planting native species from the mix of original ecosystem during pre-phase in consultation with the local DFO/Agriculture department. The density of the trees shall be around 2500 plants per ha.	Biological reclamation on the technically reclaimed locations is made on the old portion of the OB dump. The OB dump is biologically stabilized. The plantation in 1.15 Ha along the Nala and biological reclamation in 1.0 Ha of OB dump is executed out by the contractor. Pictures of biological reclamation and plantation are enclosed as Annexure X.
xvil.	A final mine closure plan shall be implemented by reclamation of quarry area of 108.57 ha which shall be backfilled using 3.84 Mm3 of OB and by re-handling of 2.7 Mm3 of OB to a maximum depth of 40-45 m, the upper area shall be gently sloped and stabilized with plantation from species found in original ecosystem. No dumping of fly ash shall be permitted.	A mine closure plan of TTK OCP has been approved by CCI. Board in 385 th meeting held on 24/02/2012. All the necessary measures would be taken at the time of closure of mines as per Mine Closure plan. The copy of mine closure plan OF Tetariakhar OCP is enclosed as Document 1.
	The wildlife conservation plan of wolves. Vultures and stripped hyenas prepared at the cost of Rs 95 Lakh, Rs 25 Lakhs, Rs	The Wildlife Conservation plan has been prepared by and its implementation is under process. Few of the activities are mentioned here. i) Regular health checkups of the villagers. ii) Distribution of anti-rabies concised.
xviii.	of wild life Conservation plan should be implemented in Schedule-I & Schedule-II species found in the study area.	 the local government hospitals. iii) Development of habitat liki plantation, provision of safety zone a the mine.
÷.,		iv) Construction of kutcha check dan for storage of water for drinking

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		purposes of the animals.
		The picture of activities as per the approved Wild Life Plan of Tetarikhar OCP is enclosed as Annexore XI.
		The copy of wild life conservation plan is enclosed as Document 2 .
ix.	The sand stone present in the OB should be provided to local people free of cost for further use.	The sandstone will be provided to the villagers whenever available.
xx	No ground water shall be used for mining operations except for drinking (mine and colony). Rain water harvesting structures including check dam for recharge of ground water shall be done four times a year in pre-monsoon.	The rain water Harvesting Arrangement is made at the Canteen Building of Tetariakhar OCP, Rajhara Area. The kutcha check dams are constructed during Monsson period across the Mukhar Nala. The images of the rain water Harvesting Arrangement is enclosed as Annexure XII.
XXI.	Regular monitoring of ground water level and quality should be carried out by establishing a network of existing wells and construction of new piezometers. The monitoring of quantity should be done four times a year in pre monsoon (May), post monsoon (November), Winter (January), seasons and for quality in May. Data thus collected should be submitted to the ministry of Environment & Forests and to the Central Pollution Control Board quarterly within one month of monitoring.	The borewell for ground water level measurement is completed and piezometers are also installed, one at the upper level and another at deeper side of the mine as suggested by the CMPDIL team. The images of the Piezometers are enclosed as Annexure XIII .
•		The regular arrangements for water supply are done by the Project Proponent through CSR works. The villagers were provided with 5 numbers of hand pumps and 1 No of
xxii	The project authorities shall meet water requirement of nearly village (s) in ease the village's wells go dry due to dewatering of mines.	The picture is enclosed in the CSR section. The work for installing 20 numbers of handpumps have been completed and handed over to the villagers in FY 2023- 24. Also, 6 numbers of deep bore wells with solar power arrangements have been
		completed and it is handed over to the
		Project Office/ Tetariakhar OCP

		villagers in FY 2023-24.
xxIII.	Sewage treatment plant shall be installed in the existing colony. ETP should be provided for workshop and CHP wastewater. Treated waste water meeting prescribed norms only shall be discharged into natural water bodies.	There is no colony at Tetariakhar OCP, therefore, the Sewage treatment plant is not installed. There is no workshop at Tetariakhar OCP. An arrangement has been made at the mine for settling of effluent water generated at the mine. No waste water of the mine is being discharged into natural water body. The waste water is temporarily stored at the settling chamber near the pit office. The proposal for permanent washing platform and Oil and grease trap will be developed at the proposed location of workshop.
xxiv	Beside carrying out regular periodic health checkup of their workers, 10 % of the workers identified from workforce engaged in active mining shall be subjected to third party health checkup for occupational disease and hearing impairment, if any through an specialized agency/institutions within the district/state.	IME and PME of CCL workers are being carried out in periodic manner at Central Hospital of CCL. The list of IME and PME for the year 2024 is enclosed as Annexure XIV .
XXV	A pre-mining socio-economic survey shall be undertaken and impact of CSR shall be assessed every year on the basis of socio- economic and quality of parameter such as the UNDP. Human Development Index and furnished as part of the Monitoring report. R & R shall be compensated as per the norms not below that laid out under national/ State Government R & R policy. Revenue expenditure of Rs 5/T of total coal shall be earmarked for CSR. The details of the expenditure and various activities shall be uploaded on the company website and uploaded once a year. The CSR budget should be Rs. 75 Lakhs for 2012-2013 and the same should be continued till the end of the mine with proper escalation factor every year. The project authorities shall in consultation with the Panchayts of the local villages and administration identify socio-economic and welfare measures under CSR to be carried out over the balance life of the mine.	 The R & R policy 2012 of CII. is being implemented and some of CSR activities are being executed at the adjoining area/villages. Few major activities executed under CSR scheme is given below. 1) Construction of 2 Community halls at Nagra and Belwadih, 2) Construction of boundary wall at Indira Gandhi Project High School, a deep boring well with solar Cells, and 3) Regular medical camp is organized for villagers. 4) Construction of Wells. 5) Providing Household solar lights The list of CSR Activities along with their status are enclosed as Annexure XV.
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2	For monitoring the Land Use Pattern and for post mining land use, a time series of land use maps, based on satellite imagery (on scale of 1:5000) of the core zone and buffer zone, from the start of the Project until of mine life shall be prepared once in 3 years (for any particular season which is consistent in the series time) and the project submitted MOEF and its Regional Office at Bhubaneswar.	The monitoring of Land use maps based on satellite imaging is being carried out by CMPDI which is NABL accredited lab. The land use map based on satellite imaging is enclosed herewith. The land use report is prepared by CMPDIL; Ranchi is enclosed as Document 3 .
xxvii	A detailed final mine closure plan along with details of Corpus Fund should be submitted to the Ministry of Environment and Forests for within 6 months of grant of Environmental Clearance.	The final mine closure plan of the mine is already prepared and it will be implemented post mining period.
xxviii	Corporate Environmental Responsibility:	
a)	The company shall have well laid down Environment Policy approved by the Board of Directors.	The company has well laid down environment policy which is available at CIL website. The Environmental Policy of CCL is enclosed as Document 4 .
b)	The Environment Policy shall prescribe for standard operating process/procedures to bring into focus any infringement/deviation/violation of the Environment or Forest Norms/Conditions.	There is well laid down Environmental policy for these conditions.
c)	The hierarchical system or administrative order of the company to deal with environmental issues and for ensuring compliance with the environmental clearance conditions shall be furnished.	The hierarchical system Environmental Cell is as follows Company level: HOD (Environment) Area level: Area Environment Officer and Management Traince (Env.) Project Level: Nodal Officer (Env). Project Engineer (Civil), Project Officer, TTK OCP The letter of committee constitution at project and Area level is attached as Annexure XVI (a and b).
d)	To have proper checks and balances, the company shall have a well laid down system of reporting of non- compliance/violations of environmental norms to the Board of Directors of the company and/or shareholders ou stakeholders at large.	A committee has formed which include officials of CCL Head Quarter, Rajhara Area officials and TTK mine officials to look after all the non- complication/violation of Environmental Norms.
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Project Officer Tetariakhar OCP

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	No change in mining technology and scope of working should be made without prior approval of the Ministry of Environment and Forests.	The mine is being operated on OC method, there is no change in open cas mining methodology. As the feasibility of working with surface miner is not being utilized due to more inclination of seam deposit, the working method is mentioned in expansion project report is Shove Dumper combination only. The correction in the existing EC will be made in the EC expansion.
i	No change in the calendar plan including excavation, quantum of mineral coal and waste should be made.	There is no change in the calendar plan for Coal and OB production.
iii	Four ambient air quality monitoring stations should be established in the core zone as well as in the buffer zone for SPM, RPM, SO2 and NOX monitoring. Location of the stations should be decided based on the meteorological data, topographical features and environmentally and ecologically sensitive in consultation with the State Pollution Control Board. Monitoring of heavy metals such as Hg, As, Ni, Cd, Cr, etc carried out at least once in six months.	Air quality monitoring station has been established at PO Office, Pindarkom Village and workshop for monitoring SPM. RPM, SO ₂ , and NOX. The reports are enclosed as Document 5(i). The monitoring report of Heavy Metals is enclosed as Document 5 .
ix	Data on ambient Air quality (SPM, RPM, SO2, NOX) and heavy metals such as Hg. As, Ni, Cd, Cr, etc and other monitoring data should be regularly submitted to the ministry and its Regional Office at Bhubaneswar and to the State Pollution Control Board and to the Central Pollution Control Board, once in every six months. Random verifications of samples through analysis from independent laboratories recognized under the EPA rules, 1986 shall be furnished as part of compliance report.	Monitoring of ambient air quality parameters is being carried out by CMPDIL which is a NABL accredited Lab. The monitoring quarterly monitoring report regularly submitted to MoEF, Regional Office and SPCI along with Six monthly Complianc Report and Environmental Statement of the mine. A copy of same is enclosed a Document 5 (i to iv) .
v	Adequate measures should be taken for control of noise levels below 85 dBA in the work environment. Workers engaged in blasting and drilling operations, operations of HEMM etc. should be provided with ear plugs/muffs.	The noise in the working area is within permissible limit. The machines are regularly maintained to avoid un-necessary noise. Worker working in such conditions are provided with ear plugs/muffs. Regula checkups for their ears are being done.
		Project Officer Tetariakhar OCP

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rī	Industrial waste water (Workshops and Waste Water from the mine) should be properly collected, treated so as to confirm the standards prescribed under GSR 422 (E) dated 19 May 1993 and 31 Dec 1993 or as amended from to time before discharge. Oil and Grease trap should be installed before discharge of workshop effluents.	The results of water quality monitoring report are enclosed Document 5 . All the effluent are stored at the settling chamber constructed at the mine. The process of constructing Oil and Grease trap along with washing platform is under process. Currently all the effluents of the mines are being collected at the temporary settling chamber constructed at the mine.
vii	Vehicular emissions should be kept controlled and regularly monitored. The vehicles used for transporting the minerals sold should be covered with Tarpaulins and optimally loaded.	The vehicles used for transporting the minerals are covered with Tarpaulins covers. The trucks are loaded optimally loaded. The Pollution Under Control Certificate (PUC) for the vehicles used for coal transportation is enclosed as Annexure XIX .
viii	Monitoring of Environmental quality parameters shall be carried out with adequate number and type of pollution monitoring and analysis equipment in consolations with the State Pollution <u>Control Board and data got analyzed</u> through a laboratory recognized under EPA Rules, 1986.	Monitoring of Environmental quality parameters like Air, Water, Noise and Heavy Metals area carried out by CMPDIL which is NABL accredited Lab. The monitoring reports are enclosed as above. The monitoring report is enclosed as Document 5 .
ix	Personnel working in the dusty area should wear protective respiratory devices and they should also be provided with adequate training and information on safety and health aspects. Operational health Surveillance programmed of the workers should be under taken periodically to observe any contractions due to exposure to duct and to take corrective measures, if needed.	The Personnel working in the dusty area is provided with respiratory devices such as dust mask for their protection Regular training and various awareness programs are also organized for their safety.
** x	A separate Environmental Management Cell with suitable qualified personnel should be set up under the control of a Senior Executive, who will report directly to the head of the company.	Separate Environmental Managemen cell is established at Area Level.
xi	The funds earmarked for Environmental Protections measures should kept in separate account and should not be diverted for other purposes. Year wise expenditure	It is being maintained at area level and HQ level. All the Environmental related
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	should be reported to the Ministry and its Regional Office at Bhubaneswar.	works like monitoring and control of pollution, construction of catch drains, garland drains, biological reclamation, plantation, construction of retaining and toe walls, rain water harvesting, washing platforms and other environmental related activities area are being done by that fund using capital budget of allotted fund.
		Activities for FY 2024-25 is enclosed as Annexure XVII.
xii	The project authorities should advertise at least in two local newspapers widely circulated around the project, one of which shall be in the Vernacular language of the locality concerned within 7 days of the clearance Letter informing that the project has been accorded Environmental Clearance and a copy of Clearance Letter is available with the State Pollution Control Board and may also be seen at the website of the ministry of Environment and Forests at https://envfor.nic.in.	The information about Environment Clearance was published in local newspapers.
xiii	A copy of Environmental Clearance letter shall be marked to concern Panchayat, Local NGO, if any, from whom any suggestion/ representation has been received while processing the proposal. A copy of the clearance letter shall also be displayed on company's website.	All the Panchayat Members and local NGO members were informed about the Environmental Clearance. The copy of EC letter is available at CCL official website.
xiv	A copy Environmental Clearance letter shall also be displayed on the website of concerned State Pollution Control Board. The EC letter shall also be displayed at the regional office, District Industry Centre and Collectors Office/ Tahsildars Office for 30 days.	Copy of EC letter is available at PARIVESH portal.
xv	The clearance letter shall be uploaded on the company's website. The compliance status of the stipulated environmental clearance conditions shall also be uploaded by the project authorities on their website and uploaded at least once every six months so as to bring the same in public domain. The monitoring data of environmental quality parameter (air, water, noise and soil) and critical pollutants such as PM10, PM2.5, SO2, NOX	The copy Environmental Clearance letter is available at the official website of CCL. The compliance report of Tetariakhar OCP is available at CCL website. Regular monitoring of Environmental quality parameters is being done by CMPDIL; The copy of Monitoring report is attached herewith.
22	such as PM10, PM2.5, SO2, NOX	Stort .

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	(Ambient) and actional moremeters shall	
	(Ambient) and critical parameters share also be displayed at the entrance of the project premises and mine office and in corporate office and on company's website.	
svi	The project proponent shall submit six monthly compliance reports on status of compliance of the stipulated environmental clearance conditions (both in hard copy and in e-mail) to the respective Regional Office of the ministry, respective Zonal Office 's of CPCB and SPCB.	Six monthly compliance reports an submitted to the respective Regiona Office of the MOEF & CC and Regional Office, JSPCB in the specifice time.
xvii	The regional office of the ministry located at Bhubaneswar shall monitor compliance of the stipulated condition. The project authorities shall extend full co-operations to the office(s) of the regional office by furnishing the requisite data/ information/ monitoring reports.	All the required help will be provided to concerned authorities wheneve required.
xviii	The Environmental Statement for each financial year ending 31 Form-V is mandated to be submitted yearly.	Environmental Statement of each financial year is submitted regularly.
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Are	ea Envirenment Officer Rajhara Area Nodal Officer (Env.) Rajhara Area	Project Officer Tetariakhar OCP Project Officer Tetariakhar OCP
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Attachments:

- 1. Annexure I: The production detail of last ten years.
- Annexure II: Construction of Toe wall at the toe of OB to avoid siltation of Bhutia Nala.
- Annexure III: The Picture of Top Soil dumping/Storage site.
- Annexure IV: The pictures of plantation at the bottom of OB dump.
- 5. Annexure V: The pictures of catch drains and sump for storage of water.
- 6. Annexure VI: The Picture of Garland drain with Sump
- 7. Annexure VII: The picture of retaining wall constructed at the mine.
- 8. Enclosure VIII: The pictures of Movable Water Sprinkler.
- 9. Annexure IX: The Pictures of Fixed Water Sprinkler for dust suppression at Tetariakhar OCP.
- 10. Annexure X: Pictures of biological reclamation through Seed Ball technique and plantation at the mine area.
- 11. Annexure XI: The picture of activities as per the approved Wild Life Plan of Tetarikhar OCP is enclosed as Annexure XI.
- 12. Annexure XII: The images of the rain water Harvesting Arrangement is enclosed as Annexure XII.
- 13. Annexure XIII: The images of the Piezometers
- 14. Annexure XIV: The list of IME and PME for the year 2024
- 15. Annexure XV : The list of CSR Activities along with their status
- Annexure XVI: The letter of committee constitution at project and Area level
- 17. Annexure XVII: The list of various Environmental Activities for FY 2024-25

Documents:

- 1. Document 1: The copy of approval for mine closure plan.
- 2. Document 2: The copy of wild life conservation plan
- 3. Document 3: The Environmental Policy of CCL.

4. Document 4: The report of Land Use Plan of Tetariakhar OCP prepared by CMPDIL, Ranchi.

5. Document 5: The copy of Environmental monitoring report.

Sent

Project Officer Tetariakhar OCP

Attachments

1. Annexure I: The production detail of last ten years

SI No.	Year	Coal Production (Te)
1	2013-2014	342263.00
2	2014-2015	564802.00
3	2015-2016	1340016.00
4	2016-2017	850151.00
5	2017-2018	619775.00
6	2018-2019	1030439.00
7	2019-2020	1165474.00
8	2020-2021	133296.00
9	2021-2022	1019251.28
10	2022-2023	910167.90
11	2023-2024	1032024.00

2. Annexure II: Construction of Toe wall at the toe of OB to avoid siltation of Bhutia Nala









3. Annexure III: The Picture of Top Soil dumping/Storage site.





4. Annexure IV: The pictures of plantation at the bottom of OB dump.







5. Annexure V: The pictures of catch drains and Siltation Pond at the mine.





6. Annexure VI: The picture of retaining wall at the mine.





7. Annexure VII: The Picture of Garland drain with Sump at the mine.



8. Annexure VIII: The pictures of water sprinkling through movable water sprinkler.







9. Annexure IX: The Pictures of Fixed Water Sprinkler for dust suppression at Tetariakhar OCP.





10. Annexure X: Pictures of biological reclamation through Seed Ball technique and plantation at the mine area.









11. Annexure XI: The copy of approval for mine closure plan

CENTRAL COALFIELDS LIMITED DARBHANGA HOUSE: RANCHI

Sub: Forwarding Minutes of the 385th (No.2 of 2012) Meeting of the Board of Directors held on 24.02.2012.

Extracts from the minutes of the above meeting, in respect of following item, is appended below:

Bern No.4(16): Proposal seeking approval of Mine Closure Plan of 15 Projects of CCL (Financial assurance).

The Board noted that the "Mine Closure Plans" for 15 mines have been prepared as per the guidelines issued by Ministry of Coal, Government of India.

The Board further noted the following-

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- For financial assurance for mine closure, CCL shall open an Escrow Account with any scheduled bank, with the Coal Controller Organization (on behalf of the Central Govt.) as exclusive beneficiary.
- When implementation of the final mine closure scheme is undertaken by the mine owner starting five years before the scheduled closure of mining operations, the Coal Controller may permit withdrawals (4 years before final mine closure date) from the Escrow Account proportionate to the quantum of work carried out, as reimbursement.
- The withdrawn amount each year shall not exceed 20% of the total amount deposited in the account.
- The corpus for mine closure has to be generated as per this guideline @ ₹ 1.0 Lakh / Ha of lease area in case of underground mines & ₹ 6.0 Lakh / Ha of lease area in case of opencast mines.
- The base date for this rate is August, 2009 which has to be escalated at the time of preparation of mine closure plan on the basis of Wholesale Price Index issued from Ministry Of Finance from time to time.
- Annual closure cost is to be computed considering the total leasehold area at the above mentioned rates (evaluated at the time of preparation of mine closure plan on the basis current WPI) and dividing the same by the balance life of the mine in case of operating / existing mines. An amount to the annual cost is to be deposited each year throughout the life of the mine compounded @5% annually.

Keeping in view of the above, after detailed deliberation, the Board approved the 1 oposal as brought out in the agenda, of Mine Closure Plans of following 15 mines with corresponding hunds as mentioned below to facilitate generation of fund for Escrew Account with Coal Controller Organization on behalf of the Central Covernment.

	Name of Projects	Proposed fund for Mine Closure (Cumulative) (in ₹ Lakh)
1	Jarangdih UGP	814.70
1.2	Jarangdih OCP	1332.00
3	Karma OCP	2685.80
1.4	Urimari Exp. OCP	2097.14
\$	Ashok Expn OCP	13849.67
6	Govindpur P-II CP	3111,92
7	KDHOCP	7818.80
8	Purnadih OCF	10406.70
9	Karo OCP	9742.16
10.	Rohini OCP	2227.26
11	-Piparwar-OCP	9664.67
12	Tetariskhar OCP	1895.90
13	Dakra OCP	2395.86
14	Tapin OCP	3345.78
15	Churi-Benti UGP	1164.10
	GRAND TOTAL	72552.47

(₹ Seven Twenty Five Crore Fifty Lac & Forty Seven Thousand only)

The CGM (P&P) in consultation with the Finance department of CCL shall take necessary action in this regard.

It is requested kindly to take necessary action on the decision, wherever necessary, under intimation to this office.

(C.V.N. Ganganam)

(C.V.N. Gangaram) Company Secretary

U.O.No.CS/BM/385/2012/ 193

Date: 01-03-2012

12. Annexure XII: The picture of check dam constructed at Mukhar Nala and medical camp arranged at the Belwadih village.

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13. Annexure XIII: The ground water level measured during October 2023 to March 2024.

Note: Also, the piezometer is installed at upside and downside of the project for measurement of ground water level meter. The depth of the ground water level at Upside location (Piezometer 1) is there at 6.43 m below ground level and depth of the water at down side location (Piezometer 2) is there at 28.0 m below ground water level. The images of the digital water level recorder are enclosed herewith.





14. Annexure XIV: The list of IME / PME for the year 2023 (till date) and safety talk for the worker of the mine.

	1-	TABLES	-	ALAHIV	LMINT	Camp I		36
NIAR	Dega	tineutal c	mitrartual	Deportments	Com	nactual	Department	a linear
	334	DYME	1515	7%K			INE,/IME	Enstracto
17704	1	26	101	26	-	101	000	.00
	Var	Vepenances	Omirata	ul Departmenta	T Gain	(actual)	Repeteentel	Contracted
	Auc	312	NR.	32	167	NIL	100	NH
1 2	Shoes Heimer			250 150	1	00 \$0	nent 2025	
4	Gougle	Sent Jacket		180 Nil	1210	20 Strip 50	TYPE	
5	Dust M	lunk		210	1	00		
Fire Lat	Descrip	t stion tinguisher A	BC (5kg)	Distributed in	2024	Requir	wment 2025	
						Lad net		(m)-



15. Annexure XV: The picture of temporary settling tank constructed for the storage of waste water.



16. Annexure VI: Various activities of CSR and their status for execution in FY 2024-25.



		Amount	
SI No.	Name of the Activity	(in Lakhs)	Remarks
	Construction of Guard Wall at		The work is completed.
1	Belwadih Village	6	
	Construction of Cuard Wall at		The work is under process.
2	Pindarkom villago	12	
Z	Prilling of 4 numbers of Deen Bore	12	The work is completed
	Unling of 4 humbers of Deep Bore		The work is completed.
2	Arrangements	10	
3	Arrangements	42	The work is completed
	Providing 14 numbers of		The work is completed
4	handpumps at Basia Panchayat	10	
	Construction of Boundary Wall at		The work is completed.
	Primary School, Belwadih near		
5	Tetariakhar OCP, Rajhara Area	10	
	2 numbers of borewells at Basia		The work is completed.
6	Panchavat	8	
			The work is completed.
_	Digging of Two Number of Wolls	14	
/	Digging of two Number of Wells	14	The work is under process
			The work is under process.
8	Digging of One number of Pond	6	
			The work is completed.
9	Construction of Cricket Pitches	10	
			The work is under process,
	Construction of PCC road at Jarri		
10	Phutani Chowk, Nagra Village	75	
			In words: One Crore, Ninety-
	Total Expenses	193	Three Lakhs.

17. Annexure XVII: The letter of committee constitution at project and Area level.



CENTRAL COALFIELDS LIMITED OFFICE OF THE PROJECT OFFICER TETARIAKHAR OCP, BALUMATH

Ref. No .: PO/TTK/O. Order/ 1264

Dated- 2/03/2019

OFFICE ORDER

As per the Specification Condition imposed in the Environmental Clearance of Tetarlakhar OCP, Specific Condition No xxvi (d), "the company shall have a well laid down system of reporting of non-compliances/violations of Environmental norms to the Board of Directors of the company". Thus a committee consisting of following executives is here by constituted to look after the all non-compliances/violations related issues which are imposed in Environmental Clearance of Tetariakhar OCP and report to the competent authorities.

Designation
Project Manager, Tetariakhar OCP
Nodal Officer (Environment), Tetarlakhar OCP
Project-in-Charge (Civil), Tetariakhar OCP
Project-in Charge (Survey), Tetariakhar OCP
Project-in-Charge (Safety), Tetariakher OCP

Project Officer Tetariakhar OCP

Copy to:-

1. Colliery Manager, TTK OCP

2. Executive concerned

3. Office Copy.

Scanned with CamScanner

18. Annexure XVIII: i) The Pollution under Control Certificate (PUC) for the vehicles involved in the mine.

Pollution Under Authorised By : Government of Jhar	Control Certificate			
Date Time Validity upto	20/11/2024 11:06:01 AM 19/05/2025			
Registration No. Date of Registration Month & Year of Manufi Valid Mobile Number Emission Norms Fuel PUC Code GSTIN Fees MIL observation	acturing E	3H01012800133 3H01BG2890 06/Jun/2014 Apri-2014 2940 BHARAT STAGE II DIESEL 3H0010126 Rs.300.00 No	и	
Vehicle Photo 60 mm x 30 m	with Registration plate m	SPEE	40 KM	
Vehicle Photo 60 mm x 30 m sr. No.	with Registration plate m Pollutant (as applicable)	Units (as applicable)	40KM	Measured Value (upto 2 decimal places)
Vehicle Photo 60 mm x 30 m sr. No. 1	with Registration plate m Pollutant (as applicable) 2	Units (as applicable)	Emission limits	Measured Value (upto 2 decimal places) 5
Vehicle Photo 60 mm x 30 m sr. No. 1 Idling Emissions	with Registration plate m Pollutant (as applicable) 2 Carbon Monexide (CO) Hydrocarbon, (THC/HC)	Units (as applicable) 3 percentage (%) ppm	Emission limits	Measured Value (upto 2 decimal places) 5
Vehicle Photo 60 mm x 30 m Sr. No. 1 Idling Emissions	with Registration plate m Pollutant (as applicable) 2 Carbon Monoxide (CO) Hydrocarbon, (THC/HC) CO	Units (as applicable) 3 percentage (%) ppm percentage (%)	40KM Emission limits 4	Measured Value (upto 2 decimal places) 5
Vehicle Photo 60 mm x 30 m sr. No. 1 Idling Emissions High idling	with Registration plate m Pollutant (as applicable) 2 Carbon Monoxide (CO) Hydrocarbon, (THC/HC) CO RPM	Units (as applicable) 3 percentage (%) ppm percentage (%) RPM	Emission limits 4 2500 ± 200	Measured Value (upto 2 decimal places) 5
Vehicle Photo 60 mm x 30 m Sr. No. 1 Idling Emissions High idling emissions	with Registration plate m Pollutant (as applicable) 2 Carbon Monoxide (CO) Hydrocarbon, (THC/HC) CO RPM Lambda	Units (as applicable) 3 percentage (%) ppm percentage (%) RPM	40000 Emission limits 4 2500 ± 200 1 ± 0.03	Measured Value (upto 2 decimal places) 5
Vehicle Photo 60 mm x 30 m Sr. No. 1 Idling Emissions High idling emissions Smoke Density	with Registration plate m Pollutant (as applicable) 2 Carbon Monoxide (CO) Hydrocarbon, (THC/HC) CO RPM Lambda Light absorption coefficient	Units (as applicable) J percentage (%) ppm percentage (%) RPM L/metre	40000 Emission limits 4 2500 ± 200 1 ± 0.03 2.45	Measured Value (upto 2 decimal places) 5 0.49

20.Nov-24 11:05 AM

Pollution Under Authorised By : Government of Jhar	Control Certificate			
Date Time Validity upto	: 25/06/2024 : 18:15:01 PM : 24/12/2024			
Centricule SL. No. Registration No. Date of Registration Month & Year of Manut Valid Mobile Number Emission Norms Fuel PUC Code GSTIN Fees MIL observation Vehicle Photo 60 mm x 30 m	acturing	JH001005800175 JH01AU7719 03/Sep/2012 June-2012 9520 BHARAT STAGE II DIESEL JH0010058 Rs.300.0 No	II	
Sr. No.	Pollutant (as applicable)	Units (as applicable)	Emission limits	Measured Value (upto 2 decimal places)
Sr. No.	Pollutant (as applicable) 2	Units (as applicable) 3	Emission limits	Measured Value (upto 2 decimal places) 5
Sr. No. 1 Idling Emissions	Pollutant (as applicable) 2 Carbon Monoxide (CO) Hydrocarbon, (THC/HC)	Units (as applicable) 3 percentage (%) ppm	Emission limits	Measured Value (upto 2 decimal places) 5
Sr. No. 1 Iding Emissions	Pollutant (as applicable) 2 Carbon Monoxide (CO) Hydrocarbon, (THC/HC) CO	Units (as applicable) 3 percentage (%) ppm percentage (%)	Emission limits 4	Measured Value (upto 2 decimal places) 5
Sr. No. 1 Iding Emissions High idling emissions	Pollutant (as applicable) 2 Carbon Monoxide (CO) Hydrocarbon, (THC/HC) CO RPM	Units (as applicable) 3 percentage (%) ppm percentage (%) RPM	Emission limits 4 2500 ± 200	Measured Value (upto 2 decimal places) 5
Sr. No. 1 Iding Emissions High idling emissions	Pollutant (as applicable) 2 Carbon Monoxide (CO) Hydrocarbon, (THC/HC) CO RPM Lambda	Units (as applicable) 3 percentage (%) ppm percentage (%) RPM	Emission limits 4 2500 ± 200 1 ± 0.03	Measured Value (upto 2 decimal places) 5
Sr. No. 1 Iding Emissions High Idling emissions Smoke Density	Pollutant (as applicable) 2 Carbon Monoxide (CO) Hydrocarbon, (THC/HC) CO RPM Lambda Light absorption coefficient	Units (as applicable) 3 percentage (%) ppm percentage (%) RPM - 1/metre	Emission limits 4 2500 ± 200 1 ± 0.03 2.45	Measured Value (upto 2 decimal places) 5 1.15
Sr. No. 1 Iding Emissions High idling emissions Smoke Density This PUC certif	Pollutant (as applicable) 2 Carbon Monoxide (CO) Hydrocarbon, (THC/HC) CO RPM Lambda Light absorption coefficient	Units (as applicable) 3 percentage (%) ppm percentage (%) RPM - 1/metre through the national quire any signature.	Emission limits 4 2500 ± 200 1 ± 0.03 2.45 register of Motor ve	Measured Value (upto 2 decimal places) 5 1.15 ehicles and does
Sr. No. 1 Iding Emissions High iding emissions Smoke Density This PUC certif Note : 1. Vehicle ow https://vahan.pariva	Pollutant (as applicable) 2 Carbon Monoxide (CO) Hydrocarbon, (THC/HC) CO RPM Lambda Light absorption coefficient ficate is system generated to not re	Units (as applicable) 3 percentage (%) ppm percentage (%) RPM - 1/metre through the national quire any signature.	Emission limits 4 2500 ± 200 1 ± 0.03 2.45 register of Motor ve	Measured Value (upto 2 decimal places) 5 1.15 ehicles and does

ii) Trucks covered with tarpaulin covers





19. Annexure XIX: The list of various Environmental activities with their expenditure details for the activities of FY 2024-25.

List of Activities for Environmental Expenditure related works at TTK OCP for FY	
2024-25	

S1	Name of the Activities	Amount in	Status of Work
No.		(Lakhs Rs.)	
1	Construction of Wind Screen Arrangement	110	The work is under
	around the Coal Stock of Tetariakhar OCP		progress
2	Environmental Monitoring Work	50.14	Continuous Work
3	Operation of Movable Water Sprinkler	86.99	Continuous Work
	Total	247.13 Lakhs	

MINE CLOSURE REPORT

FOR

TETARIAKHAR OPEN CAST PROJECT (2.0 MTY)

(CENTRAL COALFIELDS LIMITED)



SEPTEMBER 2011

Regional Institute – III Central Mine Planning & Design Institute Ltd. (A Subsidiary of Coal India Ltd.) Gondwana Place, Kanke Road Ranchi-834008, Jharkhand

INTRODUCTION

1.1 About the Mine

Tetariakhar OCP is an old running project of earlier sanctioned capacity 0.50 MTPA. After getting detailed geological information and reports a project report of 0.50 MTY was prepared in 1992 and was approved in 1993 under which it was running. The mine was earlier producing Fgrade coal @ 0.12 MTPA. This had achieved maximum production of 0.30 MTPA in the year 2002-03.

Availability of additional geological exploration data necessitated fresh mine planning to enhance the production capacity of the mine and to extract bottom most Seam IB as base seam from conservation point of view. At the same time it would be helping to meet the demand of power grade coal from N.K. Coalfield and to reduce the gap to some extent of demand and production of CCL for XI plan period. Accordingly a Project Report for expansion of Tetariakhar OCP from 0.50 MTPA Capacity to 2.00 MTPA Normative and 2.50 MTPA Peak Capacity was prepared. The balance mineabl reserve is 17.20 MT, OB is 16.84 MCum, average stripping ratio is 0.98 and the life of the mine has been estimated as 11 years. The PR has been approved by the Board on 21.01.2009.

Details of Mine

The mine has been designed to produce at the rate of 2.00 MTPA for project life of 11 years. The design of the mine is mainly based on lay & deposition of coal seams and intervening partings of the block as estimated in the Geological report and the HEMM productivity norms adopted in CIL mines.

Keeping into account the current state of development in technology and attainment of improved skills of operators and maintenance crew, it will be possible for coal producing company to produce 2.50 MTPA of coal by achieving higher availability and utilization of HEMM. It is therefore, Tetariakhar OCP may produce coal at the rate of 2.50 MTPA in any one or all the year of the life of the mine against normative mine capacity of 2.00 MTPA.

1.1.1 Name of mine owner / company

Project----- Tetariakhar OCP Area----- Rajhara Area Company----- Central Coalfields Limited Mine Owner---Director (Technical)(Operation), CCL

1.1.2 Address for Communication

Project----- Tetariakhar OCP

Nearest Railway station — The nearest railway station is Mahuamilan which is at a distance of 21 km via Chakla. The railway station at Tori on the Barkakana-Dehri-on-sone loop line of eastern railway is about 29km from the Tetariakhar OCP.

District----- Latehar.

