



HALF YEARLY COMPLIANCE OF ENVIRONMENTAL CLEARANCE (EC)

**KERANDARI COAL MINING PROJECT, NTPC MINING LTD
HAZARIBAGH, JHARKHAND 825311
Period: April'2024 to September'2024**



Ref. No.: NTPC/KDCMP/EMG/2024/25

Date: 30.11.2024

To,
The Deputy Director General of Forest (Central),
MoEF & CC, Integrated Regional Office,
2nd Floor, Headquarter- Jharkhand State Housing Board,
Harmu Chowk Ranchi (Jharkhand) – 834 002.
e-mail: ro.ranchi-mef@gov.in

Subject: Submission of six-monthly progress report for Kerandari Coal Mining Project (6 MTPA) area of 1173 Ha located in North-Karanpura Coalfields in Hazaribagh Dist., Jharkhand, for the period **April'2024 to September'2024.**

Ref1: EC letter no: J-11015/133/2007-IA. II(M) dated 31st March'2010.

Ref2: EC Amendment Ltr No: J-11015/120/2007-IA. II(M) dated 05.02.2024.

Dear Sir,

With reference to the above-mentioned subject in respect of Environment Clearance, please find enclosed with the six-monthly progress report in compliance to conditions of Environment Clearance letter and its amendment for Kerandari Coal Mining Project (6 MTPA), NTPC Mining Ltd., for the period **April'2024 to September'2024.**

This is for your kind information please.
Thanking you,

Yours faithfully



Pravin Ramdas Sanap
Asst. Officer (EMG)
Kerandari CMP
NTPC Mining Limited

Encl.: A/a

CC:

1. Regional Director, Kolkata, Central Pollution Control Board, Southern Conclave, Block 502, 5th & 6th Floors, Rajdhanga Main Road, Kolkata-700107 (W B). Email: mkbiswas.cpcb@nic.in
2. Member Secretary, Jharkhand State Pollution Control Board, Ranchi-834004 (Jharkhand), email: ranchijspcb@gmail.com
3. Regional Officer, JSPCB, Hazaribagh-825301, mail: jspcb_hazaribagh@rediffmail.com

**EC Letter No. J-11015/133/2007-IA. II (M) Dated 31st March 2010 and
revalidation on 28.10.2015**

S. N.	CONDITIONS	Compliance status as on 30.09.2024
2.	The Ministry of Environment & Forests hereby accords Environmental Clearance for the above-mentioned Kerandari Opencast Coal Mine Project of M/s National Thermal Power Corporation Ltd. for production of Coal at 6 MTPA annual rated capacity in a total project area of 1173 ha under the Environmental Impact Assessment Notification, 2006 and subsequent amendments thereto and circulars thereto subject to the compliance of the terms and conditions mentioned below:	Being Complied.
A.	Specific Conditions	
(i)	Mining shall not be carried out in 169.35 ha of forestland until prior forestry clearance is obtained under FC Act 1980.	Complied. KDCMP obtained Stage-I & Stage-II Forest Clearance for diversion of 243.32 Ha forest land involve in ML vide letter "F. No. 8-53/2011 FC dated 01.02.2012 & 28.08.2019", respectively. (Attached as Annexure-1)
(ii)	Prior approval of the Flood & Irrigation Department shall be obtained for the proposed route for diversion of Baldeori nala, design of the embankment and realignment of the diverted nala along the fault lines. A minimum safe distance of 60 m distance shall be maintained between the realigned nala and embankment. The embankment shall be a minimum 3 m higher than the HFL and 30 m wide at the bottom the slope of the embankment shall at least 2:1 towards the ML, compacted and stone pitching done towards the river and shall be stabilized with plantation. Materials such as OB shall be tested for strength before using for construction of embankment.	Being Complied. A study for diversion of nala was conducted through CWPRS, Pune for diversion proposal of Baldeori Nala. Approvals from Water Resources Dept accorded for diversion of Baldeori nala vide Memo no: 2/PMC- 55/2009-223 dated 19.03.2013 as per the specified design of CWPRS. (Attached as Annexure-2) Mining activities started in the month of Apr'23. Diversion of Baladeori Nala shall be required before the 6th year of mining (2029-2030). Nala diversion and construction of embankment will be started in Apr'26 and completed before Mar'29. Plantation shall be done during the monsoon season of 2029.
(iii)	Topsoil shall be stacked properly within the earmarked area for one topsoil dump of a maximum height of 15 m height with proper slope at earmarked site(s) and shall be used concurrently for reclamation and development of green belt.	Being Complied. Topsoil is being stacked in suitable and within earmarked land. As per stipulation, the stacked topsoil shall be further used for reclamation & development of green belt. (Photographs attached as Annexure-3)
(iv)	Of the total 621.22 Mm ³ of OB generated to be stored in external OB dumps, 84.14 Mm ³ of OB shall be stacked at earmarked external OB dumpsite of an area of 130 ha and shall not exceed a height of 120 m consisting of 4 benches of 30 m each. The ultimate slope of the dump shall not exceed 28°. Reclamation of the external OB dump shall be done using native species and species of economic importance. Monitoring and management of reclaimed dumpsites shall continue until the	Being Complied. The mining operation has started on 5th April 2023. At present OB has been kept at designated location, ultimate slope angle being maintained at 28°, presently height of the dump is 40m. OB Dump Stability study has been carried out by CIMFR, Dhanbad and the recommendations are being followed. As per approved mining plan reclamation will start from 6 th year from start of the mining. All the provisions have been incorporated in the

	<p>vegetation becomes self-sustaining. Compliance status shall be submitted to the Ministry of Environment & Forests and its Regional Office located at Bhubaneswar on yearly basis. The balance 210 Mm³ of OB to be temporarily stored in an external OB dump of an area of 250 ha in the mineralized area of the adjoining Chhatti- Bariatu (South) Coal Mine Block of M/s NTPC shall be entirely re-handled at the end of mine life into the de-coaled voids of the Kerandari Coalmine and the backfilled area biologically reclaimed.</p>	<p>approved mine closure plan and it is being complied. Plantation of 3800 plants of different species (Jamun, Arjun, Mahuguni, Gulmohar, Karanj, Sisam, Chakundi, Neem, Kathal, Kadam, Aam) near OB dump with density not less than 2500 per Ha. Further, 60 kg of Babool, Subabool and Grass seeds have also been spread over the slop of dump, to arrest the erosion of dump slope. At the end of mining, a total area of 472.29 Ha. (which includes reclaimed external OB dump (130 Ha), backfilled area (332.71 Ha), along ML boundary (7.58 Ha) along roads, infrastructure (2Ha)) will be converted as an afforested area of not less 2500 per Ha. (Photographs attached as Annexure-4)</p>
(v)	<p>The design of the dumps shall be done incorporating the specific recommendations of the slope Stability study for the internal and external dumps keeping in view the rainfall (peak), Soil characteristics, proposed dump stabilization measures, etc. Regular monitoring of dump slope stability shall be also carried out. These modifications shall also be appropriately reflected in the Mining Plan.</p>	<p>Being Complied. The design of dumps has been studied by CIMFR, Dhanbad and the recommendations have been incorporated in the Mine Closure plan which was approved by MOC incorporating necessary changes vide letter number 34011-10-2011-CPAM dated 11.11.2013. The latest dump slope stability study was done by the Dept. of Mining Engineering IIT BHU in August 2023. (Attached as Annexure-5)</p>
(vi)	<p>A thick 3-tier plantation shall be developed between quarry, external OB dump and habitation using native species and species of economic importance.</p>	<p>Being Complied. The topsoil and OB dump are located on the northern side of the mine, and 3800 native species in 3-tier have been planted in the safety zone area. (Attached as Annexure-4)</p>
(vii)	<p>Catch drains and siltation ponds of appropriate size shall be constructed to arrest silt and sediment flows from soil, OB and mineral dumps. The water so collected shall be utilized for watering the mine area, road, green belt development, etc. The drains shall be regularly desilted and maintained properly. Garland drains (size, gradient and length) and sump capacity shall be designed keeping 50% safety margin over and above the peak sudden rainfall and maximum discharge in the area adjoining the mine site. Sump capacity shall also provide adequate retention period to allow proper settling of silt material.</p>	<p>Being Complied. Garland drains and catch drain is under construction along OB dump & for the settlement of silt, a siltation pond has been constructed. Further, the settled water is being used for mining activities. (Photographs attached as Annexure-6) Drains are being desilted and maintained properly. As mining operations started at KDCMP on 05.04.2023 a sump has been built in pit-2 with a 50% safety margin and a capacity of 1.56 lakh cum.</p>
(viii)	<p>Dimension of the retaining wall at the toe of the dumps and OB benches within the mine to check run off and siltation shall be based on the rainfall data.</p>	<p>Being Complied. Retaining wall construction started and 380 m long has been constructed along the topsoil dump and OB dump. As the dump is in active stage, only 800m is available for toe wall construction. (Photographs attached as Annexure 7).</p>
(ix)	<p>Drills shall be wet operated</p>	<p>Being Complied. A drilling machine with an inbuilt water injection system is being utilized for drilling purposes.</p>

		Also, regular water spraying is being carried out in the drilling area for minimization of fugitive dust emission. (Photographs attached as Annexure 8)
(x)	Controlled blasting shall be practiced only during daytime with use of delay detonators. The mitigative measures for control of ground vibrations and to arrest the fly rocks and boulders shall be implemented.	Being Complied. Controlled Blasting is practiced in the daytime only. The mitigative measures being taken to arrest the fly rocks and boulders. A vibrometer is installed for measurement of vibrations, and it is within limits.
(xi)	Raw coal from CHP shall be transported by closed conveyors to the railway siding proposed at village Khadamdari and thereafter by rail to the linked Tanda/Barh STPP. The conveyor-cum-rail corridor consisting of a stretch of 13.1 km of rail and 10.5 km of overhead closed conveyors and extend up-to unloading part at the Railway Siding with Silo Loading facilities and from there to linked Barh/Tanda STPP by rail. There shall be no road transportation of coal.	Amendment in this condition till 31.10.2024 vide amendment file no.: J-11015/120/2007-IA-II(M) dated 05.02.2024 from MoEF&CC for transportation of coal by road. The construction work of conveyor is under progress. (Photographs are attached as Annexure-9)
EC Amendment condition vide file no.: J-11015/120/2007-IA-II(M) dated 05.02.2024		
1.1	As proposed, PP shall complete the work of conveyor and CHP by October, 2024 and railway siding by March, 2025.	Being Complied. The work of conveyor, CHP and railway siding is under progress. Overall 73% of the conveyor work has been completed till Sept 2024.
1.2	PP shall submit the approved revised Mine Plan with progressive reclamation for changes in land use/ area of forest land as per approvals obtained to IRO, MoEF&CC.	Agreed to comply. The progressive reclamation is being implemented as per the approved mine closure plan. During mining operations any change in land use pattern shall be incorporated and submitted for approval.
1.3	PP shall avoid transporting coal by road through forest land without permission from concerned Forest Department.	Complied. All the necessary permissions have been obtained from the forest department for the transportation of coal by road.
1.4	PP shall not use any village road and road along sensitive locations such as schools, hospitals etc. for transportation of coal by dumpers/ trucks.	Being Complied. The coal is being transported mainly through the State and National Highways. The trucks used for transportation of coal are optimally loaded and properly covered with tarpaulin to curb pollution. Further, to avoid village road NTPC has constructed a dedicated 2.2 Km road to connect the Mine to the State Highway.
1.5	PP shall use the road having width more than 7 mts with tarpaulin covered 40-50 (payload) dumpers/ trucks. Further, State Pollution Control Board shall ensure the emissions of trucks by regular inspections.	Being Complied. The width of roads being used for transportation is more than 7 mts and the transportation is being done strictly with tarpaulin covered trucks. Further, the coal at KDCMP is being transported through high axle trucks with a size of up to 50 tons.
1.6	M/s NTPC shall write to Ministry of Power to coordinate with Ministry of Railways for	Complied. Request letters have been sent to the Ministry of Power vide letters dtd. 23.02.2024 &

	expeditious construction of Railway siding near to the proposal location.	14.08.2024, to expedite the construction of the Railway Siding for Chatti Bariatu and Kerandari Coal Mining Project. Further, the Ministry of Power vide Office Memorandum no. FU-19/2021-FSC dtd. 13.09.2024 requested the Ministry of Railway to expedite the approval of the DPR and the subsequent construction of the Railway Siding to ensure timely coal evacuation from Chatti Bariatu and Kerandari Coal Mining Projects. (Copy of the letter attached as Annexure-10).
1.7	PP shall maximum use the nearest location of railway siding (Shivpur and Bachra) for transporting the coal instead of using road for long distance.	60% coal is being transported to M/s NTPC's North Karanpura Super Thermal Power Plant (NKSTPP) which is at a distance of 24 Km from mine. Balance coal is being transported to available sidings (Tori). Construction of the road to Shivpur railway siding has been awarded to M/s SHAJ. Forest Clearance (FC) regarding the Forest land area (3.204 Ha) is awaited.
1.8	As proposed, construction of road for enroute Shivpur siding shall be immediately completed with water sprinkler and tree plantation along the road.	Agreed to Comply. Construction of the road to Shivpur railway siding has been awarded to M/s SHAJ. Forest Clearance (FC) regarding the Forest land area (3.204 Ha) is awaited.
1.9	PP shall install atleast 10 nos of fog cannon in mine lease, overburden dump and transportation route within 6 months.	Being complied. Four nos. of fog canons have been installed within mine lease, at OB dump and Transportation route and an additional ten nos. of fog canons will be deployed upon receiving delivery by 18.12.2024. Water sprinkling within the mining area, along the transportation route and Railway Siding is being done through 22 nos. of mobile water tankers.
1.10	PP shall establish Environmental laboratory at project site by March 2024 and create Environmental Management Cell to monitor the issues related environmental degradation.	Complied. Monthly monitoring and analysis is being done through the MoEF&CC and NABL accredited lab in consultation with the State Pollution Control Board. The Environmental Laboratory has been established at the project site office and an Environmental Monitoring Cell has been created to monitor the issues related to environmental degradation.
1.11	PP shall explore at least 20% of overall fleet size of dumpers/ trucks as electrical or CNG/ LNG based dumpers/ trucks for transportation of coal/ OB etc and deploy e-vehicles for workers/ staff in/ out of the mine.	Agreed to comply. One vehicle for commutation of personnel has been hired and 2 vehicles are in process of hiring. One electric dumper is under testing mode in PBCMP, on successful run, the same shall be extended to other projects.
1.12	PP shall ensure the compliance of expenditure to be incurred for wildlife conservation plan	Being Complied.

	submitted to the State Govt. and the details expenditure shall be submitted with six monthly EC compliance report to Ministry's IRO. Also, PP shall engage State Biodiversity Authority and local biodiversity committee for implementation of CSR activity for developing the local market.	NTPC KDCMP has deposited Rs. 24,76,04,400.00 (Rs. Twenty-Four Crore Seventy-Six Lakh Four Hundred only) in ad-hoc CAMPA account for the implementation of Site-Specific Wildlife Management Plan prepared in line with Integrated Wildlife Management Plan and Biodiversity plan. CSR activities are being implemented in consultation with local committee of villagers. The utilization certificate for years 2023-24 and 2024-25 is attached as Annexure-19.
1.13	PP shall create a "Public Grievance Redressal and Monitoring System" for resolving any issues related to the pollution of mines and complaint has to resolve as soon as possible not beyond 30 days. In this regard, adequate awareness to be spread among the public to address their grievance to company with simple and easy manner and for which company needs to devise the mechanism. The same shall be reported to IRO within 3 months. A logbook to be maintained by PP on "Public Grievance Redressal and Monitoring System."	Complied. A "Public Grievance Redressal and Monitoring System" for resolving any issues related to the pollution of mines and complaints is being resolved within 30 days for this logbook is being maintained at the mine site office of KDCMP. Further an online system with the web address, https://www.ntpc.co.in/grievance/ has also been established. The same has been reported to IRO vide letter no. 1078/KDCMP/Mining/2024/54. (Copy of last 6 months data is attached as Annexure-11)
1.14	PP shall submit certified compliance report of EC vide letter No. J-11015/120/2007-IA.II(M) dated 31st March, 2010 and later re-validated letter dated 28.10.2015.	Complied. The certified compliance report has been submitted by Scientist 'D' from IRO, MoEF&CC, Ranchi vide letter F. No. 103-207/08/FPE/596 dated 24.09.2024.
1.15	PP shall commission a study for evaluating the impact of air pollution generated by its activities on the forests upto a distance of about 10 kms through an institution of MoEF&CC.	Agreed to comply. Initially, CB & KDCMP has approached MoEF &CC institutions, the Institute of Forest Productivity (IFP), Ranchi and the Forest Research Institute (FRI), Dehradun. But no response has been received yet. Further, CB & KDCMP have approached two agencies/Institutions for conducting study and a budgetary offer for the same has been received and the same are under review.
(xii)	All approach roads shall be black topped and internal roads shall be black topped or concreted. The roads shall be regularly cleaned with mechanical sweepers. A 3-tier avenue plantation using local species shall be developed along the main roads, and approach roads to the mine and at railway siding. Green belt shall be developed using local species all along the periphery of the site, along the areas such as infrastructure, and at Railway Siding.	Being Complied. Mine approach road from SH-25 via Kodway - Lochar widening and strengthening including black topping completed. The road construction of 2.9Km is blacktop from KDCMP to CBCMP.
(xiii)	Crushers at the CHP shall be operated with high efficiency bag filters, water sprinkling system shall be provided to check fugitive emissions from crushing operations, conveyor system, haulage roads, transfer points, etc. Hoppers of the coal crushing unit shall be fitted with high efficiency bag filters and mist spray water	Being Complied. CHP is under construction. The work of conveyor, CHP and railway siding is under progress. Overall, 73% of the conveyor work has been completed till Sept. 2024. It is also submitted that with all out efforts the conveyor system will be commissioned by Dec'25.