State----Jharkhand.

1.1.3 Location of mine:

Project----- The project is located in Tetariakhar geological block part of North Karanpura Coalfield in Village – Bahera, Block – Balumath, District -Latehar, Jharkhand. It lies between latitudes 23° 47' 57". N to 23° 48' 45" N and longitudes of 84° 50' 27" E. to 84° 51' 14" E. The specific location of Tetariakhar OCP in the State, District has been shown in Plate 1. It is covered in Survey of India Topo sheet no 73 A/13 (RF 1:50000).

Tetariakhar OCP is approachable by black top road from Balumath located about 7 km to the north-west of the project. Balumath is connected by National highway no.-99 which runs from Chandwa to Chatra. Balumath is also connected to Mcluskiganj by black top road.

The nearest railway station is Mahuamilan which is at a distance of 21 km via Chakla. The railway station at Tori on the Barkakana-Dehri-on-sone loop line of eastern railway is about 29km from the Tetariakhar OCP. The nearest air port is Ranchi at a distance of 105 km by road.

Area ------ Rajhara area Latitude ----- 23º 47'57". N to 23º 48' 45" N Longitude ----- 84º 50' 27" E. to 84º 51' 14" E

1.1.4 Date of start & Life of mine:

Date of start of production----- 1993-94 Life of mine------ 11 years Estimated remaining life of mine (as on 01.04.11) ------ 11 years

1.1.5 Total Lease Area of the mine :----- 208.47 Ha

1.1.6 Communication

Tetariakhar OCP is approachable by black top road from Balumath located about 7 km to the north-west of the project. Balumath is connected by National highway no.-99 which runs from Chandwa to Chatra. Balumath is also connected to Mcluskiganj by black top road.

The nearest railway station is Mahuamilan which is at a distance of 21 km via Chakla. The railway station at Tori on the Barkakana-Dehri-on-sone loop line of eastern railway is about 29km from the Tetariakhar OCP. The nearest air port is Ranchi at a distance of 105 km by road.

1.1.7 Topography of the area

The Tetariakhar OCP, in general is having flat topography with the general elevation ranging from 488m to 510m. The undulating to rolling topographic features have been well developed to the north of Tetarikhar village where incrop of seams are projected below detritalmantle/alluvium.

Tetariakhar sector, covering an area of 1.20 sq.km is drained by two meeadering southerly flowing fairly large streams i.e. Bhutha Nala in the east and Mukhar Nalain the west. These two nalas join in the south east of the sector to form Ramghat River.

1.2 Reasons for Closure

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To restore the disturbed area after extraction of planned quantity of coal, to the acceptable limit of local community and regulatory authority.

1.3 Need of mine closure planning

- 1.3.1 Mining activities leave long lasting impacts on the landscape, ecology and on local inhabitants. These activities disturb the delicate environmental and social equilibrium that exists in its area of influence. Hence, it becomes imperative on part of the mine operator to restore the equilibrium in the mine affected area that existed in the pre-mining period. Thus, any mining venture must have adequate closure plan, aimed at rehabilitation of disturbed area, which should be acceptable to local community as well as regulatory authority.
- 1.3.2 Mine closure encompasses rehabilitation process designed to restore physical, chemical and biological quality disturbed by the mining activities. Mine closure is not just something that happens at the end of a mine's life rather mine closure is an ongoing series of decisions and activities beginning in the pre-mining stage of mine and ending with a sustainable site that can be returned to the community.
- 1.3.3 Thus, a Mine closure plan needs to define the liabilities, responsibilities and authorities of the different agencies like the mine management, other regulatory bodies, Central and State Governments after mine closure. Various objectives of the advance mine closure planning are as follows:
 - a. To allow productive and sustainable after-use of the site, which is acceptable to the mine owner and the regulatory authority
 - b. To protect public health and safety
 - To eliminate environmental damage and thereby encourage environmental sustainability
 - d. To minimize adverse socio-economic impacts of mining activities
 - e. To protect the flora and fauna of the area affected by the mining
 - Effective use of the assets created in course of mining
- 1.3.4 Primarily, the mine closure activities are planned in two stages. The initial plan identifies the activities required to be executed as the mining activities

4

progress after the inception of the Project. These activities may undergo subtle changes depending upon the actual site condition during implementation. Finally, a detailed closure plan is to be prepared 4-5 years before the actual closure time of the mine depending upon the existing parameters at that point of time.

Plans Enclosed

The following surface plans have been enclosed along with this mine closure report plan:

The local bills have start a Toplet star so it is common it then do Aleren and

- a. Pre mining Land use plan of core zone
- b. Quarry & Dump Plan at the end of mining.
- c. Post mining land use plan with reclamation.

Financial Provisions

Mine Closure activities of Tetariakhar OCP would be a constant exercise for the mine which would begin with the commencement of mining operations and continue till post closure. The mine closure activities would naturally entail certain expenditures, which will have to be borne by the mine operator.

2.1 Revenue expenditures

This would cover the activities which are being executed along with normal mining operation and would continue to be executed in course of execution of the Project. The cost of progressive mine closure activities is already part of the project cost.

2.2 Expenditures to be incurred just prior to actual mine closure and in the post closure period

2.2.1 As per MOC guidelines, a corpus escrow account @ Rs. 6.0 lakhs per Ha of the property leasehold shall be opened with the coal controller organization to meet the expenses of final mine closure. Thus the total expenditure on his front may be calculated in following manner:

The cost expenditure after closure of mine will be met from the corpus escrow account deposited by the mine operator. However, the additional amount beyond the escrow account will be provided by the mine operator after estimating the final mine closure cost five years prior to mine closure (as per the mine closure guideline).

The progressive mine closure will deal the land reclamation as per the calendar plan of project report. The cost of progressive land reclamation is already part of the project cost. Therefore, the escrow account for mine closure will deal only the final mine closure.

The detail of escrow account

The total mine lease area is **208.47** Ha, so the corpus based on August, 2009 rate is Rs. 1250.82 Lakh @ Rs. 6.0 Lakh/Ha of lease area. The wholesale price index in August, 2009 and April, 2011 is 129.60 and 152.10 respectively. So the current value of corpus is Rs 1250.82x152.10/129.60 Lakh, which comes to Rs. 1467.98 lakh. Since this is an operating/existing mine, this corpus is to be divided by balance life of mine. The balance life of the mine is 11 years. So, by dividing by 11 years, the annual corpus comes to Rs. 133.45 Lakh. This amount is to be deposited in escrow account every year with 5% escalation.

Year	Amount in Lakh (Rs.)
1 2011-12	133.45
2 12-13	140.12

Year	Amount in Lakh (Rs.)
3 13-14	147.13
4 14+15	154.49
5 15-16	162.21
6 14-17	170.32
7 13-18	178.84
8 /6-19	187.78
9 19-2P	197.17
10 20-21	207.02
11 21-22-	217.38
Total	1895.90

As per above an amount will be deposited every year up to the last year of mine life. The amount calculated by the above formula shall be deposited every year by CCL in the Escrow amount opened with the Coal Controller organization in a scheduled Bank. An agreement, outlining detailed terms and conditions of operating the said Escrow Account shall be executed amongst CCL, the Coal Controller and the commercial Bank.

However the additional amount beyond the escrow account, if any estimated later on, will be provided by the mine operator after estimating the final mine closure cost five years prior to mine closure (as per the mine closure guideline).

The details of Mine Closure Cost

The above escrow account will meet the cost of different activities of Mine Closure cost which is given in the table below:

SL. NO.	ACTIVITY	% OF TOTAL MINE CLOSURE COST	AMOUNT IN LAKH (RS.)
A	Dismantling of Structures		
	Service Buildings	0.20	3.79
	Residential Buildings	2.67	50.62
	Industrial structures like CHP, Workshop, field sub-station etc.	0.30	5.69
8	Permanent Fencing of mine void and other dangerous area	10.000	
	Random rubble masonry of height 1.2 metre including levelling up in cement concrete 1:6:12 in mud mortar	1.50	28.44
C	Grading of highwall slopes		1121
1	Levelling and grading of highwall slopes	1.77	33.56
D	OB Dump Reclamation		
	Handling/ Dozing of external OB Dump in to mine void	88.66	1680.90
	Bio-reclamation including soil spreading, plantation and maintenance	0.40	7.58
E	Landscaping		
	Landscaping of the clear land for improving its esthetic	0.30	5.69

S! NO.	ACTIVITY	% OF TOTAL MINE CLOSURE COST	AMOUNT IN LAKH (RS.)
F	Plantation		and the second
	Plantation over area obtained after dismantling	0.50	9.48
	Plantation around the fencing	0.20	3.79
	Plantation over the cleared off external OB Dump	0.02	0.38
G	Monitoring/ Testing of paramaters for three years		
	Air Quality	0.22	4.17
	Water Quality	0.20	3.79
н	Enterpreneurship Development (Vocational/ skill development training for sustainable income of affected people	0.26	4.93
1	Miscellaneous and other mitigative measures	2.00	37.92
J	Manpower cost for supervision	0.80	15.17
	TOTAL	100.00	1895.90

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Time Schedule

The closure of mines evolves environmental, technical, social aspect and financial assurance for implementing the post closure activities as per guidelines of Ministry of Coal. The post closure implementing activities will run for three years. The following activities will be implemented as per bar chart.

S.N	Activities	Time Frame	Half Y	early				
	Activities		1	2	3	4	5	6
1,	Preparation of Survey & Disposal Report	1 month						
2.	Slope Stability study for high walls and internal backfilled dumps	1 month					Section 2	
3.	Disposal of P&M including HEMM, CHP, W/S, Siding	2 and half years						
4.	Backfilling of mined out Area (OC)	2 years						
5.	Dismantling of Industrial structure	2 years						
6.	Grading & dozing of high walls for OC	2 years						_
7.	Fencing of quarry	2 years		1. A. A.			-	-
8.	Clearing of Coal Stock and Infrastructural Area.	2 years					-	
9.	Disposal / Dismantling of Residential colony	2 &1/2 years						-
10.	Plantation & landscaping on backfilled area.	3 years						
11.	Plantation over cleaned land of Infrastructure.	from 2 nd year						No.
12.	Environmental Monitoring	3 years						-

The manpower for implementing the above activities with time bound manner have been provided in the subsequent chapter with cost details.

NOTE : The progressive mine closure will be done as per the calendar plan of the OC project for technical and biological reclamation of dumps and internal voids.

CENTRAL COALFIELDS LIMITED DARBHANGA HOUSE: RANCHI

Sub: Forwarding Minutes of the 385th (No.2 of 2012) Meeting of the Board of Directors held on 24.02.2012.

Extracts from the minutes of the above meeting, in respect of following item, is appended below.

Item No.4(16): Proposal seeking approval of Mine Closure Plan of 15 Projects of CCL (Financial assurance).

The Board noted that the "Mine Closure Plans" for 15 mines have been prepared as per the guidelines issued by Ministry of Coal, Government of India.

The Board further noted the following-

- For financial assurance for mine closure, CCL shall open an Escrow Account with any scheduled bank, with the Coal Controller Organization (on behalf of the Central Govt.) as exclusive beneficiary.
- When implementation of the final mine closure scheme is undertaken by the mine owner starting five years before the scheduled closure of mining operations, the Coal Controller may permit withdrawals (4 years before final mine closure date) from the Escrow Account proportionate to the quantum of work carried out, as reimbursement.
- The withdrawn amount each year shall not exceed 20% of the total amount deposited in the account.
- The corpus for mine closure has to be generated as per this guideline @ ₹ 1.0 Lakh / Ha of lease area in case of underground mines & ₹ 6.0 Lakh / Ha of lease area in case of opencast mines.
- The base date for this rate is August, 2009 which has to be escalated at the time of preparation of mine closure plan on the basis of Wholesale Price Index issued from Ministry Of Finance from time to time.
- Annual closure cost is to be computed considering the total leasehold area at the above mentioned rates (evaluated at the time of preparation of mine closure plan on the basis current WPI) and dividing the same by the balance life of the mine in case of operating / existing mines. An amount to the annual cost is to be deposited each year throughout the life of the mine compounded @5% annually.

Keeping in view of the above, after detailed deliberation, the Board approved the 1 oposal as brought out in the agenda, of Mine Closure Plans of following 15 mines with corresponding funds as mentioned below to facilitate generation of fund for Escrow Account with Coal Controller Organization on behalf of the Central Government-

	Name of Projects	Proposed fund for Mine Closure (Cumulative) (in ₹ Lakh)
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6	Govindpur P-II CP	3111.92
7	KDH OCP	7818.80
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9	Karo OCP	9742.16
10	Rohini OCP	2227.26
11	Piparwar OCP	
12	Tetariakhar OCP	1895.90
13	Dakra OCP	2395.86
14	Tapin OCP	3345.78
15	Churi-Benti UGP	1164.10
	GRAND TOTAL	72552.47

(₹ Seven Twenty Five Crore Fifty Lac & Forty Seven Thousand only)

The CGM (P&P) in consultation with the Finance department of CCL shall take necessary action in this regard.

It is requested kindly to take necessary action on the decision, wherever necessary, under intimation to this office.

1/3/12

(C.V.N. Gangaram) Company Secretary

GM(E&P)

U.O.No.CS/BM/385/2012/ 193

Date: 01-03-2012

भारत INDIA 001100 INDIA NON JUDICIAL

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AMENDED AGREEMENT

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ONE

HUNDRED RUPEES

ESCROW ACCOUNT AGREEMENT BETWEEN

Central Coalfields Limited (Coal Mining Company) for its Tetariakhar OCP (Name of Coal Block/Mine) with Coal Controller's Organization & Bank.

This Escrow Account Agreement is made at Kolkata on 5 day of August 2013 amongst

1) Central Coalfields Limited (a company registered under the Indian Companies Act, 1956 having its registered office at Darbhanga House, Ranchi - 834001 and branch office at , hereinafter called a mining company or lessee or mine owner which expression shall unless repugnant to the subject or context thereof includes, its successors and permitted assigns.

AND

2) Coal Controller's Organisation, Government of India, Ministry of Coal having its office at 1, Council House Street, Kolkata, and branch office at Dhanbad, Ranchi, Bilaspur, Nagpur, Kothagudam, Sambalpur & Asansol hereinafter called the Coal Controller's Organization which expression shall unless repugnant to the subject or context thereof include its, successors and permitted assigns.

AND

3) United Bank of India, a body corporate constituted under the Banking Companies (Acquisition & Transfer of Undertakings Act, 1970) having its H.O. at 11, Hemanta Basu Sarani, Kolkata-700001 & Branch Office at Ranchi Branch, Post Box No.94, Main Roud, Ranchi - 834001 hereinafter called the "Escrow Agent" which expression shall, unless repugnant to the subject or context thereof include its, successors and assigns.

Each of the parties mentioned hereinabove, hereinafter collectively referred to as parties and individually as party.

TRAL COALFIEL DARBHANGA HOU. RANCHE

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कते. युनाइटेड येंक औफ इंडिया For & on behalf of For UNITED BANK OF INDIA सौंची साखा/Ranchi Branch

Asst. General Mahager

新, 新闻·新闻·A WHAT DOWNER CONTRACTOR TH HEAT / Government of India कोपला भयामय/Ministry of Coal भारतनिसल शाउस स्ट्रीट/ 1. Council House Siree winterm-gougot / Kolkata - 700 001

Whereas :

- As per the guidelines of the Ministry of Coal, Government of India all Coal Mine owners who are operating Coal Mines are required to obtain a Mine Closure Plan within a period of One year from the day when the original guidelines came into effect (i.e. 27th August, 2009) and from the date of publishing of the amended guidelines i.e. 7th January, 2013 for those mine owners who have not yet complied to the same failing which the Government will take action as appropriate.
- 2) The Coal Mine Owners who have been accorded approval of mining Plan/Project Reports without the Mine Closure Plans as per the guidelines framed by the Ministry of Coal, Govt. of India, are required to prepare and obtain the approval of Mine Closure Plan as per guidelines of the said Ministry of Coal, Government of India, within a period of one year of the day when the original guidelines coming into effect (i.e. 27th August, 2009).
- 3) The money to be deposited every year by the said Mining Company is the annual Mine closure cost as approved by the Ministry of Coal and which is to be verified by the Coal Controller's Organization as per the guidelines of the Ministry of Coal, Govt. of Incia, (at the price level of August, 2009 which will be reviewed on the basis of the wholesale price index) on a yearly basis in the Escrow A/c to be opened by the said Coal Mine owners with any Scheduled Bank with Coal Controller's Organization (on behalf of the Central Government) as exclusive beneficiary as per the guidelines of the Ministry of Coal.
- 4) Up to 80% of the total deposited amount including interest accrued in the Escrow Account may be released after every 5 years in the line with the periodic examination of the closure plan as per clause 3.1 of the annexure of the guidelines. The amount released should be equal to the expenditure incurred in the Progressive Mine Closure in the past 5 years or 80% whichever is less. The belance amount at the end of the Final Mine Closure shall be released to the Mine Owners/Leaseholder on compliance of all provisions of closure plan duly signed by the Lessee to the effect that said closure of mine complied all statutory rules, regulations, orders made by the Central or State Government, statutory organizations, court etc. and duly certified by the Coal Controller.
 - The Coal Controller has reasonable grounds for believing that the protective, reclamation and respective of the end of the approved mine closure plan in respect of which financial was given has not been or will not be carried out in accordance with mine closure plan, or partially, the Coal controller shall give the mine owner a written notice of his intention to be carried at least thirty days prior to the date of the order to be content of the beard.
 - details of terms and conditions of opening and operating the Escrow Access the details of terms and conditions of opening and operating the Escrow Back for giving effect to the same.
 - 7) Parties now have agreed to establish an Escrow Account/Arrangements and engage an Escrow Agent to act in connection with the said deposits and withdrawal in the said Escrow account on the terms and conditions contained herein.

Whereas Central Coalfields Limited Company, (the Mining Company) has approached United Bank of India, a scheduled Bank under Schedule II of the RBI Act, 1934 for opening such Escrow Accounts and United Bank of India has agreed for the same.

COALFIEL .

बुले, युनाइटेड बैंक ऑफ इंडिया For & on behalf of For UNITED BANK OF INDIA रीवी साखा/Ranchi Bragh

Assit. General Manager

M. month ACHINEYA

योगांगा निराज / Goar Contrate भारत घरवार / Government of India कायमा मंद्राराय/Ministry of Coal 1. भारतनिस्त हाडम स्ट्रीट/ 1. Council House Street अभाषपात-13Accet / Kolkata - 700 001

NOW, IT IS HEREBY AGREED BY AND AMONGST THE PARTIES AS FOLLOWS:

Appointment of Escrow Agent:

The parties (Other than the Escrow Agent) hereby appoint United Bank of India, as Escrow Agent to act subject to and in accordance with the terms and conditions set out in this sgreement.

The Escrow Agent shall not be personally liable in any manner whatsoever to any party for any acts it may do or omit to do hereunder as Escrow Agent or for any loss, harm, damage cost or expenses of any kinds suffered by any person, party or entity as a consequence of the action or inaction of the Escrow Agent other than for its gross negligence or willful disregards of the terms of the agreements.

- In its performance of its duties under this agreement, the Escrew Agent shall be entitled to rely upon any documents, instruments, or signature believed by it in good faith to be genuine & signed by an authorized signatory of any parties hereto and shall not be required to investigate the truth or accuracy of any statement contained in such document or instrument. The Escrew Agent may assume that any person purporting to give any notice in accordance with the provision hereof has been duly authorized to do so.
- The party shall jointly and severally indemnify & hold harmless the Escrow Agent from and against all claims, actions, demands, liabilities, proceedings or judgments which the Escrow Agent may incur or suffer or may be brought against Escrow Agent and from and against all losses, costs, charges, liabilities, and expenses reasonably incurred in connection with the performance by the Escrow Agent of its duties under or in connection with this agreement save where there is gross negligence or willful misconduct or willful disregard of the terms of this agreement and the part of the Escrow Agent.
- The Escrow Agent will act in terms of the agreement, only if sufficient funds are available in the escrow account for discharging its obligation as Escrow Agent.

Establishment of Escrow Account

- The Mining Company shall open an Escrow Account (Fixed Deposit, any type) with United Bank of India(Bank name) under the title "Mine-Closure Escrow A/c No.0059101073863", the Coal Controller's Organization being the exclusive beneficiary. The Coal Controller will have the authority to write to the Bank to freeze operation in the said Escrow A/c without the concurrence of the mining company & the said decision of the Coal Controller will be binding on the mining company and mining company cannot have any objection on the same.
- The opening, operation of Escrow Account, deposit and withdrawal of money from the said account shall be in accordance with this agreement.
- iii) The parties agree(other than the Escrow Agent) that all rights, title and interest in and to the Escrow Account shall be vested in the Escrow Agent and shall be in trust for the parties.
- iv)

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The Escrow Account will be operated as per direction of Coal Controller by the authorized

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कृते. युनाइटेड³बॅंक ऑफ इंडिया For & on behalf of For UNITED BANK OF INDIA रॉवी शाखा/Ranch Branch

सम्बद्ध महाप्रबंधक Asstt. General Manager

র, রাম্বি', A CHARYA ভাষেল: দিয়েজ/ Coal Controller খাবল মসকল / Government of India ভাষিল: মহাকাশ/Ministry of Coal t, জাহনিলে হারম মন্টার/1, Counci House Street ফালফালো-Govert / Kolkata - 700.001

signatories of the Company.

For any avoidance of the doubts it is made clear that all money held by the Escrow Agent/Designated Bank shall not be considered as part of the personal assets of the Escrow Agent/Designated Bank.

vi) In the event of any deviation in the withdrawals, the parties shall communicate the same in writing to the Escrow Agent.

vii) Tax will be deducted at source as per Income Tax Act. Without discontinuing Mine Escrow Account till the life of the mine, the total deposited amount including interest in Escrow Account will be renewed / reinvested after three years and this amount may continue with same bank or other bank as selected by mining company in consultation with Coal Controller. Up to 80% of the total deposited amount including interest accrued in the Escrow Account may be released after every 5 years in the line with the periodic examination of the closure plan as per clause 3.1 of the annexure of the guidelines. The amount released should be equal to the expenditure incurred in the Progressive Mine Closure in the past 5 years or 80% whichever is less. The balance amount at the end of the Final Mine Closure shall be released to the Mine Owners/Leaseholder on compliance of all provisions of closure plan duly signed by the Lessee to the effect that said closure of mine complied all statutory rules, regulations, orders made by the Central or State Government, statutory organizations, court etc. and duly certified by the Coal Controller.

viii) Funds: Interest will be paid at the offered rate at the time of opening the Escrow Account.

ix) Income Tax: Tax will be deducted at source as per Income Tax Act. The Mining Company shall not charge the funds kept in the term deposits in escrow accounts by way of assignment / lien / hypothecation to secure any loan/advance/credit facilities taken / to be taken by the mining Company. The deposits created out of funds of Escrow account automatically be renewed for a further period of one year on due date if the Escrow Agent do not receive any instruction from the Coal Controller to the contrary.

Operation of Escrow Account,

Deposit

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The Escrow Account shall continue as a debit freeze account subject to withdrawal of 80% of total deposited amount including interest accrued in the Escrow Account after 5 years of every deposit in line with the periodic examination of the closure plan. The balance amount shall be released to the mine owner/leaseholder at the end of the final Mine Closure on compliance of all provision of closure Plan.

The Central Coalfields Limited (Mining Company) shall cause deposit in such "Escrow Account" in the following manner on yearly basis as would be communicated by the Coal Controller from time to time to it.

a) The payment shall be made by RTGS/NEFT/DEMAND DRAFT/PAY ORDER.

कृते, युनाइटेड बैंक ऑफ इंडिया For & on behalf of For UNITED BANK OF INDIA

रोंची शाखा/Ranchi Branch

राहायक महाप्रश्वभूष

Asstl. General Maham

- b) Around Six lakhs per hectare of the total project area in case of OC mines at current price level (August, 2009) subject to modification based on the wholesale price Index (WPI) as notified by the Government of India from time to time.
- c) One lakh per hectare for UG project area, at current price level of (August, 2009) subject to modification based on the wholesale price Index as notified by the Government of

M. MENGA, ACHARCIA where Friday/Coal Controller भारत सरमार / Government of India कोयला यंत्रालय/Ministry of Coal , फाउन्सिल साउस स्ट्रीप्ट/1, Council House Street minument-uponest / Knikats - 705 001

India from time to time.

- d) Annual Closure Cost is to be computed on the total Project Area over and above the aforesaid rate per hectare and dividing the same by the entire life of the mine in years for new projects and balance life of mine in years for operating /existing mines is to be deposited each year by the said company (Central Coalfields Limited, the mining company) throughout the life of the mine compounded at the rate of 5% annually.
- e) An amount equal to the annual cost is to be deposited each year throughout the life of the mine compounded at the rate of 5% annually.
- f) Mine closure plan which have already been approved earlier on the basis of lease hold area, the project proponents are required to recalculate the closure cost on the basis of total project area and submit a certificate stating that amount in Escrow Account would be deposited as per re-calculated amount.
- g) The Closure Cost may change subject to Government of India's Notification from time to time.
- h) If the Mine owners fail to deposit the annual amount required to be deposited, the Government can withdraw the mining permission.
- i) It is to be clearly understood that the fund so generated are towards the security to cover the cost of closure in case the mine owner fails to complete the relevant closure activities, The prime responsibility of mine closure shall always lie with the mine owner, and in case the funds so generated are found to be insufficient to cover the cost of final mine closure, the mine owner shall undertake to provide the additional fund equivalent to the gap in funding before five years of Mine Closure failing which it may be recovered by such other methods as the competent authority may deem fit in this regard.

Withdrawal.

Withdrawal/transfer from Escrow Account shall be in accordance with the water fall mentioned herein below:

- (1) To allow the mine owners by way of reimbursement up to 80% of the total deposited amount including interest accrued in the Escrow Account after every 5 years of every deposit in line with the periodic examination of the closure plan as per clause 3.1 of the Annexure of the Guidelines.
- 2) The balance amount shall be released to mine owner/lease holder at the end of the final mine Closure on compliance of all provision of closure plan. The compliance report should be duly signed by the lessee and certify that the said closure of mine complied all statutory rules, regulations, orders made by the Central or State Government, statutory organizations, court etc. and certified by the Coal Controller. Provided that if all the above criteria is not completed within the period specified in mine closure plan the amount in the Encrow Account shall be forfeited.

Duties of Escrow Agent

Escrow Agent shall:

Keep proper books of accounts relating to Escrow Account maintained by the

Provide Statement of Accounts to the parties at such frequencies which will be evolved by consensus amongst the Central Coalfields Limited (mining company),

SCHEMAN

कृते, युनाइटेड बैंक औफ इंडिया For & on behalf of For UNITED BANK OF INDIA रीवी शाखा/Ranch Branch सहायक महायसंधिक Asatt. General Manager

the Coal Controller's Organization and Escrow Agent.

Not to allow any payment out of the Escrow account in respect of money deposited without the approval of the Coal Controller's Organization except in the manner stated hereinabove.

iv) Act in accordance with the agreement.

Irrevocably and absolutely waive all present and future rights to make or exercise any claims or demands, any rights of counter-claim, lien/set-off and all other present or future rights against the balance amount standing to the credit of the Escrow account, to make any withholding or balancing of any accounts or to effect any transfers without the approval of the Coal Controller's Organisation.

 Vi) Irrevocably and absolutely waive all present and future rights to combine or consolidate any other non-Escrow Account of any offices anywhere with the Escrow Agent or the designated Bank.

vii) As promptly, as is reasonably practical, after receipt of any reasonable written request from the parties provide such information to such parties regarding the amounts available in the Escrow Accounts and balances there under.

Termination/Resignation of Escrow Agent.

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- The obligation of the Escrow Agent under this agreement shall end on the final payment of the amount under the aforesaid scheme.
- ii) The Escrow Agent may resign from its appointment as an Escrow Agent subject to the Escrow Agent giving 30 Business days prior notice in writing to the other parties. The Escrow Agent shall deal with the Escrow Account in accordance with the provisions of the Escrow Agreement and continue to be bound by the terms and conditions hereof until the Coal Controller's Organization identify a successor.
 - The Escrow Agent may be removed by the Coal Controller' Organisation on giving 30 days notice to the Escrow Agent. In case the Coal Controller's Organization fails to identify a successor Escrow Agent within the above-mentioned 30 days', the Escrow Agent, United Bank of India(Bank Name), shall by itself appoint a successor as Escrow Agent.
 - If the Escrow Agent resigns or removed in accordance with the agreement, then Coal Controller's Organisation shall appoint a successor as Escrow Agent in consultation with the Coal Mining Company.
 - If the Escrow Agent resigns or is replaced pursuan to this agreement, such Escrow Agent shall do all necessary acts for the transfer of the Escrow account to the successor Escrow Agent.
 - The fees for the service rendered if any by the Escrow Agent shall be in accordance with the letter to be exchanged between the Escrow Agent, the Coal Controller's Organisation and Coal Mining Company.

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कृते, युनाइटेड र्स्ता ऑफ इंडिया For & on behalf of For UNITED BANK OF INDIA राजी शाखा/Ranchi Branch

RESIZION METURISIUN Asstt. General Manade

থা, ১০খন ৬, ১৫ চন্ট্ৰাইশ্ব ভাষায় সিৰ্বাগত/ Cosi Consuler থালে মাজেন / Government of India -ভাষালে পালপন/Ministry of Cost ভাইলিক নাহন, মৃতি/ 5, Council House Street জীৱনিক নাহন, মৃতি/ 5, Council House Street

Amendment of the Agreement

i)

This agreement may be altered, amended, modified or revoked by an instrument in writing signed in original by Coal Controller as and when required.

All notices or other communications to be given under this agreement shall be made in writing to:

- Central Coalfields Limited (Mining Company), Address. Darbhanga House, Ranchi -834001 Tel: 0651-2360123/0606/5998 Fax: 0651-2360012
- ii) Coal Controller Organization, Address. 1, Council House Street, Kolkata. Tel: 033-22489613-16 Fax:03322482459
- United Bank of India, Address. Ranchi Branch, Post Box No. 94, Main Road. Ranchi-834001 Tel: 0651-2204266/3320 Fax:0651-2204266

Governing Law & Jurisdiction

 This agreement shall be governed by and interpreted in accordance with Indian Law and shall be subject to the exclusive jurisdiction of the courts at Kolkata.

Whole Agreement & Variation

This agreement together with the schedules hereto contains the whole agreement between the parties relating to the rights and obligations in relation to the subject matter of the agreement.

Invalidity

i)

If any term or provision in this agreement is held to be illegal or unenforceable in whole or in part, under any enactment or rule of law, such term or provision or part to that extent will be deemed not to form part of this agreement, but the enforceability of the remainder of the agreement will not be affected.

Counterparts

i).

This agreement may be entered into in any number of counterparts and the parties of it on separate counterpart each of which when so executed and delivered will be in original, but all the counterparts will together constitute one and the same instrument.

No Waiver

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अ. आर्वाचे A. ACHARYA अवस्ता शिववार/ Cost Controlor अग्रेस सरकार / Government of India कोधमा मंबारग/Monstry of Cost काइन्सिम हावस स्ट्रीट/ 1, Counce House St वोस्वियाम-Generot / Kokate - 700.001

कृते, युनाइटेड येक ऑफ इंडिया For & on behalf of For UNITED BANK OF INDIA राँची शाखा/Ranchi Branch

राहायक महाप्रमध्य Asstt. General Manager

No failure to exercise or delay in exercising any right or remedy inder this agreement by any party will operate as a waiver of any other right or remedy hereunder, nor will any single or partial exercise of such right or remedy preclude any further exercise thereof or of any other right or remedy which such party may have in this agreement.

Rights Cumulative

 The rights and remedies provided herein are cumulative and not exclusive of any rights and remedies provided by law in equity or otherwise.

Rights of Third Parties

i)

i)

For the avoidance of doubts, this agreement does not and shall not confer rights upon a person which is not a party to this agreement.

In witness of which the parties have executed the agreement on _______ day of Arc___ 2013 as mentioned above.

SIGNED AND THE IVERED BY

(Central Coalfields Limited)

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By Name: P.K Guin Designation: CGM(Project and Planning)

SIGNED AND DELIVERED BY

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Name: Designation:

SIGNED AND DELIVERED BY

(United Bank of India)

By Name : **3.** S. R. Designation :

कृते. युनाइटेड वैंक ऑफ इंडिया For & on behalf of For UNITED BANK OF INDIA रांधी शाखा/Rands Branch

शहावक महाप्रबंधेक Asstit. General Manager

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चेंद्र, गुप्सी / K. GUPTA. इर स्टारक कार्यन नियम / Dy Aret Goal Controller भारत कार्यना / Goal, cf Soda कोर्यन निर्देश रहा निर्म / Dr Coal Controller र साई किल्ल रहा निर्म / D. Change Houre Street कोलकार-700.001 / Kolkata-700.001

S. p. 14 1 LSAN मुख्य प्रबंधक / CHIEF MANAGER क्रियज्ज्ज्ज्ज् किमाजा / Marketing Dept. युपाइटेड देव जोज इंडिया, प्र.का. UNITED BANK OF POIA, H.O.


PRE-MINING LAND USE OF LEASE AREA

2	Ha	re 141.74	0.85	2.60	12.54	47.74	LY OUC
Particular		Agricultur	Forest	Nala	Mining	Others	Tota

LAND USE OF TETARIAKHAR OCP DURING MINING

1 Correst Land Govt/ Tenancy 1 Quarry - 108.57 108.57 2 External OB Dump - 108.57 108.57 3 W/S, CHP & Office - 117.11 117.11 4 Nala - 5.60 5.60 5 Haul Road 0.71 12.00 12.71 6 Green Belt - 15.35 15.35 7 Safety Zone 0.14 1.76 1.90 TOTAL 0.85 207.62 208.47	SI no	Details of land use	Ownershi	o of Land	Area in Ha.
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3 W/S, CHP & Office - 11.71 34.34 4 Nala - 11.71 11.71 11.71 4 Nala - 5.60 5.60 5.60 5 Haul Road 0.71 12.00 12.71 6 Green Belt - 15.35 15.35 7 Safety Zone 0.14 1.76 1.90 TOTAL 0.85 207.62 208.47	2	External OB Dump		54 24	10.001
4 Nala - 5.60 7.71 7 Safety Zone 0.14 1.76 1.5.35 15.35 15.35 7 508.47 TOTAL 0.85 207.62 207.62 208.47 208.47	3	W/S, CHP & Office		11.71	14 74
5 Haul Road 0.71 12.00 5.00 6 Green Belt - 15.35 15.35 7 Safety Zone 0.14 1.76 1.90 7 TOTAL 0.85 207.62 208.47	4	Nala •		5.60	E ED
6 Green Belt - 15.35 15.35 7 Safety Zone 0.14 1.76 1.90 TOTAL 0.85 207.62 208.47	5	Haul Road	0.71	12.00	10.0
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TOTAL 0.85 207.62 208.47	7	Safety Zone	0.14	1.76	1 00
		TOTAL	0.85	207.62	208.47



CONCEPTUAL POST MINING LAND USE OF CORE ZONE

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Nala 5.60 Total 208.47	Plantation	24.61	
Total 208 47	Nala	5.60	•
	Total	208.47	4

REVISED REPORT

ON

FAUNA STUDY AND SITE SPECIFIC CONSERVATION PLAN

FOR HYAENA

IN

CORE & BUFFER ZONES OF

TETARIAKHAR OC PROJECT IN RAJHARA AREA OF

CENTRAL COALFIELDS LIMITED

AUGUST 2012

PREPARED BY:

INSTITUTE OF FOREST PRODUCTIVITY, INDIAN COUNCIL OF FORESTRY RESEARCH & EDUCATION, GUMLA NATIONAL HIGHWAY, RANCHI 834023

JHARKHAND

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1.0 INTRODUCTION

1.1 BACKGROUND

Tetariakhar Opencast Mine Project is an existing coal mining project of Central Coalfields Limited which is going to be expanded from 0.50 MTPA to nominal capacity 2.00 MTPA and peak capacity 2.50 MTPA. This project is located in Tetariakhar in village Bahera, Block – Balumath, District - Latehar , Jharkhand. The project proponents had applied for environmental clearance of this project to MOEF, New Delhi. One of the conditions of the EAC Committee of Ministry of Environment & Forest, Govt of India was to submit conservation plans of Hyaena, Wolf and Vulture. The EAC meetings and other requirements of environment clearance has been completed.

Institute Of Forest Productivity submitted three Conservation Plans in August, 2010 in respect of Hyaena, Wolf & Vulture in study area of Tetariakhar OCP of Central Coalfields Limited.

The reports were submitted to MoEF, GOI, New Delhi initially in 2010 and again 2012 which was subsequently forwarded to Wildlife Institute Of India, Dehradun in July, 2012 for their comments. The Dean, Wildlife Institute Of India (WII) submitted his comments vide letter number WII/Dean/MoEF_EAC(Coal & Thermal)/92/2010 Dated 02.08.2012.

This report has been revised with incorporation of additional information and clarifications based on the comments of Dean, Wildlife Institute Of India (WII) vide his letter number WII / Dean / MoEF_EAC(Coal & Thermal) / 92 / 2010 Dated 02.08.2012 have been covered in this report.

1.2 Mining Project Description

The mine has been designed to produce at the rate of 2.00 MTPA (with peak capacity of 2.50 MTPA) for project life of 11 years. The project is located in northeastern part of North Karanpura Coalfield in Tetariakhar village of Balumath block, Ranchi District

of Jharkhand State. It lies between latitudes 23° 47^{\prime} $57^{\prime\prime}$. N to 23° 48^{\prime} $45^{\prime\prime}$ N and longitudes of $84^{\circ}50^{\prime}$ $27^{\prime\prime}$ E. to $84^{\circ}51^{\prime}$ $14^{\prime\prime}$ E. The specific location of Tetariakhar OCP in the State, District has been shown in Plate-I.

The Tetariakhar OCP, in general is having flat topography with the general elevation ranging from 488m to 510m. The undulating to rolling topographic features have been well developed to the north of Tetarikhar village where incrop of seams are projected below detritalmantle/alluvium.

Tetariakhar project is surrounded by two meandering southerly flowing fairly large streams i.e. Bhutha Nala in the east and Mukhar Nalain the west. These two nalas join in the south east of the sector to form Ramghat River.

2.0 General Information on Hyaena:

The striped (hyaena hyaena) is an omnivorous mammal of the family hyaenidae. It is found in Africa the middle East, Pakistan and India. Striped Hyenas are largely scavengers, but will also eat small animals, fruit and insects. Larger subspecies are known to hunt animals as large as wild boar. They are nomadic, moving from water hole to water hole, but never straying more than 10 km from one site. Striped hyenas hunt in solitude but do congregate in small family groups. Like many other animals of hot climates, their ears radiate heat. The striped hyena lives in the tropical savanna, grasslands, semi-desert, scrub forest, and woodland.

Conservation Status:

Hyaena is endangered as per Wildlife (Protection) Act, 1972 as Schedule-I animal.

Scientific Classification:

Kingdom	:	Animalia
Phylum	:	Chordata
Class	:	Mammalia
Order	:	Carnivora
Family	:	Hyaenidae
Genus	:	Hyaena
Species	:	H. Hyaena
Sub. Species	:	H.h. hyaena (Linn.)

Description:

The striped hyena is the second largest hyena species, being intermediate in size to the spotted hyena and the brown hyena. Its skull is not as large as that of the brown hyena, and its dentition less robust, indicating more generalized dietary adaptations.

- (a) It is a medium sized animal with a downward sloping back and a roundish head with a pointed muzzle and pointed ears.
- (b) It is generally pale gray or brownish/beige in colour with a black patch on the throat.
- (c) It sports distinct vertical stripes on the flanks, with clearer black transverse and horizontal stripes on the legs. A seasonal dimorphism in pelt colour is noticeable; the stripes of the summer coat are much blacker and better defined than in the winter coat.
- (d) The mid-dorsal line has a mane which can be held erect making it appear bigger, which it does when it feels threatened. The mane serves as a signaling device during social interactions.
- (e) It has a long, bushy tail which is black and white in colour, with long, coarse hair.
- (f) Four toes with short, blunt non-retractable claws are present on the feet.
- (g) Males weigh between 26-41 kilograms, while females weigh 26-34 kg.
- (h) Excluding the tail total body length varies between 1.0 and 1.15 m.
- (i) Shoulder height is between 0.66 and 0.75 m.
- (j) Striped hyenas have scent glands resembling fairly large, hairless pouches which are located at the opening of the anus.

Conflicts:

The effects striped hyenas have on livestock vary according to region. There are reports of few attacks, with some accounts describing how hyenas crossed through pastures without even spooking the grazing herds. Surveys indicate that goat, sheep dogs pigs and poultry are the most commonly recorded livestock killed by striped hyenas. There are records of hyenas eating larger animals, though it is unclear if said cases were truly kills or scavenging mistakenly identified as kills. The age and health of targeted individuals of larger livestock animals are unclear, though records suggest that attacks typically occur at low frequencies. Livestock damage reputedly occurs in greater frequencies in India. Dogs are the most commonly targeted animals in India.

The sugarcane crops sweet potato crops watermelons crops are frequently raided by hyenas in central India. They were seen eating the fruits Mangoes also.

Attack On Humans:

There are no reports oh attack of Hyaena on hHuman population in this part of Jharkhand, although there are historical reports in other parts of the Country.

3.0 Baseline Survey

3.1 Forest & Land Use

The core zone is defined as the area where mining operations shall take place. In this case the leasehold area is 208.47 Ha only.

The buffer zone for Environment Impact Study is the area of 10 kms from the periphery of the mining area and this report shall refer to the core and buffer zones accordingly.

The study of Hyaena assessment was made at the site at Tetariakhar in core and buffer zone of the project. The core area consists mostly of barren and agricultural land and the tree cover is sparse. There is no forest land in core zone. Occasional scrub land/ weeds were found during the study. A satellite imagery map showing the detail of land use is given in this report. During our field visits, it was found that the Eastern part of the buffer zone extending to about 1 km with a width of about 250 metres. The presence of Hyaena or its den was not sighted in the core zone, but was reported in the buffer zone in 2005 during the baseline survey done by St Xavier's College, Ranchi which is now considered doubtful.

The baseline survey was initially done in 2005 by St Xavier's College, Ranchi wherein during the site visits, it was reported by the locals that Hyaenas were seen occasionally, but no sighting was done by St Xavier's College survey team. Further in 2010, Ms Ramkey Enterprises, Hyderabad carried out a repeat fauna baseline study wherein no incidence of Hyaena or its den was either sighted or reported by the local people. The presence of Hyaena is the core zone is not reported as per the survey. Our scientists also visited the site but no Hyaena was either reported or sighted.

The baseline data of other parameters like **land use** and forest is given below. There is no forest land in the core zone and land use of the core zone is follows:

Land use of Core zone

SI	Particulars	Ar	еа
No.		На	%
1	Agriculture & fallow land	133.41	63.99
2	Scrub land with sparse trees	52.04	24.96
3	Waste land	16.18	7.76
4	Grazing	0.00	0.00
5	Surface water bodies	3.44	1.65
6	Others (Mining)	3.40	1.63
	Total	208.47	100.00

There is no forest land found in the core zone. The status of land is either tenancy land or revenue land taken over under Coal Bearing area Act.

Buffer zone of 384.40 Sq Km area including core zone consists of rural settlements, small urban settlement like Balumath and forest area. The land is mainly scrubs land consisiting of small shrubs and weeds (52%) There are no other coal mines in the buffer zone. North Karanpura Coalfield consisting of a number of coal mining projects like Dakra, Churi Benti, Piparwar, Asok etc are out side the buffer zone. Altogether there are 34 villages in the buffer zone. Tow tributaries of Ramghat river i.e. Mukhar nala and Bhutiya nala flow along the boundary of Tetarikhar and are main drainage of the area.

Land use/cover class in buffer zone of Tetriakhar OCP			
Land Use	/cover Class	Are	а
Level -I	Level -II	Area in Km ²	%
(1) Sattlement	(i) Rural	4.60	1.20
(1) Settlement	Sub-total:	4.60	1.20
	(i) Dense Forest	46.91	12.20
(2) Vegetation Cover	(ii) Open Forest	76.34	19.86
	(iii) Scrub	200.31	52.11
	Sub-total:	323.56	84.17
	(i) Crop Land	4.39	1.14
(3)Agricultural Land	(ii) Fallow Land	41.05	10.68
	Sub-total:	45.44	11.82
(A) Wasteland	(i) Waste Upland	8.56	2.23
(4) Wasteland		8.56	2.23
(E) Mining Area	(i)Coal Quarry	0.04	0.01
	Sub-total:	0.04	0.01
(6) Water bodies	Water bodies	2.20	0.57
Total:		384.40	100.00

Table L 2

Analysis of the satellite data reveals that total area of vegetation cover in the buffer zone is 323.56 Km2; out of which 46.91 Km2 (12.20%) is the dense forest, 76.34 Km2 (19.86%) is the open forest and 200.31 Km2 (52.11%) is the scrubs.

A Study area map of the core zone and 10km area of the buffer zone (1: 50,000 scale) clearly delineating the major topographical features such as the land use, surface drainage of rivers/streams/nalas/canals, locations of human habitations, major constructions including railways, roads, pipelines, major industries/mines have been shown in this report in Map No I.

3.2 Survey on Status of faunal Species Including Hyaena

3.2.1 Methodology of Sampling:

Fauna studies were carried out during the month of Mar-June-2010, to assess the list of animal species that occur in the core zone and the buffer zone.

The entire mine lease area of Tetariakhar Opencast Project has been surveyed for enumeration of fauna. This area is described here after as the core zone. Within the core zone, all the locations were surveyed using restricted random sampling techniques. Within the 10km buffer zone, 10 sample areas of 10000 m2 each were chosen at random for study of fauna. For the purpose of calculation of Importance Value Indices (IVI) of the core zone, quadrant method was used for estimation of frequency and density while the cover was estimated by modified line intercept method. Sighting and remarks of the local inhabitants were taken into the survey in the field on several field visits.

A list of fauna species were prepared based on the data available and also with the reports of the earlier study done through CMPDI by ST Xavier's College, Ranchi and Ramky Enterprises, Hyderabad is given below.

3.2.2 Baseline Survey of Fauna

The baseline survey was initially done in 2005 by St Xavier's College, Ranchi wherein during the site visits, it was reported by the locals that Hyaenas were seen occasionally, nut no sighting was done by St Xavier's College survey team.

Further in 2010, Ms Ramky Enterprises, Hyderabad carried out a repeat fauna baseline study wherein no incidence of Hyaena was either sighted or reported by the local people. The presence of Hyaena is the core zone is not reported as per the survey. Our scientists also visited the site but no Hyaena was either reported or sighted.

Therefore, as per the survey done, there is no evidence of Hyaena in the core zone. There are only occasional reported cases of Hyaenas in the buffer zone, that too only in 2005 survey.

3.2.3 Study Team:

Rapid survey of terrestrial flora and fauna of the core zone and its environs extending up to a 10 km from the boundary of the core zone was carried out during the month of Mar-June, 2010, under the supervision and guidance of our experts Dr DS Srivastava, Secretary, Nature Conservation Society, Daltonganj and other scientists. The members of Ms Ramkey Enterprises were Prof. K.B.Reddy, Retired Professor of Environmental Biology and a senior consultant on flora, fauna and ecology for several major irrigation and hydroelectric projects and his team comprising of Sri Sai Chandra Sekhar, Zoologist, Sri R. Mohan Reddy, Plant Ecologist and U. Praveen, Environmental Engineer and senior consultants on flora, fauna and ecology.

3.2.4 Environmental Setting of the Study Area

There are no Reserve forests and ecologically sensitive areas such as biosphere reserves, national parks, wildlife sanctuaries and other protected area in and around the mine lease area.

3.2.5 Survey List of fauna in Core and Buffer Zone:

Checklist of vertebrate species other than birds either recorded or reported from the Core zone.

MAMMALS:

Latin Name	Common Name	WPA Schedule
Bandicota indica	Large bandicoot Rat	Schedule V
Funambulus palmarum	Three striped squirrel	Schedule IV
Golunda ellioti myothrix	Indian bush rat	Schedule IV
Lepus nigricollis	Indian hare	Schedule IV
Mus booduga	Common Indian field mouse	Schedule V
Mus musculus homeurus	Home Mouse	Schedule V
Mus musculus tytleri	Mouse	Schedule V
Nosokia indica indica	Bandicoot rat	Schedule V
Rattus rattus gangutrianus	Common Indian rat	Schedule V
Rattus rattus refescens	Common Indian rat	Schedule V
Suncus etruscus	Savi pygmy shrew	Schedule V
Suncus murinus	House shrew	Schedule V
AMPHIBIANS:		
Rana breviceps	Indian burrowing frog	Schedule IV
Rana cyanophlyctis	Skipper frog	Schedule IV
REPTILES:		
Calotes versicolor	Garden lizard	Schedule IV
Chrysopelea taprobanica	Tree Snake	Schedule IV
Dryphis nasutus	Whip Snake	Schedule IV
Echis carinatus	Saw scaled viper	Schedule IV
Enhydris enhydris	Dhondwa / Common smooth	Schedule IV
	Water snake	
Hemidactylus flaviviridis	Indian wall lizard	Schedule IV
Typhlops diardii	Giant Blind Snake	Schedule IV
Typhlops porrectus	Slender Blind Snake	Schedule IV

CORE ZONE Table F1

Checklist of vertebrate species other than birds either recorded or reported from the Buffer zone.

MAMMALS:

Latin Name	Common Name	WPA Schedule
Herpestes edwardsi	Indian gray mongoose	Schedule IV
Herpestes smithii	Ruddy mongoose	Schedule II
Paradoxurus hermaphroditus	Common Palm civet	Schedule II
Persbytes entellus	Black faced monkey	Schedule II
Sus scrofa	Wild pig	Schedule III
AMPHIBIANS:		
Rana breviceps	Indian burrowing frog	Schedule IV
Rana cyanophlyctis	Skipper frog	Schedule IV
Rana limnocharis	Indian cricket frog	Schedule IV
Rana tigrina	Indian Bull frog	Schedule IV
REPTILES:		
Chameleo zeylanicus	Chameleon	Schedule II
Chrysopelea taprobanica	Tree Snake	Schedule IV
Dryphis nasutus	Whip Snake	Schedule IV
Echis carinatus	Saw scaled viper	Schedule IV
Naja naja	Nag / Cobra	Schedule II
Ptyas mucosa	Dhaman / Indian Rat snake	Schedule II
Typhlops diardii	Giant Blind Snake	Schedule IV
Varanus bengalensis	Common Indian Monitor	Schedule II
Vipera ruselli	Russel viper	Schedule II

BUFFER ZONE Table F 2

List of birds either spotted or reported from the study area.

Table F 3

Latin Name	Common Name	WPA Schedule
Ceryle rudis	Lesser pied Kingfisher	Schedule IV
Columba livia	Blue rock pigeon	Schedule IV
Coracias benghalensis	Indian roller	Schedule IV
Corvus splendens	House crow	Schedule V
Dendrocitta vagabunda	Indian tree pie	Schedule IV
Dendrocopus marhatensis	Maratha Woodpecker	Schedule IV
Dicrurus macrocercus	Black drongo	Schedule IV
Egretta garzetta	Little egret	Schedule IV
Phalacrocorax carbo	Large Cormorant	Schedule IV
Phalacrocorax niger	Little cormorant	Schedule IV
Psittacula cyanocephala	Blossom headed Parakeet	Schedule IV
Psittacula krameri	Rose-Ringed Parakeet	Schedule IV
Pycnonotus cafer	Red-vented bulbul	Schedule IV
Saxicolodies fulicata	Indian robin	Schedule IV
Streptopelia chinensis	Spotted dove	Schedule IV
Sturnus contra	Pied myna	Schedule IV
Turdoides caudatus	Common babbler	Schedule IV

List of birds either spotted or reported from the buffer zone.

Table F 4

Latin Name	Common Name	WPA Schedule
Acridotheres tristis	Common myna	Schedule IV
Alcedo atthis	Small blue kingfisher	Schedule IV
Andeolv grayii	Pond heron	Schedule IV
Bubulcus ibis	Cattle Egret	Schedule IV

Latin Name	Common Name	WPA Schedule
Ceryle rudis	Lesser pied Kingfisher	Schedule IV
Columba livia	Blue rock pigeon	Schedule IV
Coracias benghalensis	Indian roller	Schedule IV
Corvus splendens	House crow	ScheduleV
Dendrocitta vagabunda	Indian tree pie	Schedule IV
Dendrocopus marhatensis	Maratha Woodpecker	Schedule IV
Dicrurus macrocercus	Black drongo	Schedule IV
Egretta garzetta	Little egret	Schedule IV
Phalacrocorax carbo	Large Cormorant	Schedule IV
Phalacrocorax niger	Little cormorant	Schedule IV
Psittacula cyanocephala	Blossom headed Parakeet	Schedule IV
Psittacula krameri	Rose-Ringed Parakeet	Schedule IV
Pycnonotus cafer	Red-vented bulbul	Schedule IV
Saxicolodies fulicata	Indian robin	Schedule IV
Streptopelia chinensis	Spotted dove	Schedule IV
Sturnus contra	Pied myna	Schedule IV
Sturnus pagodrum	Brahminy myna	Schedule IV
Turdoides caudatus	Common babbler	Schedule IV
Tyto alba	Barn owl	Schedule IV
Upupa epops	Common hoopoe	Schedule IV

3.3 Socio-Economic Study of the buffer zone

In order to determine project impact at the area level, socio-economic profile is an has been study for analyzing any impacts of wild life. Some of the important indicators like demographic growth rate, religious composition, caste composition, literacy, employment pattern etc. are have been studied in the project area and buffer zone of this project. There is only one village in the core zone where only 34 households were there, now only 5 houses are there which will shift from the core zone.

3.3.1 Physical setting of the project

Tetariakhar OCP project is situated in the Bahera Village of Balumath block in the district of Latehar falling in the state of Jharkhand. The Core zone is confined to only Tetariakhar tola of Bahera village. There are 34 villages in the buffer zone. List of villages is given below

Table S 1

SI.	Name of Village	SI.	Name of Village	SI.	Name of Village
No.		No.		No.	
1	Renchi	13	Kolpatia	25	Chamatu
2	Pipradih	14	komar	26	Hempur
3	Barikhap	15	Balumath	27	Samarost
4	Gurusalve	16	Chataug	28	Chitang
5	Barni	17	Kesiadih	29	Behera
6	Tundahatu	18	Mahutanr	30	Bisunpur
7	Rehea	19	Jilanga	31	Bishrampur
8	Mahuatoli	20	Okea	32	Barwadih
9	Cherra	21	Keri	33	Soparam
10	Karmahi	22	Kharatanr	34	Jogiyadih
11	Pukchu	23	Dandu		
12	Banio	24	Murpa		

Villages in Buffer Zone

3.3.2 The summarized details of population characteristics in the villages surveyed are enumerated below

Table S 2

Population Characteristics

SI. No.	Description	Total Study Area
1	Population	42473 (100%)
2	Male	21881 (51.52%)
3	Female	20592 (48.48%)
4	Scheduled Cast Population	12547 (29.54%)
5	Scheduled Tribe Population	10000 (23.54%)
6	Literates	13210 (31.10%)
7	Male Literates	9154 (21.55%)
8	Female Literates	4056 (9.55%)

3.3.3 Economic profile and Workforce pattern

The summarized details of workforce pattern of the villages surveyed is as mentioned below :

Table S3

Workforce Pattern

SI.No.	Description	Total study area, Percentage
		in bracket
1	Population	42473 (100%)
2	Total worker population	17655 (41.57%)
3	Main worker	8885 (20.92%)
4	Cultivators	4439(10.45%)
5	Agricultural labourers	2355 (5.54%)
6	Other worker	1748(4.12%)

The Census data reveals that 41.57% of the population is working population and rest 60.43% are non workers. 10.45.00% of population is cultivators supported by 5.54% agricultural labourers and other workers are mainly in household industries, mining, construction, transportation and other allied activities.

3.3.4 Basic and Civic amenities

The Basic and civic amenities available in the villages surveyed in the buffer zone are summarised below :-

Table S4

AMENITIES

SI.No.	Description	Total
1	EDUCATIONAL FACILITIES	
	Primary school	31
	Middle school	7
2	MEDICAL FACILITIES	4
3	DRINKING WATER	
	Well	41
	Tank	10
	Hand pump	41

3.3.5 PRIMARY DATA COLLECTION

The sample households have been selected by multi-stage sampling method. The Primary data has been collected from field through questionnaire, schedule, group discussion and interview. Village profile has been made with the help of information collected through interview guide. Caste information, economic activities and health status have been estimated based on the village profile questionnaire.

SECONDARY DATA

Secondary data has been collected from census report 2001, Statistical hand book and the District Gazetteer of Jharkhand.

SAMPLING

250 households have been randomly selected for sample from different villages. While deciding the number of sample households a minimum 20 houses and maximum 35 houses were interviewed.

DATA ANALYSIS

Simple Process of Ratio and Percentage Method has been used to analyze and compare primary data with census 2011. The house hold survey has been validated by the latest census report. On the basis of household sample survey, data analysis have been made about occupations, health aspects, community, income and expenditure pattern, family size and environmental problems of the study area.

Present status and validation of Households Data in Buffer zone

Seven villages have been taken for sample survey in the Buffer zone of the Tetariakhar OCP. According to Census there are 777 households. Out of them 230 households are taken for sample survey, consisting of 1255 individuals with 626 male and 629 females.

Family Size

The average family size is 5.45 in the sample survey and according to Census 2001, it is 5.41.

Community Representation

According to household survey the SC population is 504 while the ST population is 316. In the Census 2001 the population of SC is 1540 and ST 1040.

Literacy

So far as the literacy is concerned 222 persons are literates, out of which 163 male and 59 are females. According to Census 2001, 969 persons are literate out of which 726 are male and 243 are females.

Occupational Structure

The economic profile of the buffer zone suggests that the total working population is 581, in which 149 persons are main workers, 70 are cultivators, 62 persons are Agricultural labourers and 76 persons are in the category of other workers. According to Census 2001, total working population is 2049, 517 are main workers, 208 are cultivators, 137 are agricultural labourers and 168 are other workers.

Housing Pattern

Based on household survey the housing pattern is mixed type both kuccha and pakka are found.

Cropping Pattern

As per the household survey the main crops are rice and vegetables. The source of irrigation is rain water and few wells.

Educational Institutions

According to survey all the sample villages have primary schools. Some of them have Middle, Secondary and Senior Secondary schools in the Buffer zone.

Medical Facility

In most of the Buffer zone villages there is no medical centre but within five to ten km. there is hospital and other medical facilities available.

Power Supply

According to survey there is power supply in most of the villages of study area.

Transportations

In the Buffer zone villages the source of transportation is private vehicles and public vehicle like Jeeps and mini buses.

Historical and Archaeological site

No historical and archaeological site is found in the study area.

Population and average family size of the sample village.

Table S5

Population and average family size of the sample village.

SI.No.	Name of village	No.of Households	Total Population	Family Size
1	Pindarkom	40	238	5.95
2	Pukchu	30	172	5.73
3	Bari Khap	40	230	5.75
4	Goli	35	165	4.71
5	Bukru	45	234	5.2
6	Renchi	20	118	5.9
7	Barni	20	98	4.9
	Total	230	1255	5.45

Source: Sample survey result

Community Representation

Table below depicts the primary data of the total population and Schedule Caste and Schedule Tribes breakup of the sample villages.

Table S6

SC & ST Details

SI.	Name of village	No.of	Total	Schedule	Schedule
No.		Households	Population	Caste	Tribe
1	Pindarkom	40	238	70	00
2	Pukchu	30	172	04	113
3	Bari Khap	40	230	66	130
4	Goli	35	165	16	54
5	Bukru	45	234	162	11
6	Renchi	20	118	88	08
7	Barni	20	98	98	00
	Total	230	1255	504	316

LITERACY

Following Tables depict literacy level in the villages under survey.

SI.	Name of village	No. of	Total	Total	Literate	Literate
No.		Households	Population	Literates	Male	Feale
1	Pindarkom	40	238	41	31	10
2	Pukchu	30	172	20	16	04
3	Bari Khap	40	230	39	29	10
4	Goli	35	165	59	41	18
5	Bukru	45	234	40	25	15
6	Renchi	20	118	15	13	02
7	Barni	20	98	08	08	00
	Total	230	1255	222	163	59

Literacy Table S7

ECONOMIC PROFILE

The economic profile of the Buffer zone village has been shown in the table given below **Table S 8**

Economic Profile

SI.	Name of	No of.	Total	Total Work	Main	Cultivators	Agri.	Others
No.	village	Household	Populat	Population	workers		Labour	
			ion				er	
1	Pindarkom	40	238	126	20	07	10	06
2	Pukchu	30	172	103	47	17	28	55
3	Bari Khap	40	230	89	14	10	02	04
4	Goli	35	165	74	20	12	04	05
5	Bukru	45	234	72	14	09	02	04
6	Renchi	20	118	67	31	13	16	02
7	Barni	20	98	50	03	02	00	00
	Total	230	1255	581	149	70	62	76

ANNUAL FAMILY INCOME AND SOURCE OF INCOME

The survey is based upon Interview and response of the people to the questionnaire and schedule.

APPRC	APPROX ANNUAL INCOME IN RUPEES							F INCOME I	N %
SI No	Sample	House-	<20	20 Th.–	50 Th. – 1	> 1	Primary	Secondary	Tertiary
	village	hold	Th.	50Th.	Lac.	Lac			
1	Tetariakhar	20	5	7	6	2	25	65	10
2	Pindarkom	40	9	12	11	8	22.5	57.5	20
3	Pukchu	30	6	7	9	8	20	53.33	26.66
4	Bari Khap	40	5	14	13	8	12.5	67.5	20
5	Goli	35	5	12	10	8	14.28	62.85	22.85
6	Bukru	45	5	15	13	12	11.11	62.22	26.66
7	Renchi	20	5	7	6	2	25	65	10
8	Barni	20	4	8	7	1	20	75	5
	Total	250	44	82	75	49	17.6	62.8	19.6

INCOME DETAILS Table: S 9

Sample survey results.

The survey of flora (vegetation) is given in Annexure-I.

4.0 Site Specific Conservation Plan (Hyaena) :

The Map of Core Zone and buffer zone is given below is given below : (Map No I)





Google earth Image of Tetariakhar OCP with lease hold area (Map No II)

It is evident from the maps that in the core zone there is practically no forest and the area is mostly scrubs and waste land with some temporary agricultural land. The presence of Hyaena reported was nil in the buffer zone. The buffer zone consists of low and medium density forest land in the eastern side of the area and the evidence of Schedule IV fauna were found in the forest areas which are about 1-2 kms away from the mining area.

The Hyaena (Hyaena Hyaena) is not reported in core zone as well as buffer zone, as such, there is no impact due to mining activity. The conservation plan has been made to ensure that, if any Hyaenas are found in the buffer zone, in that case its care can be taken. The prey population for Hyaena is available in the buffer zone. Regular Status surveys shall be done to locate the Hyaenas in the buffer zone of the area. This shall be done through institutes / NGO s.

4.1 Compensation Payment:

There was no report of Hyaena in the core & buffer zone, therefore, the conservation plan is not necessary. However, since the initial survey of St Xavier's College, Ranchi had the reporting of the animal and the Ministry of Environment & Forest had advised to prepare the Conservation Plan, therefore, as a precautionary measure, this plan is being prepared. This may be required in future, if the presence is reported.

The Hyaenas may prey upon livestock/cattle in the buffer zone for which domesticated animals should be compensated with prompt payment at the market value. Although there is no reported case of Hyaena damaging or killing any cattle form the survey done in 10 villages of the buffer zone, but arrangement of fund has been made of exigencies or requirements which may come in future. Arrangement of funds in this account has been proposed in the conservation plan based on certain assumptions, like probable frequency of damage to domesticated animals / livestock which emerged while discussing with the villagers of the buffer zone. The estimates have been prepared accordingly. Fund provisioning for supplementary food for Hyaena has been estimated and suggested for the conservation plan. The village head shall look after the logistics of supplementary feeding, in case of reports of Hyaena's presence in any nearby area surrounding the village.

Estimate:

a. Estimate of Compensation for Loss of Domesticated Animals @ Rs 60,000 per year X 10 years= Rs 6.0 Lakh.

b. Estimate for arrangement of supplementary food provision for Hyaenas (@ Rs 1.40 Lakh per annum for 10 years)= Rs 14.0 Lakh

Total Rs 20.0 lakhs

4.2 Water Provision:

The water availability shall help the wild life and other animals to thrive in the area. This is not specific to any single species.

Provision of Rs 20.0 Lakh for creation of check dams, water holes etc for water provision (6 check dams, two each on Mukhar Nal & Bhutha Nala and one each on Keri Nala & Dhordhora Nala @ Rs 2.50 Lakh per site i.e. Rs 15.0 Lakh and 5 water holes, one each in Chetang, Rahia, Harhi Pahar, Bishnupur & Balbal @ Rs 1.0 Lakh per site i.e. Rs. 5.0 Lakh).= Total Rs. 20.0 Lakhs.

4.3 Protection of Breeding Sites

The breeding sites, if found, shall be protected under this conservation plan. For protection of specific breeding sites, preferably in hilly terrain and near water holes, special guard's posting for protection of these sites will be needed to ensure the safety of Hyaenas and cubs and also to the people. The fund provisioning has been suggested, in case, the breeding sites are found in the span of 10 years (during the mining period). The estimate has been prepared for all villages in the buffer zone so that the fund provision is made in the conservation plan.

Estimate: The cost of hiring local guards (from villages) and coordination @ Rs 5000 per month X 2 guards X 34 villages for an estimate of six months i.e. Rs 20.0 Lakh approximately. The total no of man months for guards as per fund provision are 400 @ Rs 5000 per month. This can be used as and when required in the villages.

4.4 Development of Habitat

The habitat development programme is to ensure the raising of grasses, useful shrubs, checking soil erosion, control of fire etc to develop the habitat for natural food availability to the Hyaenas. These activities shall be taken up in the forest areas of Chetang, Rahia, Harhi Pahar, Bishnupur & Balbal, where it is expected that

the habitat can support the Hyaenas in a better manner. Fund provision @ Rs 4.0 Lakh per area X 5 areas i.e. Rs 20.0 Lakh.

4.5 Health Care:

Provision of anti rabies medicines to each health center of the villages shall be provided in the buffer zone. At the village level this shall be managed through the mukhiya through the local health centre. There are 34 villages in the buffer zone, therefore the estimate is approximately Rs 1500 / village / year. Total cost for 10 years is approx Rs 5.0 lakhs.

4.6 Awareness & Research:

The local NGOs, youth clubs and forest department will be engaged for awareness programme on Hyaena conservation through schools and media in a big way to make general mass aware about the Hyaena as a predator and scavenger and its services to the eco system. This shall be done in 10 selected villages, spread across the buffer zone and the lump sum fund provision per village shall be Rs 2.0 lakhs. The list of selected villages is given below: Renchi, Bukru, Jala, Balumath, Komar, Pukchu, Barni ,Bari Khap, Bariatu &Nachna. The lump sum provision RS 20 lakhs.

4.7 Reclamation / Eco restoration in Mining areas

Bio-Reclamation / Afforestation shall be done in the Core zone to with creation of an all season water body with pisciculture which will improve the land use and biodiversity of the area. The plantation of about 2.7 lakhs trees (with 3 tier plantation, grassing etc.) is proposed during and after mining. This shall drastically improve the habitat for wild life and in due course of time there will be induction of further fauna in the area. An exemplary site of reclamation and eco-restoration has been done in one of our mine at Piparwar area, where large scale plantation, creation of water bodies has helped induction of fauna in the area. It has been observed that in winter season even birds from other places come to this eco- restored area. Reclamation of the mining area shall take place and 3 tier plantation on the periphery and block plantations shall be taken up. Adopt/prescribe mitigation measures where ever / where ever detected. The mining activities shall be going on for about 11 years and thereafter there is proposal of reclamation and post mining land use plan with sufficient number of trees and one water body which will not only bring the wild life back but also provide a better habitat for additional wild life so that eco system shall be better than before. The cost incurred on the reclamation work is included in the EIA/EMP report (estimated Rs 815 lakhs). The reclaimed area shall provide a good habitat for the fauna of the region and also induce fauna from the nearby areas.

The map showing the details of post mining reclamation is given below:



Bio-reclamation In Mining areas: Selection of plant for forestation on the OB dumps and the periphery is of mixed type having a combination of fast and slow growing species with an ultimate aim to have triple storey plantation i.e a combination of species of tall, intermediate and short height plant may be planted all around the dump. At the top of OB dump slow and short height plant should be planted while at the foot, fast growing and long height plants should be planted. The eco-restoration / bio-réclamation of the area shall provide an excellent habitat for the wild-life.

Greening of peripheral areas will be done. There is need for creating green belt of at least 30-40 meters width to provide and effective dust, noise and sight curtain in the periphery of mining area, this green belt shall also provide a good environment for the wild life. A green belt of 20-30 metres wide in triple storey fashion is proposed to be raised on either side of the roads.