	sprinkling system shall be installed and operated effectively at all times of operation to check fugitive emissions from crushing operation transfer points of and from transportation roads and at Railway Siding.	(Progress report of the conveyor is attached as Annexure-12) The interim crusher being used in the mine is fitted with a mist spray water sprinkling system. Mobile water sprinkling tankers were deployed over the internal haul roads.
(xiv)	Company's Railway Siding at village Khadambari shall be established within 3 years from date of grant of Environmental Clearance.	DPR for the Railway line from Urda/Khadamdari village to the linked Barh/Tanda STPP via Kharika station had been approved by Railways in 2008 and NTPC had applied for forest clearance and proceeded with land acquisition. Kharika Station was on the proposed ECR railway line from Shivpur-Hazaribagh which was later dropped as MOEF had rejected the Forest clearance for the said line. The alternate railway alignment for the Shivpur-Hazaribagh line viz., Shivpur-Kathautia was finalized subsequently, and work started by Railways only in 2022. Accordingly, NTPC has requested Railways to connect a common conveyor system from Gopda village to revised alignment (Shivpur-Kathutia). The alignment and DPR are under finalization by Railways. Amendment in Environment Clearance has been obtained from MoEF&CC vide letter dated 05.02.2024 for construction of railway siding by March 2025.
(xv)	No fly ash from the TPP shall be used in backfilling of the void without undertaking an Environmental Feasibility study and without prior approval of this ministry.	Agreed to comply. No fly ash from the TPP will be used for the purpose of backfilling the void without undertaking an environmental feasibility study and without prior approval of MoEF&CC.
(xvi)	Regular monitoring of groundwater level and quality shall be carried out by establishing a network of existing wells and construction of new piezometers. The monitoring for quantity shall be carried out four times a year in pre-monsoon (May), monsoon (August), post-monsoon, (November), and winter (January), seasons and for quality in May and in monsoon in the villages in core and buffer zone. Data thus collected shall be submitted to the Ministry of Environment & Forests and to the Central Pollution Control Board quarterly within one month of monitoring.	Being complied. The ground water quality is being monitored monthly through NABL accredited laboratory regularly as per stipulations. (reports attached as Annexure-13) Apart from monitoring "automatic water level recorders (Piezometers) have been installed at two locations viz., Pagar Substation, Fagu Saw School. (Photographs attached as Annexure-14).
(xvii)	The levels of fluoride and TDS in drinking water shall be regularly monitored and records thereon maintained. In case the levels are found to be higher than the prescribed limits in the groundwater and mine discharge water, the project authorities shall provide drinking water to the affected villages in the impact zone.	Being complied. Regular monitoring of fluoride and TDS is being done to determine their level in drinking water and mine discharge water of the mine. In summer water tankers were provided to villagers as per requirement. (reports attached as Annexure-13)
(xviii)	The company shall put up artificial groundwater recharge measures including rainwater harvesting structures for augmentation of	Being complied. Rainwater Harvesting system at site mine office is under construction and shall be

	groundwater resource in case monitoring indicates decline in water table. The project authorities shall meet water requirement of nearby village(s) in case the village wells go dry due to dewatering of mine.	completed by 30 th Nov'24. (photos attached as Annexure-15)
(xix)	ETP shall also be provided for workshop, and CHP. Effluents shall be treated to confirm to prescribed standards, particularly for pH and TSS in case of discharge into any watercourse within or outside the lease. Mine water discharge and run off from external dumps shall be treated to prescribed norms and monitored at all the outlet points before discharge into natural water courses or onto land.	Complied. ETP has been constructed at the workshop, treated water is being reused for washing and zero liquid discharge (ZLD) is being maintained. Effluents are being treated to confirm to prescribed standards from NABL accredited laboratory. (Photos attached as Annexure-16)
(xx)	An STP shall be provided for the township/colony to treat the domestic effluents to prescribed standards and for green belt development or reuse in project activities.	Agreed to comply. STP is proposed in the integrated township/colony. STP will be installed for township as township is under construction.
(xxi)	Any additional water requirement envisaged shall be obtained by recycle/reuse to the maximum extent and from rainwater harvesting measures. Recycled water shall be used for development and maintenance of green belt and in the Plant Operations.	Being complied. As per the NOC issued to KDCMP by CGWA vide NOC no. CGWA/NOC/MIN/REN/1/2024/9595, the groundwater abstraction permission is 915 cum/day . However, the current average consumption of groundwater is 520.72 cum/day . (NOC attached annexure-17) A rainwater harvesting system is under construction at the site mine site office and recycle/reuse water will be used for development and maintenance of green belt and in plant operations. (Photos attached as Annexure-15)
(xxii)	Industrial wastewater shall be properly collected, treated so as to conform to the standards prescribed under GSR 422 (E) dated 19th may 1993 and 31st December 1993 or as amended from time to time before discharge. Oil and grease trap shall be installed for treatment of workshop effluents.	Complied. A dedicated ETP has been constructed for oil and grease traps at the workshop for effective treatment of the effluents conforming to the prescribed statutory standard, and treated water is being reused for washing of vehicles and zero liquid discharge is being maintained.
(xxiii)	Area brought under afforestation shall not be less than 472.29 Ha. which includes reclaimed external OB dump (130 Ha), backfilled area (332.71 Ha), along ML boundary (7.58 Ha) along roads, infrastructure (2Ha), in undisturbed areas infrastructure and in colony by planting native species in consultation with the local DFO/ Agriculture Department. The density of the trees shall be around 2500 plants per Ha.	Being Complied. As mining operations started on 05.04.2023, all dumps are in the active stage and around 3800 plantations have been done alongside of OB dump. (Photos attached as Annexure-18)
(xxiv)	A Progressive Closure Plan shall be implemented by reclamation of quarry area of 470.18 ha of which 332.17 ha shall be backfilled and afforested by planting native plant species in consultation with the local DFO/Agriculture Department. The density of the trees shall be around 2500 plants per ha, the balance 137.47	Being complied. The progressive Mine closure plan was approved by MOC vide letter number 34011-10-2011-CPAM dated 11-11-2013. A progressive mine closure plan shall be implemented as per stipulation. Mine activities at KDCMP started on

	ha of de-coaled area being converted into a water reservoir and gently sloped along the upper benches and stabilized and reclaimed with plantation.	05.04.2023, and reclamation shall start in the 6 th year of mining. Plantation on the reclaimed area shall be done as mine progresses. An Escrow account has been opened, and the amount is being deposited annually. Rs 5.109 crore has been deposited in FY 2024-2025 as 2 nd year Mine Closure Cost. So far Rs. 9.97 crore, including interest, has accrued in the Escrow account as part of the Mine Closure cost.
(xxv)	A Conservation Plan (in-situ and ex-situ) for endangered Schedule-I and II faunal species reported in the study area and for the medicinal plants found in and around the project area shall be prepared and implemented in consultation with the State Forest and Wildlife Departments. The implementation of the various activities there under and the status thereof shall be regularly reported to this ministry and the MOEF Regional Office, Bhubaneswar and uploaded on the company's website. The proponent shall also participate in the Regional Wildlife Conservation Plan to be prepared by the State Wildlife Department and shall also contribute financially for implementation of the RAP.	Being Complied. An integrated wildlife conservation plan has been prepared and submitted to the Chief Wildlife Warden, Govt. of Jharkhand and MOEF&CC and approved by NBWL. The amount of Rs 24.76 Crs has been paid on 16.12.2020 towards implementation of the wildlife management plan as per the direction of the State Forest Department. The utilization certificate for years 2023-24 & 2024-25 is attached as Annexure-19 A Site-specific wildlife management plan has been submitted to the State Forest Department on 17.05.2021 and the same is approved vide office order No. 40, dated-11.10.2021 by PCCF (WL), GoJH. (approval copy attached as Annexure-20).
(xxvi)	An amount not less than a capital expenditure of Rs 2102.62 lakhs and a revenue expenditure of Rs 497.85 lakhs (which shall be up scaled after adjusting for depreciation of the rupee) shall be earmarked and utilized for environmental protection measures, the status of which shall be uploaded regularly on the company website and also furnished as part of the monitoring report.	Being Complied. The amount of Rs 2102.62 lakhs has been earmarked for implementing environmental measures. Mine operation started on 05.04.2023. Total expenditure incurred for 2023-24 is 134.03 lakh. The total expenditure utilized is uploaded with six monthly compliance and Environment statement on company website.
(xxvii)	A detailed project specific R&R plan shall be prepared for the 7 villages –Tarhesa, Pandu, Pagar, Kabed, Balediori, Basaria, and Lochar comprising about 1453 PAP's and land losers and implemented in consultation with the stakeholders. R&R shall be based on norms laid down/approval by the State Government and shall not be inferior than that in the National R&R policy and shall be completed within a specified time–frame. R&R shall include specific income generation schemes. A Corpus fund of Rs 5 crores shall be created for maintenance of the R&R colony. Annuities shall be provided for the vulnerable sections of the displace population. Alternate livelihood schemes shall be implemented for the persons not being absorbed for employment.	Being Complied. R&R plan for Kerandari Coal Mining Project is approved by GoJh vide sankalp dated 26.07.2013. The plan is under implementation under the direction of State Govt. Sankalp. Annuities are being provided Annuity is being provided to the eldest member of the project affected family. Annuity amount Land acquired < 1 acre: - Rs. 2500 per month with Rs. 750 increment every 2 years Land acquired > 1 acre: Rs 3000 per month per acre with Rs.1000 increment every 2 years. Till date annuity has been provided to 877 no of PAPs. In addition, direct employment has been provided to 1890 PAPs.

		<p>Various community development activities such as income generation schemes, woman empowerment, promotion of education, infrastructure and health etc. are undertaken in project affected villages (Expenditure).</p> <table border="1"> <thead> <tr> <th>Financial year</th> <th>Expenditure (in Lakh)</th> </tr> </thead> <tbody> <tr> <td>2020-2021</td> <td>84.42</td> </tr> <tr> <td>2021-2022</td> <td>65.77</td> </tr> <tr> <td>2022-2023</td> <td>157.71</td> </tr> <tr> <td>2023-2024</td> <td>421.52</td> </tr> </tbody> </table>	Financial year	Expenditure (in Lakh)	2020-2021	84.42	2021-2022	65.77	2022-2023	157.71	2023-2024	421.52
Financial year	Expenditure (in Lakh)											
2020-2021	84.42											
2021-2022	65.77											
2022-2023	157.71											
2023-2024	421.52											
(xxviii)	The proponent shall provide a minimum Rs.5 per tonne of coal as supporting revenue expenditure (which shall be up scaled after adjusting for depreciation of the rupee) towards activities undertaken under CSR. The details of the activities and expenditure made thereon shall be displayed on the company's website and updated at least once in six months.	<p>Being Complied. Coal production started from 25.01.2024 and the expenditure is published with an environmental statement on the company's website. Various community development activities such as income generation schemes, woman empowerment, promotion of education, infrastructure and health etc. are undertaken in project affected villages.</p>										
(xxix)	For monitoring land use pattern and for post mining land use, a time series of land-use maps, based on satellite imagery (on a scale of 1:5000) of the core zone and buffer zone, from the start of the project until end of mine life shall be prepared once in 3 years for any one particular season which is consistent in the time series), and the report submitted to MOEF and its Regional office at Bhubaneswar.	<p>Being Complied. Post mining land use maps based on Satellite imagery of the core zone and buffer zone, from the start of the project until end of mine life will be prepared at regular interval, and the report will be submitted to MOEF&CC and its Regional Office. Image of Dec'2022 is attached as Annexure-21.</p>										
(xxx)	A Final Mine Closure Plan along with details of corpus fund shall be submitted to the Ministry of Environment & Forests for approval 5 years in advance of final mine closure for approval and for Habitat Restoration by using a mix of native species found during per-mining stage.	<p>Assured to Comply. A Final Mine Closure Plan with corpus fund details will be submitted to MOEF&CC for approval well in advance as per stipulation.</p>										

B.	General conditions	
(i)	No change in technology and scope of working shall be made without prior approval of the Ministry of Environment and Forests.	<p>Being Complied. Permission for MOEF&CC will be taken well in advance in case of change in technology and scope of work.</p>
(ii)	No change in the calendar plan including quantum of mineral coal and waste being produced shall be made.	<p>Being Complied. As per OM from MoEF&CC vide F. No. 22-44/2018-IA.III dated 14.05.2020 regarding flexibility in coal or mineral production of capacity irrespective of calendar plan subject to maximum of capacity granted in the environmental clearance.</p>
(iii)	Four ambient air quality monitoring stations shall be established in the core zone as well as in the buffer zone for monitoring PM10, PM2.5, SO2 and NOx. Location of the stations shall be decided based on the meteorological data, topographical features and	<p>Being complied. The project has established 8 nos. of ambient air quality monitoring stations, 4 in the core and 4 in the buffer zone of the mine lease area in consultation with the Jharkhand State Pollution Control Board (JSPCB) and the monitoring is done</p>

	environmentally and ecologically sensitive targets in Consultation with the State Pollution Control Board. Monitoring of heavy metals such as Hg, As, Ni, Cd, Cr in particulates shall be carried out at least once in six months.	by an NABL accredited laboratory and registered by JSPCB. Approval letter and Toposheet approved by JSPCB with monitoring reports for the last 6 months attached as Annexure-22 The Continuous Ambient Air Quality Monitoring Station (CAAQMS) has been installed at the mine office, and CAAQMS is connected to the JSAC portal of the Jharkhand State Pollution Control Board for submission of data. PM10, PM2.5, SO2 and NO2 readings were within the limit. Calibration has been done on 10.10.2024. Photographs and Calibration certificate attached as Annexure-23 .
(iv)	Data on ambient air quality (PM10, PM2.5, SO2 and NOx and heavy metals such as Hg, As, Ni, Cr, etc) and other monitoring data shall be regularly submitted to the Ministry including its Regional Office at Bhubaneswar and to the State Pollution Control Board and the Central Pollution Control Board once in six months. Random verification of samples through analysis from independent laboratories recognized under the EP Rules 1986 shall be furnished as part of the compliance report.	Being Complied. The monitoring data for air quality and heavy metals data six monthly to the concerned statutory authorities has been submitted i.e. Regional Office of MOEF&CC at Ranchi, JSPCB & CPCB. (reports of the last 06 months are attached as Annexure-24)
(v)	Adequate measures shall be taken for control of noise levels below 85 dB (A) in the work environment. Workers engaged in blasting and drilling operations, operation of HEMM, etc shall be provided with ear plugs/muffs.	Being Complied. The noise level monitoring data for 8 locations has been submitted. (from October 2023-March 2024). Workers engaged in blasting and drilling operations, operation of HEMM, etc. have provided ear plugs and proper PPE. (reports of last 06 months are attached as Annexure-25)
(vi)	Industrial wastewater (workshop and wastewater from the mine) shall be properly collected, and treated so as to conform to the standards including for heavy metals before discharge prescribed under GSR 422(E) dated 19th May 1993 and 31st December 1993 or as amended from time to time. Oil and grease trap shall be installed before discharge of workshop effluents.	Being Complied. ETP of 20 KLD with oil/grease traps has been constructed, and water is being treated and reused for vehicle washing and dust suppression. The inlet & outlet water is tested by an NABL accredited laboratory. (Photos and last 6 months lab test reports attached as Annexure-26)
(vii)	Vehicular emissions shall be kept under control and regularly monitored. Vehicles used for transportation of the mineral shall be covered with tarpaulins and optimally loaded.	Being Complied. The vehicles deployed are PUC compliant. Vehicles used for mineral transportation are optimally loaded and covered with tarpaulin. (Photos attached as Annexure-27)
(viii)	Monitoring of environmental quality parameters shall be carried out through establishment of adequate number and type of pollution monitoring and analysis equipment in consultation with the State Pollution Control Board and data got analyzed	Being Complied. Monitoring of environmental quality parameters is being carried out in consultation with the State pollution control board by JSPCB and NABL accredited laboratory. The monitoring has been done by M/s Biocrat

	through a laboratory recognized under EP Rules, 1986.	Environmental Services, Ranchi, Jharkhand accredited by NABL and registered by JSPCB.																
(ix)	Personnel working in dusty areas shall wear protective respiratory devices and they shall also be provided with adequate training and information on safety and health aspects. Occupational health surveillance program of the workers shall be undertaken periodically to observe any contractions due to exposure to dust and to take corrective measures, if needed.	<p>Being Complied. Personal protective respiratory devices such as masks are made available to personnel working in dusty areas & adequate training on safety & health is also imparted. PPE distribution details for the year 2023-24 as submitted by PP are as follows:</p> <table border="1"> <thead> <tr> <th>Year</th> <th>Safety shoes</th> <th>Hel met</th> <th>Safety Jacket</th> <th>Nose Mask</th> <th>Ear Plug</th> </tr> </thead> <tbody> <tr> <td>2023-24</td> <td>122</td> <td>110</td> <td>67</td> <td>300</td> <td>130</td> </tr> </tbody> </table> <p>Also observed is that vocational training is imparted:</p> <table border="1"> <thead> <tr> <th>Financial year</th> <th>No.</th> </tr> </thead> <tbody> <tr> <td>2023-2024</td> <td>295</td> </tr> </tbody> </table>	Year	Safety shoes	Hel met	Safety Jacket	Nose Mask	Ear Plug	2023-24	122	110	67	300	130	Financial year	No.	2023-2024	295
Year	Safety shoes	Hel met	Safety Jacket	Nose Mask	Ear Plug													
2023-24	122	110	67	300	130													
Financial year	No.																	
2023-2024	295																	
(x)	A separate environment management cell with suitable qualified personnel shall be set up under the control of a senior executive, who will report directly to the head of the company.	<p>Being Complied. At the corporate office, a separate Environmental Management Cell is already functioning under the supervision of a senior executive who is reporting to the Head of the company to look after the implementation of the various pollution control measures and other Environment Management System requirements. (EMG cell is attached as Annexure-28)</p>																
(xi)	The funds earmarked for environmental protection measures shall be kept in separate account and shall not be diverted for other purpose. Year-wise expenditure shall be reported to this Ministry and its Regional office at Bhubaneswar.	<p>Being Complied. The requisite funds for environmental mitigation measures have been included in the project cost. The financial provision stipulated towards environmental mitigative measures will not be diverted for other proposes. Year wise details of Environmental expenditure from year 2023-2024 given below-</p> <table border="1"> <thead> <tr> <th>Year</th> <th>Expenditure (in lakh.)</th> </tr> </thead> <tbody> <tr> <td>2023-2024</td> <td>134.03</td> </tr> </tbody> </table>	Year	Expenditure (in lakh.)	2023-2024	134.03												
Year	Expenditure (in lakh.)																	
2023-2024	134.03																	
(xii)	The Project authorities shall 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 seven days of the clearance letter informing that the project has been accorded Environmental Clearance and a copy of the clearance letter is available with the State Pollution Control Board and may also be seen at the website of the Ministry of Environment & Forests at http://envfor.nic.in	<p>Complied. The copy of Environmental Clearance accorded by MOEF & CC was published in two local newspapers widely circulated around the ML area, namely; Prabhat Khabur daily newspaper in Hindi on 06.04.2010 and Times of India in English paper on 07.04.2010." (Newspaper cutting attached as Annexure-29) The EC letter can be seen at MoEF&CC website/PARIVESH portal.</p>																
(xiii)	A copy of the Environmental Clearance letter shall be marked to concerned Panchayat/Zila Parishad, Municipal Corporation or Urban Local Body and local NGO, if any from whom any suggestion	<p>Complied. A copy of the EC letter has been submitted to the offices of Zila Parishad, Municipal Corporation, Urban Local Body and local NGOs. A copy of EC letter has also been posted on the</p>																

	/representation has been received while processing the proposal. A copy of the clearance letter shall also be displayed on the company's website.	company's website (https://www.ntpc.co.in .)
(xiv)	A copy of the clearance letter shall be displayed on the website of the State Pollution Control Board concerned. The EC letter shall also be displayed at the Regional Office, District Industry Centre and Collector's Office/ Tehsildar's Office for 30 days.	Complied. A copy of the EC letter was sent to the office of District Industry Centre, District Collector for display. A copy of the EC was marked to JSPCB for display at the regional office for a period of 30 days.
(xv)	The clearance letter shall be uploaded on the company's website. The compliance status of the stipulated EC conditions shall also be uploaded by the project authorities on their website and updated at least once every six months so as to bring the same in the public domain. The monitoring data of environmental quality parameters (air, water, noise and soil) and critical pollutants such as PM10, PM2.5, SO2 and NOx (ambient and stack if any) and critical sectoral parameters shall also be displayed at the entrance of the project premises and mines office and in corporate office and on the company's website.	Being Complied. The clearance letter has been uploaded on the company website. Six monthly EC Compliance status are being regularly submitted and uploaded on the company website. (https://ntpc.co.in/index.php/about-us/corporate-functions/environment/status-hyc-reports). The monitored data is being displayed at the entrance of project premises and on the company website.
(xvi)	The project proponent shall submit six monthly reports on the status of compliance of the stipulated Environmental Clearance conditions (both in hard copy and in e-mail) to the respective Regional Office of the MOEF, the respective Zonal offices of CPCB and the SPCB.	Being Complied. Six monthly progress reports on the status of compliance are being submitted to the Regional Office of the MOEF & CC at Ranchi, the Respective Zonal offices of CPCB and the JSPCB via mail.
(xvii)	The Regional Office of this Ministry located at Bhubaneswar shall monitor compliance of the stipulated conditions. The project authorities shall extend full cooperation to the office (s) of the Regional Office by furnishing the requisite data/ information/ monitoring reports.	Agreed to Comply.
(xviii)	The environmental statement for each financial year ending 31st march in Form-V is mandated to be submitted by the project proponent to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently, shall also be uploaded on the company's website along with the status of compliance of EC conditions and shall be sent to the respective Regional Offices of the MOEF by E-mail.	Being Complied. The environmental statement of the project for each financial year is being submitted to the State Pollution Control Board and Regional Office of MOEF & CC in the prescribed Form V. Last report submitted vide letter no. 1078/KDCMP/EMG/2024/07 Dated:25.09.2024 and uploaded on NML portal (NTPC Mining Limited nml.co.in).

Compliance Status of the conditions given in EC revalidation letter vide F.No. J-11015/133/2007-IA.II(M) Dated 28.10.2015

S. N.	Stipulated Condition	Compliance Status
1.	Any change in scope of work will attract the provisions of the Environment (Protection) Act, 1986 and the EIA notification, 2006 in conjunction with the subsequent amendments/circulars.	Noted and Agreed to comply. Any change in scope of work shall attract the provisions of the Environment (Protection) Act, 1986 and the EIA notification, 2006 in conjunction with the subsequent amendments/circulars.
2.	All conditions stipulated in the EC letter No. J-11015/133/2007-IA.II (M) dated 31st March, 2010 shall remain unchanged.	Noted and Agreed to comply. All the conditions stipulated in the EC letter No. J-11015/133/2007-IA.II (M) dated 31st March, 2010 shall remain unchanged.
3.	The allottee shall be liable, if any, for any act of violation of the EP Act, 1986 / EIA Notification 2006/subsequent amendments and circulars which it has inherited during the revalidation/transfer.	Noted and Agreed to comply. The PP shall be liable, if any, for any act of violation of the EP Act, 1986 / EIA Notification 2006/subsequent amendments and circulars which it has inherited during the revalidation/transfer.
4.	The allottee shall be liable for compliance of all court directions, if any.	Noted and Agreed to comply. The PP shall be liable for compliance with all court directions, if any.

Authorised Signatory



Pravin Ramdas Sanap
Asst. Officer (EMG)
Kerandari CMP
NTPC Mining Limited

F. No. 8-53/2011-FC
Government of India
Ministry of Environment, Forests and Climate Change
(Forest Conservation Division)

Indira ParyavaranBhawan,
Aliganj, Jor Bag Road,
New Delhi - 110003.

Dated: 28th August, 2019

To

The Principal Secretary (Forests),
Government of Jharkhand,
Ranchi.

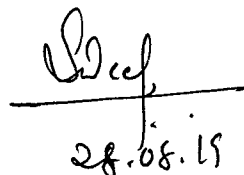
Sub: Diversion of 243.32 ha of forest land for North Karanpura Coal Keredari Coal Mining Project in favour of M/s NTPC Ltd. in Chatra South and Hazaribagh West Forest Division of Districts Chatra and Hazaribagh, respectively in the State of Jharkhand – regarding.


Sir,

I am directed to refer to the State Government's letter no. 3/Vanbhumi-103/2010-1643 dated 4.05.2011 on the above subject seeking prior approval of the Central Government, in accordance with Section-2 of the Forest (Conservation) Act, 1980 After careful examination of the proposal by the Forest Advisory Committee, constituted under Section-3 of the said Act, 'in-principle' approval to the proposal under the Forest (Conservation) Act, 1980 was granted vide this Ministry's letter of even number dated 1st February, 2012 read with letter dated 17th July, 2019 subject to fulfillment of certain conditions prescribed therein. The State Government has furnished compliance report in respect of the conditions stipulated in the in-principle approval and has requested the Central Government to grant final approval.

In this connection, I am directed to say that on the basis of the compliance report furnished by the State Government vide letter No. 22 P 2 (2) 22/2010/575 dated 10.02.2014, 3/VanBhumi-103/2010/68-VP dated 06.01.2017, 3/VanBhumi-103/2010/1825-VP dated 08.05.2018, VanBhumi-103/2010/3956-VP dated 19.09.2018, Van Bhumi-103/2010-1301-VP dated 05.04.2019 and Van Bhumi-103/2010-2657-VP dated 16.07.2019, final approval of the Central Government is hereby granted under Section-2 of the Forest (Conservation) Act, 1980 for diversion of 243.32 ha of forest land for North Karanpura Coal Keredari Coal Mining Project in favour of M/s NTPC Ltd in Chatra South and Hazaribagh West Forest Division of Districts Chatra and Hazaribagh, respectively in the State of Jharkhand subject to following conditions:

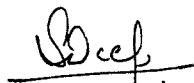
1. Legal status of the diverted forest land shall remain unchanged;
2. (i) Compensatory Afforestation (CA) shall be raised and maintained by the State Forest Department over double degraded forest land (323.505 ha) equal in extent to the forest land being diverted, from the funds already provided by the User Agency;
- (ii) Approved site-specific CA schemes, in lieu of diversion of forest land of 243.32 ha shall be implemented by the State Forest Department from the funds already provided by the User Agency;
3. The State Government has realized the Net Present Value of the forest area diverted under this proposal from the User Agency as per the Judgment of the Hon'ble Supreme Court of India dated 28.03.2008 & 09.05.2008 in IA No. 566 in WP (C) No. 202/1995 and as per the guidelines issued by this Ministry vide letter No. 5-3/2007-FC dated 05.02.2009 in this regard, additional NPV if becomes due as per final order of Hon'ble Supreme Court, shall be paid by the User Agency;
4. The User Agency shall furnish an undertaking to pay the additional NPV, if so determined, as per


28.08.19


Pravin Ramdas Sanap
Asst. Officer (Env't Mgmt)
NTPC Mining Limited
Kerandari Coal Mining Project
Sikri, Barkagaon - 825311

the final decision of Hon'ble Supreme Court of India;

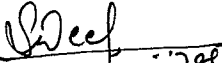
5. Fencing, protection and regeneration of the safety zone area (7.5 metre strip all along the outer boundary of the mining lease area), wherever feasible, shall be done at the project cost. Besides this, afforestation on degraded forest land, to be selected elsewhere, measuring one and a half times the area under safety zone shall also be done at the project cost;
6. Funds, if any to be received from the User Agency under the project in future, shall be transferred, through e-challan, to the account of State CAMPA concerned;
7. In view of displacement of people the User Agency shall implement a welfare plan for displaced people, which can track individual displaced facilities and establish an appropriate welfare unit to monitor the welfare.
8. The User Agency shall implement the approved R&R Plan as submitted along with the compliance of Stage-I approval;
9. The period of diversion under this approval shall be twenty (20) years or coterminous with the valid mining lease subject to possession of valid mining lease under the MMDR Act, 1957;
10. The forest land shall not be used for any purpose other than that specified in the proposal;
11. The following activities shall be undertaken by the User Agency under supervision of the State Forest Department at the project cost:
 - i. Proper mitigative measures to minimize soil erosion and choking of streams shall be implemented;
 - ii. Planting of adequate drought hardy plant species and sowing of seeds to arrest soil erosion;
 - iii. Construction of check dams, retention/toe walls to arrest sliding down of the excavated material along the contour;
12. Ample care shall be taken while reclaiming the mined area by employing suitable top soil management scheme and ensuring plantation of native species of the area;
13. The user agency shall provide fuel wood preferably alternate fuel such as kerosene oil and LPG to the labourers working at the site to avoid damage to adjoining forests;
14. No labour camps shall be set up inside the forest area;
15. The forest land proposed to be diverted shall under no circumstances be transferred to any other agency, department or person without prior approval of the Central Government;
16. The user agency shall pay the cost of implementation of Wildlife Management Plan, on pro rata basis, prepared by the State Government for the entire North Karanpura Field, as per the undertaking submitted by them and accepted by State Government along with the Stage-I compliance. Forest land shall be handed over to the user Agency, after realizing the proportionate cost from the User Agency. A copy of the approved Wildlife Life Management Plan, along with detail of proportionate cost shall be submitted to the Ministry and its Regional Office;
17. Any tree felling shall be done only when it is unavoidable under strict supervision of the State Forest Department. User Agency shall translocate the trees, marked for felling, wherever possible, in consultation with the State Forest Department;
18. No damage to the flora and fauna of the adjoining area shall be caused;
19. The user agency will obtain Environmental clearance and any other clearances required for such project, if required;
20. The user agency shall take up the de-silting of the village tanks within five km area from the mine


28/08/15

lease boundary as a Corporate's social responsibility so as to mitigate the impact of siltation of such tanks, if any;

21. The User Agency will ensure the dumping of over burden (OB) as per the approved phased Reclamation plan;
22. The State Government shall ensure that compliance of Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 has been completed in accordance with the relevant Rules and Guidelines issued by the MoEF&CC in this regard;
23. Any other condition that the Dy. Director General of Forests (Central), Regional Office, Ranchi, may impose from time to time, with the approval of competent authority, for protection and improvement of flora and fauna in the forest area, shall also be applicable.
24. Compliance of any legal matters, in any court of law, shall be the responsibility of the user agency / and the State Government; and
25. The user agency shall submit the annual compliance report in respect of the above conditions to the State Government and to the Regional Office, Ranchi regularly.

Yours faithfully,


(Sandeep Sharma) 28/08/19

Assistant Inspector General of Forests (FC)

Copy to:-

1. The Principal Chief Conservator of Forest, Government of Jharkhand, Ranchi.
2. The Deputy Director General (Central), Regional Office, Ranchi.
3. The Nodal Officer (FCA), Office of the PCCF, Government of Jharkhand, Ranchi.
4. User Agency.
5. Monitoring Cell of FC Division.
6. Guard File.


(Sandeep Sharma) 28/08/19

Assistant Inspector General of Forests (FC)

File P-08 001 Annexure - A

**Office of the Chief Engineer
Project Monitoring & Planning
Water Resources Department,
Govt. of Jharkhand, Ranchi**

Letter No.: 2/PMC-55/2009-

Ranchi, dated -

From: Er. Ashok Kumar
Chief Engineer (Mon)

To,
Sri B.K.Roy
AGM (Projects),
NTPC Ltd.
Chatbariatu Coal Mining Projects,
Ujjwal Complex, Pugmil Road,
Hazaribag-825301
(Fax: 06546 270744)

Sub :- Proposal for clearance for diversion of Baldeori Nala flowing within Keredari-A Coal Block of NTPC Limited as per CWPRS report.

Ref: Letter No.7010/NTPC-PB/CH & KD:2009:5341, dated 30.07.2009 and CBCMP/Project/2012/PO8/16, dated 24.09.2012

Sir,
With reference to the letter on the subject, I am directed to convey the clearance of the department for diversion of Baldeori Nala flowing within Keredari-A Coal Block of NTPC Ltd. on the following conditions:

- (i). Clearance by Ministry of Environment and Forests, Government of India for non-forest use of the forest area be obtained under Forest Conservation Act 1980;
- (ii). Environmental clearance be obtained from Ministry of Environment and Forests, Government of India;
- (iii). The excavated mined area should be replenished as per the approved mining closure plan and to the extent in reference to the existing natural ground profile. This is required to ensure for non-reduction in water availability and no adverse impact on the environment.
- (iv). The diversion of Baldeori nala should be done as per the recommendation/suggestion given by by Central Water and Power Research Station (CWPRS), Pune given in its technical report.

Yours faithfully,

sd/-
(Ashok Kumar)
Chief Engineer (Mon)

S.K. Sinha
संयोजक प्रमुख / General Manager
परिचालन प्रमुख / HOP
प्रमुख / Chief Engineer / NTPC Limited
केरदारी कोयला ब्लॉक / Keredari Coal Block / CBCMP
हजारिया / Hazaribag

Memo No.: 2/PMC-55/2009- 223

Ranchi, dated 19/3/23

Copy to :

- 1. Principal Secretary, Department of Mines & Geology, Govt. of Jharkhand, Nepal House, Doranda, Ranchi for information.
- 2. Chief Engineer, Water Resources Department, Hazaribag for information and needful.

361
19/3/23

(Ashok Kumar)
Chief Engineer (M/W)

शंकर कुमार सिन्हा / B.K. SINHA
प्रबन्धक / General Manager
परियोजना प्रमुख / HOP
एनटीपीसी लिमिटेड / NTPC Limited
कोरदारी कोयला खनन परियोजना / KOCMP
हजारियाग / Hazaribag

Pravin Kandas Sanap
Asst Officer (Envr Mgnt)
NTPC Mining Limited
Kerandari Coal Mining Project
Sikri, Barkaagan - 825311




केन्द्रीय जल और विद्युत अनुसंधान शाला CENTRAL WATER AND POWER RESEARCH STATION

TECHNICAL REPORT NO. 462B

MARCH, 2009

DIVERSION SCHEME FOR CHATTIBARIATTU AND KERANDARI COAL
MINING BLOCKS, JHARKHAND

V. M. BENDRE (Mrs)
DIRECTOR


Pravin Ramdas Sanap
Asst. Officer (Envl. Mgmt.)
NTPC Mining Limited
Kerandari Coal Mining Project
Sikri, Barkagaon - 825311

6.5.3 A review of bed levels of Kerandari nalla shows a bed slope of about 1:220, that would lead to velocities more than 5-6 m/s. In order to reduce flow velocity and quantity of excavation, a slope of 1:1000 was considered. Alternative cross sections of remodelled reach of Kerandari nalla were derived with concrete lining that can stand velocity upto 3.5 to 4 m/s. It was noticed that either rectangular section 60 m wide x 6.5 m deep or trapezoidal section having a base width of 60 m and side slope of 1:2 with a depth of 6 m would be required to pass the design discharge of 1400 cu.m./s without overflowing to adjoining areas.

6.5.4 The mining project is planned for a period of 25 – 30 years. It is likely that the estimated flood discharge of 1400 cu.m/s may not be experienced in this phase. As such other alternative for NTPC is accepting the risk that the discharge is not experienced in the project period. However, it would be essential to be prepared for the situation that would prevail, in case of occurrence of event. Thus, preparedness would include formulation of measures for activating emergency action plan, assessment of damages, compensation to be paid, etc.

7. CONCLUSIONS

7.1 Studies have been carried out at CWPRS for suggesting diversion schemes for the nallas in Chattibariattu and Kerandari coal mining blocks in Jharkhand State. The important conclusions of the studies are given below:

- a) Minor diversion would be required for the nallas in Chattibariattu coal mining block. The works are to be carried out as per the decisions taken in discussions with NTPC authorities on 7-8 April 2008 at Hazaribagh, Jharkhand.
- b) Baldeori nalla flows nearly along the diagonal of Kerandari coal mining block needs diversion to minimize disturbance in coal mining activities, especially during monsoon season. A diversion scheme has been derived.