S No.	Description	Land-use (Ha) Of Mining Area						
		Plantation	Water Body	Public use	Undisturbed	Total		
1	Quarry	21.71	86.86	0.00	0.00	108.57		
2	Ext. OB Dump	54.34	0.00	0.00	0.00	54.34		
3	Infrastructure	11.71	0.00	0.00	0.00	11.71		
4	Nala	0.00	5.60	0.00	0.00	5.60		
5	Road	7.00	0.00	5.00	0.00	12.00		
6	Green Belt	15.35	0.00	0.00	0.00	15.35		
7	Safety Zone	2.61	0.00	0.00	0.00	2.61		
Total		111.01 92.46 5.00 0.00 208.47				208.47		

Table Showing Bio-Reclamation / Plantation to Be Done In The Mining Area

(@2500 trees / Ha ie. 277525 no of trees)

5.0 Conclusion:

The Tetarikhar OCP is an operating mine since last 25 years. This area is devoid of any forest/ tree clusters and the occurrence of Hyaena is very remote. The initial survey of 2005 done by St Xavier's College, Ranchi had indicated the reporting of Hyaena by the villagers, however this was not authenticated by subsequent surveys The baseline survey does not indicate the presence of Hyaena in the core & buffer zone as per 2 subsequent surveys done in 2010. The Expert Appraisal Committee (T&C) of MoEF had advised for preparation of Conservation Plan for Hyaena, because of which this plan has been prepared. The revision of this report has been done keeping in view the observations of Wildlife Institute Of India, Dehradun in August, 2012.

The mine area is devoid of any forest / tree clusters and there is very little chance of Hyaena being found in the core zone. The conservation plan is more of a preventive measure for management and conservation of Hyaena which may be useful if Hyaena is found in the buffer zone at a later stage. The conservation plan covers compensation payment for harm to domesticated animals, water provision and bioreclamation as habitat conservation and development, awareness and research, protection of breeding sites and health care of the villagers by way of provision for anti-rabies vaccines. The total estimated fund provisioning has been made accordingly.

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ANNEXURE-I

Baseline Survey of Flora

SI.No.	Botanical Name	English Name (Common Name)
--------	----------------	----------------------------

- Α. Forest
- Trees ١.
- 1. Shorea robusta Sal
- 2. Terminalia indica Asan
- 3. Madhuca indica Mahua
- 4. Pterocarpus mansupium Paisar
- 5. Adina cardifolia Haldu
- 6. Bushanamia lanzan Piar
- 7. Semicarpus anacardium Bhelwa 8. Dendrocalamus strictus Bans (banmboo)
- Shrubs II.
- 1. Holarhena antidysentria Dudh koria
- 2. Nyctanthus arbortristis
- 3. Randhia Spp.
- 4. Carissa Spp.
- 5. Indigofera purlchulla
- 6. Wendlandia tinctoria
- 7. Dhawal Woodfordia fruticosa 8. Masondha Croton oblongifolius
- Kathber
- 9. Zizyphus Spp.
- Galfulli 10. Moghania spp.

Kanod

Jirhu

Tilai

Sl.No.	Botanical Name	English Name (Common Name)
III.	Grasses	
1.	Hetropogon contortus	Choranth
2.	Enlaliopsis Binata	Sabai
IV.	Climbers	
1.	Bauhinia vahlu	Mahuat
2.	Acucia Pinata	Arar
3.	Butia superbu	lalpulas
4.	Millatia auriculata	gai
5.	Simlax Spp.	Ranulatman
6.	Cryptolepis Buchunani	Dudhlar
В.	Miscellaneous Forest	
I.	Trees.	
1.	Boswellia Serata	Salai
2.	Anogeissus latifolia	Dhaw
3.	Lagerstroentia Parviflora	Sidha
4.	Diospvros melanoxylon	Kend
5.	Prerocarpus marsupium	Paisar
6.	Adina cardifolia	Karam
7.	Mitrajiva parviflora	Gurikaram
8.	Buchanania lanzam	Piar
9.	Sterculia villous	Udal
10.	Cochlaspernuni religiousum	Galzal

Sl.No. Botanical Name

English Name (Common Name)

11.	Madhuca indica	Mahuuuua
12.	Emblica officinalis	Anwala
13.	Aegle marmelas	Bel
14.	Lagerstroemia parviflora	Sidha
15.	Dendrocalamus spp.	Bans(bamboo)

II. Shrubs

1.	Woodfordia fruticosa	Dhawai
2.	Nyclanthus arbortristis	Harsmgar
3.	Zizyphus spp.	Kather

ANNEXURE-II

CLARIFICATIONS ON HYAENA CONSERVATION PLAN

COMMENTS OF WILDLIFE INSTITUTE OF INDIA & PARA-WISE CLARIFICATIONS BY INSTITUTE OF FOREST PRODUCTIVITY

1. General Information regarding Hyaena has been mentioned in the document.

The details (site specific) have been provided in this revised report.

2. After general introduction locality profile has been discussed in detail. Lot of information is provided in terms of population and social aspects of the area, number of villages, productivity, water bodies etc. The information regarding Forest and Wildlife provided is very general. For conservation planning specific information baseline status is required. For example, extent of different forest types at project site and status of forests. Similarly, wildlife species list is provided with no information on status of these species at target site, not even for the target species, for which conservation plan has been prepared.

The information regarding forest & wildlife has been provided in the baseline data at Para-3.1 of this revised report.

The baseline survey was initially done in 2005 by St Xavier's College, Ranchi. Further in 2010, Ms Ramkey Enterprises, Hyderabad carried out a repeat fauna baseline study wherein no incidence of Hyaena was either sighted or reported by the local people. The presence of Hyaena in the core zone is not reported as per our survey also. Further details are given in the revised report.

3. Guidelines for Striped Hyaena Conservation Plan have been mentioned. They are for overall conservation, but not for site specific actions.

The site specific Hyaena Conservation Plan has been elaborated in this revised report.

4. Strategies for reducing man–Hyaena conflicts, such as payment for compensation, provision of health care, improving habitat & provision of water are mentioned without giving the baseline data from the site. What is the magnitude of livestock losses from the area? How many incidents of Hyaena attacking humans have been reported? What sort of habitat improvement is required.? Basic information on which conservation planning for Hyaena has been proposed is missing from the plan.

The mining area of 208 Ha consists mostly of barren and agricultural land and the tree cover is very sparse. There is no forest land in core zone. Occasional scrub land / weeds were

found during the study. The same can be seen in the remote sensing map and google earth map shown in this report.

There were no reports of Hyaena being sighted by the villagers in core & buffer zone during our survey. In this matter, even the baseline survey of M/s Ramky Enterprises, Hyderabad indicates no reports of Hyaena being being found in the core zone. The basic information of hyaena has been covered in the baseline survey and no dens or breeding sites were found in the core & buffer zones during the survey.

No man-Hyaena conflicts have been reported in the core as well as buffer zone during our survey as well as the survey of Ms Ramky, Hyderabad. The enquiries were made in 6 villages from the list of villages, namely Renchi, Pipradih, Pukchu, Komar, Mahuatanr & Murpa in the buffer zone. Further, there is no live-stock losses reported. There is no incident of hyaena attacking humans in the core & buffer zones. The basic information of forest areas and fauna survey has been has been provided in this revised report.

 For each activity, budget has been mentioned, but no justification has been provided. For example, budget of Rs 20.0 Lakh has been mentioned for compensation considering the food requirement of Hyaena with population estimate of 50 Hyaenas. No scientific basis for presence of 50 Hyaena has been provided.

The detailed justification of the budget is given in this report. Although, there is no report of Hyaena being seen in the core zone, but there are stretches of forest & scrub land in the buffer zone which may provide habitat for Hyaena.

Reference has bee taken from published document titled "ESTIMATION OF STRIPED HYENA HYAENA HYAENA POPULATION USING CAMERA TRAPS IN SARISKA TIGER RESERVE, RAJASTHAN, INDIA" under the joint authorship of SHILPI GUPTA, KRISHNENDU MONDAL, K. SANKAR1 AND QAMAR QURESHI of Wildlife Institute of India, Dehradun.

As per this report, the maximum population density of Hyaena in the Sariska Reserve has been found to be 24.5 / 100 Km². The average density comes to 16.8 / 100 Km².

The buffer zone of Tetariakhar OCP covers an area of 384.4 Km² and out of this area, 323.56 Km² is under few patches of trees & mostly scrubs, as interpreted from Satellite imagery and the google earth image of the area given in this report. Based on the maximum probable occurance (as this data has been taken from the Sariska reserve) the average density of 16.8 Hyaena / 100 Km² over an area of 323.56 Km2, (which may support the habitat of Hyaena), the population in the buffer zone is estimated to be 54 numbers of Hyaena, which has been rounded-off to 50 numbers. The estimates are based on this justification.

This estimate is on the higher side, as it is based on the data of Sariska reserve, but has been adopted with a view to provide fund provision on the higher side to safeguard against any fund shortage for the conservation plan. The details of Hyaena Conservation Plan has been covered in this report.

6. The first step for preparing conservation plan for a species at any specific site is to evaluate the status of species and the threats faced by the species at the particular site. This has not been done. Priority management activities that can be initiated promptly to benefit the species have not been visualized in the Conservation Plan.

Status of Hyaena species has been covered in this report in para "Survey on Status of faunal Species Including Hyaena". The threats are given below.

Threats

S No	Human Activity	Threat Perception to Hyaenas	
1	Coal Mining	No threats are perceived during mining activity as the presence of Hyaena is not reported in the core zone. There are no cases of hyaena-man conflict and any attacks to humans. Further, there are no reports of killing or injury to hyaenas by the villagers or outsiders. The mining operations in this area are in existence since more than last 25 years and are having activities of mining, handling & transport of material, people traveling and no such sightings have been done among the local people. Therefore the threat to hyaena are nil or negligible due to mining operations. The percentage of mining area is only 0.54 % of the total buffer zone area.	
		Rather, the reclamation measures proposed during and after mining shall increase the green cover/ number of trees as well as lead to creation of fresh water body (mine lagoon) which will cause habitat creation for wild life, which in turn will not only restore but improve the prey population and the food chain of Hyaena population leading to healthy species growth. The eco-restoration through bio- reclamation is expected to improve the bio-diversity of the core zone. This will further induce fauna into the region and a healthy support system for the wild life is expected in the area. The total area under bio-reclamation is proposed to be 111.01 Ha out of 208.47 Ha (ie 2.77 Lakh trees over 53.25 % of mining area).	
2	Agricultural Activity	No report of any damage to crops has been reported by the villagers due to hyaena interference. The crop is mainly paddy cultivation (only one crop per year).	
3	Man- Hyaena conflict	There have been no reports of conflict or damage to human beings or animals. The survey was done in ten villages of the buffer zone through questions posed to the cross section of the population of the villagers.	
4	Others / Industrial	There are no other threats perceived. There are no industries in the buffer zone of the area.	

ANNEXURE-III

PLATES/ MAPS

LOCATION MAP P-I



PRESENT POSITION OF MINE P-II



POST MINING LANDUSE OF TETARIAKHAR OCP P-III



WATER BODY IN MINE LAGOON IN CCL P-IV





REVISED REPORT

ON

FAUNA STUDY AND SITE SPECIFIC CONSERVATION PLAN

FOR VULTURE

IN

CORE & BUFFER ZONES OF

TETARIAKHAR OC PROJECT IN RAJHARA AREA OF

CENTRAL COALFIELDS LIMITED

AUGUST 2012

PREPARED BY:

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1.0 INTRODUCTION

1.1 BACKGROUND

Tetariakhar Opencast Mine Project is an existing coal mining project of Central Coalfields Limited which is going to be expanded from 0.50 MTPA to nominal capacity 2.00 MTPA and peak capacity 2.50 MTPA. This project is located in Tetariakhar in village Bahera, Block – Balumath, District - Latehar, Jharkhand.

CCL had applied for environmental clearance of this project to MOEF, New Delhi. One of the conditions of the EAC Committee of Ministry of Environment & Forest, Govt of India was to submit conservation plans of Vulture, Wolf and Vulture in 2008. The EAC meetings and other requirements of environment clearance has been completed.

Institute of Forest Productivity, Lalgutwa, Ranchi, submitted three Conservation Plans in August, 2010 in respect of Vulture, Wolf & Vulture in study area of Tetariakhar OCP of Central Coalfields Limited. The baseline survey data for the three animals were made simultaneously and most of the data on forest, land use, socio-economic (demographic) are common as it is for the same project and the same buffer zone.

The reports were submitted to MoEF, GOI, New Delhi initially in 2010 and again 2012 which was subsequently forwarded to Wildlife Institute Of India, Dehradun in July, 2012 for their comments. The Dean, Wildlife Institute Of India (WII) submitted his comments vide letter number WII/Dean/MoEF_EAC(Coal & Thermal)/92/2010 Dated 02.08.2012.

This report has been revised with incorporation of additional information and clarifications based on the comments of Dean, Wildlife Institute Of India (WII) vide his letter dated 02.08.2012.

1.2 Mining Project Description

The mine has been designed to produce at the rate of 2.00 MTPA (with peak capacity of 2.50 MTPA) for project life of 11 years. The project is located in northeastern part of North Karanpura Coalfield in Tetariakhar village of Balumath block, Ranchi District of Jharkhand State. It lies between latitudes 23^o 47['] 57["]. N to 23^o 48['] 45["]N and longitudes of 84^o 50['] 27["] E. to 84^o 51['] 14["] E. The specific location of Tetariakhar OCP in the State, District has been shown in Plate-I.

The Tetariakhar OCP, in general is having flat topography with the general elevation ranging from 488m to 510m. The undulating to rolling topographic features have been well developed to the north of Tetarikhar village where incrop of seams are projected below detritalmantle/alluvium.

Tetariakhar project is surrounded by two meandering southerly flowing fairly large streams i.e. Bhutha Nala in the east and Mukhar Nalain the west. These two nalas join in the south east of the sector to form Ramghat stream.

2.0 General Information on Vulture:

The Indian Vulture (Gyps indicus) is an Old World vulture and is closely related to the Griffon Vulture, G. fulvus. It breeds mainly on hilly crags in central and peninsular India. The birds in the northern part of its range once considered a subspecies are now considered a separate species, the Slender-billed Vulture Gyps tenuirostris. These were lumped together under the name Long-billed Vulture.

The species breeds mainly on cliffs, but is known to use trees to nest in Rajasthan. Like other vultures it is a scavenger, feeding mostly from carcasses of dead animals which it finds by soaring over savannah and around human habitation. They often move in flocks.

Biology:

The Indian white-rumped Vulture (Gyps begalensis) is an old world vulture in the family Accipitridae, which also includes eagles, kites, buzzards and hawks. It is closely related to the European Griffon Vulture (Gyps fulvus). At one time it was believed to be closer to the White-backed Vulture of Africa and was known as the Oriental White-backed Vulture. Numbers of the species declined rapidly in the decades from 1990.

Description:

The white-rumped Vulture is a typical vulture, with an un-feathered head and neck, very broad wings and short tail feathers. It is much smaller than European Griffon. It has a white neck ruff. The adult's whitish back, rump and under-wing cover's are a contrast with the otherwise dark plumage of the body. The body is black and the secondary's are silvery grey. The head is tinged in pink and bill is silvery with dark spots. The nostril openings are slit-like. Juveniles are largely dark and take about four or five years to acquire the adult plumage. In flight, the adults show a dark colour and leading edge of the wing and has a white wing-lining on the underside. This is the smallest of the Gyps vultures, but is still a very large bird. It weighs 5-12 Kg. measures 89-93 cm in length and has a wingspan of 83-88 inches.

This vulture builds its nests on tall trees often near human habitations in northern and central India, Pakistan, Nepal and Southeast Asia, laying one egg. Birds form roost colonies. The population is mostly resident.

Vulture is a scavenger, feeding mostly from carcasses of dead animals which it finds by soaring high in thermals and spotting other scavengers. It often moves in flocks. The population of the vultures in India was quite high about five decades earlier compared to the population today.

Vulture scavenging:

These birds fly very high and are usually inactive until the morning sun has warmed up the air with sufficient thermals to support their soaring. They circle and rise in altitude and join move off in a glide to change thermals. They spot any carcass from good heights and descend to scavenge on the remains of any flesh. Parsees have created towers and they keep the dead body of human beings for the vulture to feed upon. When a kill is found it quickly descends and feed voraciously, and will perch on trees nearby and are known to sometimes descend even after dark to feed on a carcass. In forests, the sight of their soaring was often the indication of an animal kill.

They build nests on large trees near habitations even when there were convenient cliffs in the vicinity. Their preferred trees were Banyan, Peepul, Arjun and Neem. The main nesting period was November to March with eggs being laid mainly in January. Nests are usually in clusters and isolated nests tend to be those of younger birds.

Status in India

The decline has been widely attributed to poisoning by diclofenac, which is used as veterinary non-steroidal anti-inflammatory drug (NSAID), leaving traces in cattle carcasses which when fed on leads to kidney failure in birds. Diclofenac was also found to be lethal at low dosages to other species in the genus Gyps. Other substitute drugs like meloxicam are now being recommended and diclofenac is being banned.

Conservation Status:

Vulture is endangered as per Wildlife (Protection) Act, 1972 as Schedule-I bird.

Scientific Classification:

Kingdom	:	Animalia
Phylum	:	Chordata
Class	:	Mammalia
Order	:	Carnivora
Family	:	Hyaenidae
Genus	:	Vulture
Species	:	H. Vulture
Sub. Species	:	H.h. Vulture (Linn.)

3.0 Baseline Survey

3.1 Forest & Land Use

The core zone is defined as the area where mining operations shall take place. In this case the leasehold area is 208.47 Ha only.

The buffer zone for Environment Impact Study is the area of 10 kms from the periphery of the mining area and this report shall refer to the core and buffer zones accordingly.

The study of Vulture assessment was made at the site at Tetariakhar in core and buffer zone of the project. The core area consists mostly of barren and agricultural land and the tree cover is sparse. There is no forest land in core zone. Occasional scrub land/ weeds were found during the study. A satellite imagery map showing the detail of land use is given in this report. During our field visits, it was found that the Eastern part of the buffer zone extending to about 1 km with a width of about 250 metres. The presence of Vulture or its den was not sighted in the core zone, but was reported in the buffer zone in 2005 during the baseline survey done by St Xavier's College, Ranchi which is now considered doubtful.

The baseline survey was initially done in 2005 by St Xavier's College, Ranchi wherein during the site visits, it was reported by the locals that Vultures were seen occasionally, but no sighting was done by St Xavier's College survey team. Further in 2010, Ms Ramkey Enterprises, Hyderabad carried out a repeat fauna baseline study wherein no incidence of Vulture or its den was either sighted or reported by the local people. The presence of Vulture is the core zone is not reported as per the survey. Our scientists also visited the site but no Vulture was either reported or sighted.

The baseline data of other parameters like **land use** and forest is given below. There is no forest land in the core zone and land use of the core zone is follows:

Land use of Core zone

SI	Particulars	Area	
No.		На	%
1	Agriculture & fallow land	133.41	63.99
2	Scrub land with sparse trees	52.04	24.96
3	Waste land	16.18	7.76
4	Grazing	0.00	0.00
5	Surface water bodies	3.44	1.65
6	Others (Mining)	3.40	1.63
	Total	208.47	100.00

Table L 1

There is no forest land found in the core zone. The status of land is either tenancy land or revenue land taken over under Coal Bearing area Act.

Buffer zone of 384.40 Sq Km area including core zone consists of rural settlements, small urban settlement like Balumath and forest area. The land is mainly scrubs land consisiting of small shrubs and weeds (52%) There are no other coal mines in the buffer zone. North Karanpura Coalfield consisting of a number of coal mining projects like Dakra, Churi Benti, Piparwar, Asok etc are out side the buffer zone. Altogether there are 34 villages in the buffer zone. Tow tributaries of Ramghat river i.e. Mukhar nala and Bhutiya nala flow along the boundary of Tetarikhar and are main drainage of the area.

Land use/cover class in buffer zone of Tetriakhar OCP				
Land L	Jse/cover Class	Area	Area	
Level -I	Level -II	Area in Km ²	%	
(1) Sottlement	(i) Rural	4.60	1.20	
(1) Settlement	Sub-total:	4.60	1.20	
	(i) Dense Forest	46.91	12.20	
(2) Vegetation Cover	(ii) Open Forest	76.34	19.86	
	(iii) Scrub	200.31	52.11	
	Sub-total:	323.56	84.17	
(3)Agricultural Land	(i) Crop Land	4.39	1.14	
	(ii) Fallow Land	41.05	10.68	
	Sub-total:	45.44	11.82	
(4) Wasteland	(i) Waste Upland	8.56	2.23	
		8.56	2.23	
(5) Mining Area	(i)Coal Quarry	0.04	0.01	
	Sub-total:	0.04	0.01	
(6) Water bodies	Water bodies	2.20	0.57	
	Total:	384.40	100.00	

Table L 2

Analysis of the satellite data reveals that total area of vegetation cover in the buffer zone is 323.56 Km2; out of which 46.91 Km2 (12.20%) is the dense forest, 76.34 Km2 (19.86%) is the open forest and 200.31 Km2 (52.11%) is the scrubs.

A Study area map of the core zone and 10km area of the buffer zone (1: 50,000 scale) clearly delineating the major topographical features such as the land use, surface drainage of rivers/streams/nalas/canals, locations of human habitations, major constructions including railways, roads, pipelines, major industries/mines have been shown in this report in Map No I.

3.2 Survey on Status of faunal Species Including Vulture

3.2.1 Methodology of Sampling:

Fauna studies were carried out during the month of Mar-June-2010, to assess the list of animal species that occur in the core zone and the buffer zone.

The entire mine lease area of Tetariakhar Opencast Project has been surveyed for enumeration of fauna. This area is described here after as the core zone. Within the core zone, all the locations were surveyed using restricted random sampling techniques. Within the 10km buffer zone, 10 sample areas of 10000 m2 each were chosen at random for study of fauna. For the purpose of calculation of Importance Value Indices (IVI) of the core zone, quadrant method was used for estimation of frequency and density while the cover was estimated by modified line intercept method. Sighting and remarks of the local inhabitants were taken into the survey in the field on several field visits.

A list of fauna species were prepared based on the data available and also with the reports of the earlier study done through CMPDI by ST Xavier's College, Ranchi and Ramky Enterprises, Hyderabad is given below.

3.2.2 Baseline Survey of Fauna

The baseline survey was initially done in 2005 by St Xavier's College, Ranchi wherein during the site visits, it was reported by the locals that Vultures were seen occasionally, nut no sighting was done by St Xavier's College survey team.

Further in 2010, Ms Ramky Enterprises, Hyderabad carried out a repeat fauna baseline study wherein no incidence of Vulture was either sighted or reported by the local people. The

presence of Vulture is the core zone is not reported as per the survey. Our scientists also visited the site but no Vulture was either reported or sighted.

Therefore, as per the survey done, there is no evidence of Vulture in the core zone. There are only occasional reported cases of Vultures in the buffer zone, that too only in 2005 survey.

3.2.3 Study Team:

Rapid survey of terrestrial flora and fauna of the core zone and its environs extending up to a 10 km from the boundary of the core zone was carried out during the month of Mar-June, 2010, under the supervision and guidance of our experts Dr DS Srivastava, Secretary, Nature Conservation Society, Daltonganj and other scientists. The members of Ms Ramkey Enterprises were Prof. K.B.Reddy, Retired Professor of Environmental Biology and a senior consultant on flora, fauna and ecology for several major irrigation and hydroelectric projects and his team comprising of Sri Sai Chandra Sekhar, Zoologist, Sri R. Mohan Reddy, Plant Ecologist and U. Praveen, Environmental Engineer and senior consultants on flora, fauna and ecology.

3.2.4 Environmental Setting of the Study Area

There are no Reserve forests and ecologically sensitive areas such as biosphere reserves, national parks, wildlife sanctuaries and other protected area in and around the mine lease area.

3.2.5 Survey List of fauna in Core and Buffer Zone:

Checklist of vertebrate species other than birds either recorded or reported from the Core zone.

MAMMALS:

Latin Name	Common Name	WPA Schedule
Bandicota indica	Large bandicoot Rat	Schedule V
Funambulus palmarum	Three striped squirrel	Schedule IV
Golunda ellioti myothrix	Indian bush rat	Schedule IV
Lepus nigricollis	Indian hare	Schedule IV
Mus booduga	Common Indian field mouse	Schedule V
Mus musculus homeurus	Home Mouse	Schedule V
Mus musculus tytleri	Mouse	Schedule V
Nosokia indica indica	Bandicoot rat	Schedule V
Rattus rattus gangutrianus	Common Indian rat	Schedule V
Rattus rattus refescens	Common Indian rat	Schedule V
Suncus etruscus	Savi pygmy shrew	Schedule V
Suncus murinus	House shrew	Schedule V
AMPHIBIANS:		
Rana breviceps	Indian burrowing frog	Schedule IV
Rana cyanophlyctis	Skipper frog	Schedule IV
REPTILES:		
Calotes versicolor	Garden lizard	Schedule IV
Chrysopelea taprobanica	Tree Snake	Schedule IV
Dryphis nasutus	Whip Snake	Schedule IV
Echis carinatus	Saw scaled viper	Schedule IV
Enhydris enhydris	Dhondwa / Common smooth	Schedule IV
	Water snake	
Hemidactylus flaviviridis	Indian wall lizard	Schedule IV
Typhlops diardii	Giant Blind Snake	Schedule IV
Typhlops porrectus	Slender Blind Snake	Schedule IV

CORE ZONE Table F1

Checklist of vertebrate species other than birds either recorded or reported from the Buffer zone.

MAMMALS:

Latin Name	Common Name	WPA Schedule
Herpestes edwardsi	Indian gray mongoose	Schedule IV
Herpestes smithii	Ruddy mongoose	Schedule II
Paradoxurus hermaphroditus	Common Palm civet	Schedule II
Persbytes entellus	Black faced monkey	Schedule II
Sus scrofa	Wild pig	Schedule III
AMPHIBIANS:		
Rana breviceps	Indian burrowing frog	Schedule IV
Rana cyanophlyctis	Skipper frog	Schedule IV
Rana limnocharis	Indian cricket frog	Schedule IV
Rana tigrina	Indian Bull frog	Schedule IV
REPTILES:		
Chameleo zeylanicus	Chameleon	Schedule II
Chrysopelea taprobanica	Tree Snake	Schedule IV
Dryphis nasutus	Whip Snake	Schedule IV
Echis carinatus	Saw scaled viper	Schedule IV
Naja naja	Nag / Cobra	Schedule II
Ptyas mucosa	Dhaman / Indian Rat snake	Schedule II
Typhlops diardii	Giant Blind Snake	Schedule IV
Varanus bengalensis	Common Indian Monitor	Schedule II
Vipera ruselli	Russel viper	Schedule II

BUFFER ZONE Table F 2

List of birds either spotted or reported from the study area.

Table F 3

Latin Name	Common Name	WPA Schedule
Ceryle rudis	Lesser pied Kingfisher	Schedule IV
Columba livia	Blue rock pigeon	Schedule IV
Coracias benghalensis	Indian roller	Schedule IV
Corvus splendens	House crow	Schedule V
Dendrocitta vagabunda	Indian tree pie	Schedule IV
Dendrocopus marhatensis	Maratha Woodpecker	Schedule IV
Dicrurus macrocercus	Black drongo	Schedule IV
Egretta garzetta	Little egret	Schedule IV
Phalacrocorax carbo	Large Cormorant	Schedule IV
Phalacrocorax niger	Little cormorant	Schedule IV
Psittacula cyanocephala	Blossom headed Parakeet	Schedule IV
Psittacula krameri	Rose-Ringed Parakeet	Schedule IV
Pycnonotus cafer	Red-vented bulbul	Schedule IV
Saxicolodies fulicata	Indian robin	Schedule IV
Streptopelia chinensis	Spotted dove	Schedule IV
Sturnus contra	Pied myna	Schedule IV
Turdoides caudatus	Common babbler	Schedule IV

List of birds either spotted or reported from the buffer zone.

Table F 4

Latin Name	Common Name	WPA Schedule
Acridotheres tristis	Common myna	Schedule IV
Alcedo atthis	Small blue kingfisher	Schedule IV
Andeolv grayii	Pond heron	Schedule IV
Bubulcus ibis	Cattle Egret	Schedule IV
Ceryle rudis	Lesser pied Kingfisher	Schedule IV
Columba livia	Blue rock pigeon	Schedule IV
Coracias benghalensis	Indian roller	Schedule IV

Latin Name	Common Name	WPA Schedule
Corvus splendens	House crow	ScheduleV
Dendrocitta vagabunda	Indian tree pie	Schedule IV
Dendrocopus marhatensis	Maratha Woodpecker	Schedule IV
Dicrurus macrocercus	Black drongo	Schedule IV
Egretta garzetta	Little egret	Schedule IV
Phalacrocorax carbo	Large Cormorant	Schedule IV
Phalacrocorax niger	Little cormorant	Schedule IV
Psittacula cyanocephala	Blossom headed Parakeet	Schedule IV
Psittacula krameri	Rose-Ringed Parakeet	Schedule IV
Pycnonotus cafer	Red-vented bulbul	Schedule IV
Saxicolodies fulicata	Indian robin	Schedule IV
Streptopelia chinensis	Spotted dove	Schedule IV
Sturnus contra	Pied myna	Schedule IV
Sturnus pagodrum	Brahminy myna	Schedule IV
Turdoides caudatus	Common babbler	Schedule IV
Tyto alba	Barn owl	Schedule IV
Upupa epops	Common hoopoe	Schedule IV

3.3 Socio-Economic Study of the buffer zone

In order to determine project impact at the area level, socio-economic profile is an has been study for analyzing any impacts of wild life. Some of the important indicators like demographic growth rate, religious composition, caste composition, literacy, employment pattern etc. are have been studied in the project area and buffer zone of this project. There is only one village in the core zone where only 34 households were there, now only 5 houses are there which will shift from the core zone.

3.3.1 **Physical setting of the project**

Tetariakhar OCP project is situated in the Bahera Village of Balumath block in the district of Latehar falling in the state of Jharkhand. The Core zone is confined to only

Tetariakhar tola of Bahera village. There are 34 villages in the buffer zone. List of villages is given below

Table S 1

Villages in Buffer Zone

SI.	Name of Village	SI.	Name of Village	SI.	Name of Village
No.		No.		No.	
1	Renchi	13	Kolpatia	25	Chamatu
2	Pipradih	14	komar	26	Hempur
3	Barikhap	15	Balumath	27	Samarost
4	Gurusalve	16	Chataug	28	Chitang
5	Barni	17	Kesiadih	29	Behera
6	Tundahatu	18	Mahutanr	30	Bisunpur
7	Rehea	19	Jilanga	31	Bishrampur
8	Mahuatoli	20	Okea	32	Barwadih
9	Cherra	21	Keri	33	Soparam
10	Karmahi	22	Kharatanr	34	Jogiyadih
11	Pukchu	23	Dandu		
12	Banio	24	Murpa		

3.3.2 The summarized details of population characteristics in the villages surveyed are enumerated below

Table S 2

Population Characteristics

SI. No.	Description	Total Study Area
1	Population	42473 (100%)
2	Male	21881 (51.52%)
3	Female	20592 (48.48%)
4	Scheduled Cast Population	12547 (29.54%)
5	Scheduled Tribe Population	10000 (23.54%)

6	Literates	13210 (31.10%)
7	Male Literates	9154 (21.55%)
8	Female Literates	4056 (9.55%)

3.3.3 Economic profile and Workforce pattern

The summarized details of workforce pattern of the villages surveyed is as mentioned below :

Table S3

Workforce Pattern

SI.No.	Description	Total study area, Percentage
		in bracket
1	Population	42473 (100%)
2	Total worker population	17655 (41.57%)
3	Main worker	8885 (20.92%)
4	Cultivators	4439(10.45%)
5	Agricultural labourers	2355 (5.54%)
6	Other worker	1748(4.12%)

The Census data reveals that 41.57% of the population is working population and rest 60.43% are non workers. 10.45% of population is cultivators supported by 5.54% agricultural labourers and other workers are mainly in household industries, mining, construction, transportation and other allied activities.

3.3.4 Basic and Civic amenities

The Basic and civic amenities available in the villages surveyed in the buffer zone are summarised below :-

Table S4

AMENITIES

SI.No.	Description	Total
1	EDUCATIONAL FACILITIES	
	Primary school	31
	Middle school	7
2	MEDICAL FACILITIES	4
3	DRINKING WATER	
	Well	41
	Tank	10
	Hand pump	41

3.3.5 PRIMARY DATA COLLECTION

The sample households have been selected by multi-stage sampling method. The Primary data has been collected from field through questionnaire, schedule, group discussion and interview. Village profile has been made with the help of information collected through interview guide. Caste information, economic activities and health status have been estimated based on the village profile questionnaire.

SECONDARY DATA

Secondary data has been collected from census report 2001, Statistical hand book and the District Gazetteer of Jharkhand.

SAMPLING

250 households have been randomly selected for sample from different villages. While deciding the number of sample households a minimum 20 houses and maximum 35 houses were interviewed.

DATA ANALYSIS

Simple Process of Ratio and Percentage Method has been used to analyze and compare primary data with census 2011. The house hold survey has been validated by the latest census report. On the basis of household sample survey, data analysis have been made about occupations, health aspects, community, income and expenditure pattern, family size and environmental problems of the study area.

Present status and validation of Households Data in Buffer zone

Seven villages have been taken for sample survey in the Buffer zone of the Tetariakhar OCP. According to Census there are 777 households. Out of them 230 households are taken for sample survey, consisting of 1255 individuals with 626 male and 629 females.

Family Size

The average family size is 5.45 in the sample survey and according to Census 2001, it is 5.41.

Community Representation

According to household survey the SC population is 504 while the ST population is 316. In the Census 2001 the population of SC is 1540 and ST 1040.

Literacy

So far as the literacy is concerned 222 persons are literates, out of which 163 male and 59 are females. According to Census 2001, 969 persons are literate out of which 726 are male and 243 are females.

Occupational Structure

The economic profile of the buffer zone suggests that the total working population is 581, in which 149 persons are main workers, 70 are cultivators, 62 persons are Agricultural labourers and 76 persons are in the category of other workers. According to Census 2001, total working population is 2049, 517 are main workers, 208 are cultivators, 137 are agricultural labourers and 168 are other workers.

Housing Pattern

Based on household survey the housing pattern is mixed type both kuccha and pakka are found.

Cropping Pattern

As per the household survey the main crops are rice and vegetables. The source of irrigation is rain water and few wells.

Educational Institutions

According to survey all the sample villages have primary schools. Some of them have Middle, Secondary and Senior Secondary schools in the Buffer zone.

Medical Facility

In most of the Buffer zone villages there is no medical centre but within five to ten km. there is hospital and other medical facilities available.

Power Supply

According to survey there is power supply in most of the villages of study area.

Transportations

In the Buffer zone villages the source of transportation is private vehicles and public vehicle like Jeeps and mini buses.

Historical and Archaeological site

No historical and archaeological site is found in the study area.

Population and average family size of the sample village.

Table S5

Population and average family size of the sample village.