- c) Three alternate alignments were reviewed and alignment L1 shown in Figure 11 is finalized after review and joint discussions with Coal mining Group and Project Engineering of NTPC, Noida.
- d) Two alternate cross sections of diversion channel for Baldeori nalla have been suggested as given below:
- Rectangular section 45 m wide x 4.5 m deep
 - Trapezoidal section with base width of 40 m and side slope of 1:2 with depth of 4 m.
- e) Two fall structures have been suggested. The fall structures are to be designed with suitable energy dissipation arrangements.
- f) Design discharge for remodeled reach of Kerandari nalla has been estimated as 1400 cu.m./s and alternatives as given below are suggested:
- Raising of bank by 2 - 3 m alongwith proper protection of bank slope with stone in crates
 - Rectangular section 60 m wide x 6.5 m deep
 - Trapezoidal section with base width of 60 m and side slope of 1:2 with depth of 6 m.
 - Accepting the risk of overflow in reach of Kerandari downstream of diversion channel outfall and take the steps as per the prevailing situation.

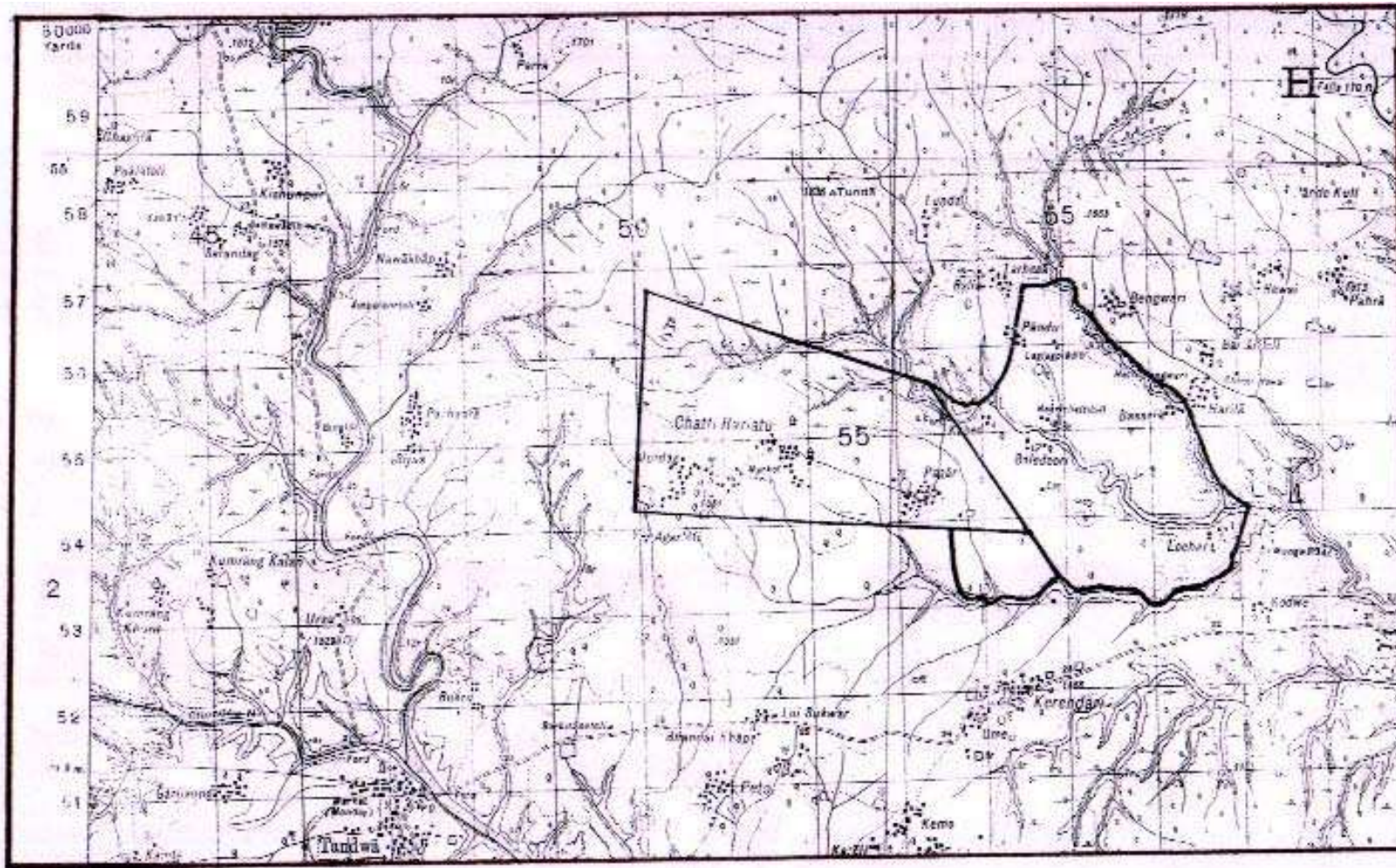


FIGURE 1 : INDEX MAP OF KERANDARI AND CHATTIBARIATTU COAL MINE BLOCKS

Top Soil Dump in the North of the mine



OB Dump in the North of the mine





Plantation in the Dump Area



FINAL REPORT**On**

Scientific study on method of working, ultimate pit slope, dump slope and monitoring of slope stability as per Regulation (106) (2) of Coal Mines Regulations – 2017

for

Kerandari Coal Mining Project of NTPC Ltd, located in Hazaribagh (Dist), Jharkhand.

Sponsored by**BGR Mining & Infra Limited****Scientific study by****DEPARTMENT OF MINING ENGINEERING****INDIAN INSTITUTE OF TECHNOLOGY****(BANARAS HINDU UNIVERSITY)****VARANASI 221 005, UP (INDIA)****Aug, 2023**

Contents

1.0 Project Profile	5
1.1 Introduction.....	5
1.2 Location and Approach.....	5
1.3 Objective of study.....	5
2.0 Geology of Area	7
2.1 General geology	7
Topography.....	9
Climate	9
Block Boundaries	9
3.0 Method of working.....	10
3.1 Choice of Opencast Mining:.....	11
3.2 Life of the mine	14
3.3 Sequence of mining operation:.....	14
4.0 Mining and Overburden	15
5.0 Numerical simulation	16
5.1 Geotechnical Assessment of open cast and dump.....	16
5.2 Modeling methods	18
5.2.1 Limit Equilibrium Method.....	18
5.2.3 Numerical Modeling (Finite Element Method).....	18
6.0 Design of Opencast.....	20
6.1 Design of Bench Geometry.....	21
6.2 Simulation of opencast benches after Five-Year	26
6.3 Simulation of Final Pit Slope	30
7.0 Drainage	34
8.0 Drilling and Blasting.....	36
8.1 Design of blasting pattern	37
8.2 Effect of Dynamic Forces on Slope Stability	38
9.0 Effect of Fire or Spontaneous Heating on Bench/ Dump Stability	40
Effect of Fault on slope stability	43

10.0 Slope Instrumentation and monitoring Plan 44

 10.1 Slope instrumentation 45

 10.2 Frequency of Monitoring 47

 10.3 Recommendation for slope monitoring 49

11.0 Water Management and Drainage 51

12.0 Conclusions and Recommendations 53



Figures

Figure 1: Geological Plan of Kerendari Coal Mine.....	20
Figure 2: First year stage mine plan with external dump and mine pit	21
Figure 3: Effect of height of slope on factor of safety at different slope angle (Alluvium Soil).....	23
Figure 4: Effect of height of slope on factor of safety at different slope angle (sandy soil)	23
Figure 5: Effect of height of slope on factor of safety at different slope angle (Coal).....	24
Figure 6: Effect of height of slope on factor of safety at 80 degree slope angle (Shale/Sandy shale/shaly coal).....	24
Figure 7: Effect of height of slope on factor of safety at 80 degree slope angle (Rockmass)	25
Figure 8: Plan of opencast mine after 5 years	26
Figure 9: Discretized view of Open Cast Coal Mines at five years for CMKN40 and CMKN48	27
Figure 10: Maximum Shear strain of opencast coal mine at five years.....	28
Figure 11: Factor of safety by Limit Equilibrium method	29
Figure 12: Plan of opencast mine at end of mine	30
Figure 13: Discretized view of various sections view of Open Cast Coal Mine	31
Figure 14: Maximum Shear strain at various sections of Open Cast Coal Mine	32
Figure 15: Factor of safety and probable failure circle by Limit Equilibrium method	33
Figure 16: Relation between seismic coefficient and factor of safety.....	39
Figure 17: Components of robotic total station system.....	47

Tables

Table 1: Stratigraphic Succession of Kerendari ‘A’ Block	7
Table 2: Details of Faults in Kerendari ‘A’ Block	8
Table 3: Equipment for Top OB Type of equipment	13
Table 4: Auxiliary Equipment	13
Table 5: Geotechnical properties of dump material and Rock Mass	17
Table 6: Recommended bench parameter for different benches	22
Table 7: Damage level of rock mass based on ground vibration (after Bauer & Calder, 1971)	36
Table 8: Suggested monitoring frequency	48
Table 9: summary of the movement thresholds suggested by various authors	48

1.0 Project Profile

1.1 Introduction

NTPC Ltd. is the largest thermal power generating company in India. It was incorporated in the year 1975 with the objective of planning, promoting, and organizing an integrated development of thermal power in India. NTPC, at present, has a total installed capacity of 73024 MW. NTPC has applied for allotment of a few coal-mining blocks and has been allotted Kerendari 'A' coal mining block in the North Karanpura Coalfields.

NTPC intends to develop this coal mining block cost-effectively in a safe and environmentally friendly manner. The life of the mine will be 25 years including increasing and decreasing trends of coal production during the initial and closing stages. Kerendari Block was regionally explored by GSI during 1961-71. The Regional boreholes of GSI which fall within the Kerendari Block indicated that the block has Quarriable potentiality. Based on the data of regional exploration, Kerendari Block was further subdivided into Kerendari "A", "B"&"C" blocks by CMPDI.

1.2 Location and Approach

Kerendari 'A' Block covers an area of 6.54 sq. Km, and is located in the Northern part of the North Karanpura Coalfield. It is bounded by Longitude 85°05'15" to 85°07'05"E and Latitude 23°54'45" to 23°52'20"N. The block is covered by the Survey of India Toposheet No. 73 E/1 (RF 1:50,000) and special sheet no. 16,17821 on R.F. 1:10,000. The block is surrounded by Chatti-Bariatu & Chatti- Bariatu South block in the west and southwest respectively, Kerendari -'B' block in the East, the Dumri block in the northwest, and the Hazaribagh-Tandwa State Highway in the South. The entire block falls in the Hazaribagh district of Jharkhand. The nearest township is Hazaribagh located at a distance of about 45 Km from the block. The nearest railhead is Ray (25 Km), and Khalari (40 Km) on the Gomoh- Barkakana-Dehri-On-Sone loop line. Ranchi, the State capital of Jharkhand is located about 100 Km from the block.

1.3 Objective of study

The Kerendari 'A' coal block located in North Karanpura coalfield, Hazaribagh district has been taken on lease by NTPC as a captive coal block for their own need for a Thermal Power Plant. Before opening up opencast mining operations, it was necessary to study slope stability of dump slope and open pit slope of OCP. Therefore, the present study is focused on the slope stability of the Pit as the dump slope study has already been done by CIMFER.

The present study has been carried out to fulfill the DGMS circular 3, (2020) under regulation 106 of the Coal Mines Regulation, 2017. The Major Objectives major is given below.

- Design of bench slope in different strata
- Design of overall slope angle
- Design of ultimate bench configuration
- Method of working
- Slope monitoring

2.0 Geology of Area

2.1 General geology

The block comprises Talchir, Karhabari, Barakar, Barren Measures, and Raniganj Formation belonging to the Damuda Subgroup of Lower Gondwana. Talchir Formation rests directly over the Archaeans. The Karharbaris and Barakars are the main Coal bearing formations in the block. The stratigraphic succession of the block is given in Table 1.

Table 1: Stratigraphic Succession of Kerendari 'A' Block

Period	Group	Sub-Group	Formation	Thickness range (m)	Lithology
Recent			Alluvium	6.00-24.50	Detrital & Alluvial Soil + Subsoil
Upper Permian	Lower Gondwana	Damuda	Raniganj	Up to 107.00	Fine to medium grained micaceous sandstone. Interbanded shale & thin Coal seams
			Barren Measures	Up to 268.00	Dark grey Shale, Sandy Shale & interbanded Shale & Sandstone.
			Barakar	Up to 182.00	Fine to coarse grained sandstone, shale, Carb. Shale & coal seams.
			Karharbari	24.00-81.00	Medium to coarse grained sandstone, shale, silicified quartzitic sandstone & thin coal seams.
Permo-carboniferous			Talchir	6.00	Green coloured shale Boulders & Conglomerates
-----Unconformity-----					
Pre- Cambrian			Metamorphic		Granite Gneisses & Quartzites

Structure: Kerendari 'A' block is located in the northern part of the North Karanpura Coalfield. The block is moderately faulted with 5 faults. Most of the faults are generally curvilinear and have almost NW-SE trend with variable northerly/north easterly throw giving rise to a step fault configuration. The strike of the strata is almost E-W in the entire block. The general dip of the strata/Coal seams is Southerly and varies from 9 deg. To 11deg. Five faults have been interpreted in the block based on Surface and Sub-Surface data. Three of these faults viz F1, F2 & F3 are in continuation from the adjoining Dumri & Chatti-Bariatu blocks. The remaining two faults viz F4 & F5 have been interpreted from Surface & Sub-Surface data generated in the block. In general, the faults are curvilinear with low to moderate throw towards North & North East. The block is moderately disturbed by faults. The details of faults as interpreted based on available information for the Kerendari 'A' block are given in Table 2.

Table 2: Details of Faults in Kerendari 'A' Block

Fault No.	Extent of Fault	Trend of Fault	Direction of throw	Amount of throw (m)	Evidences
F1-F1	About 2.5 km	NW-SE	NE	100-130	Continuation from Dumri Block and separates Chatti-Bariatu block on the Western side. Based on stratum colours of both sides.
F2-F2	About 3.5 km	NW-SE	N/NE	15-40	Continuation from Dumri block. Seam II Top, II Bottom, I Top and roof I Middle are omitted in BH CMKNC-79
F3-F3	About 3.6 km	NW-SE	N/NE	20-30	Continuation from Dumri block. (i) Seam II Top is faulted in BH CMKNC-49 (ii) Floor of seam IV Top, IV Bottom, III and III Bottom are faulted in BH CMKNC-27
F4-F4	About 3.6 km	NW-SE	N/NE	20-30	(i) Roof of seam IV top is faulted in BH CMKNC-80 (ii) Seam IV D, IV C, IV B, IV A, & IV top are faulted in BH CMKNC-81
F5-F5	About 1.7 km	NW-SE	NE	0-40	(i) Seam IV D, IV C, IV B, IV A, & IV top are faulted in BH CMKNC-25 (ii) Floor of seam III bottom is faulted in BH CMKK-116. (iii) Floor of seam II Bottom is middle, I bottom & local are totally faulted in BH CMKNC-12

Types of Rocks:

The block is mainly covered by rocks of Barakar formation which comprises Conglomerates, and various types of sandstones viz Coarse-grained to fine-grained quartzofeldspathic

Sandstone, Gritty sandstone, micaceous sandstone, Sandstone shale intercalations, Shale, Siltstones, carbonaceous shale & coal. Some part of the block is also covered by barren measures which comprise dark shale, sandy micaceous shale, interbedded shale, and sandstones & sideratic sandstones.

Topography

Kerendari 'A' Block shows a flat topography. The ground, in general, slopes towards the south and west. The elevation varies from 432 m to 459 m RL with reference to MSL within the block. In general, the entire block has a more or less flat topography. The drainage is controlled by the Basaria Nala in the east and Baldeori Nala in the south-central of the block. All the nalas are seasonal but during the rainy season, they discharge their load in the Barki River, which flows on the west of the block. The block has a flat terrain, the land is good agricultural land. Outside the block area on the northern side, there is hilly terrain. Two main nalas Baldeori and Basaria control the drainage of the area. Man-made canals exist in the block area and they will be put in disuse.

Climate

The Kerendari '-A' block falls in the tropical zone and the maximum temperature during the summer season (March-May) varies from 40-45° C. The minimum temperature during the same period is around 22° C. The winter (Nov-Feb.) is normally cold with a minimum recorded temperature of about 1°C. The average rainfall in the region is generally 1200 mm.

Block Boundaries

The block boundaries of the Kerendari "A" block are demarcated by Basaria Nala in the east, Chatti Bariatu block in the west, Dumri block in the northwest, extension of U/G position of fault F6- F6 of Dumri block in the north and Kerendari Nala in the South. In addition to the above about 0.5 Sq Km area of the block falls on the upthrown side of the fault Fi-Fi fault in the South-West direction. The boundaries of this patch are controlled by the Fi-Fi fault in the east, the eastern boundary of the Chatti Bariatu South block in the West, the Southern boundary of the Chatti Bariatu in the north, and the Kerendari Nala in the South.

3.0 Method of working

Kerendari 'A' Block is a part of Kerendari Block, which has been subdivided by CMPDI into 3 blocks namely Kerendari 'A', 'B' & 'C'. Kerendari 'A' is on the western part of the Kerendari block, which is located in the northern part of North Karanpura Coalfield. The block is surrounded by Chatti Bariatu & Chatti Bariatu South blocks in the west & southwest respectively. The entire block falls in the Hazaribagh district of Jharkhand. Hazaribagh, the headquarters of Hazaribagh district is at a distance of about 45 km from the block and is connected by an all-weather metalled road going from Hazaribagh to Tandwa.

The stability of slopes depends on the geological structures, geomechanical properties of the slope materials, and groundwater/ rainwater conditions in the quarry. Circular failure is the basic mode of slope instability in weathered slope material, whereas plane wedge-toppling failures occur in the hard rock mass. The detailed slope stability analysis is carried out by the limit equilibrium method and finite element methods

Mining Method:

CMPDI suggests given the geology of this block, a mechanized opencast method of mining with shovel dumper combination is best suited to remove the coal, overburden, and inter burden. The proposed shovel-dumper system is very flexible and also offers convenient mining operations to deal with sudden occurrences of unworkable or poor-quality patches. The technology is well known and advantageous to get skilled manpower.

Opening of the deposit:

The mine will be opened up by driving an access trench from the surface with RL 454m at a gradient of 6° (i.e., 1 in 16) to reach the quarry floor at 438m R.L. The benches will be formed along the strike for the advancement of the quarry for initial Box cut. The Box cut operation will continue along strike as well as along dip. In the box cut the quarry will reach a floor RL of 420 m. At this stage, the mine will produce 2 million Tonnes of coal by removing the overburden of 6.49 M cum. The corresponding stripping ratio works out to 3.24 cum/t. This box cut operation is the mine working during first the year.

3.1 Choice of Opencast Mining:

Mining system and selection of Equipment:

Mining System

The Mine having multi-seam deposits with steeply dipping seams does not attract the application of dragline for the removal of overburden. Applicability of surface miner: Since there are multiple coal seams, both thin and medium thick and it will not be possible to have large exposure of coal in a single thick and flat seam, which is a pre-requisite for application of surface miner, the same is being ruled out in favor of shovel dumper combination.

Top overburden is proposed to be removed by deploying an electric rope shovel in conjunction with the rear dumper. Coal and the group of partings between the seams are proposed to be excavated by deploying an electric hydraulic shovel in conjunction with rear a dumper. Practically the opencast mine is divided vertically by two main horizons. The upper horizon consists of large top overburden and the lower horizon is the combination of all coal seams and their inter-burdens.

Both coal and overburdened rocks have to be loosened/fragmented before actual extraction. As such, drilling blast holes and subsequent blasting will be resorted to. Before the blasting operation commences, a series of trial blasting has to be done by the mine blasting engineer to arrive at the appropriate blast hole geometry, powder factor, type of initiation, deck charging, if any, etc, to ensure proper fragmentation, minimum throw, and toe.

A mining system with shovel dumper combination has been suggested for both overburden removal and coal extraction by the Mine planner. Top overburden is proposed to be removed by deploying an electric rope shovel in conjunction with the rear dumper. Coal and the group of partings between the seams are proposed to be excavated by deploying an electric hydraulic shovel in conjunction with a rear dumper. Practically the opencast mine is divided vertically by two main horizons. The upper horizon consists of large top overburdened and the lower horizon is the combination of all coal seams and their inter-burdens. Both coal and overburden rocks have to be loosened/fragmented before actual extraction. As such, drilling blast holes and subsequent blasting will be resorted to. Before the blasting operation commences, a series of trial blasting has to be done by the mine blasting engineer to arrive at the appropriate blast hole

geometry, powder factor, type of initiation, deck charging if any, etc, to ensure proper fragmentation, minimum throw and toe.

The blasted/ fragmented materials will be excavated by the respective shovels for the particular horizons and loaded into the truck for being hauled out. In the case of coal, it will be transported up to the crusher/coal dump. The following are the various parameters adopted in the bench design.

- a) For 25 M³ Electric rope shovel to be deployed for removal of Top overburden
- 1) Height of the bench- 15m
 - 2) Width of the working bench-60m
 - 3) Width of the non-working bench-30m 4) High wall angle of the bench- 70° to the horizontal
- b) For 12 M³ hydraulic shovel working in the thick seam and thick parting.
- 1) Height of the bench-15m
 - 2) Width of the working bench-40m
 - 3) Width of the non-working bench-25m 4) High wall angle of the bench-70°
- c) For 4.5 M³ hydraulic shovel working in the thin seam and thin parting.
- 1) Height of the bench-equal to thickness of coal seam and thickness of parting
 - 2) Width of the working bench-30m
 - 3) Width of the non-working bench-25m
 - 4) High wall angle of the bench-70°

the above parameters may be modified according to the actual working condition. The bench slope angle for the soft OB bench will not be steeper than 45°.

Selection of Equipment's:

A large electric rope shovel in conjunction with a dumper for the removal of top overburden has been used due to its large volume and large depth. For optimum fragmentation of OB rock, for drilling blast holes in the OB bench 250 mm diameter Rotary blast hole drill has been suggested

to match with the 25m³ bucket electric rope shovel. Other two types of hydraulic shovels have been suggested for the extraction of coal as well as the removal of interburden. Hydraulic shovel with a bucket capacity of 12 m³ is proposed to extract coal from thick seams and remove interburden of large depth. This shovel will work in conjunction with 120 T dumper. Similarly, hydraulic shovel of a smaller bucket e.g. 4.5m³ is suggested to extract coal from thin seams and remove of interburden of smaller depth. The hydraulic shovel will work with a 50T Rear dumper. The equipment is given in table 3.

Table 3: Equipment for Top OB Type of equipment

SL.	Type of Equipment for		
No.	Removal of top OB	Extraction of coal as well as removal of interburden	Extract coal from thin seams and removal of interburden of smaller depth
1	25 m ³ Electric Rope Shovel	12m ³ Electric Hydraulic Shovel	250 mm diameter Rotary blast hole drill
2	200 T Rear discharge dumper	120 T Rear discharge dumper	160 mm diameter Rotary blast hole drill
3	250 mm diameter Rotary blast hole Drill	4.5m ³ Electric Hydraulic Shovel	610 HP crawler mounted dozer
4	600 HP crawler mounted dozer	50 T Rear discharge dumper	410 HP crawler mounted dozer

Auxiliary Equipment: Apart from the main Heavy earth moving equipment for removal of overburden and extraction of coal, a fleet of other auxiliary equipment are suggested for the smooth operation of the opencast mine. Table 4 below shows the list of auxiliary equipment suggested in this project.

Table 4: Auxiliary Equipment

SL No.	Type of equipment
1	285 HP Motor grader
2	28 KL water sprinkler

3	25T Vibratory compactor
4	4.5 M ³ F.E loader
5	100 T mobile crane
6	60 T mobile crane
7	18 T mobile crane
8	Jack hammer drill with compressor
9	2 m ³ hydraulic backhoe
10	Mobile workshop/service van
11	Tyre handler dozer
12	460 HP Wheel dozer
13	8 m ³ Tipping truck

3.2 Life of the mine

Considering the mineable reserves of the mine and above-rated production and build-up of production in the initial 2 production years, the open-cast mine will produce coal for 25 years in the proved reserve.

3.3 Sequence of mining operation:

After the completion of the box cut operation, the mine will advance along the strike and towards the dip by removing O.B. to produce a planned quantity of coal every year. As the quarry progresses towards the dip, no. of O.B. and coal benches will be increased to match the depth of the quarry in a particular stage of operation. The opencast mine will reach its annual production target in the 3 production year. During 3 production years, the mine will produce 6.0 million tonnes of coal by removing 14.87 million Cum of O.B. The mine will continue to produce at the same rate i.e 6.0 MT/year till the 24th year of mine life, in the 25th year the mine will produce 1.74 Million tonnes of coal and the corresponding volume of overburden to be removed will be 1.13 Million Cum

4.0 Mining and Overburden

Overburden Disposal

The mine will be divided into 4 different Sectors, each Sector with roughly 6 years of coal production.

Sector A, the first Sector from the incorp on the rising side will have mine entry at the incorp of the lowermost seam ie Scam I Bottom. For the first six years, the O.B. removed will be dumped in the external dump to the north of the north boundary of the block, on approx. 100 Ha of non-forest and non-coal land. After Sector A is de-coaled, the void will be filled by O.B. of Sector B by internal dumping and the haul road serving Sector A. Simultaneously, alternate O.B. roads (2 Nos.) on the east side and one coal road will be put in use in Sector B an alternate route for dumpers.

Sector B, the second Sector, to the dip side adjoining Sector A will be worked after Sector A. O.B. from Sector B will be dumped in the old Sector A, flush against the sides of the excavation. There will be three O.B. exit roads at 345 m, 360 m, and 375 m. levels for internal dumping at different levels on the east side. A fourth exit road at 435 m level will come to the surface for moving dumpers to the workshop for daily maintenance. One road on the west side at 435m level will be for coal haulers. Both O.B. and coal dumpers will negotiate different benches through ramps.

Sector C, the Third Sector, to the dip side adjoining Sector B will be worked after Sector B. O.B. from Sector C will be dumped in the void in Sector B, flush against the sides of the excavation. There will be two O.B. exit roads at 375 m and 315 m levels for internal dumping on the east side. A third exit road at 435 m level will come to the surface for moving dumpers to the workshop for daily maintenance. One road on the west level at 435m level will be for coal haulers Both OB and coal haulers will negotiate different benches through ramps,

Sector D, the fourth Sector, to the dip side adjoining Sector C will be worked in Sector C. O.B. from Sector D will be dumped in the void in Sector C, flush against the side of the excavation. There will be two OB exit roads for internal dumping at 375 m and 300 m levels on the east side. A third exit road at 435 m will come to the surface for moving dumpers to the workshop for daily maintenance. One road on the west side at 435m level will be for coal haulers. Both O.B. and coal haulers will negotiate different benches through ramps.

Dump 1 (located in the north of the project) will be utilized for external dumping In the first six years of the mining operation. Subsequently, the quarry will be backfilled from the seventh year onwards. To maximize internal dumping the mine has been divided into four Sectors. Starting from the incrop side with Sector A towards the dip there will be three more Sectors, Sector B adjoining Sector A, Sector C adjoining Sector B, and Sector D adjoining Sector C. As per the approved mining plan the maximum height of the internal dump was planned as 470 m from pit bottom. It was presented to MOEF according to Environmental Clearance.

5.0 Numerical simulation

The stability analysis was done by the finite element method and the Limit equilibrium method. These methods have been used to assess the failure mechanisms and to determine the factor of safety. These techniques are widely used to perform stability analysis where the conditions are complex and possible consequences of failure are significant. Modeling has advantages: design ideas can be tested, different material properties can be evaluated, and risk analysis carried out.

The slope stability study is essential because of the influence of slope angle on the design and economics of opencast mining operations. On the one hand, stable slopes are essential for the safety of men and machines and on the other hand, vast amounts of land and money can be saved by optimizing slope geometry. It is, therefore, the technical and economic necessity that the most optimum design be achieved in the light of these two conflicting requirements by optimizing the slope, i.e. steep enough to be economically acceptable and flat enough to be safe.

5.1 Geotechnical Assessment of open cast and dump

The mine is proposed to be worked by shovel-dumper combination. The stability of the slope primarily depends on the strength properties of the dump material, orientation and geology of the dump foundation, and infiltration of the rainfall, drainage, and groundwater condition within the slope.

Engineering properties of the dump material and rock mass are important in the analysis of slope stability. The slope stability analysis was done based on data given in Table 4. However, it is recommended to re-examine the changes in the different geotechnical parameters of the dump material and pit material during mining **every five years**. Table 4 shows the material properties

used for the simulation of the dump slope of Kerendari OCP. The data is obtained from mine official and literature survey.

Table 5: Geotechnical properties of dump material and Rock Mass

Properties Type of Material	Cohesion (kPa)	Friction angle (degree)	Modulus of Elasticity (MPa)	Poisson Ratio	Density KN/m ³
Sandy soil	10	33	400	0.30	18
Soil	24	26	600	0.32	16
Clay	22	25	100	0.32	14
Carb Shale	450	30	1200	0.28	14
Shaly coal	490	24	1400	0.26	14
Shale	400	27	1400	0.26	15
Coal	400	26	1600	0.26	13
Sh/Sst intercal	470	26	800	0.32	18
Medium grain sandstone	340	28	1800	0.26	26
Fine grain sandstone	410	27	2000	0.26	28
Coarse grain sandstone	280	28	1500	0.26	24
Overburden dump	38.0	32	800	0.30	17

5.2 Modeling methods

5.2.1 Limit Equilibrium Method

The conventional limit equilibrium method is used in many geotechnical practices to investigate the equilibrium condition and analyze slope stability with varying geotechnical data and geometry. These methods assume that the shear strengths of the materials along the potential failure surface are governed by linear (Mohr-Coulomb) or nonlinear relationships between shear strength and the normal stress on the failure surface. The most common methods for limit equilibrium analysis are methods of slices. The soil mass above the assumed slip surface is divided into vertical slices for analysis. Several different methods of slices are available for analyzing the circular and non-circular failure conditions.

In the present study, Geo5 software based on the limit equilibrium method has been used to compute the factor of safety using bishop methods. The critical slip surface has been calculated by the above methods having the lowest factor of safety. Two-dimensional (2-D) cross-section and plane strain conditions are used for the present analysis. The factor of Safety is defined as the ratio of resisting forces to driving forces of the slope material.

5.2.3 Numerical Modeling (Finite Element Method)

Numerical modeling is widely used to compute stresses and displacements in structures caused by the applied load. The method is particularly useful for complex problems. The stability of a slope cannot be determined directly from finite element analyses, but the computed stresses in a slope can be used to compute a factor of safety. Phase 2 based on the finite element method has been used to calculate the factor of safety.

The shear strength reduction technique has two advantages over the conventional approach. The critical failure surface is found automatically and it is not necessary to specify the shape of the failure surface. To perform slope stability analysis with the shear strength reduction technique, simulations are run for a series of increasing trial factors of safety, F^{trial} (Griffiths and Lane, 1999). The actual shear strength properties cohesion (c) and internal friction angle (Φ) are reduced for each trial according to equations 1 and 2. If multiple materials are present, the reduction is made

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simultaneously for all materials. The trial factor of safety is gradually increased until the slope fails. At failure, the safety factor equals the trial safety factor. The factor of safety is defined according to the equation

$$C^{trial} = \frac{1}{F^{trial}} C \quad \dots\dots(1)$$

$$\phi^{trial} = \arctan \left(\frac{1}{F^{trial}} \tan \phi \right) \quad \dots\dots(2)$$

The numerical model of the slope has been developed based on the finite element method and finite difference method. The key success of numerical modeling is to consider the representative constitutive behavior of dump material. It has been observed from the literature that dumps (soil) behave as a non-associated elastic-perfectly plastic material. Generally, it obeys the Mohr-Coulomb yield function. It can be expressed as:

$$\sigma_1 = 2C \left(\frac{\cos(\phi)}{1 - \sin(\phi)} \right) + \sigma_3 \left(\frac{1 + \sin(\phi)}{1 - \sin(\phi)} \right)$$

Where, C and Φ are cohesion and internal frictional angle

σ_1 and σ_3 are principal stress

This factor of safety could either be directly calculated based on the limit equilibrium method or indirectly by numerical modeling based on the strength reduction technique. The factor of safety must be greater than 1 for a stable slope. The minimum Factor of Safety for the design of pit, bench, and dump slope shall be in any case not be less than 1.5 for permanent or long-standing slopes and 1.3 for all other cases (DGMS, circular 3/2020). Keeping the above discussion in mind, 1.5 has been taken as a minimum factor of safety for the stable slope of the Kerandari Open cast coal mine.

6.0 Design of Opencast

Figure 1 shows the plan of the Geological Plan mine of Kerendari OCP. The model of open pit slope has been simulated by finite element and limit equilibrium method. The results in terms of shear strain and probable failure circle are shown in various figures.

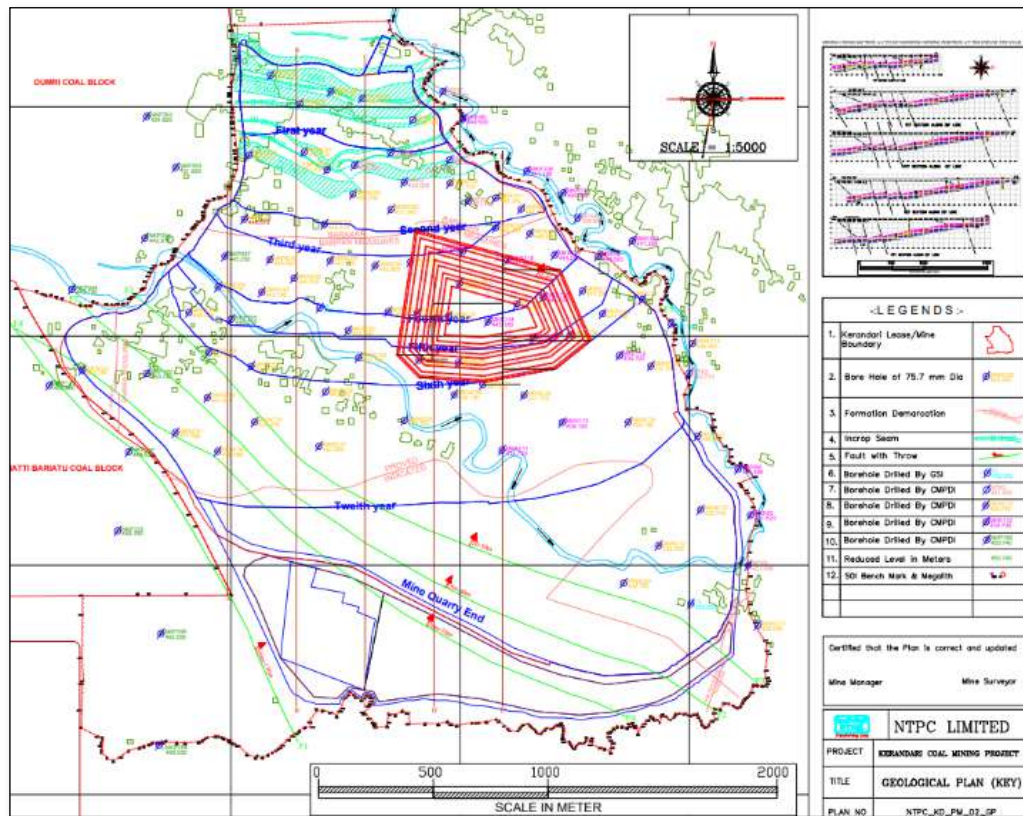


Figure 1: Geological Plan of Kerendari Coal Mine

6.1 Design of Bench Geometry

The design of mine benches is dependent on many parameters such as the stability of mine benches, types of rock mass, geological disturbances, machinery used, etc. In the Kerendari opencast mine, the final bench height and bench width are 15 m and 25m respectively. The maximum overall slope angle is 27 degrees and the bench angle is 75 degrees. Two scenarios have been simulated, one is after five and the other is the final pit slope.