SI.No.	Name of village	No.of Households	Total Population	Family Size
1	Pindarkom	40	238	5.95
2	Pukchu	30	172	5.73
3	Bari Khap	40	230	5.75
4	Goli	35	165	4.71
5	Bukru	45	234	5.2
6	Renchi	20	118	5.9
7	Barni	20	98	4.9
	Total	230	1255	5.45

Source: Sample survey result

Community Representation

Table below depicts the primary data of the total population and Schedule Caste and Schedule Tribes breakup of the sample villages.

Table S6

SC	&	ST	Detai	ls

SI.	Name of village	No.of	Total	Schedule	Schedule
No.		Households	Population	Caste	Tribe
1	Pindarkom	40	238	70	00
2	Pukchu	30	172	04	113
3	Bari Khap	40	230	66	130
4	Goli	35	165	16	54
5	Bukru	45	234	162	11
6	Renchi	20	118	88	08
7	Barni	20	98	98	00
	Total	230	1255	504	316

LITERACY

Following Tables depict literacy level in the villages under survey.

SI.	Name of village	No. of	Total	Total	Literate	Literate
No.		Households	Population	Literates	Male	Feale
1	Pindarkom	40	238	41	31	10
2	Pukchu	30	172	20	16	04
3	Bari Khap	40	230	39	29	10
4	Goli	35	165	59	41	18
5	Bukru	45	234	40	25	15
6	Renchi	20	118	15	13	02
7	Barni	20	98	08	08	00
	Total	230	1255	222	163	59

Literacy Table S7

ECONOMIC PROFILE

The economic profile of the Buffer zone village has been shown in the table given below

SI. Name of No of. Total **Total Work** Main Cultivators Agri. Others No. village Household workers Labour Populat Population ion er Pindarkom Pukchu Bari Khap Goli Bukru Renchi Barni Total

Table S 8 Economic Profile

ANNUAL FAMILY INCOME AND SOURCE OF INCOME

The survey is based upon Interview and response of the people to the questionnaire and schedule.

APPROX ANNUAL INCOME IN RUPEES							SOURCE OF INCOME IN %		
SI No	Sample	House-	<20	20 Th.–	50 Th. – 1	>1	Primary	Secondary	Tertiary
	village	hold	Th.	50Th.	Lac.	Lac			
1	Tetariakhar	20	5	7	6	2	25	65	10
2	Pindarkom	40	9	12	11	8	22.5	57.5	20
3	Pukchu	30	6	7	9	8	20	53.33	26.66
4	Bari Khap	40	5	14	13	8	12.5	67.5	20
5	Goli	35	5	12	10	8	14.28	62.85	22.85
6	Bukru	45	5	15	13	12	11.11	62.22	26.66
7	Renchi	20	5	7	6	2	25	65	10
8	Barni	20	4	8	7	1	20	75	5
	Total	250	44	82	75	49	17.6	62.8	19.6

INCOME DETAILS Table: S 9

Sample survey results.

The survey of flora (vegetation) is given in Annexure-I.

4.0 Site Specific Conservation Plan (Vulture) :

The Map of Core Zone and buffer zone is given below is given below : (Map No I)





Google earth Image of Tetariakhar OCP with lease hold area (Map No II)

It is evident from the maps that in the core zone there is practically no forest and the area is mostly scrubs and waste land with some temporary agricultural land. The presence of Vulture reported was nil in the buffer zone. The buffer zone consists of low and medium density forest land in the eastern side of the area and the evidence of Schedule IV fauna were found in the forest areas which are about 1-2 kms away from the mining area.

The baseline survey was initially done in 2005 by St Xaviers college, Ranchi wherein during the site visits, it was reported by the locals that vultures were seen, nut no sighting was done. Further in 2010 Ms Ramkey Enterprises, Hyderabad carried out a
fauna baseline study wherein *no incidence of vulture was neither sighted nor reported by the local people*. The presence of vulture is the core zone is not reported as per the survey. Our scientists also visited the site but no vulture was either reported or sighted.

As per the survey done in Bahera village and the mine, there is no evidence of vulture in the core zone. The survey was done in Belwadih, Pindracom, Bara, Bahera and Nagra Villages in the buffer zone there are reports of vultures in the buffer zone.

The Indian white rumped vulture (gyps bengalensis) population has declined in India but since the vultures are not reported here there is no impact. The conservation plan has been made to ensure that, if any vultures are found in the buffer zone, in that case, its care can be taken.

Regular Status surveys shall be done to locate the vultures in the buffer zone of the area. The study shall also cover the number of carcasses found in the buffer zone which could help in facilitating feeding facilities to the vultures of the area. The common method of burial of dead cattle can be replaced by assigning a fixed place for disposal of cattle carcasses, with cooperation of the villagers / mukhiyas, so the vultures can survive. The villagers of Pipradih reported that one or two carcasses could be seen in the jungle area in 3-4 months, but vultures were not sighted. As per the statement of Shri Baldeo Rajwar of Bahera village no vultures could be seen since last 2-3 years. This proposal shall be discussed and covered in the awareness programme, in which villagers shall be involved, has been suggested with fund provisioning in the conservation Plan.

4.1 Periodic Survey (Estimate):

4.1.1 Survey through NGOs/Other agencies (Once every year at 4 places in buffer zone at protected forest areas in Balbal, Bishnupur and Piprahi Cost: Rs 20000 per location/year x 3 locations x 10 years =Rs 6.0 lakhs.

- 4.1.2 Survey / Monitoring through Mukhiyas of villagers who will assign literate youths of the villages to keep records of vultures and wild life animals in registers on sighting basis which will be official document monitored by the Mukhiya in 4 villages namely Belwadih, Pindracom, Bara and Nagra Cost: Rs 2800 per village/ month x 4 villages x 36 months =Rs 4.03 lakhs (Total Rs6.0 Lakh+ Rs4.03 Lakh, Say Rs 10.00 lakhs)
- 4.1.3 Diclofenac: One of the main conservation measures is to stop use of Diclofenac in the veterinary services of the area. The matter has been in discussion at the national level and there are very few doctors in the area who are prescribing Diclofenac. In fact, the cattle population in the core zone is very low. In the buffer zone, awareness measures have been proposed in the conservation Plan and it is expected that with this, the use of Diclofenac shall be minimised / stopped. The safe disposal of Diclofenac is also recommended and the state authorities shall assist as it is in their own programme. The substitute drug Meloxicam has been recommended.
- 4.1.4 Bio-Reclamation / Afforestation shall be done in the Core zone with creation of an all season water body with pisciculture which will improve the land use and bio-diversity of the area. The plantation of about 2.7 lakhs trees (with 3 tier plantation, grassing etc.) is proposed during and after mining. This shall drastically improve the habitat for wild life and in due course of time there will be induction of further fauna in the area. An exemplary site of reclamation and eco-restoration has been done in one of our mine at Piparwar area, where large scale plantation, creation of water bodies has helped induction of fauna in the area. It has been observed that in winter season even birds from other places come to this eco- restored area.

Reclamation of the mining area shall take place and 3 tier plantation on the periphery and block plantations shall be taken up. Adopt/prescribe mitigation measures where ever / whenever detected for conservation of wild animals. The mining activities shall be going on for about 11 years and thereafter there

is proposal of reclamation and post mining land use plan with sufficient number of trees and one water body which will not only bring the wild life back but also provide a better habitat for additional wild life, so that eco system shall be better than before. The cost incurred on the reclamation work is included in the EIA/EMP report (**estimated Rs 815 lakhs**). The reclaimed area shall provide a good habitat for the fauna of the region and also induce fauna from the nearby areas.

The map showing the details of post mining reclamation is given below:



Bio-reclamation In Mining areas: Selection of plant for forestation on the OB dumps and the periphery is of mixed type having a combination of fast and slow growing species with an ultimate aim to have triple storey plantation i.e a

combination of species of tall, intermediate and short height plant may be planted all around the dump. At the top of OB dump slow and short height plant should be planted while at the foot, fast growing and long height plants should be planted. The eco-restoration / bio-réclamation of the area shall provide an excellent habitat for the wild-life.

Greening of peripheral areas will be done. There is need for creating green belt of at least 30-40 meters width to provide and effective dust, noise and sight curtain in the periphery of mining area, this green belt shall also provide a good environment for the wild life. A green belt of 20-30 metres wide in triple storey fashion is proposed to be raised on either side of the roads.

S	Description	Land-use (Ha) Of Mining Area				
No.		Plantation	Water Body	Public	Undisturbed	Total
				use		
1	Quarry	21.71	86.86	0.00	0.00	108.57
2	Ext. OB Dump	54.34	0.00	0.00	0.00	54.34
3	Infrastructure	11.71	0.00	0.00	0.00	11.71
4	Nala	0.00	5.60	0.00	0.00	5.60
5	Road	7.00	0.00	5.00	0.00	12.00
6	Green Belt	15.35	0.00	0.00	0.00	15.35
7	Safety Zone	2.61	0.00	0.00	0.00	2.61
Total		111.01	92.46	5.00	0.00	208.47

Table Showing Bio-Reclamation / Plantation to be Done In Mining Area

(@2500 trees / Ha ie. 277525 no of trees)

Management shall help the local people and villagers to keep a watch to prevent hunting / killing of the wild animals. Forest and police department will be informed if such incident

happens in order to take action against offenders. If necessary, help of forest department will be taken to shift any such stranded animals to safer places.

4.1.5 Awareness Programmes : Awareness measures about preservation of vultures and biodiversity in neighborhood villages will be brought through painted signboards and slogans etc. Awareness programmes in local villages will be arranged every year preferably during Environmental week / wild life week / Van Mahotsava etc.

The cost of awareness programme which is to be held every year is as follows.

Estimate:

Sign Boards / Posters (Once every year at 4 places in buffer zone villages at Belwadih, Pindracom, Bara and Nagra) & awareness meetings.

Cost: Rs 25000 per village/year x 4 villages x 10 years

= Rs 10.0 lakhs

A programme on conservation of vultures shall be done through local villagers/mukhiyas and veterinary doctors. The use of diclofenac is to be strictly banned. The villagers shall be made aware of the plan for conservation of vultures and animal carcasses should be placed in selected places where vultures could feed upon.

4.1.6 **Monitoring Stations** : A monitoring station for information on vultures shall be done in the Belwadih village 1 km north west side of the mining area. The monitoring station shall be under the direct supervision of the Chief Wild Warden. The cost shall be on the transport and supervision through local person of the village.

Estimate:

Travel and supervision cost on yearly basis @ Rs 1.0 lakhs / year for five years.

Travel Cost : Rs 4000 per day of travel x 10 days/year for 5 years = Rs 2.0 lakhs

Supervision Cost ; Rs 4000 / month x 60 months= Rs 2.40 lakhs

Other expenses (documentation, local travel etc) @ Rs 1000 per month x 60 months= Rs 0.60 lakhs (Total Rs 5.0 lakhs)

5.0 Conclusion:

The Tetarikhar OCP is an operating mine since last 25 years. This core zone area is devoid of any forest/ tree clusters and there is only one village where out of 34 families only 5 families are residing. These families are also going to shift to other places. Since the number of households is negligible there are practically no cattle in this area and therefore the feed of carcasses are very remote for vultures. Therefore vultures can be rarely be seen in the core zone.

The initial survey of 2005 done by St Xavier's College, Ranchi had indicated the reporting of Vulture by the villagers, however this was not authenticated by subsequent surveys done in 2010 by Ms Ramky Enterprises, Hyderabad and our institute. The baseline survey does not indicate the presence of Vulture in the core & buffer zone as per 2 surveys. The Expert Appraisal Committee (T&C) of MoEF had advised for preparation of Conservation Plan for Vulture, because of which this plan has been prepared. The revision of this report has been done keeping in view the observations of Wildlife Institute of India, Dehradun in August, 2012.

The conservation plan covers survey and monitoring at villages in the core zone, awareness programmes for conservation and ban on use of Diclofenac by veternary doctors and bio-reclamation as habitat conservation and development. The total estimated fund provisioning has been made accordingly.

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ANNEXURE-I

Baseline Survey of Flora

SI.No.	Botanical Name	English Name (Common Name)
--------	----------------	----------------------------

- A. Forest
- I. Trees
- 1. Shorea robusta Sal
- 2. *Terminalia indica* Asan
- 3. *Madhuca indica* Mahua
- 4. *Pterocarpus mansupium* Paisar
- 5. Adina cardifolia Haldu
- 6. Bushanamia lanzan Piar
- 7. Semicarpus anacardium Bhelwa
- 8. *Dendrocalamus strictus* Bans (banmboo)

II. Shrubs

- 1. Holarhena antidysentria Dudh koria
- 2. Nyctanthus arbortristis
- 3. Randhia Spp.
- 4. *Carissa Spp.* Kanod
- 5. Indigofera purlchulla Jirhu
- 6. *Wendlandia tinctoria* Tilai
- 7. *Woodfordia fruticosa* Dhawal
- 8. Croton oblongifolius Masondha
- 9. Zizyphus Spp. Kathber
- 10. Moghania spp. Galfulli

SI.No.	Botanical Name	English Name (Common Name)
III.	Grasses	
1.	Hetropogon contortus	Choranth
2.	Enlaliopsis Binata	Sabai
IV.	Climbers	
1.	Bauhinia vahlu	Mahuat
2.	Acucia Pinata	Arar
3.	Butia superbu	lalpulas
4.	Millatia auriculata	gai
5.	Simlax Spp.	Ranulatman
6.	Cryptolepis Buchunani	Dudhlar
В.	Miscellaneous Forest	
I.	Trees.	
1.	Boswellia Serata	Salai
2.	Anogeissus latifolia	Dhaw
3.	Lagerstroentia Parviflora	Sidha
4.	Diospvros melanoxylon	Kend
5.	Prerocarpus marsupium	Paisar
6.	Adina cardifolia	Karam
7.	Mitrajiva parviflora	Gurikaram
8.	Buchanania lanzam	Piar
9.	Sterculia villous	Udal
10.	Cochlaspernuni religiousum	Galzal

Sl.No. Botanical Name

English Name (Common Name)

11.	Madhuca indica	Mahua
12.	Emblica officinalis	Anwala
13.	Aegle marmelas	Bel
14.	Lagerstroemia parviflora	Sidha
15.	Dendrocalamus spp.	Bans(bamboo)

II. Shrubs

1.	Woodfordia fruticosa	Dhawai
2.	Nyclanthus arbortristis	Harsingar
3.	Zizyphus spp.	Kather

ANNEXURE-II

COMMENTS OF WILDLIFE INSTITUTE OF INDIA & PARA-WISE CLARIFICATIONS BY INSTITUTE OF FOREST PRODUCTIVITY

1. Chapter 1 of the plan deals with the Biology of Indian White-rumped Vulture. Most of the information in this chapter is taken from Wikipedia. There are no references in this chapter. Some of the statements like "it has been suggested that rabies cases have increased in India due to vulture decline" have not been substantiated by relevant scientific literature.

The statement that "it has been suggested that rabies cases have increased in India due to vulture decline" is substantiated with details as given below.

The paper was published by the authorsnamely Anil Markandya, Tim Taylor, Alberto Longo, University of Bath & M.N.Murty, Sucheta Murty and Kishore K. Dhavala in their paper titled "Counting the Cost of Vulture Declines – Economic Appraisal of the Benefits of the Gyps Vulture in India, Institute of Economic Growth, India.

2. Chapter 2 deals with locality profile, lot of information is provided in terms of population and social aspects of the area, number of villages, productivity, water bodies etc. The information regarding Forest and Wildlife provided is very general. For conservation planning specific baseline information is required. Like extent of different forest types at project site and status of forests. Similarly wildlife species list has been provided with no information on status of these species at target site not even for the target species i.e. Vulture, for which conservation plan has been prepared.

The site wise information on land use, forest and wild life has been given in the revised report. The status of the vultures and other species along with the baseline survey has been given in the addendum. The baseline survey was initially done in 2005 by St Xavier's College, Ranchi wherein during the site visits, it was reported by the locals that vultures were seen occasionally, nut no sighting was done by St Xavier's College survey team. Further in 2010, Ms Ramkey Enterprises, Hyderabad carried out a repeat fauna baseline study wherein no incidence of vulture was either sighted or reported by the local people. The presence of vulture is the core zone is not reported as per the survey. Our scientists also visited the site but no vulture or was either reported or sighted. (The report of the workers residing in the area has also informed that vultures were never seen in the core zone).

3. Chapter 3 deals with International and National Conservation Planning initiatives. As initiative by Govt. of India and BNHS has been mentioned in detail. The report from Govt. of India (Action Plan for Vulture Conservation in India) and details of Vulture Conservation Breeding Programme of BNHS has been straight away produced in the report including additional paper on 'Status of Vulture in India'. Lot of information and policies are described in detail in these two documents but authors have failed to gain insights from these reports for drafting sitespecific Vulture Conservation Plan.

The site specific vulture conservation Plan has been given in this report at 4.0.

4. Chapter 4 which deals with site specific vulture Conservation Planning for Tetaria Khar OCP. There are no objectives of the conservation plan and neither steps to monitor the progress of conservation plan have been outlined. Status Survey is mentioned as point no 1 in the plan but in reality before preparing the conservation plan information regarding the status of species at site that is required has not been collected. Point No. 2 mentions about awareness creation which is important but it is not mentioned what will be protocol for this and how long it would take, Budget of 10 Lakhs has been proposed without any justification. Point No3 is about monitoring but is not mentioned what. When and how to monitor. What are the objectives of the monitoring and what would be the periodicity of data collection analyses and reporting? Budget of Rs 5 lakhs has been proposed without any justification.

The objective is Vulture Conservation which has been referred in the report. The status survey details are given in this revised report at 3.2. The awareness programme details with cost estimate is covered in this addendum revised report.

5. The first step for preparing conservation plan for a species at any specific site is to evaluate the status of species and assess the threats faced by species at that particular site. This has not been done. Similarly, priority management activities that can be initiated promptly to benefit have not been visualized in the Conservation Plan.

Status of vulture species has been covered in this report in para "Survey on Status of faunal Species Including Vulture" at 4.1. The threats are given below.

Threats

S No	Human Activity	Threat Perception to vultures		
1	Coal Mining	No threat perceived during mining activity as the presence of vulture is not reported. Rather, the reclamation measures proposed during and after mining shall increase the green cover/ number of trees as well as lead to creation of fresh water body (mine lagoon) which will cause habitat creation for wild life, which in turn will not only restore but improve the food chain of vulture population leading to healthy species growth. The total area under plantation is proposed to be 111.01 Ha out of 208.47 Ha (ie 2.77 Lakh trees over 53.25 % of mining area)		
2	Agricultural Activity	No discernible threat has been observed. It was enquired from the villagers / farmers about the use of pesticide etc and its impacts. The farmers are mostly growing rice, as one crop per year, due to shortage of irrigation facilities and the traditional method of rice farming is used. The rice growers do not use pesticides in this area.		
3	Cattle Rearing	Significant adverse impact of Diclofenac has been reported at national level. Campaign & awareness programme has been proposed through Mine Management as a preventive measure for elimination of this threat in the buffer zone in the conservation programme. Jharkhand State Govt has also been taking action in this regard.		
4	Industrial Activity	There is no major industrial activity in the buffer zone of Tetariakhar OCP.		

ANNEXURE-III

PLATES/ MAPS

LOCATION MAP P-I



PRESENT POSITION OF MINE P-II



POST MINING LANDUSE OF TETARIAKHAR OCP P-III



FILE PHOTO OF INDIAN VULTURE P-IV



Water Body In Mine Lagoon in Piparawar





REVISED REPORT

ON

FAUNA STUDY AND SITE SPECIFIC CONSERVATION PLAN

FOR WOLF

IN

CORE & BUFFER ZONES OF

TETARIAKHAR OC PROJECT IN RAJHARA AREA OF

CENTRAL COALFIELDS LIMITED

AUGUST 2012

PREPARED BY:

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JHARKHAND

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1.0 INTRODUCTION

1.1 BACKGROUND

Tetariakhar Opencast Mine Project is an existing coal mining project of Central Coalfields Limited which is going to be expanded from 0.50 MTPA to nominal capacity 2.00 MTPA and peak capacity 2.50 MTPA. This project is located in Tetariakhar in village Bahera, Block – Balumath, District - Latehar , Jharkhand. The project proponents had applied for environmental clearance of this project to MOEF, New Delhi. One of the conditions of the EAC Committee of Ministry of Environment & Forest, Govt of India was to submit conservation plans of wolf, hyaena and vulture. The EAC meetings and other requirements of environment clearance has been completed.

The Institute Of Forest Productivity had taken up this work in 2008 three conservation plans were prepared separately and submitted in August, 2010 in respect of Wolf, Hyaena & Vulture in study area of Tetariakhar OCP of Central Coalfields Limited.

The reports were submitted to MoEF, GOI, New Delhi and subsequently forwarded to Wildlife Institute Of India, Dehradun in July, 2012 for their comments. The Wildlife Institute of India (WII) submitted their comments and this report has been revised covering all the comments of WII in respect of wolf.

1.2 Mining Project Description

The mine has been designed to produce at the rate of 2.00 MTPA (with peak capacity of 2.50 MTPA) for project life of 11 years. The project is located in northeastern part of North Karanpura Coalfield in Tetariakhar village of Balumath block, Ranchi District of Jharkhand State. It lies between latitudes 23^o 47['] 57["]. N to 23^o 48['] 45["]N and longitudes of 84^o 50['] 27["] E. to 84^o 51['] 14["] E. The specific location of Tetariakhar OCP in the State, District has been shown in Plate-I.

The Tetariakhar OCP, in general is having flat topography with the general elevation ranging from 488m to 510m. The undulating to rolling topographic features have been

well developed to the north of Tetarikhar village where incrop of seams are projected below detritalmantle/alluvium.

Tetariakhar project is surrounded by two meandering southerly flowing fairly large streams i.e. Bhutha Nala in the east and Mukhar Nalain the west. These two nalas join in the south east of the sector to form Ramghat River.

2.0 General Information on Indian Wolf:

Indian wolves (*canis lupus*) are generally smaller than European wolves. The pelage is shorter than that of northern wolves, and has little to no under fur. The colour of its body ranges from greyish to brownish with black tips. The stripes or spots cover the shoulders and body in a random manner. The Indian wolves are more of brown shades. Indian wolves, like Arabian wolves, have short, thin fur in summer, though the hair on their back remains long even in summer. It is thought that this is an adaptation against solar radiation. The distributional range of Indian wolves extends from south of the Himalayas in India Pakistan to Afghanistan, Iran, Iraq, Saudi Arabia UAE and other middle east countries. Indian wolves do not form large packs like northern wolves, though they have been shown to better tolerate crowding conditions in captivity. Packs typically consist of a nuclear family of six to eight animals, though pairs are more common. They tend to breed from mid-October to late December. Indian wolves typically prey on antelopes, rodents and hares. Indian wolves usually hunt in pairs when targeting antelopes. When hunting them, a single wolf will distract the herd with its presence, acting as a decoy, while its pack mate and attacks from behind.

The Indian Wolf is mainly distributed across the states Gujarat, Rajasthan, Haryana, Uttar Pradesh, Madhya Pradesh, Maharashtra, Karnataka and Andhra Pradesh. The Indian wolf, because it takes children and preys on livestock, has long been hunted, though it is protected as an endangered species in India under Schedule 1 of the Indian Wildlife (Protection) Act of 1972. In India, wolves are mainly found outside of protected reserves and feed mainly on domestic animals, like goat or sheep.

The Scientific Classification as follows:

Kingdom	:	Animalia
Phylum	:	Chordata
Class	:	Mamalia
Order	:	Carnivora
Family	:	Canidac
Genus	:	Canis
Species	:	C. Indica
		(R.K. Agarwal et. At 2007)

The Indian wolf, is well distributed in scrub, forests, near to villages of western, central and eastern part of India, mainly. The species took shelter in Himalayan mountain region also. The habit of these wolves is peripheral capturing food (prey animals) from forests like rodents and also village cattle like calves, goats and pigs etc. the prey

Biology:

Appearance: It is commonly called Bheria in Central India. It reaches 60-95 cms in height, 90-105 cms in length. The bushy tail extends to 35-40 cms. Its weight is around 17-18 kgs. The coat colour is typically sandy buff / brownish.

Adaptation: The Indian wolf is well adapted to hot and semi-arid areas. It has adapted to forest, scrubland, grassland, pastoral land and even in open areas.

Habits: Indian wolves shelter under rocks, dunes, caves, shrubs, during day time. The summer months are very harsh in Central India and they shelter nearer to waterholes, valleys and under cooler rocks. The hunting by the wolf is made mostly in the late evening.

Distribution: Indian wolf is distributed in the arid and hot, temperate climates of West, Central and Southern India. It is distributed in the states of Rajasthan , Gujrat,

Maharastra, U.P., Madhya Pradesh, Bihar, Jharkhand, Orissa, Arunachal Pradesh and Karnataka.

The population as per reports is apparently is going down and is protected as endangered species in India under Schedule-I of Wildlife (Protection) Act, 1972.

Feeding: Indian wolf preys in packs of two or more. The major preys are goats, pigs, cattle, rodents, hares, rabbits etc. The lone wolf kills by the capturing neck, but in packs, they can collectively pull down the prey larger animals. The preying is destructive and they kill more than they can eat. The average feeding interval recorded is 3.6 days and average food consumption is 1.8 kg/wolf/day (Jethva and Jhala 2004).

Breeding: The observations have shown that the breeding starts by November and cubs (whelps) are born in December. They take care of young between Feb-March and then disperse to other places. This period has the maximum lifting of village cattle, pigs, goats etc. Both male and female take care of their young cubs.

Conflicts: The Indian wolves are basically forest dwellers but are now adapted to open country, scrub forests and areas nearer to villages due to non availability of natural preys. Sometimes they are in conflicts with human beings.

3.0 Baseline Survey

3.1 Forest & Land Use

The core zone is defined as the area where mining operations shall take place. In this case the leasehold area is 208.47 Ha only.

The buffer zone for Environment Impact Study is the area of 10 kms from the periphery of the mining area and this report shall refer to the core and buffer zones accordingly.

The study of Wolf assessment was made at the site at Tetariakhar in core and buffer zone of the project. The core area consists mostly of barren and agricultural land and the tree cover is sparse. There is no forest land in core zone. Occasional scrub land/ weeds were found during the study. A satellite imagery map showing the detail of land use is given in this report. During our field visits, it was found that the Eastern part of the buffer zone extending to about 1 km with a width of about 250 metres. The presence of Wolf or its den was not sighted in the core zone, but was reported in the buffer zone in 2005 during the baseline survey done by St Xavier's College, Ranchi which is now considered doubtful.

The baseline survey was initially done in 2005 by St Xavier's College, Ranchi wherein during the site visits, it was reported by the locals that Wolfs were seen occasionally, but no sighting was done by St Xavier's College survey team. Further in 2010, Ms Ramkey Enterprises, Hyderabad carried out a repeat fauna baseline study wherein no incidence of Wolf or its den was either sighted or reported by the local people. The presence of Wolf is the core zone is not reported as per the survey. Our scientists also visited the site but no Wolf was either reported or sighted.

The baseline data of other parameters like **land use** and forest is given below. There is no forest land in the core zone and land use of the core zone is follows:

Land use of Core zone

SI	Particulars	Area	
No.		На	%
1	Agriculture & fallow land	133.41	63.99
2	Scrub land with sparse trees	52.04	24.96
3	Waste land	16.18	7.76
4	Grazing	0.00	0.00
5	Surface water bodies	3.44	1.65
6	Others (Mining)	3.40	1.63
	Total	208.47	100.00

Table L 1

There is no forest land found in the core zone. The status of land is either tenancy land or revenue land taken over under Coal Bearing area Act.

Buffer zone of 384.40 Sq Km area including core zone consists of rural settlements, small urban settlement like Balumath and forest area. The land is mainly scrubs land consisiting of small shrubs and weeds (52%) There are no other coal mines in the buffer zone. North Karanpura Coalfield consisting of a number of coal mining projects like Dakra, Churi Benti, Piparwar, Asok etc are out side the buffer zone. Altogether there are 42 villages in the buffer zone. Tow tributaries of Ramghat river i.e. Mukhar nala and bhutiya nala flow along the boundary of Tetarikhar and are main drainage of the area.

Land use/cover class in buffer zone of Tetriakhar OCP				
Land Use/cover Class Area				
Level -I	Level -II	Area in Km ²	%	
(1) Sottlement	(i) Rural	4.60	1.20	
(1) Settlement	Sub-total:	4.60	1.20	
	(i) Dense Forest	46.91	12.20	
(2) Vegetation Cover	(ii) Open Forest	76.34	19.86	
	(iii) Scrub	200.31	52.11	
	Sub-total:	323.56	84.17	
	(i) Crop Land	4.39	1.14	
(3)Agricultural Land	(ii) Fallow Land	41.05	10.68	
	Sub-total:	45.44	11.82	
(A) Wasteland	(i) Waste Upland	8.56	2.23	
(4) Wasteland		8.56	2.23	
(E) Mining Area	(i)Coal Quarry	0.04	0.01	
	Sub-total:	0.04	0.01	
(6) Water bodies	Water bodies	2.20	0.57	
Total: 384.40 100.00				

Table L 2

Analysis of the satellite data reveals that total area of vegetation cover in the buffer zone is 323.56 Km2; out of which 46.91 Km2 (12.20%) is the dense forest, 76.34 Km2 (19.86%) is the open forest and 200.31 Km2 (52.11%) is the scrubs.

A Study area map of the core zone and 10km area of the buffer zone (1: 50,000 scale) clearly delineating the major topographical features such as the land use, surface drainage of rivers/streams/nalas/canals, locations of human habitations, major constructions including railways, roads, pipelines, major industries/mines have been shown in this report in Map No I.

3.2 Survey on Status of faunal Species Including Wolf

3.2.1 Methodology of Sampling:

Fauna studies were carried out during the month of Mar-June-2010, to assess the list of animal species that occur in the core zone and the buffer zone.

The entire mine lease area of Tetariakhar Opencast Project has been surveyed for enumeration of fauna. This area is described here after as the core zone. Within the core zone, all the locations were surveyed using restricted random sampling techniques. Within the 10km buffer zone, 10 sample areas of 10000 m2 each were chosen at random for study of fauna. For the purpose of calculation of Importance Value Indices (IVI) of the core zone, quadrant method was used for estimation of frequency and density while the cover was estimated by modified line intercept method. Sighting and remarks of the local inhabitants were taken into the survey in the field on several field visits.

A list of fauna species were prepared based on the data available and also with the reports of the earlier study done through CMPDI by ST Xavier's College, Ranchi and Ramky Enterprises, Hyderabad is given below.

3.2.2 Baseline Survey of Fauna

The baseline survey was initially done in 2005 by St Xavier's College, Ranchi wherein during the site visits, it was reported by the locals that Wolfs were seen occasionally, nut no sighting was done by St Xavier's College survey team.

Further in 2010, Ms Ramky Enterprises, Hyderabad carried out a repeat fauna baseline study wherein no incidence of Wolf was either sighted or reported by the local people. The presence of Wolf is the core zone is not reported as per the survey. Our scientists also visited the site but no Wolf was either reported or sighted.

Therefore, as per the survey done, there is no evidence of Wolf in the core zone. There are only occasional reported cases of Wolfs in the buffer zone, that too only in 2005 survey.

3.2.3 Study Team:

Rapid survey of terrestrial flora and fauna of the core zone and its environs extending up to a 10 km from the boundary of the core zone was carried out during the month of Mar-June, 2010, under the supervision and guidance of our experts Dr DS Srivastava, Secretary, Nature Conservation Society, Daltonganj and other scientists. The members of Ms Ramkey Enterprises were Prof. K.B.Reddy, Retired Professor of Environmental Biology and a senior consultant on flora, fauna and ecology for several major irrigation and hydroelectric projects and his team comprising of Sri Sai Chandra Sekhar, Zoologist, Sri R. Mohan Reddy, Plant Ecologist and U. Praveen, Environmental Engineer and senior consultants on flora, fauna and ecology.

3.2.4 Environmental Setting of the Study Area

There are no Reserve forests and ecologically sensitive areas such as biosphere reserves, national parks, wildlife sanctuaries and other protected area in and around the mine lease area.

3.2.5 Survey List of fauna in Core and Buffer Zone:

Checklist of vertebrate species other than birds either recorded or reported from the Core zone.

MAMMALS:

Latin Name	Common Name	WPA Schedule		
Bandicota indica	Large bandicoot Rat	Schedule V		
Funambulus palmarum	Three striped squirrel	Schedule IV		
Golunda ellioti myothrix	Indian bush rat	Schedule IV		
Lepus nigricollis	Indian hare	Schedule IV		
Mus booduga	Common Indian field mouse	Schedule V		
Mus musculus homeurus	Home Mouse	Schedule V		
Mus musculus tytleri	Mouse	Schedule V		
Nosokia indica indica	Bandicoot rat	Schedule V		
Rattus rattus gangutrianus	Common Indian rat	Schedule V		
Rattus rattus refescens	Common Indian rat	Schedule V		
Suncus etruscus	Savi pygmy shrew	Schedule V		
Suncus murinus	House shrew	Schedule V		
AMPHIBIANS:				
Rana breviceps	Indian burrowing frog	Schedule IV		
Rana cyanophlyctis	Skipper frog	Schedule IV		
REPTILES:				
Calotes versicolor	Garden lizard	Schedule IV		
Chrysopelea taprobanica	Tree Snake	Schedule IV		
Dryphis nasutus	Whip Snake	Schedule IV		
Echis carinatus	Saw scaled viper	Schedule IV		
Enhydris enhydris	Dhondwa / Common smooth	Schedule IV		
	Water snake			
Hemidactylus flaviviridis	Indian wall lizard	Schedule IV		
Typhlops diardii	Giant Blind Snake	Schedule IV		
Typhlops porrectus	Slender Blind Snake	Schedule IV		

CORE ZONE Table F1

Checklist of vertebrate species other than birds either recorded or reported from the Buffer zone.

MAMMALS:

Latin Name	Common Name	WPA Schedule
Herpestes edwardsi	Indian gray mongoose	Schedule IV
Herpestes smithii	Ruddy mongoose	Schedule II
Paradoxurus hermaphroditus	Common Palm civet	Schedule II
Persbytes entellus	Black faced monkey	Schedule II
Sus scrofa	Wild pig	Schedule III
AMPHIBIANS:		
Rana breviceps	Indian burrowing frog	Schedule IV
Rana cyanophlyctis	Skipper frog	Schedule IV
Rana limnocharis	Indian cricket frog	Schedule IV
Rana tigrina	Indian Bull frog	Schedule IV
REPTILES:		
Chameleo zeylanicus	Chameleon	Schedule II
Chrysopelea taprobanica	Tree Snake	Schedule IV
Dryphis nasutus	Whip Snake	Schedule IV
Echis carinatus	Saw scaled viper	Schedule IV
Naja naja	Nag / Cobra	Schedule II
Ptyas mucosa	Dhaman / Indian Rat snake	Schedule II
Typhlops diardii	Giant Blind Snake	Schedule IV
Varanus bengalensis	Common Indian Monitor	Schedule II
Vipera ruselli	Russel viper	Schedule II

BUFFER ZONE Table F 2

List of birds either spotted or reported from the study area.