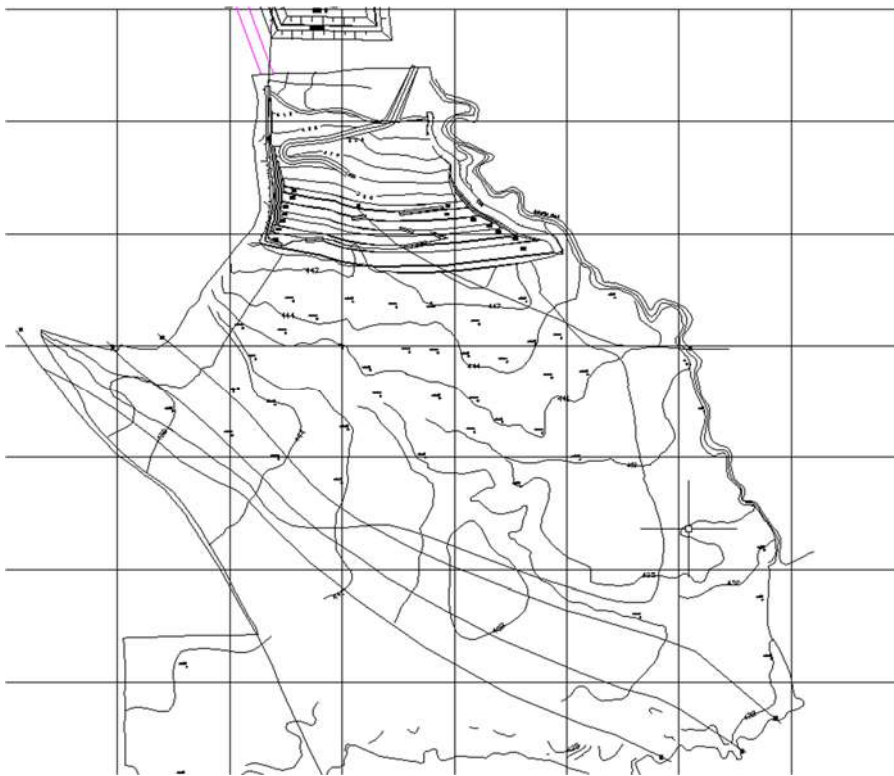


Figure 2: First year stage mine plan with external dump and mine pit

In this simulation, the optimization has been done for the bench slope angle, height, and width of mine slope. The major types of materials are Soil, Sandy soil, rock mass (Carb Shale, Medium grain sandstone, Fine grain sandstone, Coarse grain sandstone, SST MGD-CGD, SST FGD-MGD, SST CGD-VCGD, SST MGD-GRT) and coal. Various models have been prepared and solved with different heights of soil and rock material having a single bench. The slope angle of mine benches has also been varied. The properties given in Table 6 are used for the simulation. Figures 3 to 7 show the graph between the factor of safety (FOS) of the bench with varying heights of the slope. This analysis has been carried out at different slope angles and different types of soil. The results in terms of stable height with optimum slope angle have been determined in different types of soil/rock using figures 3 to 7. The results are summarized in Table 6.

Table 6: Recommended bench parameter for different benches

Sr No	Types of material	Maximum Height (m)	Maximum Slope angle (°)	Minimum Bench Width (m)
1	Soil/Alluvium/Clay	5	50	10
2	Mixed soil with medium hardness	6	60	10
3	Shale/Sandy shale/shaly coal	15	80	15
4	Coal	15	80	15
5	Rock Mass	15	80	15

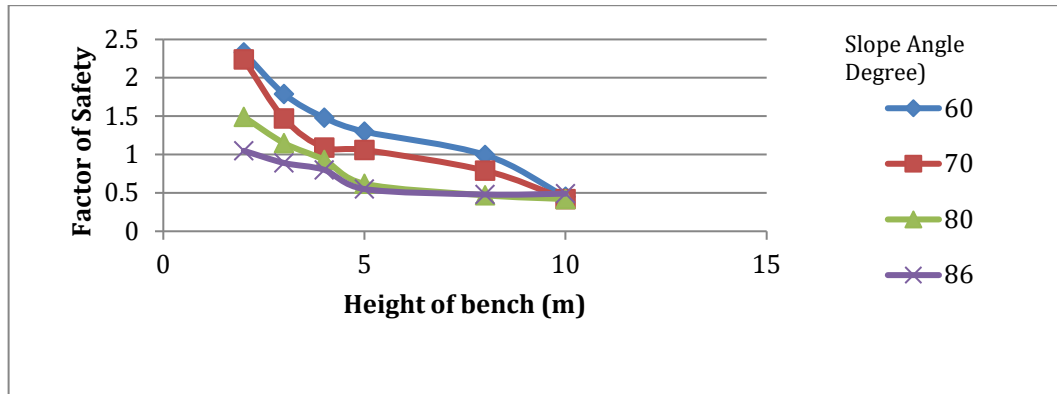


Figure 3: Effect of height of slope on factor of safety at different slope angle (Alluvium Soil)

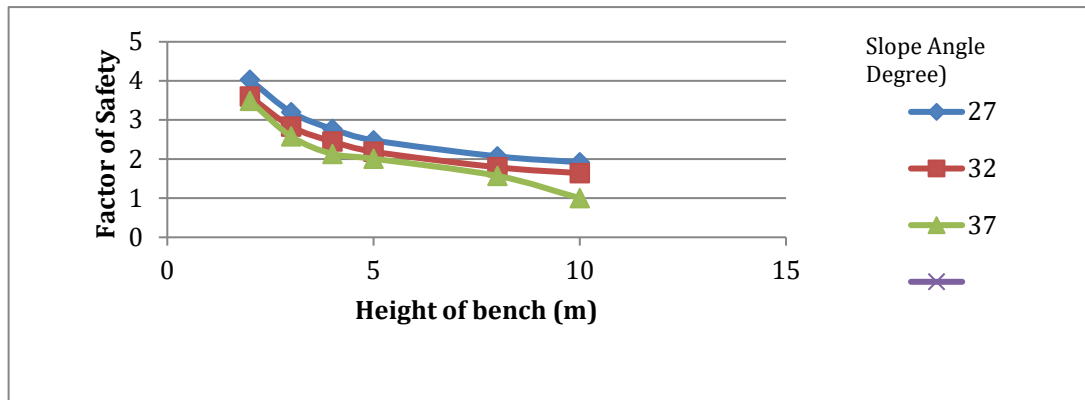


Figure 4: Effect of height of slope on factor of safety at different slope angle (sandy soil)

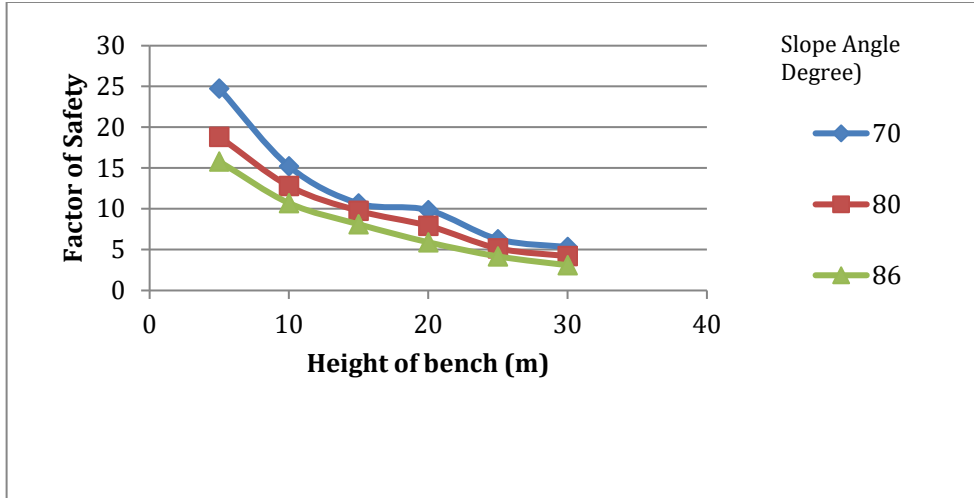


Figure 5: Effect of height of slope on factor of safety at different slope angle (Coal)

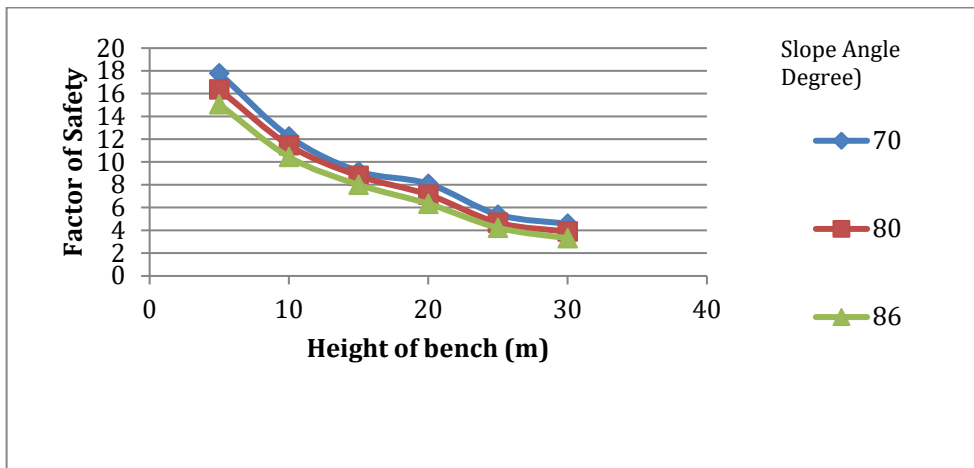


Figure 6: Effect of height of slope on factor of safety at 80 degree slope angle (Shale/Sandy shale/shaly coal)

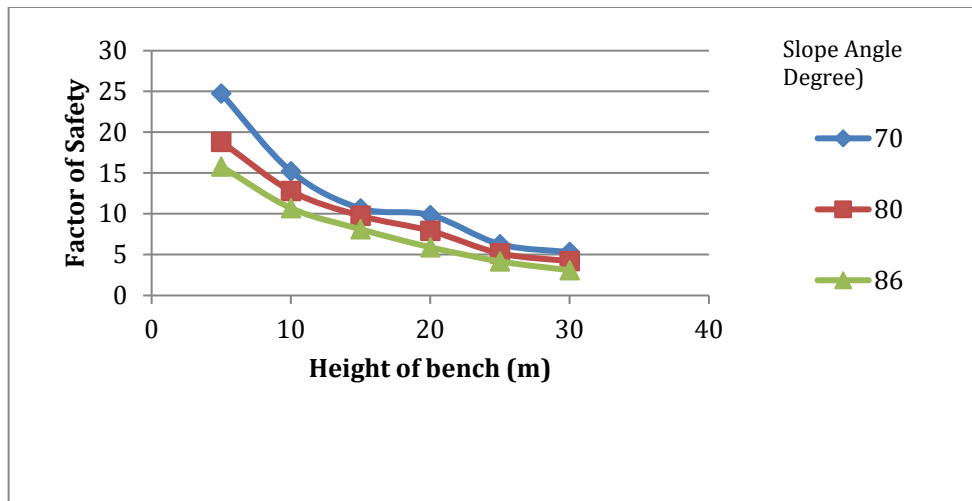


Figure 7: Effect of height of slope on factor of safety at 80 degree slope angle (Rockmass)

6.2 Simulation of opencast benches after Five-Year

Figure 8 shows the working mine plan for 5 years of Kerendari OCP. One section and two borehole logs (CMKN 40 and CMKN 48) have been taken to simulate the mine pit slope. The pit depth after five is around 110m. The discretized view of the open cast mine after five years (Figure 9). The individual bench width is 25 m and the height is 15 m has been taken for simulation as per the mine plan. The model is simulated and analyses by the finite element method and limit equilibrium method. The factor of safety by finite element method is 1.58 and 1.79 for borehole CMKN40 and 48 respectively. The results in terms of shear strain and probable failure circle are shown in figures 10 and 11 respectively. It indicates that the present design of the opencast mine is stable for the long-term.

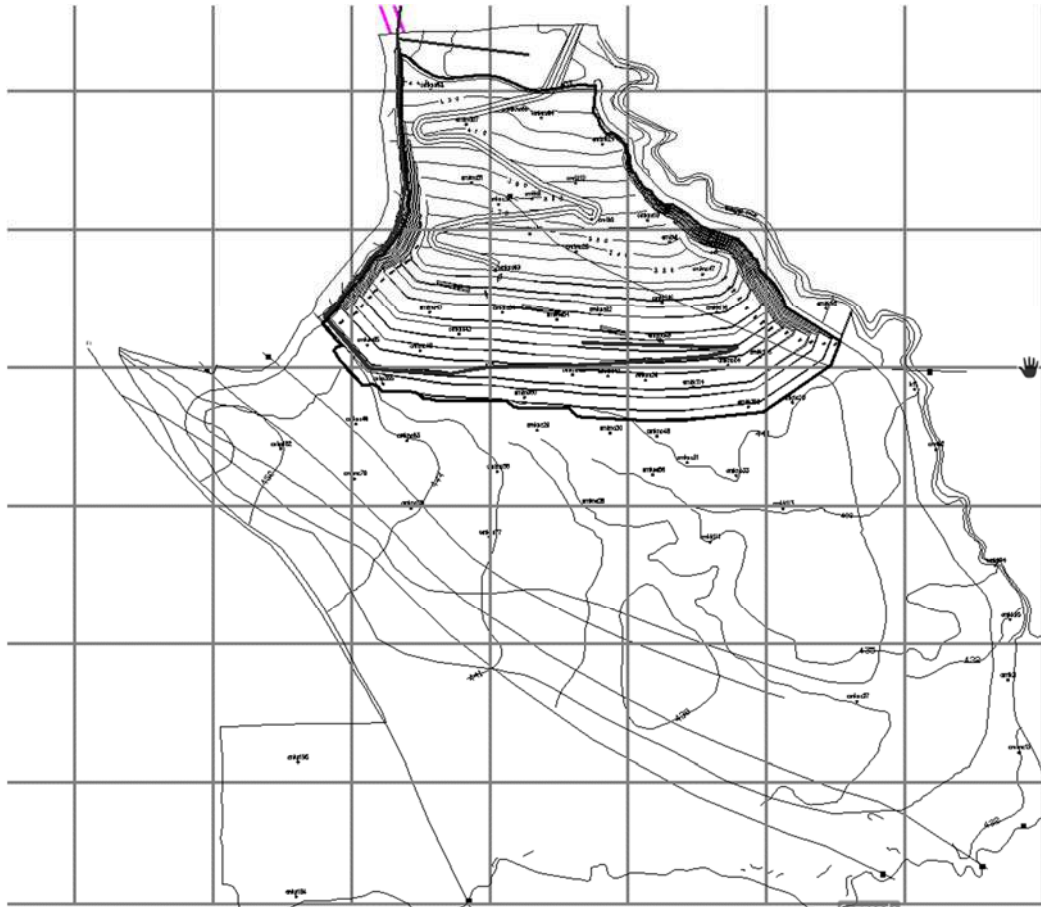


Figure 8: Plan of opencast mine after 5 years

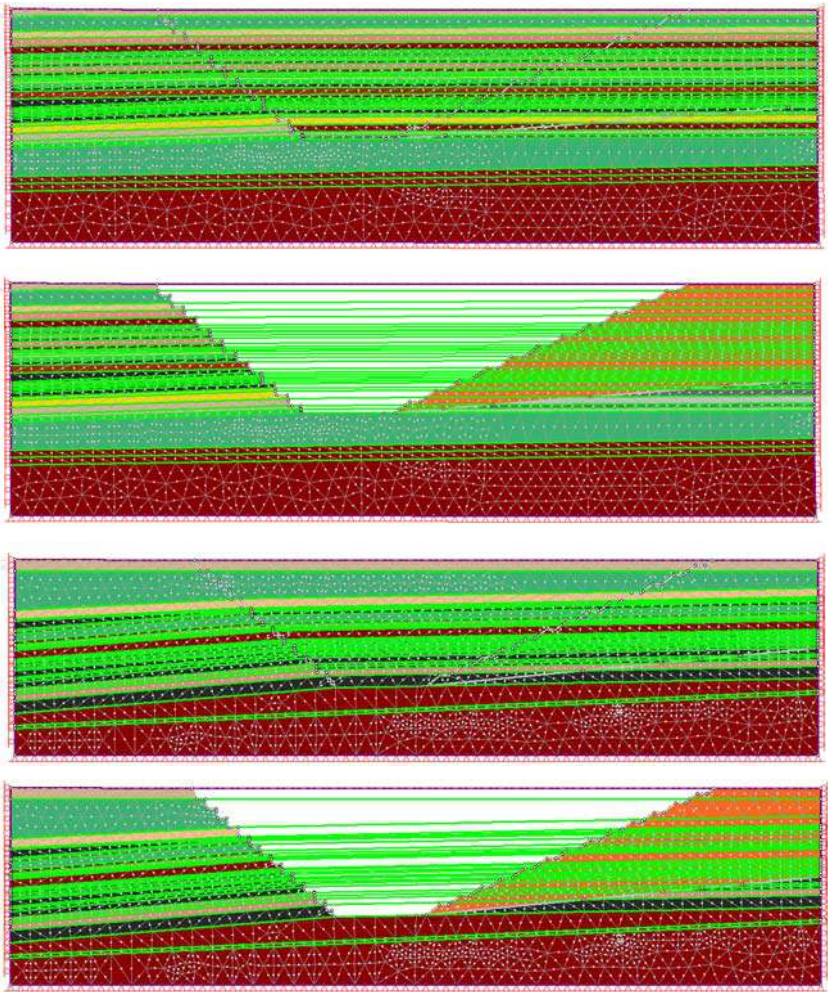


Figure 9: Discretized view of Open Cast Coal Mines at five years for CMKN40 and CMKN48