Table F 3

Latin Name	Common Name	WPA Schedule
Ceryle rudis	Lesser pied Kingfisher	Schedule IV
Columba livia	Blue rock pigeon	Schedule IV
Coracias benghalensis	Indian roller	Schedule IV
Corvus splendens	House crow	Schedule V
Dendrocitta vagabunda	Indian tree pie	Schedule IV
Dendrocopus marhatensis	Maratha Woodpecker	Schedule IV
Dicrurus macrocercus	Black drongo	Schedule IV
Egretta garzetta	Little egret	Schedule IV
Phalacrocorax carbo	Large Cormorant	Schedule IV
Phalacrocorax niger	Little cormorant	Schedule IV
Psittacula cyanocephala	Blossom headed Parakeet	Schedule IV
Psittacula krameri	Rose-Ringed Parakeet	Schedule IV
Pycnonotus cafer	Red-vented bulbul	Schedule IV
Saxicolodies fulicata	Indian robin	Schedule IV
Streptopelia chinensis	Spotted dove	Schedule IV
Sturnus contra	Pied myna	Schedule IV
Turdoides caudatus	Common babbler	Schedule IV

List of birds either spotted or reported from the buffer zone.

Table F 4

Latin Name	Common Name	WPA Schedule
Acridotheres tristis	Common myna	Schedule IV
Alcedo atthis	Small blue kingfisher	Schedule IV
Andeolv grayii	Pond heron	Schedule IV
Bubulcus ibis	Cattle Egret	Schedule IV
Ceryle rudis	Lesser pied Kingfisher	Schedule IV
Columba livia	Blue rock pigeon	Schedule IV
Coracias benghalensis	Indian roller	Schedule IV

Latin Name	Common Name	WPA Schedule
Corvus splendens	House crow	ScheduleV
Dendrocitta vagabunda	Indian tree pie	Schedule IV
Dendrocopus marhatensis	Maratha Woodpecker	Schedule IV
Dicrurus macrocercus	Black drongo	Schedule IV
Egretta garzetta	Little egret	Schedule IV
Phalacrocorax carbo	Large Cormorant	Schedule IV
Phalacrocorax niger	Little cormorant	Schedule IV
Psittacula cyanocephala	Blossom headed Parakeet	Schedule IV
Psittacula krameri	Rose-Ringed Parakeet	Schedule IV
Pycnonotus cafer	Red-vented bulbul	Schedule IV
Saxicolodies fulicata	Indian robin	Schedule IV
Streptopelia chinensis	Spotted dove	Schedule IV
Sturnus contra	Pied myna	Schedule IV
Sturnus pagodrum	Brahminy myna	Schedule IV
Turdoides caudatus	Common babbler	Schedule IV
Tyto alba	Barn owl	Schedule IV
Upupa epops	Common hoopoe	Schedule IV

3.3 Socio-Economic Study of the buffer zone

In order to determine project impact at the area level, socio-economic profile is an has been study for analyzing any impacts of wild life. Some of the important indicators like demographic growth rate, religious composition, caste composition, literacy, employment pattern etc. are have been studied in the project area and buffer zone of this project. There is only one village in the core zone where only 34 households were there, now only 5 houses are there which will shift from the core zone.

3.3.1 **Physical setting of the project**

Tetariakhar OCP project is situated in the Bahera Village of Balumath block in the district of Latehar falling in the state of Jharkhand. The Core zone is confined to only Tetariakhar tola of Bahera village. There are 34 villages in the buffer zone. List of villages is given below

Table	S	1
-------	---	---

SI.	Name of Village	SI.	Name of Village	SI.	Name of Village
No.		No.		No.	
1	Renchi	13	Kolpatia	25	Chamatu
2	Pipradih	14	komar	26	Hempur
3	Barikhap	15	Balumath	27	Samarost
4	Gurusalve	16	Chataug	28	Chitang
5	Barni	17	Kesiadih	29	Behera
6	Tundahatu	18	Mahutanr	30	Bisunpur
7	Rehea	19	Jilanga	31	Bishrampur
8	Mahuatoli	20	Okea	32	Barwadih
9	Cherra	21	Keri	33	Soparam
10	Karmahi	22	Kharatanr	34	Jogiyadih
11	Pukchu	23	Dandu		
12	Banio	24	Murpa		

Villages in Buffer Zone

3.3.2 The summarized details of population characteristics in the villages surveyed are enumerated below

Table S 2

Population Characteristics

SI. No.	Description	Total Study Area
1	Population	42473 (100%)
2	Male	21881 (51.52%)
3	Female	20592 (48.48%)
4	Scheduled Cast Population	12547 (29.54%)
5	Scheduled Tribe Population	10000 (23.54%)
6	Literates	13210 (31.10%)
7	Male Literates	9154 (21.55%)
8	Female Literates	4056 (9.55%)

3.3.3 Economic profile and Workforce pattern

The summarized details of workforce pattern of the villages surveyed is as mentioned below :

Table S3

Workforce Pattern

SI.No.	Description	Total study area, Percentage
		in bracket
1	Population	42473 (100%)
2	Total worker population	17655 (41.57%)
3	Main worker	8885 (20.92%)
4	Cultivators	4439(10.45%)
5	Agricultural labourers	2355 (5.54%)
6	Other worker	1748(4.12%)

The Census data reveals that 41.57% of the population is working population and rest 60.43% are non workers. 10.45.00% of population is cultivators supported by 5.54% agricultural labourers and other workers are mainly in household industries, mining, construction, transportation and other allied activities.

3.3.4 Basic and Civic amenities

The Basic and civic amenities available in the villages surveyed in the buffer zone are summarised below :-
Table S4

AMENITIES

SI.No.	Description	Total
1	EDUCATIONAL FACILITIES	
	Primary school	31
	Middle school	7
2	MEDICAL FACILITIES	4
3	DRINKING WATER	
	Well	41
	Tank	10
	Hand pump	41

3.3.5 PRIMARY DATA COLLECTION

The sample households have been selected by multi-stage sampling method. The Primary data has been collected from field through questionnaire, schedule, group discussion and interview. Village profile has been made with the help of information collected through interview guide. Caste information, economic activities and health status have been estimated based on the village profile questionnaire.

SECONDARY DATA

Secondary data has been collected from census report 2001, Statistical hand book and the District Gazetteer of Jharkhand.

SAMPLING

250 households have been randomly selected for sample from different villages. While deciding the number of sample households a minimum 20 houses and maximum 35 houses were interviewed.

DATA ANALYSIS

Simple Process of Ratio and Percentage Method has been used to analyze and compare primary data with census 2011. The house hold survey has been validated by the latest census report. On the basis of household sample survey, data analysis have been made about occupations, health aspects, community, income and expenditure pattern, family size and environmental problems of the study area.

Present status and validation of Households Data in Bufferzone

Seven villages have been taken for sample survey in the Buffer zone of the Tetariakhar OCP. According to Census there are 777 households. Out of them 230 households are taken for sample survey, consisting of 1255 individuals with 626 male and 629 females.

Family Size

The average family size is 5.45 in the sample survey and according to Census 2001, it is 5.41.

Community Representation

According to household survey the SC population is 504 while the ST population is 316. In the Census 2001 the population of SC is 1540 and ST 1040.

Literacy

So far as the literacy is concerned 222 persons are literates, out of which 163 male and 59 are females. According to Census 2001, 969 persons are literate out of which 726 are male and 243 are females.

Occupational Structure

The economic profile of the buffer zone suggests that the total working population is 581, in which 149 persons are main workers, 70 are cultivators, 62 persons are Agricultural labourers and 76 persons are in the category of other workers. According to Census 2001, total working population is 2049, 517 are main workers, 208 are cultivators, 137 are agricultural labourers and 168 are other workers.

Housing Pattern

Based on household survey the housing pattern is mixed type both kuccha and pakka are found.

Cropping Pattern

As per the household survey the main crops are rice and vegetables. The source of irrigation is rain water and few wells.

Educational Institutions

According to survey all the sample villages have primary schools. Some of them have Middle, Secondary and Senior Secondary schools in the Buffer zone.

Medical Facility

In most of the Buffer zone villages there is no medical centre but within five to ten km. there is hospital and other medical facilities available.

Power Supply

According to survey there is power supply in most of the villages of study area.

Transportations

In the Buffer zone villages the source of transportation is private vehicles and public vehicle like Jeeps and mini buses.

Historical and Archaeological site

No historical and archaeological site is found in the study area.

Population and average family size of the sample village.

Table S5

Population and average family size of the sample village.

SI.No.	Name of village	No.of Households	Total Population	Family Size
1	Pindarkom	40	238	5.95
2	Pukchu	30	172	5.73
3	Bari Khap	40	230	5.75
4	Goli	35	165	4.71
5	Bukru	45	234	5.2
6	Renchi	20	118	5.9
7	Barni	20	98	4.9
	Total	230	1255	5.45

Source: Sample survey result

Community Representation

Table below depicts the primary data of the total population and Schedule Caste and Schedule Tribes breakup of the sample villages.

Table S6

SC & ST Details

SI.	Name of village	No.of	Total	Schedule	Schedule
No.		Households	Population	Caste	Tribe
1	Pindarkom	40	238	70	00
2	Pukchu	30	172	04	113
3	Bari Khap	40	230	66	130
4	Goli	35	165	16	54
5	Bukru	45	234	162	11
6	Renchi	20	118	88	08
7	Barni	20	98	98	00
	Total	230	1255	504	316

LITERACY

Following Tables depict literacy level in the villages under survey.

SI.	Name of village	No. of	Total	Total	Literate	Literate
No.		Households	Population	Literates	Male	Feale
1	Pindarkom	40	238	41	31	10
2	Pukchu	30	172	20	16	04
3	Bari Khap	40	230	39	29	10
4	Goli	35	165	59	41	18
5	Bukru	45	234	40	25	15
6	Renchi	20	118	15	13	02
7	Barni	20	98	08	08	00
	Total	230	1255	222	163	59

Literacy Table S7

ECONOMIC PROFILE

The economic profile of the Buffer zone village has been shown in the table given below

Table S 8

Economic Profile

SI.	Name of	No of.	Total	Total Work	Main	Cultivators	Agri.	Others
No.	village	Household	Populat	Population	workers		Labour	
			ion				er	
1	Pindarkom	40	238	126	20	07	10	06
2	Pukchu	30	172	103	47	17	28	55
3	Bari Khap	40	230	89	14	10	02	04
4	Goli	35	165	74	20	12	04	05
5	Bukru	45	234	72	14	09	02	04
6	Renchi	20	118	67	31	13	16	02
7	Barni	20	98	50	03	02	00	00
	Total	230	1255	581	149	70	62	76

ANNUAL FAMILY INCOME AND SOURCE OF INCOME

The survey is based upon Interview and response of the people to the questionnaire and schedule.

APPROX ANNUAL INCOME IN RUPEES						SOURCE O	F INCOME IN	۱%	
SI No	Sample	House-	<20	20 Th.–	50 Th. – 1	>1	Primary	Secondary	Tertiary
	village	hold	Th.	50Th.	Lac.	Lac			
1	Tetariakhar	20	5	7	6	2	25	65	10
2	Pindarkom	40	9	12	11	8	22.5	57.5	20
3	Pukchu	30	6	7	9	8	20	53.33	26.66
4	Bari Khap	40	5	14	13	8	12.5	67.5	20
5	Goli	35	5	12	10	8	14.28	62.85	22.85
6	Bukru	45	5	15	13	12	11.11	62.22	26.66
7	Renchi	20	5	7	6	2	25	65	10
8	Barni	20	4	8	7	1	20	75	5
	Total	250	44	82	75	49	17.6	62.8	19.6

INCOME DETAILS Table: S 9

Sample survey results.

The survey of flora (vegetation) is given in Annexure-I.

4.0 Site Specific Conservation Plan (Wolf) :

The Map of Core Zone and buffer zone is given below is given below : (Map No I)



Google earth Image of Tetariakhar OCP with lease hold area (Map No II)



It is evident from the maps that in the core zone there is practically no forest and the area is mostly scrubs and waste land with some temporary agricultural land. The presence of Wolf reported was very few in the buffer zone. The buffer zone consists of low and medium density forest land in the eastern side of the area and the evidence of Schedule IV fauna were found in the forest areas which are about 1-2 kms away from the mining area.

- The Wolf (Wolf Wolf) is not reported in core zone, as such, there is no impact due to mining activity. The conservation plan has been made to ensure that, if any Wolfs are found in the buffer zone, in that case its care can be taken. The prey population for Wolf is available in the buffer zone.
- Regular Status surveys shall be done to locate the Wolfs in the buffer zone of the area. This shall be done through institutes / NGO s.

4.1 Compensation Payment:

The Wolfs may prey upon livestock/cattle in the buffer zone for which domesticated animals should be compensated with prompt payment at the market value. Although there is no reported case of Wolf damaging or killing any cattle form the survey done in 10 villages of the buffer zone, but arrangement of fund has been made of exigencies or requirements which may come in future. Arrangement of funds in this account has been proposed in the conservation plan based on certain assumptions, like probable frequency of damage to domesticated animals / livestock which emerged while discussing with the villagers of the buffer zone. The estimates have been prepared accordingly. Fund provisioning for supplementary food for Wolf has been estimated and suggested for the conservation plan. The village head shall look after the logistics of supplementary feeding, in case of reports of Wolf's presence in any nearby area surrounding the village.

Estimate:

a. Estimate of Compensation for Loss of Domesticated Animals @ Rs 60,000 per year X 10 years= Rs 6.0 Lakh.

b. Estimate for arrangement of supplementary food provision for Wolfs (@ Rs 1.40 Lakh per annum for 6 years)= Rs 8.4 Lakh (Say Rs 9.0 lakhs). Total Rs 15.0 lakhs

4.2 Water Provision:

The water availability shall help the wild life and other animals to thrive in the area. This is not specific to any single species.

Provision of Rs 15.0 Lakh for creation of check dams, water holes etc for water provision (4 check dams, two each on Mukhar Nal & Bhutha Nala and one each on Keri Nala & Dhordhora Nala @ Rs 2.50 Lakh per site i.e. Rs 10.0 Lakh and 5 water holes, one each in Chetang, Rahia, Harhi Pahar, Bishnupur & Balbal @ Rs 1.0 Lakh

per site i.e. Rs. 5.0 Lakh).= Total Rs. 15.0 Lakhs. (This activity is common for all faunal species like wolf & hyaena and others. This amount is already covered in the habitat conservation as a common facility for Hyaena Conservation Plan for the same project and buffer zone, thus this fund can be made available from the hyaena conservation plan fund)

4.3 Protection of Breeding Sites

The breeding sites, if found, shall be protected under this conservation plan. For protection of specific breeding sites, preferably in hilly terrain and near water holes, special guard's posting for protection of these sites will be needed to ensure the safety of Wolfs and cubs and also to the people. The fund provisioning has been suggested, in case, the breeding sites are found in the span of 10 years (during the mining period). The estimate has been prepared for all villages in the buffer zone so that the fund provision is made in the conservation plan.

Estimate: The cost of hiring local guards (from villages) and coordination @ Rs 5000 per month X 2 guards X 34 villages for six months i.e. Rs 20.0 Lakh approximately. The total no of man months for guards as per fund provision are 400 @ Rs 5000 per month. This can be used as and when required in the villages.

4.4 Development of Habitat

The habitat development programme is to ensure the raising of grasses, useful shrubs, checking soil erosion, control of fire etc to develop the habitat for natural food availability to the Wolfs. These activities shall be taken up in the forest areas of Chetang, Rahia, Harhi Pahar, Bishnupur & Balbal, where it is expected that the habitat can support the Wolfs in a better manner. Fund provision @ Rs 4.0 Lakh per area X 5 areas i.e. Rs 20.0 Lakh.

4.5 Health Care:

Provision of anti rabies medicines to each health center of the villages shall be provided in the buffer zone. At the village level this shall be managed through the mukhiya through the local health centre. There are 34 villages in the buffer zone, therefore the estimate is approximately Rs 1500 / village / year. Total cost for 10 years is approx Rs 5.0 lakhs.

4.6 Awareness & Research:

The local NGOs, youth clubs and forest department will be engaged for awareness programme on Wolf conservation through schools and media in a big way to make general mass aware about the Wolf as a predator and scavenger and its services to the eco system. This shall be done in 5 selected villages and the lump sum provision of Rs 5 lakhs can be made. *(The awareness programs for hyaena and wolf can be taken together)*

4.7 Reclamation / Eco restoration in Mining areas

Bio-Reclamation / Afforestation shall be done in the Core zone to with creation of an all season water body with pisciculture which will improve the land use and biodiversity of the area. The plantation of about 2.7 lakhs trees (with 3 tier plantation, grassing etc.) is proposed during and after mining. This shall drastically improve the habitat for wild life and in due course of time there will be induction of further fauna in the area. An exemplary site of reclamation and eco-restoration has been done in one of our mine at Piparwar area, where large scale plantation, creation of water bodies has helped induction of fauna in the area. It has been observed that in winter season even birds from other places come to this eco- restored area.

Reclamation of the mining area shall take place and 3 tier plantation on the periphery and block plantations shall be taken up. Adopt/prescribe mitigation measures where ever / where ever detected. The mining activities shall be going on for about 11 years and thereafter there is proposal of reclamation and post

mining land use plan with sufficient number of trees and one water body which will not only bring the wild life back but also provide a better habitat for additional wild life so that eco system shall be better than before. The cost incurred on the reclamation work is included in the EIA/EMP report (**estimated Rs 815 lakhs**). The reclaimed area shall provide a good habitat for the fauna of the region and also induce fauna from the nearby areas.

The map showing the details of post mining reclamation is given below:



Bio-reclamation In Mining areas: Selection of plant for forestation on the OB dumps and the periphery is of mixed type having a combination of fast and slow growing species with an ultimate aim to have triple storey plantation i.e a combination of species of tall, intermediate and short height plant may be

planted all around the dump. At the top of OB dump slow and short height plant should be planted while at the foot, fast growing and long height plants should be planted. The eco-restoration / bio-réclamation of the area shall provide an excellent habitat for the wild-life.

Greening of peripheral areas will be done. There is need for creating green belt of at least 30-40 meters width to provide and effective dust, noise and sight curtain in the periphery of mining area, this green belt shall also provide a good environment for the wild life. A green belt of 20-30 metres wide in triple storey fashion is proposed to be raised on either side of the roads.

S No.	Description	Land-use (Ha) Of Mining Area					
		Plantation	Water Body	Public use	Undisturbed	Total	
1	Quarry	21.71	86.86	0.00	0.00	108.57	
2	Ext. OB Dump	54.34	0.00	0.00	0.00	54.34	
3	Infrastructure	11.71	0.00	0.00	0.00	11.71	
4	Nala	0.00	5.60	0.00	0.00	5.60	
5	Road	7.00	0.00	5.00	0.00	12.00	
6	Green Belt	15.35	0.00	0.00	0.00	15.35	
7	Safety Zone	2.61	0.00	0.00	0.00	2.61	
Total		111.01	92.46	5.00	0.00	208.47	

Table Showing Bio-Reclamation / Plantation to Be Done In The Mining Area

(@2500 trees / Ha ie. 277525 no of trees)

5.0 Conclusion:

The Tetarikhar OCP is an operating mine since last 25 years. The baseline survey does not indicate the presence of wolf in the core zone and in surrounding areas as was done by the 2 surveys done in 2010. The initial survey of 2005 by St Xavier's College, Ranchi had indicated the reporting of wolf by the villagers, however this was not authenticated by subsequent surveys. Still, the survey of 2005 done by St Xavier's College, Ranchi has been considered for preparation of this conservation plan, as advised by MOEF, New Delhi.

The mine area is devoid of any forest / tree clusters and there is very little chance of wolf being found in the core zone. The conservation plan is more of a preventive measure for management and conservation of wolf which may be useful if wolf is found in the buffer zone at a later stage. The conservation plan covers compensation payment for harm to domesticated animals, water provision and bio-reclamation as habitat conservation and development, awareness and research, protection of breeding sites and health care of the villagers by way of provision for anti-rabies vaccines. The total estimated fund provisioning has been made accordingly.

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ANNEXURE-I

Baseline Survey of Flora

SI.No.	Botanical Name	English Name (Common Name)
--------	----------------	----------------------------

- A. Forest
- I. Trees
- 1.Shorea robustaSal2.Terminalia indicaAsan
- 3. *Madhuca indica* Mahua
- 4. Pterocarpus mansupium Paisar
- 5. Adina cardifolia Haldu
- 6. Bushanamia lanzan Piar
- 7. Semicarpus anacardium Bhelwa
- 8. *Dendrocalamus strictus* Bans (banmboo)

II. Shrubs

- 1. Holarhena antidysentria Dudh koria
- 2. Nyctanthus arbortristis
- 3. Randhia Spp.
- 4. Carissa Spp.
- 5. Indigofera purlchulla
- 6. Wendlandia tinctoria
- 7. *Woodfordia fruticosa* Dhawal
- 8. Croton oblongifolius Masondha
- 9. Zizyphus Spp. Kathber
- 10. Moghania spp. Galfulli

Kanod

Jirhu

Tilai

Sl.No.	Botanical Name	English Name (Common Name)
III.	Grasses	
1.	Hetropogon contortus	Choranth
2.	Enlaliopsis Binata	Sabai
IV.	Climbers	
1.	Bauhinia vahlu	Mahuat
2.	Acucia Pinata	Arar
3.	Butia superbu	lalpulas
4.	Millatia auriculata	gai
5.	Simlax Spp.	Ranulatman
6.	Cryptolepis Buchunani	Dudhlar
В.	Miscellaneous Forest	
١.	Trees.	
1.	Boswellia Serata	Salai
2.	Anogeissus latifolia	Dhaw
3.	Lagerstroentia Parviflora	Sidha
4.	Diospvros melanoxylon	Kend
5.	Prerocarpus marsupium	Paisar
6.	Adina cardifolia	Karam
7.	Mitrajiva parviflora	Gurikaram
8.	Buchanania lanzam	Piar
9.	Sterculia villous	Udal
10.	Cochlaspernuni religiousum	Galzal

Sl.No. Botanical Name

English Name (Common Name)

11.	Madhuca indica	Mahuuuua
12.	Emblica officinalis	Anwala
13.	Aegle marmelas	Bel
14.	Lagerstroemia parviflora	Sidha
15.	Dendrocalamus spp.	Bans(bamboo)

II. Shrubs

1.	Woodfordia fruticosa	Dhawai
2.	Nyclanthus arbortristis	Harsmgar
3.	Zizyphus spp.	Kather

ANNEXURE-II

ADDITIONAL INFORMATION ON THE SUBMITTED REPORT IN RESPECT OF CONSERVATION PLAN OF WOLF

The information regarding forest & wildlife has been provided in this revised report.

Baseline Survey

 The baseline survey was initially done in 2005 by St Xavier's College, Ranchi. Further in 2010, Ms Ramkey Enterprises, Hyderabad carried out a repeat fauna baseline study wherein no incidence of Wolf was either sighted or reported by the local people. The presence of Wolf in the core zone is not reported as per our survey also.

2. Site Specific Wolf Conservation Plan

The site specific Wolf Conservation Plan has been elaborated in this revised report.

The mining area of 208 Ha consists mostly of barren and agricultural land and the tree cover is very sparse. There is no forest land in core zone. Occasional scrub land/ weeds were found during the study. The same can be seen in the remote sensing map and google earth map shown in this report.

There were no reports of Wolf being sighted by the villagers in core & buffer zone during our survey. In this matter, even the baseline survey of M/s Ramky Enterprises, Hyderabad indicates no reports of Wolf being being found in the core zone. The basic information of Wolf has been covered in the baseline survey and no dens or breeding sites were found in the core & buffer zones during the survey.

3. Man Wolf Conflict

No man-Wolf conflicts have been reported in the core as well as buffer zone during our survey as well as the survey of Ms Ramky, Hyderabad. The enquiries were made in 6 villages from the list of villages in the buffer zone. Further, there is no live-stock losses reported. There is no incident of Wolf attacking humans in the core & buffer zones. The basic information of forest areas and fauna survey has been has been provided in this report.

4. Justification Of Budget

The detailed justification of the budget is given in this report at para 4.0. Although, there is no report of Wolf being seen in the core zone, but there are stretches of forest & scrub land in the buffer zone which may provide habitat for Wolf.

5. Threats

S No	Human Activity	Threat Perception to Wolfs
1	Coal Mining	No threats are perceived during mining activity as the presence of
		Wolf is not reported in the core zone.
		There are no cases of Wolf-man conflict and any attacks to humans.
		Further, there are no reports of killing or injury to Wolfs by the
		villagers or outsiders. The mining operations in this area are in
		existence since more than last 25 years and are having activities of
		mining, handling & transport of material, people traveling and no
		such sightings have been done among the local people. Therefore
		the threat to Wolf are nil or negligible due to mining operations. The
		percentage of mining area is only 0.54 % of the total buffer zone
		area.
		Rather, the reclamation measures proposed during and after mining
		shall increase the green cover/ number of trees as well as lead to
		creation of fresh water body (mine lagoon) which will cause habitat
		creation for wild life, which in turn will not only restore but improve
		the prey population and the food chain of Wolf population leading
		to healthy species growth. The eco-restoration through bio-
		reclamation is expected to improve the bio-diversity of the core
		zone. This will further induce fauna into the region and a healthy
		support system for the wild life is expected in the area.
		The total area under bio-reclamation is proposed to be 111.01 Ha
		out of 208.47 Ha (ie 2.77 Lakh trees over 53.25 % of mining area).

2	Agricultural Activity	No report of any damage to crops has been reported by the villagers
		due to Wolf interference. The crop is mainly paddy cultivation (only
		one crop per year).
3	Man- Wolf conflict	There have been no reports of conflict or damage to human beings
		or animals. The survey was done in ten villages of the buffer zone
		through questions posed to the cross section of the population of
		the villagers.
4	Others / Industrial	There are no other threats perceived. There are no industries in the
		buffer zone of the area.

ANNEXURE-III

PLATES/ MAPS

LOCATION MAP P-I



PRESENT POSITION OF MINE P-II



POST MINING LANDUSE OF MINE P-III



FOREST IN BUFFER ZONE P-IV



CENTRAL COALFIELDS LIMITED DARRHANGA HOUSE: RANCHI

Sub: Forwarding Minutes of the 480th (No. 12 of 2019) Meeting of the Board of Directors held on 16.11.2019,

Extract from the final confirmed minutes of the above meeting, in respect of following item, is appended helow:

Item No. 480.3(4): Proposal seeking approval of Corporate Environment Policy for Central Coalfields Limited, based on the Corporate Environment Policy (CEP) 2018 of Coal India Limited.

The Board was apprised of the subject proposal seeking approval of Corporate Environment Policy for Central Coalfields Limited, based on the Corporate Environment Policy (CBP) 2018 of Coal India Limited.

It was further apprised that based upon the observation of CAC in its Draft Performance Audit Report on "Assessment of Environmental Impact due to Mining activities and its mitigation in Coal India Limited and its subsidiaries", CIL had reviewed its Corporate Environment Policy in 2018 and the same had been approved in the 377th CIL Board Meeting held on 20thDecember 2018. Also, as per the directions of 2nd Apex Committee meeting dtd: 18:40:2019 presided by Additional Secretary, Ministry of Coal, the Environment Policy-2018 of CIL also needs be approved by CCL Board.

After detailed deliberations, the Board approved the subject proposal as brought out in the agenda note.

Submitted for immediate necessary action to ensure compliances of the directives of the Board. ATR, may please be submitted within 08 days, so that it can be placed before the Board at least 07 days in advance of the next Board Meeting.

HOD(E&F)

D(T/P&P)

No. CS/BM/480/2019/ 410

Date: 10-12-2019



COAL INDIA LIMITED



CORPORATE ENVIRONMENT POLICY

2018

Environmental Policy Statement:

Coal India Limited(CIL) is committed to promote sustainable development by protecting the environment through integrated project planning & design, prevention / mitigation of pollution, conservation of natural resources, restoration of ecology & biodiversity, recycling/ proper disposal of wastes, addressing climate change and inclusive growth. It also aims to bringing awareness amongst its stakeholders for continual improvement in environmental performances following best practices.

OBJECTIVES:

Coal India Limited shall endeavor to:

- 1. Plan & design projects with due consideration to environmental concerns for Sustainable Development.
- 2. Conduct mining and associated operation in an environmentally responsible manner to comply with applicable laws and other requirements related to environmental aspects.
- 3. Prevent pollution of surrounding habitation by continuous monitoring and adopting suitable measures for environment protection.
- 4. Implement Environment Management Plans in all our mines /projects effectively to mitigate pollution, conservation of natural resources and restoration of ecology & biodiversity.
- 5. Ensure compliance of all applicable Environmental Clearance& Forestry Clearance conditions and other statutory conditions issued by regulatory agencies.
- 6. Recycling of wastes on the principle of REDUCE, REUSE and RECYCLE.
- 7. Put special thrusts on efficient energy utilization / renewable energy as a measure to reduce carbon foot-print.
- 8. Strive for continual improvement in our environmental performances by setting targets, measuring progress and taking corrective action.
- 9. Taking measures to render productive post mining land use.
- 10. Implementation of activities applicable to CIL arising out of International Conventions.
- 11. Create environmental awareness among the employees and the local communities through pro-active communication and training.

STRATEGIES FOR IMPLEMENTATION OF ENVIRONMENTAL POLICY:

Back Ground:

Coal India Limited subscribes to the view of Sustainable Development. Unless the environment can sustain all the developmental activities, any pursuit of development in isolation can cause irreparable damage to the ecosystem and associated environmental attributes. Keeping this view in mind, Coal India Limited attaches top priority towards sustainable development and approved its 'Corporate Environmental Policy' in December 1995, which was subsequently revised in 2012. However the present policy is the amendment of the 2012 Policy and is complimentary to the National Environmental Policy, 2006.

This modification in the present policy is the outcome of the experience gained since 2012 keeping in view the modifications / amendments made time to time in environmental policies and additional stipulation notified by MoEF&CC (Ministry of Environment, Forest& Climate Change) and other organisations concerning mine closure, reclamation of degraded land, environmental clearance etc. and also with the objective of revisiting the corporate policy.

This Policy has a vision of Green Mining and mission of 100% compliance of environmental statutes applicable to coal mining industry.

Strategies: Coal India adopts the strategies appended below for effective implementation:

1. MINE/ PROJECT PLANNING & DESIGN FOR SUSTAINABLE DEVELOPMENT:

- a) Coal being a non-renewal energy source, extraction shall be planned prudently to meet national requirement in a planned way. The projects shall be designed on the principle of Sustainable Development with due consideration to environment, mine closure ,safety and aspirations of the stakeholders at the planning& design stage itself with due regard to mine closer plan.
- b) While preparing the Mining plan/project reports, the effort shall be to incorporate latest mining technologies and equipment's with optimal capacity, which are more environment friendly.

c) All Mining Plan/ project reports will be provided with detailed provisions for ensuring environmental compliances.

2. ENVIRONMENTAL IMPACT ASSESSMENT (EIA) & ENVIRONMENT MANAGEMENT PLAN (EMP)

- a. All mine planning and design shall be environmentally acceptable and operation shall be carried out in such a way as to facilitate the compliance of stipulated environmental standards.
- b. EIA& EMP for all projects shall be formulated as per the approved ToR (Terms of Reference) and pubic consultations for obtaining Environmental Clearance (EC) from MoEF&CC. Similarly, in the existing projects needing enhancement of production capacities with or without increase in land, change of technology, renewal of lease and change in land use etc. fresh EC is required to be sought as per norms. The projects shall be operated after obtaining Consent to Establish (CTE)/Consent to Operate (CTO) from State Pollution Control Boards (SPCB).
- c. Detailed Mine Closure Plans shall be prepared for all existing and new mines as per the MoC (Ministry of Coal) guidelines.

3. COMPLIANCE OF THE STATUTORY REQUIREMENTS:

The implementation of EMP and fulfillment of all other statutory requirements like conditions of EC, FC and consents to establish & operate, including timely submission of returns to statutory bodies and various agencies, are to be ensured at all levels.

4. MEASURES TO MITIGATE POLLUTION:

a) Air Pollution:

- i) Generation of dust is to be controlled at the source to the possible extent with necessary control measures during drilling, blasting, loading, unloading, CHP transfer points etc.
- ii) Deployment of eco-friendly mining technologies.
- iii) Dust generation is to be minimized along coal / waste transportation routes.
- iv) Mechanized transportation of coal to be encouraged.
- v) Green belt is to be created around the source of dust.

b) Water pollution:

- i) The mine water and other effluent shall be treated to ensure the discharge norms as per statute. The treated effluent shall be utilized to the extent possible with a view to achieve maximum water conservation.
- ii) Oil & grease from the effluent shall be removed by Oil & Grease Traps for proper disposal.

c) Noise / ground vibration:

- i) All measures to minimize noise pollution will be taken including maintenance of HEMM, equipment and provision of PPE where required.
- ii) Suitable controlled blasting techniques shall be followed to reduce ground vibration as well as noise pollution.

d)Land reclamation:

- i) Progressive and concurrent reclamation of mined out areas will be carried out as per approved EIA/EMP and Mine Closure Plan (MCP).
- ii) Slopes of external dumps are the important area to be suitably graded / terraced for effective reclamation and plantation.
- iii) Preservation of top soil is required for future use. Old as well as existing nonactive dumps are to be technically and biologically reclaimed.
- iv) Monitoring of reclamation work of all opencast mines will be done through Satellite Surveillance. The outcome shall be put in the websites.

e) Mine closure plans:

Mine Closure Plan (MCP) shall be prepared for each mine. MCP are being delineated in two phases viz. progressive and final mine closure. Appropriate funds are set aside and deposited under a special Escrow fund every year as per MoC guidelines, to be utilized for proper and final mine closure.

For mines closed prior to issuance of MoC guidelines (i.e. 27th August, 2009) suitable action to be taken as per provisions of Mines Act 1952.

f) Mine fire

CIL shall endeavour to reduce occurrence of mine fire and subsidence due to mining activity. Monthly report shall be submitted to top management of the subsidiary and CIL and Quarterly to company board. Action Plan for mine fire control shall be implemented. Monitoring will be done through Satellite Surveillance/other suitable technology.

g) Monitoring:

- I. All receptors in and around the mining projects shall be monitored regularly to assess the efficacy of the pollution control / mitigation measures within stipulated standards.
- II. Effect of mining on the hydrology of the area will be monitored through measurement of water level and its quality of nearby wells and bore holes provided for this purpose. Conservation of water through rainwater harvesting shall be taken up.
- III. Area and Unit environmental cells shall have regular interaction with the people in and around the coal mines and other allied units on matters related to environment to take necessary and timely corrective actions.
- V. Environmental initiatives and monitoring through self and third party environment audit shall be conducted for generating useful data for taking corrective actions and mitigation measures as per guidelines.

h) Other measures:

- I. Special emphasis shall be given to undertake R&D related to various facets of coal mine environmental management in collaboration with Central Mine Planning and Design Institute (CMPDI) and other competent institutions.
- II. Besides ensuring statutory compliance, the CIL desires to set high standards and continual improvement.
- III. A number of mines and establishments of CIL are ISO 14001 certified and balance mines & establishments shall be ISO 14001 certified in phased manner.
- IV. CSR and R&R policies of CIL are to be incorporated for better planning and implementation of the socio-economic issues of coal mining areas.
- V. The coal mining environmental issues are complex and require multidisciplinary approach to address the same. CIL will endeavor to enter into MoUs with expert agencies of repute to assist in environment issues and also help in capacity building of CIL executives.
- VI. CIL conduct periodical medical examination (PME) of its work force on routine basis in compliance of the requirement mining rules and regulation, additional test will be done as and when require.

5. PRESERVATION OF BIO-DIVERSITY:

a) This will start from mine planning including technically and biologically reclamation of mined out areas in collaboration with State Forest Departments, Wild Life Divisions, NGOs etc. working in the fields of biodiversity conservation. b) The selection of species for plantation shall be done in consultation with the local community to include the local species and their preferences, if any.

6. COAL BENEFICIATION / COALWASHERIES:

- a) For beneficiation of Runoff Mines (ROM) coal, washeries are being set up in a phased manner as per requirement and statutes.
- b) Slurry Management System (SMS) in all washeries shall be organized to ensure collection of fines, gainful utilization of rejects viz. power generation in Fluidized Bed Combustion (FBC) plants, selling to brick manufacturers or adopting other environmental friendly disposal options as feasiable.
- c) The reject dumps and tailings shall be suitably handled to avoid any contamination.
- d) The effluent from washeries including tailings pond shall be suitably treated and reused to minimize water consumption with zero discharge concept.

7. CONSERVATION AND CLEAN TECHNOLOGY:

- a) R&D projects shall be taken up to promote clean coal technology and improve the existing technologies.
- b) Energy saved is energy produced. Voluntary energy audit to be done for corrective action to reduce carbon footprint.
- c) Clean Development Mechanisms will be explored for reducing emission of Green House Gases by exploration, identification, preparation of projects reports for extraction of methane from Coal Bed, Coal Mine, Abandoned Mine, Ventilation Air, UG Coal Gasification, generation and utilization of renewable energy etc.

8. AWARENESS PROGRAMME:

- a) Publicity to generate awareness through exchange & communication of information, newsletters and periodicals on environment, seminars, work-shops, celebration of World Environment Day etc. at CIL / Subsidiary HQs, Areas & units to be undertaken. Regular training programs to be organized at various levels to inculcate awareness among employees.
- b) Courses on environmental and forestry laws and Environmental Protection Measures and the Corporate Policy to be organized for project executives for improving knowledge.
- c) CIL to give annual awards for achieving excellence in environment related

issues and activities. These awards will be in recognition for implementation of EMP, land reclamation and compliance of statutes, proper maintenance of air & water quality and noise level.

9. WASTE MANAGEMENT:

CIL will undertake appropriate action for safe handling, storage and disposal of solid waste and hazardous waste generated from its industrial set up and colonies as per relevant rules. The biomedical waste generated from hospitals and dispensaries will be collected and disposed in appropriate facilities created as per statutes. E-waste management and handling of various types of e-waste generated in its operations will be done as per rule.

10. CORPORATE ENVIRONMENT RESPONSIBILITY:

Corporate Environment Responsibility (CER) is mandatory for issuing environmental clearance for all the Greenfield and Brownfield projects as per directives of MoEFCC with effect from 1st May, 2018 (O.M.No.22-65/2017-IAIII dt. 19.06.2018). Budgetary provisions should be kept for implementation of provisions of CER for all the projects which will be submitted to MoEFCC for grant of environmental clearance.

11. INCORPORATION OF VIEWS OF STAKEHOLDERS:

CIL will critically examine and incorporate the viewpoints of various stakeholders like PAPs/PAFs, Parliamentary Committees, Standing Sub-Committees, NGOs etc. CIL being a listed entity with stock exchange, it will also take into consideration the observations/viewpoints of international investors.

12.IMPLEMENTATION OF POLICY:

- i) Manpower: CIL shall have environmental divisions at decision making & operational levels in its structure. The environment department shall be set up and strengthened at:
 - i) CIL Corporate HQ at Kolkata
 - ii) Subsidiary HQs
 - iii) Areas / Units / Collieries / Workshops /Washeries
 - iv) CMPDI (HQ) & CMPDI Regional Institutes
- **ii) Roles and Responsibilities:** The environmental department, set up at company HQs, Areas and Unit levels with appropriate manpower and resources, shall be responsible for implementation of policy, obtaining EC, FC, consent to establish

& operate, statutes requirements and undertaking mitigation measures besides preparation of action plan every year and also to intimate the status of implementation to the management regularly.

iii) Annual Environment Budget (Revenue & Capital): The Annual Environment Budget (revenue & capital) shall be prepared based on the action plan including monitoring of various bench marks and the budget utilization. The year wise funds earmarked for environmental protection measures shall be kept in separate accounts with Environmental cost code.

13. FLEXIBILITY TO THE SUBSIDIARY COMPANIES:

CEP 2018 will be applicable for all subsidiaries of CIL. The subsidiary company Boards have been authorized to approve necessary modifications in CEP 2018 with reference to unique conditions prevailing at the concerned subsidiary.

REVIEW OF ENVIRONMENTAL POLICY:

In view of the present fast changing social, economic and environmental scenario, this Policy shall be reviewed every 5 years to incorporate the changes in the legal, technical, environmental, economic and social inputs prevailing at that time. Whenever, there is change in National Environmental Policy or other National / State relevant policies, Acts etc, this Corporate Environmental Policy would be reviewed and suitably revised.

Land Restoration / Reclamation Monitoring of less than 5 m cu. m. (Coal + OB) Capacity Open Cast Coal Mines of Central Coalfields Limited Based on Satellite Data for the Year 2021



Submitted to:

Central Coalfields Limited


Land Restoration / Reclamation Monitoring of less than 5 m. cu. m (Coal + OB) capacity Open Cast Coal Mines of Central Coalfields Limited Based on Satellite Data for the Year 2021

March-2022



Remote Sensing Cell Geomatics Division CMPDI, Ranchi

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Executive Summary

- **1.0 Project** Land restoration / reclamation monitoring of 7 opencast coal mines of Central Coalfields Ltd. (CCL) producing less than 5 million cu. m. (Coal + OB) per year based on satellite data, on every three year basis.
- 2.0 Objective Objective of the land restoration / reclamation monitoring is to assess the area of backfilled, plantation, social forestry, active mining area, water bodies, and distribution of wasteland, agricultural land and forest land in the leasehold area of the various projects. This will help in assessing the progressive status of mined out land reclamation and to take up remedial measures, if any, required for environmental protection.

3.0 Salient Findings

- Out of the total mine leasehold area of 3960.82 hectares of the 7 OC projects Viz. Tetriakhar, Dakra, Giddi-A, Pundi, Kedla, Jarangdih & Karma considered for monitoring during year 2021; total excavated area is only 823.65 ha out of which 234.37 ha area (28.46%) has been biologically reclaimed, 304.45 ha area (36.96%) has been backfilled and 284.83 ha area (34.58%) is under active mining. It is evident from the analysis that 65.42% area of the OC projects have already been reclaimed and balance 34.58% area is under active mining. Project wise details are given in Table-1 & Fig -1.
- Of the total area reclaimed by CCL, 28.46% is under biological reclamation (plantation on excavated/backfilled area) and 36.96% is under technical reclamation (area under backfilling). Out of 7 projects of CCL, Dakra OCP ranks on top for land reclamation (79.32%) followed by Kedla OCP (79.19%) and Giddi-A OCP (72.17%).

Table-1

Status of Land Reclamation in Central Coalfields Limited based on Satellite Data for the Year 2021

(Projects producing less than 5 mcm of Coal+OB annually)

																		(Area)	n Hectore)		
		(Yat20.20			25005 - 683		and the second	Plantat	ion	· · · · · · ·		82		2020/202	2	Total Ar	ea under	kenno			
SI.	Dissignet	ject Total Leasehold Area		Total Lease	easebold	Technical	Reclamation	Biological I	Reclamation		Other P	lautations	ę.	Area	under	Total E	tcavated	Plant	tation	Total Ar	rea under
No.	riojeci			Area unde	e Berkfilling	Plantation or Backfill	i Estavatid. / led Area	Flantation Over Bure	on Exernal den Dumps	Social Fore Plantat	otry, Avanue ion Etc.	Active	Mining	AI	ea	(% Green Ca in Les	ver Generated ochold)	Recla	mation		
1	2		j	4		1		6		ÿ		8		9 (=d+5+8)		10 (=3+6+7)		11(~4+5)			
100		2018	2021	2018	2021	2018	2021	2018	2021	2018	2021	2018	2021	2018	2021	2018	2021	2018	2021		
1	Tetariakhar	208.47	208.47	0.00	0.00	0.00	0.00	0.00	0.00	1.45	1.45	41.29	40.19	41.29	40.19	1.45	1.45	0.00	0.00		
				0.00%	D.00%	0.00%	0.00%					100.00%	100.00%	1	10102000	8.70%	0.70%	0.00%	0.00%		
2	Dakra	249.72	249.72	27.03	47.98	45.79	37.86	4,90	1.11	9.82	15.77	24.05	22.38	96.87	108.22	60.51	54.74	72.82	85.84		
				27.90%	44.34%	47,27%	34.98%					24.83%	20.68%			24.23%	21.92%	75.17%	79.32%		
3	Giddi-A	510.00	510.00	109.10	90.81	80.14	84.88	43.90	40.61	14.00	13.84	59.16	67.74	248.40	243.43	138.04	139.33	189.24	175.69		
				43.92%	37.30%	32.26%	34.87%					23.82%	27.83%			27.07%	27.32%	76.18%	72.17%		
4	Pundi	1357.20	1357.20	35,87	37.85	13.88	13.88	22.36	22.35	1.35	1.35	30.75	43.39	80.50	95.12	37,59	37.58	49.75	51.73		
				44.56%	39.79%	17.24%	14,59%					38,20%	45,62%			2.77%	2.77%	61.80%	54,38%		
5	Kedla	1157.42	1157.42	49.76	90.56	0.00	90.56	26.75	20.24	1.46	1.45	45.92	47.60	95.68	228.72	28.21	112.26	49.76	181.12		
				52.01%	39.59%	0.00%	39.59%					47.99%	20.81%			2.44%	9.70%	52.01%	79.19%		
6	Jarangdh	179.05	179.05	29.53	29.51	7.20	7.19	3,50	3,44	18,93	17.83	17.83	22.24	54.55	58,94	29.63	28.46	35.73	36.70		
		-	1	54.12%	50.07%	13.20%	12.20%					32.68%	37.73%			16.55%	15.90%	67.32%	62.27%		
.7	Karma	298.96	298,96	0.00	7.74	0.00	0.00	8.03	9.52	1.27	1.27	29.77	41.29	29.77	49,03	9.30	10.89	0.00	7.74		
			1	0.00%	15.79%	0.00%	0.00%					108.00%	84.21%			3,11%	3.64%	0.00%	15.79%		
1	TOTAL	3960.82	3960.82	251.29	304.45	147.01	234.37	109.44	97.37	48.28	52.97	248.77	284.83	647.07	823.65	304.73	384.71	398.30	538.82		
		3	8	38.84%	36.96%	22.72%	28.46%					38.45%	34.58%			7.69%	9.71%	61.55%	65.42%		

Note: In reference of the above Table, different parameters are classified as follows:

(he is colculated with respected to Excovered Avea as upplicable).

Area under Biological Reclamation includes Areas under Plantation done on Backfilled Area Only.
Area under Technical Reclamation includes Area under Backfilling only

3. Area under Active Mining Includes Coal Quarry, Advance Quarry Site and Quarry filled with water etc., if any.

Social Forestry and Plantation on External OB Dumps are not included in Biological Reclamation and are put under separate categories as shown in the above Table.
(%) calculated in the above Table is in respect to Total Excavated Area except for ""Total Area under Plantation" where % is in terms of "Leasehold Area".



1.0 Background

- 1.1 Land is the most important natural resource which embodies soil, water, flora, fauna and total ecosystem. All human activities are based on the land which is the most scarce natural resource in our country. Mining is a site specific industry and it could not be shifted anywhere else from the location where mineral occurs. It is a fact that surface mining activities do effect the land environment due to ground breaking. Therefore, there is an urgent need to reclaim and restore the mined out land for its productive use for sustainable development of mining. This will not only mitigate environmental degradation, but would also help in creating a more congenial environment for land acquisition by coal companies in future.
- 1.2 Keeping above in view, Coal India Ltd. (CIL) issued a work order vide letter no. CIL/WBP/Env/2011/4706 dated 12.10.2012 from Coal India Limited for the period 2012-13 to 2016-17 which was subsequently followed by another work order vide letter no.CIL/WBP/Env/2017/DP/8477 dated 21.09.2017 from Coal India Limited for the period 2017-18 to 2021-22 for land reclamation monitoring of opencast projects and vegetation cover monitoring of 19 major coalfields. According to thiswork order, all mines in CIL with output capacity of 5 million cu. m (coal +OB) shall be monitored every year and all mines below this capacity shall be monitored at an interval of 3 years. All coalfields in CIL shall also be monitored at an interval of 3 years as per a defined plan. The result of land reclamation status of all such mines to be put on the website of CIL, (www.coalindia.in), CMPDI (www.cmpdi.co.in) and the concerned coal companies in public domain. Detail report to be submitted to Coal India and respective subsidiaries.
- 1.3 Land reclamation monitoring of all opencast coal mining projects would also comply the statutory requirements of Ministry of Environment & Forest (MoEF).Such monitoring would not only facilitate in taking timely mitigation measures against environmental degradation, but would also enable coal companies to utilize the reclaimed land for larger socio-economic benefits in a planned way.

1.4 Present report is embodying the finding of the study based on satellite data of the year 2021 carried out for 7 OC projects of Central Coalfields Ltd. producing less than 5 mcm (Coal+OB) per annum.

2.0 Objective

Objective of the land reclamation/restoration monitoring is to assess the area of backfilled, plantation, OB dumps, social forestry, active mining area, settlements and water bodies, distribution of wasteland, agricultural land and forest land in the leasehold area of the project. This is an important step taken up for assessing the progressive status of mined land reclamation and for taking up remedial measures, if any, required for environmental protection.

3.0 Methodology

There are number of steps involved between raw satellite data procurement and preparation of final map. National Remote Sensing Centre (NRSC) Hyderabad, being the nodal agency for satellite data supply in India, provides only raw digital satellite data, which needs further digital image processing for extracting the information and map preparation before uploading the same in the website. Methodology for land reclamation monitoring is given in given in fig 2. Following steps are involved in land reclamation /restoration monitoring:



Figure: 2 Methodology for Land Reclamation Monitoring

- **3.1 Data Procurement:** After browsing the data quality and date of pass on internet, supply order for data is placed to NRSC. Secondary data like leasehold boundary, topo sheets are procured for creation of vector database.
- **3.2** Satellite Data Processing: Satellite data are processed using ERDAS IMAGINE digital image processing s/w. Methodology involves the following major steps:
 - Rectification & Georeferencing: Inaccuracies in digital imagery may occur due to 'systematic errors' attributed to earth curvature and rotation as well as 'non-systematic errors' attributed to satellite receiving station itself. Raw digital images contain geometric distortions, which make them unusable as maps. Therefore, georeferencing is required for correction of image data using ground control points (GCP) to make it compatible to SOI toposheet.
 - Image enhancement: To improve the interpretability of the raw data, image enhancement is necessary. Local operations modify the value of each pixel based on brightness value of neighbouring pixels using ERDAS IMAGINE 14 s/w. and enhance the image quality for interpretation.

• Training set selection

Training set requires to be selected, so that software can classify the image data accurately. The image data are analysed based on the interpretation keys. These keys are evolved from certain fundamental image-elements such as tone/colour, size, shape, texture, pattern, location, association and shadow. Based on the image-elements and other geo-technical elements like land form, drainage pattern and physiography; training sets were selected/identified for each land use/cover class. Field survey was carried out by taking selective traverses in order to collect the ground information (or reference data) so that training sets are selected accurately in the image. This was intended to serve as an aid for classification.

• Classification and Accuracy assessment

Image classification is carried out using the maximum likelihood algorithm. The classification proceeds through the following steps: (a) calculation of statistics [i.e. signature generation] for the identified training areas, and (b) the decision boundary of maximum probability based on the mean vector, variance, covariance and correlation matrix of the pixels. After evaluating the statistical parameters of the training sets, reliability test of training sets is conducted by measuring the statistical separation between the classes that resulted from computing divergence matrix. The overall accuracy of the classification was finally assessed with reference to ground truth data.

Area calculation

The area of each land use class in the leasehold is determined using ERDAS IMAGINE v. 14 software and given in table 2.

• Overlay of Vector data base

Vector data base created based on secondary data. Vector layer like drainage, railway line, leasehold boundary, forest boundary etc. are superimposed on the image as vector layer in the Arc GIS database.

• Pre-field map preparation

Pre-field map is prepared for validation of the classification result

3.3 Ground Truthing:

Selective ground verification of the land use classes are carried out in the field and necessary corrections if required, are incorporated before map finalization.

3.4 Land reclamation database on GIS:

Land reclamation database is created on GIS platform to identify the temporal changes identified from satellite data of different cut-off dates.

4.0 Land Reclamation Status in Central Coalfields Ltd.

- **4.1** Following 7 OC projects producing less than 5 million m³. (Coal + OB together) of Central Coalfields Ltd. have been taken up during the year 2021 for land reclamation monitoring:
 - Tetariakhar
 - Dakra
 - Giddi-A
 - Pundi
 - Kedla
 - Jarangdih
 - Karma
- 4.2 Area statistics of different land use classes present in OC projects in the year 2021 is given in Table 2. Land use maps derived from the satellite data is given in Plate no. 1 to 7. Land use statuses are shown in Fig. 3 9 and field photographs showing plantation and backfilled area in mining projects are shown in photos 1-8.
- 4.3 Study reveals that 65.42% of excavated area has already been reclaimed by CCL in the OC projects, out of which 28.46% area has been planted and 36.96% area are under backfilling.
- 4.4 On comparing the status of land reclamation for the year 2021 with respect to the year 2018 in different projects, it is evident that the area of land reclamation has increased from 398.30 Ha.(Yr. 2018) to 538.82 Ha (Yr .2021).
- **4.5** Out of 7 projects of CCL, Dakra OCP ranks on top for land reclamation (79.32%) followed by Kedla OCP (79.19%) and Giddi-A OCP (72.17%).
- 4.6 In Dakra OCP, plantation has decreased due to OB dumping over it.

Table 2 : STATUS OF LAND RECLAMATION IN CENTRAL COALFIELDS LIMITED BASED ON SATELLITE DATA OF THE YEAR 2021

(Area in Hectare)

		IAKHAR	DAI	KRA	GID	DI-A	PUN	NDI	KED	LA	JARAN	IGDIH	KAF	RMA	тот	`AL
	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%
Dense Forest	0.02	0.01	0.00	0.00	0.00	0.00	182.67	13.46	0.00	0.00	0.00	0.00	0.00	0.00	182.69	4.61
Open Forest	5.09	2.44	0.00	0.00	0.00	0.00	235.65	17.36	174.07	15.04	0.00	0.00	15.08	5.04	429.89	10.85
Total Forest (A)	5.11	2.45	0.00	0.00	0.00	0.00	418.32	30.82	174.07	15.04	0.00	0.00	15.08	5.04	612.58	15.47
Scrubs(B)	40.64	19.49	54.68	21.90	52.13	10.22	301.95	22.25	397.87	34.38	26.02	14.53	60.60	20.27	933.89	23.58
Social Forestry	1.45	0.70	15.77	6.32	13.84	2.71	1.35	0.10	1.46	0.13	17.83	9.96	1.27	0.42	52.97	1.34
Plantation on OB Dump	0.00	0.00	1.11	0.44	40.61	7.96	22.35	1.65	32.61	2.82	3.44	1.92	9.62	3.22	109.74	2.77
Plantation on Backfill (Biological Reclamation)	0.00	0.00	37.86	15.16	84.88	16.64	13.88	1.02	20.24	1.75	7.19	4.02	0.00	0.00	164.05	4.14
Total Plantation(C)	1.45	0.70	54.74	21.92	139.33	27.32	37.58	2.77	54.31	4.69	28.46	15.90	10.89	3.64	326.76	8.25
Total Vegetation(A+B+C)	47.20	22.64	109.42	43.82	191.46	37.54	757.85	55.84	626.25	54.11	54.48	30.43	86.57	28.96	1873.23	47.29
Coal Quarry	27.70	13.29	12.11	4.85	18.02	3.53	21.52	1.59	28.38	2.45	20.22	11.29	37.25	12.46	165.20	4.17
Advance Quarry Site	2.00	0.96	2.29	0.92	4.32	0.85	6.48	0.48	1.11	0.10	1.28	0.71	0.00	0.00	17.48	0.44
Quarry Filled With Water	10.49	5.03	7.98	3.20	45.40	8.90	15.39	1.13	18.11	1.56	0.74	0.41	4.04	1.35	102.15	2.58
Total Area under Active Mining(D)	40.19	19.28	22.38	8.97	67.74	13.28	43.39	3.20	47.60	4.11	22.24	12.41	41.29	13.81	284.83	7.19
Coal Dump	20.08	9.63	2.94	1.18	5.52	1.08	4.18	0.31	5.49	0.47	4.39	2.45	6.51	2.18	49.11	1.24
Barren OB Dump	46.71	22.41	9.19	3.68	13.15	2.58	30.45	2.24	29.23	2.53	12.52	6.99	46.82	15.66	188.07	4.75
Area Under Backfilling (Technical Reclamation)	0.00	0.00	47.98	19.21	90.81	17.81	37.85	2.79	90.56	7.82	29.51	16.48	7.74	2.59	304.45	7.69
Total Area under <i>Mine Operation(D+E)</i>	106.98	51.32	82.49	33.04	177.22	34.75	115.87	8.54	172.88	14.93	68.66	38.33	102.36	34.24	826.46	20.87
	14.46	6.04	10.00	4.40	22.27	(52	105.57	0.25	74.01	6.20	19.01	10.00	21.21	7.00	207.52	7.51
Waste Lands	14.40	0.94	10.99	4.40	33.27	0.32	123.37	9.23	/4.01	0.39	18.01	10.00	21.21	7.09	297.32	7.51
Fly Ash Pond / Sand Body	0.00	0.00	0.00	0.00	5.98	1.17	3.03	0.22	0.66	0.06	0.97	0.54	9.83	3.29	20.47	0.52
Total Wasteland	14.46	6.94	10.99	4.40	39.25	7.70	128.60	9.48	74.67	6.45	18.98	10.60	31.04	10.38	317.99	8.03
Reservoir, Nallah, Ponds	6.10	2.93	1.10	0.44	17.95	3.52	8.68	0.64	16.58	5.53	2.28	1.27	12.04	4.03	64.73	1.63
Total Waterbodies	6.10	2.93	1.10	0.44	17.95	3.52	8.68	0.64	16.58	5.53	2.28	1.27	12.04	4.03	64.73	1.63
Crop Lands	0.00	0.00	0.00	0.00	0.00	0.00	127.37	9.38	1.48	0.13	0.62	0.35	0.00	0.00	129.47	3.27
Fallow Lands	32.46	15.57	1.61	0.64	2.49	0.49	186.01	13.71	201.56	17.41	0.00	0.00	60.01	20.07	484.14	12.22
Total Agriculture	32.46	15.57	1.61	0.64	2.49	0.49	313.38	23.09	203.04	17.54	0.62	0.35	60.01	20.07	613.61	15.49
Urban Settlement	0.00	0.00	18.28	7.32	61.14	11.99	6.91	0.51	26.71	2.31	31.96	17.85	0.00	0.00	145.00	3.66
Rural Settlement	0.40	0.19	17.18	6.88	0.00	0.00	21.80	1.61	26.14	2.26	0.00	0.00	5.57	1.86	71.09	1.79
Industrial Settlement	0.87	0.42	8.65	3.46	20.49	4.02	4.11	0.30	11.15	0.96	2.07	1.16	1.37	0.46	48.71	1.23
Total Settlements	1.27	2.93	44.11	17.66	81.63	16.01	32.82	2.42	64.00	5.53	34.03	19.01	6.94	2.32	264.80	6.69
Grand Total	208.47	100.00	249.72	100.00	510.00	100.00	1357.20	100.00	1157.42	100.00	179.05	100.00	298.96	100.00	3960.82	100.00









85"34'0"E 85°34'30'E \$5"35"8"E 85'35'30'E 85"36'0"E 85°36'30'E 82.21A.E 85'37'30'E 85"38"0"E Area Statistics - Kedla OCP (2021) N KEDLA OCP Classes Coloue Area % of Apea Level-I Level-II (Ha) Total 23'48'D'W Dense Forest 0.00 0.00 Forest Area. Open Forest 174.07 15.04 Total Forest Area 174.07 15.04 Scrubs Scrubs 397.87 34.38 Social Foreitry 1.46 0.13 Plantation on Backfill 20.24 1.75 Plastation Plantation on OB Dump 32.61 2.82 N-06-2 Total Plantation 54.31 4.69 **Total Vegetatian Area** 626.25 54.11 192 1.48 0.13 Crop Land Fallow Land 201.56 17.41 Agriculture Total Agriculture Area 203.04 17.54 Waste Land 74.01 6.39 Sand Body Waste Land 0.66 0.06 **Total Waste Land** 74.67 6.45 Name Vitage N.S. 2.45 Coal Quarty 28.38 Barren OB Damp 29.23 2.53 14.0 Area Under Backfilling 90.56 7.82 Mining Area Water Filled Quarty 18.11 1.56 0.47 Coal Domp 5.49 Advance Quarry Site 1.11 0.10 Total Mining Area 172.88 14.94 **Rural Settlement** 26.14 2.26 N-00,94-07 Settlements Urban Settlement 26.71 2.31 Industrial Settlement 11.15 0.96 5.53 Total Settlement Area 64.00 Water Body River, Ponds 16.58 1.43 Total 1157.42 100.00 Culture Central Coulfields Limited (CCL) 56408027 Title. Land Restantation Monitoring of OC Polyces NL0.84-57 Sebject Desperator lipson Inc Anterior See Laterechtentet steur of Kiels OCP teast schentlin Den (05-25-17) of the year 2011 Friend . Index Chesis of Witt Fronds 10.044 Appinted Activity Avenue 1041 Management cmpdi apatiold Doordan Sizile PLATE- 5 18 Bach Dog Ba HIC KING AN TITE 3434546 85*34'0*E 85'35'0"E 852353075 85736'30'E 85217-0"F 85°37'30"E 65*34'30"E 85*36'0"E 85*38'0*F

Job No 561410027 (CCL)

CMPDI







Figure – 3



Figure - 4



Figure – 5



Figure - 6



Figure – 7



Figure - 8



Figure – 9



Photo 1: Plantation using seed ball technique on OB Dump (Tetariakhar OCP)



Photo 2: Plantation on OB Dump (Tetariakhar OCP)



Photo 3: Plantation on Internal OB Dump/Backfill (Giddi-A OCP)







Photo 5: Plantation over Internal OB Dump (Pundi OCP)



Photo 6: Plantation on Internal OB Dump (Jarangdih OCP)



Photo 7: Backfill Plantation (Dakra OCP)



Photo 8: Plantation over Internal OB Dump (Kedla OCP)



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(A Subsidiary of Coal India Ltd.) Gondwana Place, Kanke Road, Ranchi 834031, Jharkhand Phone : (+91) 651 2230001, 2230002, 2230483, FAX (+91) 651 2231447, 2231851 Wesite : <u>www.cmpdi.co.in</u>, Email : cmpdihq@cmpdi.co.in





TEST REPORT

06/24 Test Report No. 2408	Job No. 094323120	Year	FY2024-25								
Type of Sample	Ambient Air	Quarter Ending	Jun-24								
Customer	CCL										
Mode of Receipt of Sample:	Joint sampling with customer										
Testing/ Sampling Protocol:	IS 5182 (part 14): 2000 ,R -2010, Me	IS 5182 (part 14): 2000 ,R -2010, Methods for Measurement of Air Pollution, LQR 32									
Remarks & Observation:	All samplers placed 1.5 m above grou	All samplers placed 1.5 m above ground level									

TEST RESULT

The sample has been tested with the following results:-

Area : Rajhara Project: Tetariakhar Stations: P.O.Office

		Data of			Wind				
Month	Date of Sampling	receipt of sample	Date of analysis	Total Particulate Matter (PM ₁₀ + >PM ₁₀)TPM	Particulate Matter (PM ₁₀)	Particulate Matter (PM _{2.5})	Sulphur Dioxide (SO ₂)	Nitrogen Oxides (as NO _x)	Direction (from) & Weather
Apr-24 1st FN	06/04/24- 07/04/24	15-04-2024	15/04/24- 16/04/24	205	108	45	< 25	< 6	West Sunny
Apr-24 2nd FN	21/04/24- 22/04/24	02-05-2024	02/05/24- 04/05/24	207	109	58	< 25	< 6	West Sunny
May-24 3rd FN	07/05/24- 08/05/24	16-05-2024	16/05/24- 18/05/24	208	112	51	< 25	< 6	North Sunny
May-24 4th FN	21/05/24- 22/05/24	04-06-2024	04/06/24- 06/06/24	218	118	47	< 25	< 6	West Sunny
Jun-24 5th FN	10/06/24- 11/06/24	17-06-2024	17/06/24- 19/06/24	213	104	53	< 25	< 6	East Sunny
Jun-24 6th FN	22/06/24- 23/06/24	01-07-2024	01/07/24- 03/07/24	203	101	35	< 25	< 6	East Sunny

Note:

1. Gazette Notification No. G.S.R 742(E) dt.25th Sept.'2000 is applicable in core zone.

2. Gazette Notification No. G.S.R 826 (É) dt.Nov.'2009 is applicable in buffer zone.

Analysed By

Authorized Signatory

Note: 1) This Report refers to the values obtained at the time of testing and results related to the items tested





TEST REPORT

06/24 Test Report No. 2409	Job No. 094323120	Year	FY2024-25							
Type of Sample	Ambient Air	Quarter Ending	Jun-24							
Customer	CCL	CCL								
Mode of Receipt of Sample:	Joint sampling with customer									
Testing/ Sampling Protocol:	IS 5182 (part 14): 2000 ,R -2010, Meth	IS 5182 (part 14): 2000 ,R -2010, Methods for Measurement of Air Pollution, LQR 32								
Remarks & Observation:	All samplers placed 1.5 m above groun	id level								

TEST RESULT

The sample has been tested with the following results:-

Area :

Rajhara

Project: Tetariakhar Stations: Workshop

		Date of receipt of sample	Date of analysis		Wind				
Month	Date of Sampling			Total Particulate Matter (PM ₁₀ + >PM ₁₀)TPM	Particulate Matter (PM ₁₀)	Particulate Matter (PM _{2.5})	Sulphur Dioxide (SO ₂)	Nitrogen Oxides (as NO _x)	Direction (from) & Weather
Apr-24 1st FN	06/04/24- 07/04/24	15-04-2024	15/04/24- 16/04/24	213	98	59	< 25	< 6	West Sunny
Apr-24 2nd FN	21/04/24- 22/04/24	02-05-2024	02/05/24- 03/05/24	192	107	55	< 25	< 6	West Sunny
May-24 3rd FN	07/05/24- 08/05/24	16-05-2024	16/05/24- 17/05/24	219	100	52	< 25	< 6	North Sunny
May-24 4th FN	21/05/24- 22/05/24	04-06-2024	04/06/24- 05/06/24	211	95	48	< 25	< 6	West Sunny
Jun-24 5th FN	10/06/24- 11/06/24	17-06-2024	17/06/24- 18/06/24	212	90	44	< 25	< 6	West Sunny
Jun-24 6th FN	22/06/24- 23/06/24	01-07-2024	01/07/24- 02/07/24	194	83	22	< 25	< 6	West Sunny

Note:

1. Gazette Notification No. G.S.R 742(E) dt.25th Sept.'2000 is applicable in core zone.

2. Gazette Notification No. G.S.R 826 (E) dt.Nov.'2009 is applicable in buffer zone.

Analysed By

Authorized Signatory

Note: 1) This Report refers to the values obtained at the time of testing and results related to the items tested





TEST REPORT

06/24 Test Report No. 2410	Job No. 094323120	Year	FY2024-25							
Type of Sample	Ambient Air	Quarter Ending	Jun-24							
Customer	CCL	CCL								
Mode of Receipt of Sample:	Joint sampling with customer									
Testing/ Sampling Protocol:	IS 5182 (part 14): 2000 ,R -2010, Meth	IS 5182 (part 14): 2000 ,R -2010, Methods for Measurement of Air Pollution, LQR 32								
Remarks & Observation:	All samplers placed 1.5 m above groun	nd level								

TEST RESULT

The sample has been tested with the following results:-

Area : Rajhara

Project: Tetariakhar

Stations: Pindercom Village

		Date of receipt of sample	Date of analysis			Wind			
Month	Date of Sampling			Total Particulate Matter (PM ₁₀ + >PM ₁₀)TPM	Particulate Matter (PM ₁₀)	Particulate Matter (PM _{2.5})	Sulphur Dioxide (SO ₂)	Nitrogen Oxides (as NO _x)	Direction (from) & Weather
Apr-24 1st FN	06/04/24- 07/04/24	15-04-2024	15/04/24- 16/04/24	125	57	25	< 25	< 6	West Sunny
Apr-24 2nd FN	21/04/24- 22/04/24	02-05-2024	02/05/24- 03/05/24	129	64	36	< 25	< 6	West Sunny
May-24 3rd FN	07/05/24- 08/05/24	16-05-2024	16/05/24- 17/05/24	125	66	28	< 25	< 6	North Sunny
May-24 4th FN	21/05/24- 22/05/24	04-06-2024	04/06/24- 05/06/24	137	63	28	< 25	< 6	West Sunny
Jun-24 5th FN	10/06/24- 11/06/24	17-06-2024	17/06/24- 18/06/24	151	72	30	< 25	< 6	West Sunny
Jun-24 6th FN	22/06/24- 23/06/24	01-07-2024	01/07/24- 02/07/24	151	67	43	< 25	< 6	West Sunny