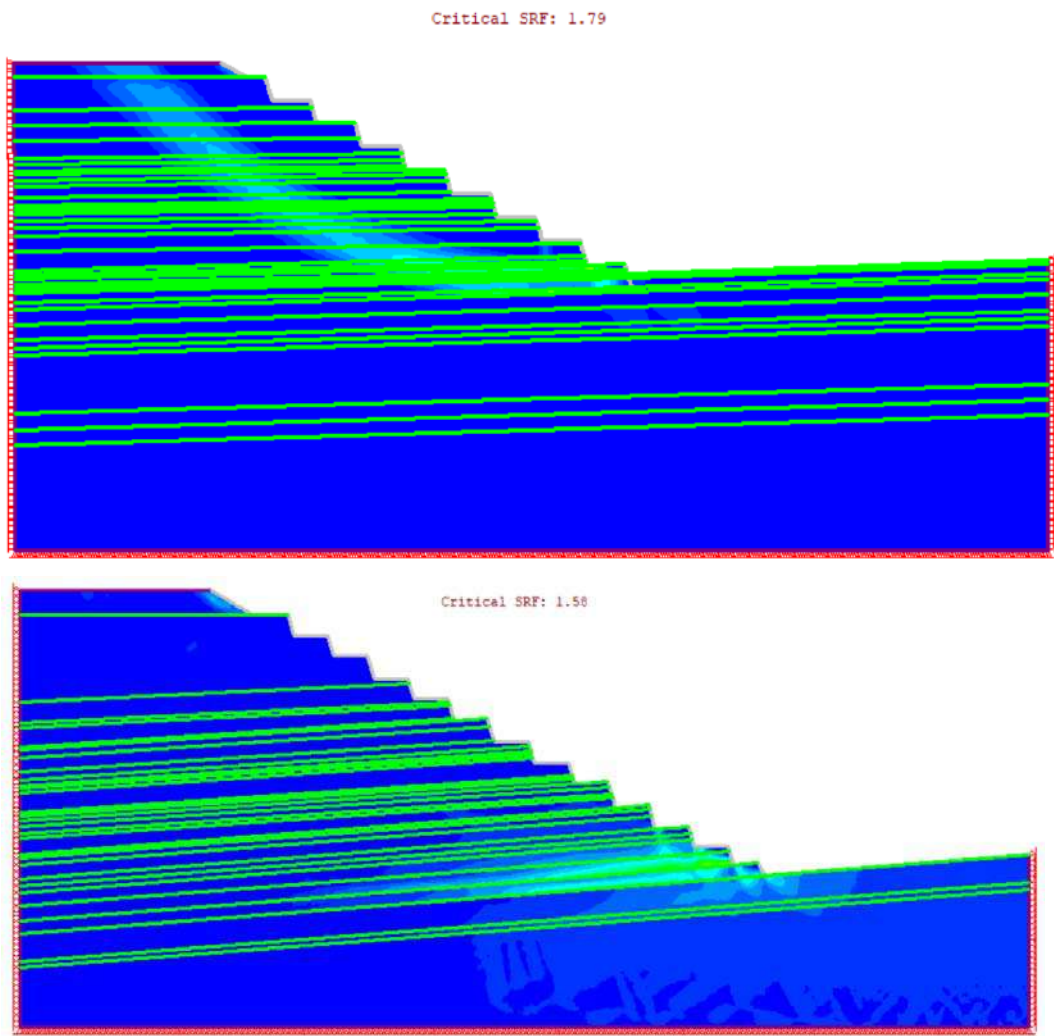


Figure 10: Maximum Shear strain of opencast coal mine at five years



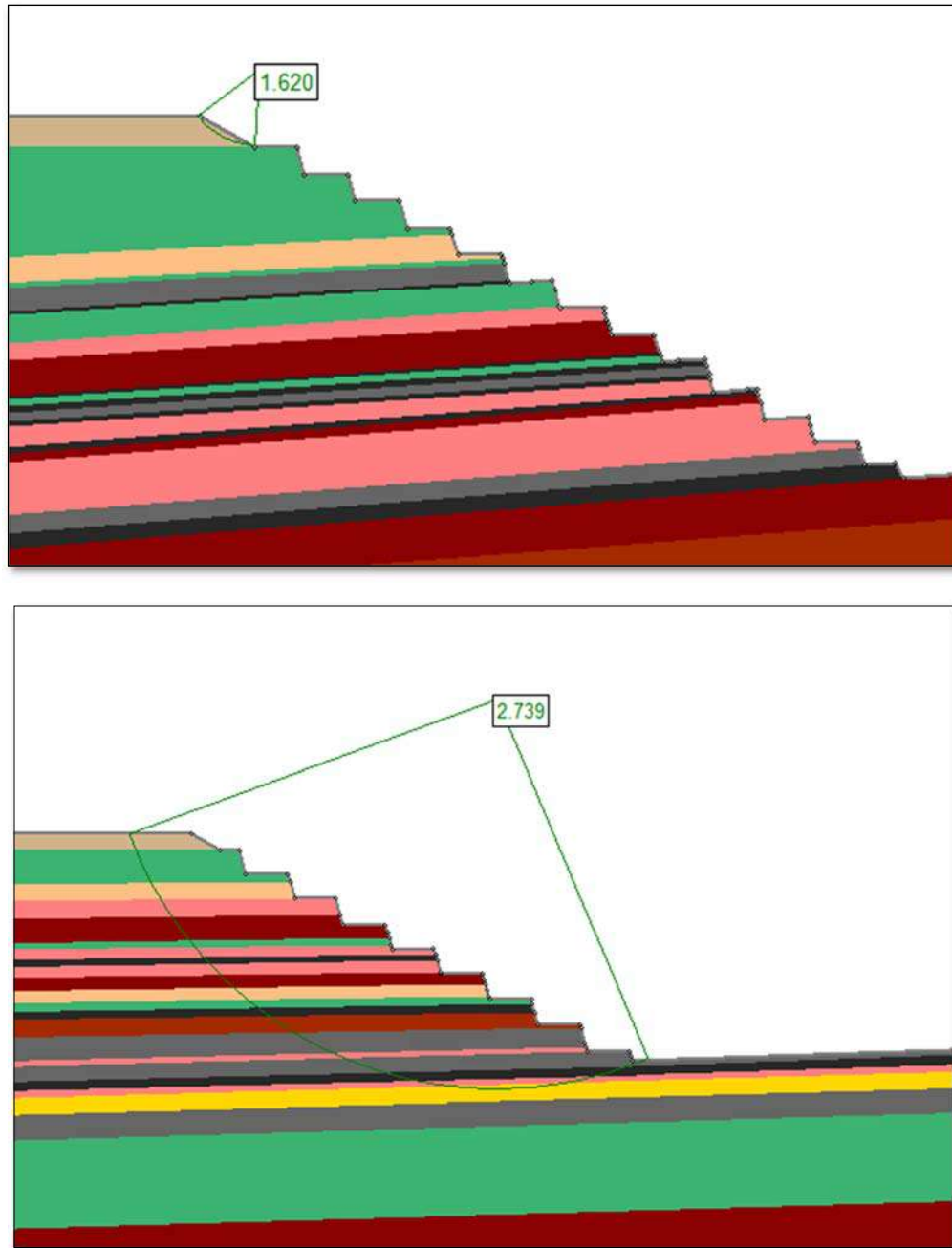


Figure 11: Factor of safety by Limit Equilibrium method



6.3 Simulation of Final Pit Slope

Figure 12 shows the final plan of the opencast mine. Figure 13 shows the discretized view of the final pit slope at a depth of 400m. The model is simulated by finite element (figures 13 and 14) and also solved by the limit equilibrium method. The individual bench width is 25 m and the height is 15 m has been taken for simulation as per the mine plan. The model is simulated and analysed by the finite element method and limit equilibrium method. The results in terms of shear strain and probable failure circle are shown in figure 15. The factor of safety by finite element method is 1.58 and 1.57 for borehole CMKN40 and 48 respectively. It indicates that the present design of the opencast mine is stable for the long-term.

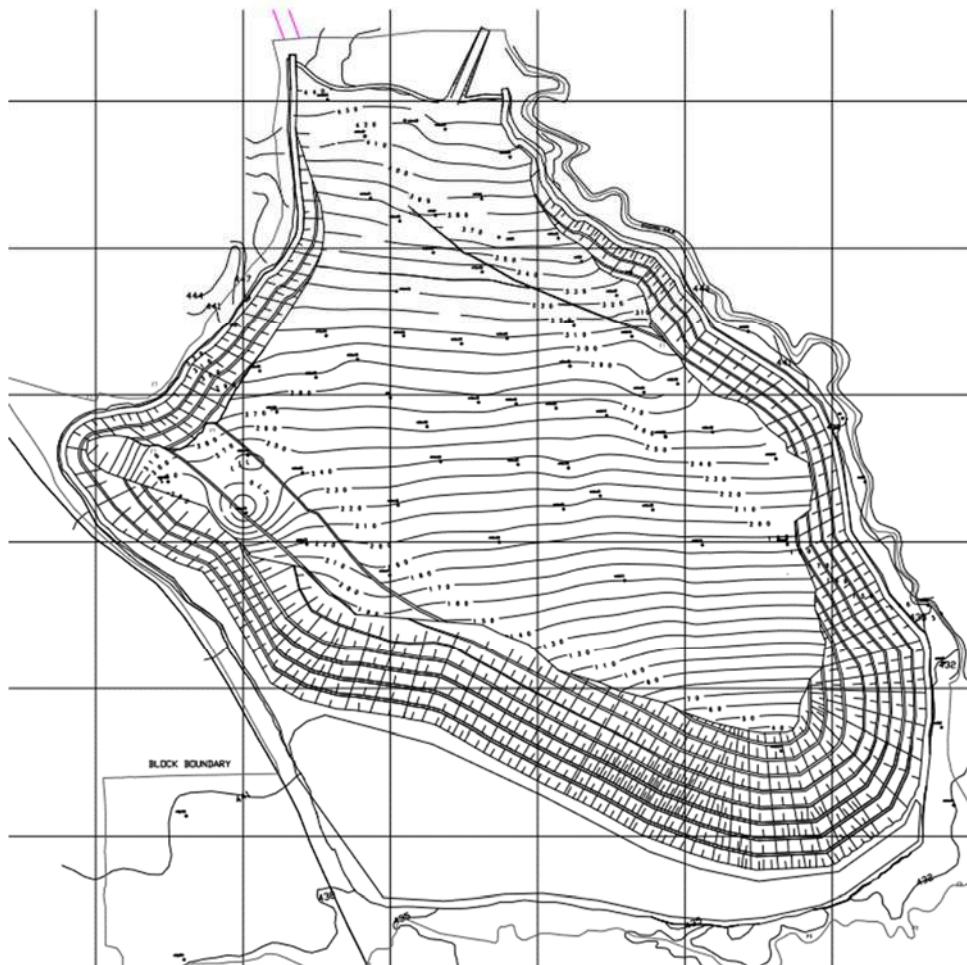


Figure 12: Plan of opencast mine at end of mine

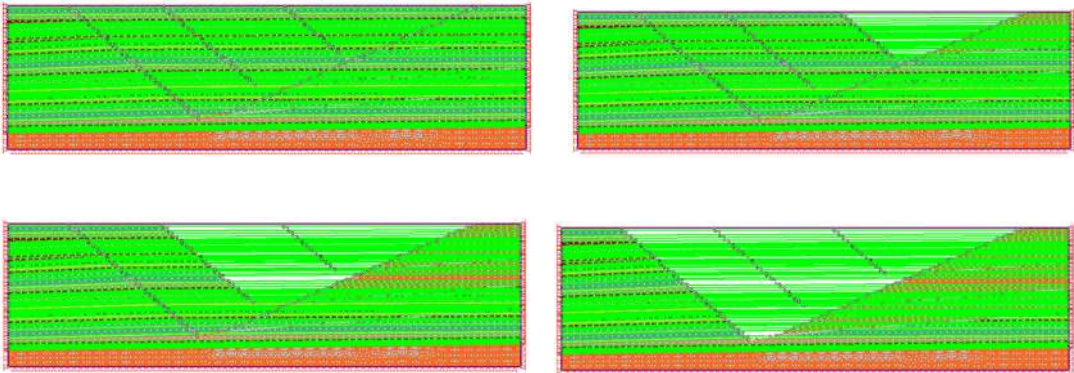


Figure 13: Discretized view of various sections view of Open Cast Coal Mine

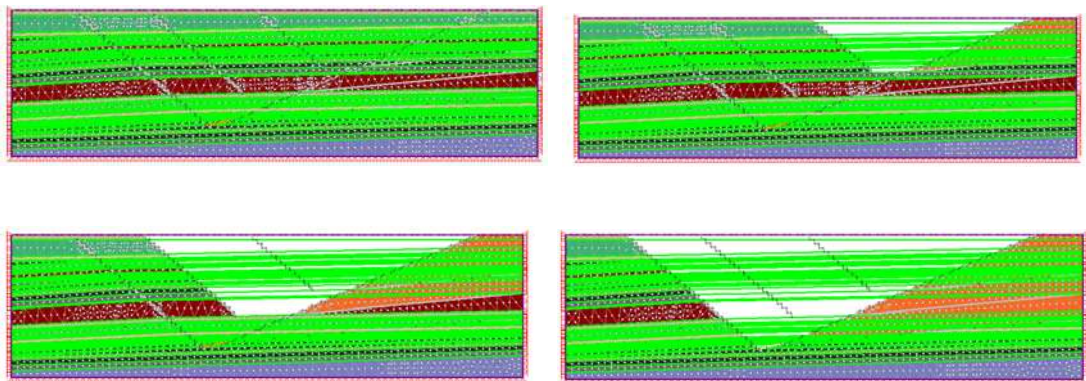


Figure 14: Discretized view of various sections view of Open Cast Coal Mine



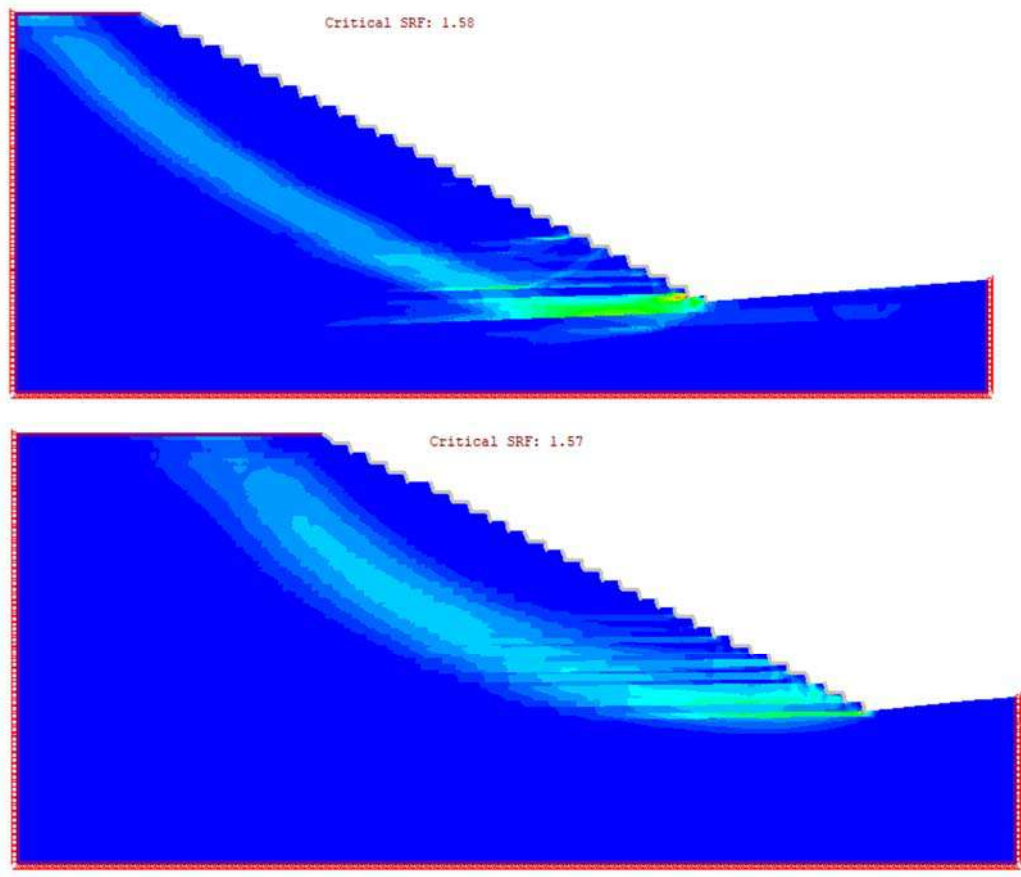


Figure 14: Maximum Shear strain at various sections of Open Cast Coal Mine



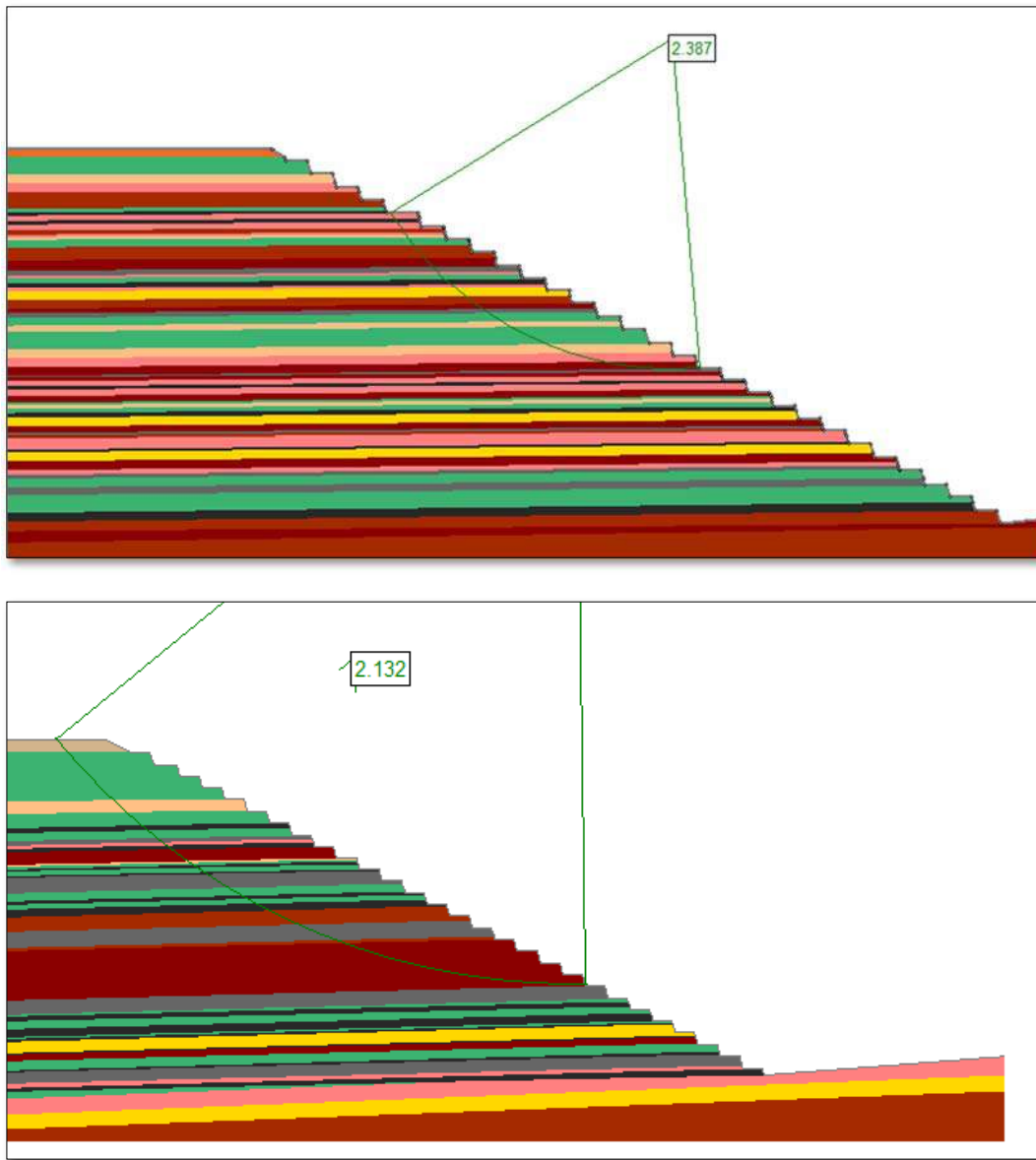


Figure 15: Factor of safety and probable failure circle by Limit Equilibrium method



7.0 Drainage

Surface drainage is controlled by Basaria Nala in the East and Baldeori Nala in the South Central Part of the block. All the nalas are seasonal, but during the rainy season June to October, they discharge their load into Barki River, which flows on the west of the block. The average rainfall in the region is about 1181.52 mm of which 69% precipitation is during the rainy season. The nearest rain gauging station is at Barka Gaon block office, where daily rainfall is recorded. From the records available at the block office from 1979 to 2004, it may be observed that the maximum annual rainfall of 2037.50 mm was recorded in the year 1994 and the minimum was 656.20 mm in the year 2002. In the monsoon period maximum rainfall observed was 820.30 mm in August 1994. In non-monsoon period (November to May), the maximum rainfall recorded was 132.20 mm in March '88. The average number of rainy days is around 75.