Note:

1. Gazette Notification No. G.S.R 742(E) dt.25th Sept.'2000 is applicable in core zone.

2. Gazette Notification No. G.S.R 826 (É) dt.Nov. 2009 is applicable in buffer zone.

Analysed By

Authorized Signatory

Note: 1) This Report refers to the values obtained at the time of testing and results related to the items tested



TEST REPORT

06/24 Test Report No. 2411	Job No. 094323120	Year	FY2024-25		
Type of Sample:	Noise	Quarter Ending	Jun-24		
Customer	CCL				
Testing/ Sampling Protocol:	'The noise pollution (Regulation and Control), Rules,2000, LQR 34				
Remarks:					

TEST RESULT

The sample has been tested with the following results:-

Area :

Rajhara

Project:

Tetariakhar

	Noise Level dB(A) Leq							
Station Name	Apr-24 1st FN	Apr-24 2nd FN	May-24 3rd FN	May-24 4th FN	Jun-24 5th FN	Jun-24 6th FN		
	Day/Night	Day/Night	Day/Night	Day/Night	Day/Night	Day/Night		
Date of recording	06-04-2024	21-04-2024	07-05-2024	21-05-2024	10-06-2024	22-06-2024		
1. P.O.Office	50.3/44.2	45.4/40.3	54.9/49.8	56.1/52.8	49.7/43.8	49.7/43.6		
Date of recording	06-04-2024	21-04-2024	07-05-2024	21-05-2024	10-06-2024	22-06-2024		
2. Work Shop	52.7/46.4	47.7/43.5	55.1/50.7	56.5/52.3	52.8/47.6	51.8/48.5		
Date of recording	06-04-2024	21-04-2024	07-05-2024	21-05-2024	10-06-2024	22-06-2024		
3. Pindercom Village	48.6/42.3	43.4/38.3	48.7/46.4	49.4/46.1	41.5/40.3	46.4/40.2		

Ambient Air Quality Standards in respect of Noise as per 'The noise pollution (Regulation and Control), Rules,2000						
Time Frame	Limits i	n dB(A) Leq				
	Day Time	Night Time				
	6.00 AM to 10.00 PM	10.00 PM to 6.00 AM				
Industrial Area	75	70				
Commercial Area	65	55				
Residential area	55	45				
Silence Zone	50	40				

Analysed By

Authorized Signatory

Note: 1) This Report refers to the values obtained at the time of testing and results related to the items tested

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TEST REPORT

06/24 Test Report No. 2412	Job No. 094323120	Year	FY2024-25		
Type of Sample:	Effluent Water	Quarter Ending	Jun-24		
Customer	CCL	CCL			
Mode of Receipt of Sample:	Joint sampling with customer				
Testing/ Sampling Protocol:	MOEF -SCH-VI STANDARDS, Class 'A', LQR 33				
Remarks & Observation:	Samples received in 2 ltr plastic Jerri cane, Colour as observed is transparent				

TEST RESULT

The sample has been tested with the following results:-

Project:

Area :

Rajhara

Tetariakhar

Stations: Mine Water

		Ana	alysis Results of FN	Effluent Wate	r		
	Parameters \rightarrow				0 & G	pH value	TSS
	Detection Limit				2	0.2	10
MO	DEF -SCH-VI, S	I, STANDARDS, Class 'A' 250 10 5.5 to 9.0				5.5 to 9.0	100
Month	Date of Sampling	Date of Receipt of Sample	Date of Analysis		Value in mg	/l, except pH	
Apr-24 1st FN	07/04/24	15/04/24	15/04/24-30/04/24	16	<2.00	7.6	38
Apr-24 2nd FN	21/04/24	02/05/24	02/05/24-16/05/24	8	<2.00	8.1	29
May-24 3rd FN	08/05/24	16/05/24	16/05/24-03/06/24	12	<2.00	8	34
May-24 4th FN	22/05/24	04/06/24	04/06/24-14/06/24	20	<2.00	7.7	39
Jun-24 5th FN	11/06/24	17/06/24	17/06/24-01/07/24	8	<2.00	7.5	31
Jun-24 6th FN	23/06/24	01/07/24	01/07/24-15/07/24	16	<2.00	7.9	33
BIS Standard & Method				APHA, 23rd Edition, Closed Reflux, Titrimetric Method, 2017	IS 3025/39:1991, R : 2003, Partition Gravimetric	IS-3025/11:1983, R-1996, Electrometric	IS 3025/17:1984, R :1996, Gravimetric Method

Analysed By

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Note: 1) This Report refers to the values obtained at the time of testing and results related to the items tested





Sump Water Discharge

TEST REPORT

06/24 Test Report No. 2413	Job No. 094323120	Year	FY2024-25		
Type of Sample:	Effluent Water	Quarter Ending	Jun-24		
Customer	CCL	CCL			
Mode of Receipt of Sample:	Joint sampling with customer	Joint sampling with customer			
Testing/ Sampling Protocol:	MOEF -SCH-VI STANDARDS, Class 'A', LQR 33				
Remarks & Observation:	Samples received in 5 ltrs plastic Jerri cane, Colour as observed is transparent				

TEST RESULT

The sample has been tested with the following results:-

Area :	Rajhara	Project:	Tetariakhar	Stations:

Analysis Results of FN Effluent Water Parameters $\overline{\rightarrow}$ COD 0 & G TSS pH value **Detection Limit** 4 2 0.2 10 MOEF -SCH-VI, STANDARDS, Class 'A' 250 5.5 to 9.0 10 100 Date of Date of Month Date of Analysis Value in mg/l, except pH Receipt of Sampling Sample Apr-24 1st FN 07/04/24 15/04/24 15/04/24-30/04/24 28 <2.00 7.8 42 Apr-24 2nd FN 21/04/24 02/05/24 02/05/24-16/05/24 24 <2.00 7.7 34 May-24 3rd FN 08/05/24 16/05/24 16/05/24-03/06/24 20 <2.00 7.3 51 May-24 4th FN 22/05/24 32 7.5 04/06/24 04/06/24-14/06/24 <2.00 48 Jun-24 5th FN 11/06/24 17/06/24 17/06/24-01/07/24 16 <2.00 7.9 39 Jun-24 6th FN 23/06/24 01/07/24 01/07/24-15/07/24 24 <2.00 7.3 45 APHA, 23rd IS 3025/17:1984, IS-3025/11:1983, IS 3025/39:1991, Edition, Closed R :1996, **BIS Standard & Method** R : 2003, Partition R-1996. Reflux, Titrimetric Gravimetric Electrometric Gravimetric Method, 2017 Method

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TEST REPORT

06/24 Test Report No. 2414	Job No. 094323120	Year	FY2024-25	
Type of Sample:	Surface Water	Quarter Ending	Jun-24	
Customer	CCL	Date of Receipt:	15-04-2024	
Mode of Receipt of Sample:	Joint sampling with customer	Date of Analysis:	15.04.24-06.06.24	
Testing/ Sampling Protocol:	LQR 33			
Remarks & Observation:	Samples received in 5 ltrs plastic Jerri cane, Colour as observed is transparent			
TEST RESULT				

The sample has been tested with the following results: -

Rajhara **Project:** Tetariakhar Area: **Stations: Date of Sampling:**

1. Upstream of Bhutha Nala

07-04-2024

2. Downstream of Bhutha Nala

07-04-2024

Sl.No	Parameter	Sampling Stations			Detection	BIS Standard & Method	
		1	2	3	4	Limit	
1	Arsenic (as As), mg/l	<0.002	<0.002			0.002	IS 3025/37:1988 R : 2003, AAS-VGA, Method
2	BOD (3 days 27°C), mg/l	2.2	2.1			2.00	IS 3025 /44: 1993, R: 2003 3 day incubation at 27°C
3	Cadmium(as Cd), mg/l	<0.0004	<0.0004			0.0004	APHA, 23rd Edition AAS-GTA Method, 2017
4	Chlorides (as Cl ⁻), mg/l	12	12			2.00	IS-3025/32:1988, R-2007, Argentometric Method
5	Copper (as Cu), mg/l	<0.02	<0.02			0.02	IS 3025/42: 1992, R : 2009, AAS (Air-Ac-Flame)
6	Disolved Oxygen	6.1	6.2			0.10	IS 3025/38: 1989, R:2003, Winkler Azide Method
7	Fluoride (as F ⁻) mg/l	0.45	0.45			0.02	APHA, 23rd Edition, SPADNS Method, 2017
8	Hexavalent Chromium, mg/l	<0.01	<0.01			0.01	APHA, 23rd Edition, 2017 Diphenylcarbohydrazide,
9	Iron (as Fe), mg/l	<0.04	<0.04			0.04	IS 3025 /53: 2003, R : 2009, AAS (Air-Ac-Flame)
10	Lead (as Pb), mg/l	<0.001	<0.001			0.001	APHA, 23rd Edition AAS-GTA Method, 2017
11	Nitrate (as NO ₃ ⁻), mg/l	1.30	1.17			0.50	APHA, 23rd Edition, UV - Spectrophotometric, 2017
12	pH value	8.4	8			1.0	IS-3025/11:1983, R-1996, Electrometric Method
13	Phenolic compounds (as C ₆ H ₅ OH), mg/l	<0.001	<0.001			0.001	APHA, 23rd Edition, 2017, 4-Amino Antipyrine Method,
14	Selenium (as Se), mg/l	<0.0005	<0.0005			0.0005	IS 3025/56:2003 AAS-VGA Method
15	Sulphate (as SO4 ⁻²) mg/l	26	26			2.00	APHA, 23rd Edition Turbidity Method, 2017
16	Total Dissolved Solids, mg/l	214	205			25.00	IS 3025 /16:1984 R : 2006, Gravimetric Method
17	Total Suspended Solids, mg/l	27	16			10.00	IS 3025 /17:1984, R :1996, Gravimetric Method
18	Zinc (as Zn), mg/l	0.009	0.006			0.005	IS 3025 /49: 1994, R : 2009, AAS (Air-Ac-Flame)

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Cmpdi

TEST REPORT

06/24 Test Report No. 2403	Job No. 094323120	Year	FY2024-25		
Type of Sample	Ambient Air	Quarter Ending	June-24		
Customer	CCL				
Mode of Receipt of Sample:	Joint sampling with customer	Joint sampling with customer			
Testing/ Sampling Protocol:	IS 5182 (part 14): 2000 ,R -2010, Me	IS 5182 (part 14): 2000 ,R -2010, Methods for Measurement of Air Pollution, LQR 32			
Remarks & Observation:	All samplers placed 1.5 m above gro	und level			

TEST RESULT

The sample has been tested with the following results:-

Area :	Rajhara	Project:	Tetariakhar	Stations:	P.O.Office
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	Date of	Date of	Date of	Parameters NAAQS (8 Hourly Average)		Wind Direction	
Month	Sampling	sample	sample analysis		CO (in mg/m³)	Ozone (in µg/m ³)	(from) & Weather
April'24 1st FN	06/04/24	06/04/24	06/04/24	<20	0.598	<19.62	W to E
April'24 2nd FN	21/04/24	21/04/24	21/04/24	<20	0.537	<19.62	W to E
May.'24 3rd FN	07/05/24	07/05/24	07/05/24	<20	0.610	<19.62	E to W
May.'24 4th FN	21/05/24	21/05/24	21/05/24	<20	0.578	<19.62	W to E
June '24 5th FN	10/06/24	10/06/24	10/06/24	<20	0.515	<19.62	E to W
June '24 6th FN	22/06/24	22/06/24	22/06/24	<20	0.564	<19.62	E to W

Note:

1. Gazette Notification No. G.S.R 742(E) dt.25th Sept.'2000 is applicable in core zone.

2. Gazette Notification No. G.S.R 826 (E) dt.Nov.'2009 is applicable in buffer zone.

Analysed By

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Note: 1) This Report refers to the values obtained at the time of testing and results related to the items tested




TEST REPORT

06/24 Test Report No. 2404	Job No. 094323120	Year	FY2024-25	
Type of Sample	Ambient Air	Quarter Ending	June-24	
Customer	CCL			
Mode of Receipt of Sample:	Joint sampling with customer			
Testing/ Sampling Protocol:	IS 5182 (part 14): 2000 ,R -2010, Methods for Measurement of Air Pollution, LQR 32			
Remarks & Observation:	All samplers placed 1.5 m above ground level			

TEST RESULT

The sample has been tested with the following results:-

Area :	Rajhara	Project:	Tetariakhar	Stations:	Workshop
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	Date of	Date of	Parameters NAAQS Date of (8 Hourly Average)		Wind Direction		
Month	Sampling	sample	analysis	Ammonia (in µg/m³)	CO (in mg/m³)	Ozone (in µg/m³)	(from) & Weather
April'24 1st FN	06/04/24	06/04/24	06/04/24	<20	0.684	<19.62	W to E
April'24 2nd FN	21/04/24	21/04/24	21/04/24	<20	0.625	<19.62	W to E
May.'24 3rd FN	07/05/24	07/05/24	07/05/24	<20	0.729	<19.62	E to W
May.'24 4th FN	21/05/24	21/05/24	21/05/24	<20	0.789	<19.62	W to E
June '24 5th FN	10/06/24	10/06/24	10/06/24	<20	0.768	<19.62	W to E
June '24 6th FN	22/06/24	22/06/24	22/06/24	<20	0.784	<19.62	W to E

Note:

1. Gazette Notification No. G.S.R 742(E) dt.25th Sept.'2000 is applicable in core zone.

2. Gazette Notification No. G.S.R 826 (E) dt.Nov.'2009 is applicable in buffer zone.

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TEST REPORT

06/24 Test Report No. 2405	Job No. 094323120	Year	FY2024-25			
Type of Sample	Ambient Air	Quarter Ending	June-24			
Customer	CCL	CCL				
Mode of Receipt of Sample:	Joint sampling with customer					
Testing/ Sampling Protocol:	IS 5182 (part 14): 2000 ,R -2010, Methods for Measurement of Air Pollution, LQR 32					
Remarks & Observation:	All samplers placed 1.5 m above ground level					

TEST RESULT

The sample has been tested with the following results:-

Area	:	Rajhara
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Project: Tetariakhar Stations: Pindercom Village

	Date of	Date of	Date of	Parameters NAAQS Date of (8 Hourly Average)	Wind Direction		
Month	Sampling	sample	analysis	Ammonia (in µg/m³)	CO (in mg/m³)	Ozone (in µg/m³)	(from) & Weather
April'24 1st FN	06/04/24	06/04/24	06/04/24	<20	0.485	<19.62	W to E
April'24 2nd FN	21/04/24	21/04/24	21/04/24	<20	0.512	<19.62	W to E
May.'24 3rd FN	07/05/24	07/05/24	07/05/24	<20	0.538	<19.62	E to W
May.'24 4th FN	21/05/24	21/05/24	21/05/24	<20	0.482	<19.62	W to E
June '24 5th FN	10/06/24	10/06/24	10/06/24	<20	0.509	<19.62	W to E
June '24 6th FN	22/06/24	22/06/24	22/06/24	<20	0.547	<19.62	W to E

Note:

1. Gazette Notification No. G.S.R 742(E) dt.25th Sept.'2000 is applicable in core zone.

2. Gazette Notification No. G.S.R 826 (E) dt.Nov.'2009 is applicable in buffer zone.

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06/24 Test Report No. Metal/ 02		Job No 094323120	2024-25
Type of Sample	Ambient Air	Quarter Ending	June'24
Customer	CCL	Date of Receipt of Sample:	15/04/2024
Mode of Receipt of	Joint sampling with customer	Date of Analysis:	06/05/24-15/06/24
Sample:			
Sampling Protocol:	USEPA IO-3.2: 1999, LQR 32		
Remarks & Observation:	All samplers placed 1.5 m above	e ground level	

TEST RESULT

The sample has been tested with the following results: -

Area : Rajhara **Project:** Tetariakhar **Stations: Date of Sampling:** 06-07/04/2024 1. P.O.Office 2. Workshop 06-07/04/2024 3. Pindercom Village 06-07/04/2024 4.

S.N o	Test Parameters	Units		Test R	esult	Method	Limit (NAAQ	Test Method	
	Stations:		1	2	3	4	n Limit	S- 2011)	Test Method
1	Conc. of As in Air	ng/m ³	0.79	1.13	1.35		0.1	6.00	USEPA IO- 3.2:1999
2	Conc. of Ni in Air	ng/m ³	2.04	3.22	4.37		0.1	20.00	USEPA IO- 3.2:1999
3	Conc. of Pb in Air	µg/m ³	0.019	0.016	0.037		0.005	1.0	USEPA IO- 3.2: 1999
4	Conc. of Cu in Air	ng/m ³	0.20	0.28	0.20		0.1	-	USEPA IO- 3.2: 1999
5	Conc. of Cd in Air	ng/m ³	<0.02	0.029	0.028		0.02	-	USEPA IO- 3.2: 1999
6	Conc. of Cr in Air	ng/m ³	0.14	0.20	0.26		0.1	-	USEPA IO- 3.2: 1999
7	Conc. of Hg in Air	ng/m ³	<0.005	<0.005	<0.005		0.005	-	USEPA IO- 3.2: 1999

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TEST REPORT

09/24 Test Report No. 2408	Job No. 094324145	Year	2024-25		
Type of Sample	Ambient Air	Quarter Ending	Sept-24		
Customer	CCL				
Mode of Receipt of Sample:	Joint sampling with customer				
Testing/ Sampling Protocol:	IS 5182 (part 14): 2000 ,R -2010, Methods for Measurement of Air Pollution, LQR 32				
Remarks & Observation:	All samplers placed 1.5 m above ground level				

TEST RESULT

The sample has been tested with the following results:-

Area : Rajha	ara	Project:	Tetariakh	ar	Sta	tions: P	.O.Office		
					Paramet	ters (in µg/	m ³)		
Month	Date of Sampling	Date of receipt of sample	Date of analysis	Total Particulate Matter (PM ₁₀ + >PM ₁₀)TPM	Particulate Matter (PM ₁₀)	Particulate Matter (PM _{2.5})	Sulphur Dioxide (SO ₂)	Nitrogen Oxides (as NO _x)	Wind Direction (from) & Weather
Jul-24 1st FN	10/07/24- 11/07/24	16-07-2024	16/07/24- 18/07/24	195	103	43	< 25	< 6	West Sunny
Jul-24 2nd FN	29/07/24- 30/07/24	01-08-2024	01/08/24- 02/08/24	194	101	54	< 25	< 6	West Sunny
Aug-24 3rd FN	12/08/24- 13/08/24	16-08-2024	16/08/24- 17/08/24	198	104	48	< 25	< 6	North Sunny
Aug-24 4th FN	29/08/24- 30/08/24	02-09-2024	02/09/24- 03/09/24	202	113	44	< 25	< 6	West Sunny
Sep-24 5th FN	12/09/24- 13/09/24	16-09-2024	16/09/24- 17/09/24	203	98	51	< 25	< 6	East Sunny
Sep-24 6th FN	19/09/24- 20/09/24	01-10-2024	01/10/24- 03/10/24	189	96	33	< 25	< 6	East Sunny

Note:

1. Gazette Notification No. G.S.R 742(E) dt.25th Sept.'2000 is applicable in core zone.

2. Gazette Notification No. G.S.R 826 (E) dt.Nov.'2009 is applicable in buffer zone.

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TEST REPORT

09/24 Test Report No. 2409	Job No. 094324145	Year	2024-25			
Type of Sample	Ambient Air	Sept-24				
Customer	CCL					
Mode of Receipt of Sample:	Joint sampling with customer	Joint sampling with customer				
Testing/ Sampling Protocol:	IS 5182 (part 14): 2000 ,R -2010, Methods for Measurement of Air Pollution, LQR 32					
Remarks & Observation:	All samplers placed 1.5 m above ground level					

TEST RESULT

The sample has been tested with the following results:-

Area :	Rajhara	Project:
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Tetariakhar

Stations: Workshop

				Parameters (in $\mu g/m^3$)					
Month	Date of Sampling	Date of receipt of sample	Date of analysis	Total Particulate Matter (PM ₁₀ + >PM ₁₀)TPM	Particulate Matter (PM ₁₀)	Particulate Matter (PM _{2.5})	Sulphur Dioxide (SO ₂)	Nitrogen Oxides (as NO _x)	Wind Direction (from) & Weather
Jul-24 1st FN	10/07/24- 11/07/24	16-07-2024	16/07/24- 18/07/24	202	93	56	< 25	< 6	West Sunny
Jul-24 2nd FN	29/07/24- 30/07/24	01-08-2024	01/08/24- 02/08/24	180	100	51	< 25	< 6	West Sunny
Aug-24 3rd FN	12/08/24- 13/08/24	16-08-2024	16/08/24- 17/08/24	208	95	50	< 25	< 6	North Sunny
Aug-24 4th FN	29/08/24- 30/08/24	02-09-2024	02/09/24- 03/09/24	196	91	45	< 25	< 6	West Sunny
Sep-24 5th FN	12/09/24- 13/09/24	16-09-2024	16/09/24- 17/09/24	201	86	42	< 25	< 6	West Sunny
Sep-24 6th FN	20/09/24- 21/09/24	01-10-2024	01/10/24- 03/10/24	182	80	30	< 25	< 6	West Sunny

Note:

1. Gazette Notification No. G.S.R 742(E) dt.25th Sept.'2000 is applicable in core zone.

2. Gazette Notification No. G.S.R 826 (E) dt.Nov.'2009 is applicable in buffer zone.

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TEST REPORT

09/24 Test Report No. 2410	Job No. 094324145	Year	2024-25
Type of Sample	Ambient Air	Quarter Ending	Sept-24
Customer	CCL		
Mode of Receipt of Sample:	Joint sampling with customer		
Testing/ Sampling Protocol:	IS 5182 (part 14): 2000 ,R -2010, Meth	nods for Measurement of	of Air Pollution, LQR 32
Remarks & Observation:	All samplers placed 1.5 m above grour	nd level	

TEST RESULT

The sample has been tested with the following results:-

Area :	Rajhara	Project:
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Tetariakhar

Stations: Pindercom Village

				Parameters (in µg/m ³)					XX / 1
Month	Date of Sampling	Date of receipt of sample	Date of analysis	Total Particulate Matter (PM ₁₀ + >PM ₁₀)TPM	Particulate Matter (PM ₁₀)	Particulate Matter (PM _{2.5})	Sulphur Dioxide (SO ₂)	Nitrogen Oxides (as NO _x)	Wind Direction (from) & Weather
Jul-24 1st FN	10/07/24- 11/07/24	16-07-2024	16/07/24- 18/07/24	119	54	23	< 25	< 6	West Sunny
Jul-24 2nd FN	29/07/24- 30/07/24	01-08-2024	01/08/24- 02/08/24	121	59	33	< 25	< 6	West Sunny
Aug-24 3rd FN	12/08/24- 13/08/24	16-08-2024	16/08/24- 17/08/24	124	57	25	< 25	< 6	North Sunny
Aug-24 4th FN	29/08/24- 30/08/24	02-09-2024	02/09/24- 03/09/24	127	61	27	< 25	< 6	West Sunny
Sep-24 5th FN	12/09/24- 13/09/24	16-09-2024	16/09/24- 17/09/24	143	68	29	< 25	< 6	West Sunny
Sep-24 6th FN	20/09/24- 21/09/24	01-10-2024	01/10/24- 03/10/24	140	64	38	< 25	< 6	West Sunny

Note:

1. Gazette Notification No. G.S.R 742(E) dt.25th Sept.'2000 is applicable in core zone.

2. Gazette Notification No. G.S.R 826 (E) dt.Nov.'2009 is applicable in buffer zone.

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09/24 Test Report No. 2411	Job No. 094324145	Year	2024-25
Type of Sample:	Noise	Quarter Ending	Sept-24
Customer	CCL		
Testing/ Sampling Protocol:	'The noise pollution (Regulation and Contr	rol), Rules,2000, LQR 34	
Remarks:			

TEST RESULT

The sample has been tested with the following results:-

Area :

Rajhara

Project:

Tetariakhar

	Noise Level dB(A) Leq							
Station Name	Jul-24 1st FN	Jul-24 2nd FN	Aug-24 3rd FN	Aug-24 4th FN	Sep-24 5th FN	Sep-24 6th FN		
	Day/Night	Day/Night	Day/Night	Day/Night	Day/Night	Day/Night		
Date of recording	10-07-2024	29-07-2024	12-08-2024	29-08-2024	12-09-2024	27-09-2024		
1. P.O.Office	53.7/48.4	45.2/40.3	54.6/49.3	50.8/48.1	50.7/48.4	5.3/45.2		
Date of recording	10-07-2024	29-07-2024	12-08-2024	29-08-2024	12-09-2024	27-09-2024		
2. Work Shop	54.9/49.6	50.5/46.4	56.7/49.3	51.3/48.9	51.8/49.3	56.7/48.3		
Date of recording	10-07-2024	29-07-2024	12-08-2024	29-08-2024	12-09-2024	27-09-2024		
3. Pindercom Village	49.7/45.2	42.2/37.1	50.1/44.5	50.8/48.6	51.2/49.5	52.1/44.3		

Ambient Air Quality Standards in respect of Noise as per 'The noise pollution				
(Regulation and Control), Rules,2000				
Time Frame	Limits in dB(A) Leq			
	Day Time	Night Time		
	6.00 AM to 10.00 PM	10.00 PM to 6.00 AM		
Industrial Area	75	70		
Commercial Area	65	55		
Residential area	55	45		
Silence Zone	50	40		

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TEST REPORT

09/24 Test Report No. 2412	Job No. 094324145	Year	2024-25
Type of Sample:	Effluent Water	Quarter Ending	Sept-24
Customer	CCL		
Mode of Receipt of Sample:	Joint sampling with customer		
Testing/ Sampling Protocol:	MOEF -SCH-VI STANDARDS, C	lass 'A', LQR 33	
Remarks & Observation:	Samples received in 2 ltr plastic Jerri cane, Colour as observed is transparent		

TEST RESULT

The sample has been tested with the following results:-

Area	:	Rajhara

Project:

Tetariakhar

Mine Water Stations:

		Analysis	Results of FN	Effluent W	ater		
Parameters \rightarrow			COD	0 & G	pH value	TSS	
	Detection Limit			4	2	0.2	10
MOEF -SCH-VI, STANDARDS, Class 'A'			250	10	5.5 to 9.0	100	
Month Date of Date of Sampling Sample Sample Sample Sample Sample Date of Analysis				Value in mg	g/l, except pH	[
Jul-24 1st FN	13/07/24	16/07/24	16/07/24- 31/07/24	8	<2.00	8.25	37
Jul-24 2nd FN	31/07/24	01/08/24	01/08/24- 16/08/24	12	<2.00	7.46	41
Aug-24 3rd FN	14/08/24	16/08/24	16/08/24- 31/08/24	16	<2.00	7.61	23
Aug-24 4th FN	31/08/24	02/09/24	02/09/24- 16/09/24	8	<2.00	7.45	29
Sep-24 5th FN	14/09/24	16/09/24	16/09/24- 30/09/24	16	<2.00	7.57	35
Sep-24 6th FN	30/09/24	01/10/24	01/10/24- 10/10/24	12	<2.00	8.15	47
BIS Standard & Method				APHA, 23rd Edition, Closed Reflux, Titrimetric Method, 2017	IS 3025/39:1991, R : 2003, Partition Gravimetric	IS- 3025/11:1983, R-1996, Electrometric	IS 3025/17:1984, R :1996, Gravimetric Method

Analysed By

Authorized Signatory

Note: 1) This Report refers to the values obtained at the time of testing and results related to the items tested





TEST REPORT

09/24 Test Report No. 2413	Job No. 094324145	Year	2024-25
Type of Sample:	Effluent Water	Quarter Ending	Sept-24
Customer	CCL		
Mode of Receipt of Sample:	Joint sampling with customer		
Testing/ Sampling Protocol:	MOEF -SCH-VI STANDARDS, Class	'A', LQR 33	
Remarks & Observation:	Samples received in 5 ltrs plastic Jerri cane, Colour as observed is transparent		

TEST RESULT

The sample has been tested with the following results:-

roject: Tetar	12
	roject: Tetar

akhar

Sump Water Discharge Stations:

Analysis Results of FN Effluent Water								
	COD	0 & G	pH value	TSS				
	4	2	0.2	10				
MOEF -	SCH-VI, STA	NDARDS, Clas	s 'A'	250	10	5.5 to 9.0	100	
Month Date of Sampling Sample Date of Analysis				Value in mg/l, except pH				
Jul-24 1st FN	13/07/24	16/07/24	16/07/24- 31/07/24	16	<2.00	8.24	54	
Jul-24 2nd FN	31/07/24	01/08/24	01/08/24- 16/08/24	20	<2.00	7.81	49	
Aug-24 3rd FN	14/08/24	16/08/24	16/08/24- 31/08/24	8	<2.00	7.76	39	
Aug-24 4th FN	31/08/24	02/09/24	02/09/24- 16/09/24	16	<2.00	7.38	42	
Sep-24 5th FN	14/09/24	16/09/24	16/09/24- 30/09/24	12	<2.00	7.71	46	
Sep-24 6th FN	30/09/24	01/10/24	01/10/24- 10/10/24	16	<2.00	7.68	38	
BIS Standard & N	vlethod			APHA, 23rd Edition, Closed Reflux, Titrimetric Method, 2017	IS 3025/39:1991, R : 2003, Partition Gravimetric	IS- 3025/11:1983, R-1996, Electrometric	IS 3025/17:1984, R :1996, Gravimetric Method	

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09/24 Test Report No. 2414	Job No. 094324145	Year	2024-25			
Type of Sample:	Surface Water	Quarter Ending	Sept-24			
Customer	CCL	Date of Receipt:	16-07-2024			
Mode of Receipt of Sample:	Joint sampling with customer	Date of Analysis:	16/07/24-18/019/24			
Testing/ Sampling Protocol:	LQR 33					
Remarks & Observation:	Samples received in 5 ltrs plastic Jerri cane, Colour as observed is transparent					

TEST RESULT

Project:

The sample has been tested with the following results: -

Rajhara

Area : **Stations:**

1. Upstream of Bhutha Nala 2. Downstream of Bhutha Nala Tetariakhar **Date of Sampling:** 12/07/2024 12/07/2024

Sl.No	Parameter	Sampling Stations				Detection	BIS Standard & Method	
		1 2 3 4			Limit			
1	Arsenic (as As), mg/l	<0.002	<0.002			0.002	IS 3025/37:1988 R : 2003, AAS-VGA, Method	
2	BOD (3 days 27°C), mg/l	2.3	2.1			2.00	IS 3025 /44: 1993, R: 2003 3 day incubation at 27°C	
3	Cadmium(as Cd), mg/l	<0.0004	<0.0004			0.0004	APHA, 23rd Edition AAS-GTA Method, 2017	
4	Chlorides (as Cl ⁻), mg/l	6	8			2.00	IS-3025/32:1988, R-2007, Argentometric Method	
5	Copper (as Cu), mg/l	<0.02	<0.02			0.02	IS 3025/42: 1992, R : 2009, AAS (Air-Ac-Flame)	
6	Disolved Oxygen	6.2	6			0.10	IS 3025/38: 1989, R:2003, Winkler Azide Method	
7	Fluoride (as F ⁻) mg/l	0.51	0.69			0.02	APHA, 23rd Edition, SPADNS Method, 2017	
8	Hexavalent Chromium, mg/l	<0.01	<0.01			0.01	APHA, 23rd Edition, 2017 Diphenylcarbohydrazide,	
9	Iron (as Fe), mg/l	<0.04	<0.04			0.04	IS 3025 /53: 2003, R : 2009, AAS (Air-Ac-Flame)	
10	Lead (as Pb), mg/l	<0.001	<0.001			0.001	APHA, 23rd Edition AAS-GTA Method, 2017	
11	Nitrate (as NO ₃ -), mg/l	1.13	7.42			0.50	APHA, 23rd Edition, UV - Spectrophotometric, 2017	
12	pH value	8.08	8.06			1.0	IS-3025/11:1983, R-1996, Electrometric Method	
13	Phenolic compounds (as C ₆ H ₅ OH), mg/l	<0.001	<0.001			0.001	APHA, 23rd Edition, 2017, 4-Amino Antipyrine Method,	
14	Selenium (as Se), mg/l	<0.0005	<0.0005			0.0005	IS 3025/56:2003 AAS-VGA Method	
15	Sulphate (as SO4 ⁻²) mg/l	14	17			2.00	APHA, 23rd Edition Turbidity Method, 2017	
16	Total Dissolved Solids, mg/l	142	193			25.00	IS 3025 /16:1984 R : 2006, Gravimetric Method	
17	Total Suspended Solids, mg/l	35	38			10.00	IS 3025 /17:1984, R :1996, Gravimetric Method	
18	Zinc (as Zn), mg/l	0.006	<0.005			0.005	IS 3025 /49: 1994, R : 2009, AAS (Air-Ac-Flame)	

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09/24 Test Report No. Meta	al/ 02	Job No 094324145	2024-25		
Type of Sample Ambient Air		Quarter Ending	Sept.'2024		
Customer	CCL	Date of Receipt of Sample:	16/07/2024		
Mode of Receipt of Joint sampling with customer		Date of Analysis:	06/09/24-20/10/24		
Sample:					
Sampling Protocol:	USEPA IO-3.2: 1999, LQR 32				
Remarks & Observation:	& Observation: All samplers placed 1.5 m above ground level				

TEST RESULT

The sample has been tested with the following results: -

Area :	Rajhara	Project:	Tetariakhar	
Stations:			Date of Sampling:	
	1. P.O.Office		10-11/07/2024	
	2. Workshop		10-11/07/2024	
	3. Pindercom Village 4.		10-11/07/2024	

S.N o	Test Parameters	Units	Test Result				Method	Limit (NAAQ	Test Method
Stations:			1	2	3	4	n Limit	S- 2011)	rest method
1	Conc. of As in Air	ng/m ³	0.91	1.53	0.74		0.1	6.00	USEPA IO- 3.2:1999
2	Conc. of Ni in Air	ng/m ³	4.77	6.62	5.52		0.1	20.00	USEPA IO- 3.2:1999
3	Conc. of Pb in Air	µg/m³	0.036	0.026	0.017		0.005	1.0	USEPA IO- 3.2: 1999
4	Conc. of Cu in Air	ng/m ³	0.336	0.171	0.208		0.1	-	USEPA IO- 3.2: 1999
5	Conc. of Cd in Air	ng/m ³	0.025	<0.02	0.052		0.02	-	USEPA IO- 3.2: 1999
6	Conc. of Cr in Air	ng/m ³	0.19	0.13	0.16		0.1	-	USEPA IO- 3.2: 1999
7	Conc. of Hg in Air	ng/m ³	<0.005	<0.005	<0.005		0.005	-	USEPA IO- 3.2: 1999

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