Garland Drain

Proper garland drains shall be made before every monsoon at the periphery of the active edge of the quarry and around dumps to prevent the surface rainwater to enter the quarry.

Mine Water Pumping

Mine working shall be planned in such a way that working faces and haul road shall remain dry as far as possible. A suitable gradient along the quarry floor and benches shall be provided to facilitate the self-drainage of water to the lowest level. Water accumulated in the sump shall be directly pumped out of the mine to drain away to nalas.

The rainwater of the adjacent catchment area should not be allowed to enter to pit in an uncontrolled way. It causes erosion and deep gullies in the weak formations, which in turn may fail over due course of time. All around the periphery of the dump, a collector drain/ bund should be formed to divert the rainwater away from the dump. The drainage must always be directed away from the pit. All the drains should be kept clear of soil debris and effective for the free flow of water. The discontinuance of the pre-monsoon preparation at any location will jeopardize the whole effort of maintaining the designed slopes.

The rainwater of the catchment area should be directed away from the pit. The excavated pit must be provided with an effective garland drain/ bund depending on the topography to check the entry of rainwater into the pit during the monsoon. The benches should be provided with bench drains to collect the rainwater. The flowing rainwater should not be allowed to flow down to lower benches in an uncontrolled manner. The slope of the upper surface benches should be well-graded so that the rainwater goes away from the quarry.

Advance pit dewatering is suitable when a confined aquifer is encountered during later stages of mining. It helps in keeping the working benches dry and the adverse effect of the ground water pressure can be minimized. Horizontal drain holes drilled into the slope face can be very effective in reducing water pressures near the seepage zone. It should be inclined at an angle of five deg. to facilitate the free flow of water. The holes should be of 10 to 15 m depth at the interval of 5 m or even closer depending upon water conditions. A perforated pipe should be inserted into the hole to prevent caving. This water will freely flow out of the slope under gravity. It will improve the stability condition of slopes.

8.0 Drilling and Blasting

The damage due to poor blasting has a significant influence on the stability of high wall slopes. Uncontrolled blasting results in rough uneven contours, over breaks, overhangs, and extension of tension cracks in the slope. Poor blasting causes opening between various weak planes, which results in loss of resultant cohesion between them. It also results in the shattering of the slope mass well behind the desired location and consequently allows easier infiltration of surface water, which leads to unfavorable groundwater pressures and related problems

Thus, ground vibrations from blasting have two-fold action on the rock mass. On one hand, they affect the integrity of rocks or their strength parameters while on the other, they can provoke wall or slope collapses when unstabilising actions are introduced (Jimeno et. al. 1996). Therefore, peak particle velocity due to blasting should be controlled by the proper selection of explosive types, blast pattern, the maximum charge per delay, etc. Bauer and Calder (1971) proposed the following generalized criteria, as given in Table 7, for the damage level of particle velocity due to blasting on rock mass and slopes.

Table 7: Damage level of rock mass based on ground vibration (after Bauer & Calder, 1971)

Particle velocity (mm/s)	Predictable damages
<250	No danger I sound rock
250-600	Possible sliding due to tensile breakage
600-2500	Strong tensile and some radial cracking
>2500	Complete break-up of rock masses

The final slope face of any open pit quarry has to be maintained in the soundest possible condition. Better ultimate wall stability can be achieved with controlled blasting (Lanfords and Kihlstrom, 1963). The uncontrolled blasting can make a slope unstable.

The controlled blast holes should be more closely spaced and lightly charged than the regular blast holes. It should be blasted before the main blast by applying the delay mechanism. It will help in making a crack line along the desired slope. The controlled blasting will not damage the slope mass beyond these lightly charged pre-splitting holes. Mine management may optimize the pre-splitting technique for the site-specific geo-mining conditions to achieve better pit slope stability.

The blasting near the shear/ fault zone must be optimised. Otherwise, it would be impossible to maintain proper bench width in the zone where faults are present. Poor blasting may result into merger of the benches which ultimately leads to failure. Any heavy blast in the proximity of weak/ weathered lithology or near the daylighting major discontinuity would cause sliding of the overlying slope mass. The heavy production blasting should be avoided/ optimised.

8.1 Design of blasting pattern

Vibrations due to blasting may cause damage to the nearby structures if appropriate control measures are not adopted. Flyrock is another possible damage-causing outcome of blasting. Many factors influence flyrocks. These are like long explosive columns with inadequate stemming columns, improper burden, loose material or pebbles near holes and long water columns in the holes.

The following control measures have been envisaged to reduce ground vibration within statutory limits:

- The peak particle velocity (PPV) of ground vibration will be kept below 10mm/s for an 8- 25 hz frequency range through optimally controlled blasting techniques. Drilling and charging patterns will be formulated, with fewer explosives charge etc, after field trials.
- Use of suitable initiating sequence and millisecond detonators.
- Reduction of the number of explosives charged per day optimally.
- To contain fly rocks, the stemming column will not be less than the burden of the hole. The Blasting area will also be muffled, if necessary, to stop fly rocks propagation.
- Blasting will not be carried out when strong winds are blowing toward habitation areas. Blasting will be done during midday time and never at night.
- Surrounding villages within a 1 km radius of blasting will be regularly inspected for any visual cracks on walls and feedback will be gathered to investigate the reasons for these and for reassessing the charge per delay from time to time.
- Controlled blasting to avoid tension cracks which may endanger the stability of bench slopes in the mine.
- Short delay detonators are to be used in preference to detonating fuse.
- Proper care and supervision during blasting by a competent and experienced person.

8.2 Effect of Dynamic Forces on Slope Stability

The pseudo-static method assumes that the blasting causes additional horizontal forces in the direction of potential failure. For normal blasting, 0.02 times of 'g' (acceleration due to gravity) can be considered as a seismic coefficient in the pseudo-static method of analysis. If the mine is operated under heavy blasting a dynamic analysis of dump stability should be performed in a separate study. Various models have been prepared with varying seismic coefficients.

The seismic coefficient method is one of the static procedures for the earthquake resistant design of structures. Horizontal and/or vertical forces, which are calculated as products of the seismic coefficients K_H , K_V , and the weight of the structures are applied to the structures. The stability and the deformation of the structures, and the stress and the strain of each structural member are examined against the horizontal and/or vertical forces in addition to the vertical load due to the weight of the structures.

The rate at which a particle changes speed is define as acceleration (m/s^2). For sine waves

$$\text{Acceleration (a)} = 2 \pi f v$$

$$\text{Seismic Coefficient (a}_g\text{)} = a / g$$

Where

$$f = \text{frequency (Hz)}$$

$$v = \text{Peak Particle velocity (m/s)}$$

$$g = \text{gravity m/s}$$

The Blasting results in acceleration of slope and that can be converted into load for a given mass. It can be applied in any numerical analysis and could be considered as extra load caused due to blasting. The seismic coefficient is an important parameter that is dependent on frequency and peak particle velocity. Generally, the horizontal seismic coefficient K_H is 0.2 – 0.3 for road and railway bridges, 0.15 for dams, 0.15 – 0.25 for port and harbor facilities, and 0.6 for nuclear power plant buildings.

An attempt has been made to plot the factor of safety of the slope graph after calculating the equivalent load caused by blasting. A curve has been plotted as shown in figure 16 which shows the relation between a factor of safety and horizontal seismic coefficient. This graph can be well interpreted for finding out the factor of safety of slope for varying blasting activity. The measurement of frequency and peak particle velocity can be determined with the help of a seismograph while doing the blasting operation. Thus, one can plan the blasting operation at the desired level of a factor of safety.

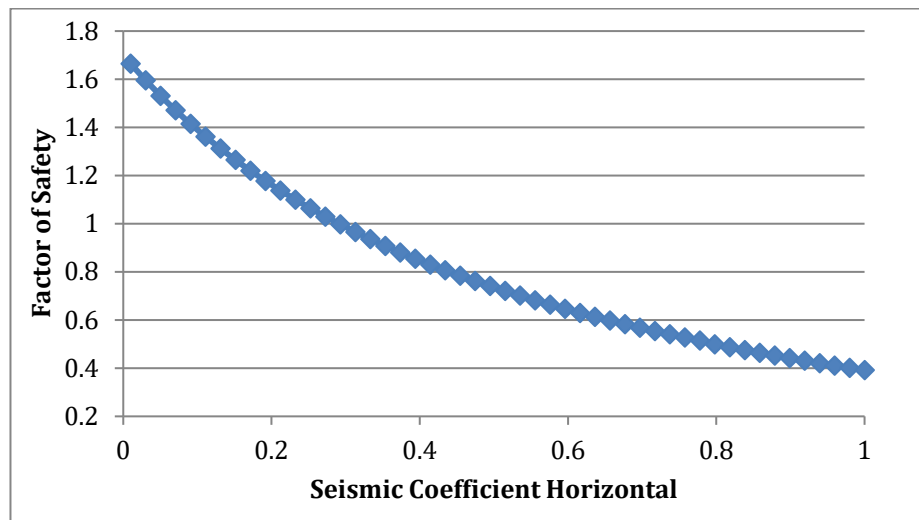


Figure 16: Relation between seismic coefficient and factor of safety

9.0 Effect of Fire or Spontaneous Heating on Bench/ Dump Stability

Spontaneous heating and fire in coal mines are major problems. The majority of fires existing today in different coalfields are mainly due to the spontaneous combustion of coal. The auto oxidation of coal ultimately leads to spontaneous combustion which is the major root cause of fire in mines. It is a slow process and the heat evolved is carried away by air. This process of self-heating of coal or other carbonaceous material resulting eventually in the fire. Coal can interact with oxygen in the air at ambient temperature liberating heat. If the heat is allowed to accumulate the interaction rate increases and may ultimately lead to fires.

Factors/Causes affecting spontaneous heating of Coal:

- Presence of micro and macro cracks on the bench walls,
- Accumulation of loose coal lying on the toe of the benches,
- Long exposure of the coal bench to the open atmosphere
- In overburden dumps and coal rejects, a fire occurs due to the presence of carbonaceous materials.
- It is practically not possible to dispatch all mined coal within its incubation period. Thus coal is stacked on the ground. Due to improper stacking of coal, a fire starts in this stacked coal.

Control of fire:

The strategy adopted for dealing with the fires is a two-phase operation - first the fires must be contained and secondly they should be extinguished. The methods adopted for dealing with these fires as per the fire situation are as follows: To prevent/control spontaneous heating in the coal stockyard, the following steps are suggested:

- Compaction of stacked coal by use of a dozer
- Minimum stacking of coal at the pit head.
- Long exposure to coal benches will be avoided.
- Water circulation under pressure or high-pressure water jet to minimize the spread of fire.
- Use of regular water spaying in coal stockyard
- A cationic bitumen emulsion-based fire protective coating material for preventing spontaneous heating.
- Blanketing.
- Digging out.
- Chemical inhibitors for control and combating fire.
- flooding with water in coal stock
- Removing the burning material regularly.
- Separation of heated coal from rest of coal stock
- Avoid the stacking of coal in large amounts in one stock
- fast evacuation of coal from the stockyard.

Precautions against spontaneous heating/fire

To prevent spontaneous heating/fire in the faces and overburden dumps. mine management should take the following precaution: -

- No coal or carbonaceous matter/debris/ overburden (except OB handled by dragline, if employed) shall be stacked within 100m around the active faces and periphery of the opencast workings.
- Blasting operations should be so regulated that broken coal / carbonaceous matter is removed and transported out of the opencast workings/quarry expeditiously.
- All parts of the quarry including workplaces within the opencast workings shall be inspected by competent persons designed by the Mine manager and not below the rank of Assistant Manager daily for early detection of heating or fire. As soon as heating or a fire is detected, suitable measures to quench it and/or to dig it out shall be adopted. All heated debris/ coal shall be removed by the machines and deposited outside the premises of the opencast workings.
- No person shall be engaged directly below or within 30m of any active fire area except to remove the hot material and quench it.
- Mine management may adopt any other additional site-specific measures against spontaneous heating/fire in dumps and pit slopes.

Effect of Fault on slope stability

The following mentioned points should be kept in mind while working near the in-crop areas and fault planes.

- Benches in soil and subsoil/alluvium shall be kept sufficiently advanced to reduce the pressure over In-crop or Fault areas.
- As far as practicable, the slope of the benches shall not be kept along the direction of the slope of the fault.
- The ratio of height vs. width of working benches shall be not less than 1:2.
- The direction of the bench shall be designed, not to be parallel to the fault plane.
- Working bench preferably be kept of low height till the area is worked out completely. Excavation may be carried out in several slices as per suitability instead of a full height bench.
- Individual bench slope shall be not more than 70°.
- The floor of the bench shall be maintained by gently dipping away from the high-wall side to eliminate the possibility of water accumulation.
- Any accumulated water shall be promptly drained out.
- Before deploying men or excavating machines at the top of the bench in the fault or in-crop area, the bench face and top shall be properly examined by the supervisor for any cracks and weak planes. As far as practicable, the machine shall be placed away from the bench edge.
- Persons shall, as far as possible, not be deployed below the high-wall side of benches.
- Special care shall be taken in the deployment of drill machines, particularly DTH drills. While drilling, the drill machine should be placed in the direction perpendicular to the bench edge.
- Special care shall be taken in blasting due to the possibility of encountering cracks /fissures/weak planes.
- The cross-section of benches shall be drawn at frequent intervals to keep a constant watch on the slope of the bench.

10.0 Slope Instrumentation and monitoring Plan

The main objective of a slope monitoring study is to detect any instability well in advance so that any damage to men and machinery can be avoided. If any instability is detected in the early stage then it can be stabilized by applying the suitable remedial measure. The early identification of movement zones allows steps to be taken to minimize the impact of mining on stability by the implementation of corrective measures and at the same time provides for optimum coal extraction.

The slope monitoring method allows failures to be predicted and safe working conditions. The review of monitoring results, visual inspection, and regular briefing of field people help to detect the onset of failure. Initially, the monitoring can be done twice (before and after the monsoon) in a year. The frequency can be increased to once a month as soon as any movement is detected in the slope. If continuous acceleration in movement is observed then weekly monitoring can predict the failure date.

The first sign of instability is a tension crack. So, it is important to carry out regular inspections to detect the development of tension cracks on the crest of the slope as well as on benches and to carry out prompt remedial measures. They may develop as a function of high stresses in the slopes. The opening of cracks will tell whether any deep-seated failure can occur or not. Tension cracks should be filled with sandstone and sealed with clay to prevent the entry of water, which may cause failure. In case any acceleration in movement is observed during the slope monitoring study, the following measures should be adopted.

- (A) The effectiveness of the remedial measures mentioned in the following sections should be reviewed by a team of at least two officials.
- (B) The geometry of the dump profile should be checked. A fresh survey should be conducted of the dump profile to check any deviation in the implemented profile.
- (C) If the movement is continued even after effective implementation of all the remedial measures and correct dump profile then a fresh geotechnical study should be conducted by any competent agency to understand the reasons for continued movement and to suggest the follow-up: action.

Slope monitoring is carried out to avoid human loss of life or injury and to prevent against damage to equipment. It is obligatory to have a slope monitoring system in surface mine and collection of data which is used in deformation models and other research. Monitoring is an important tool for assessing design and failure risk. It is desirable to eliminate or minimize accidents in mining to protect the workforce and equipment. The presence of monitoring instrumentation not only aids hazard and risk identification but reduces workforce anxiety by confirming that ground conditions are being monitored by experienced and competent personnel.

The main objectives of the slope monitoring program are:

- Maintaining safe operating conditions to protect personnel and equipment;
- Providing advance warning system for the potential zone of the unstable ground;
- Assessing the performance of the slope design.
- Provide information about the instability mechanism.
- Quantify displacements and rates.

10.1 Slope instrumentation

The regular inspection of the bench faces and the crest areas for early evidence of slope instability should be a major part of the slope stability monitoring program. These regular inspections should be conducted ideally by the same individual to maintain the continuity of the observations. Monitoring methods can be divided into four categories based on monitoring method and place.

Visual Inspection is a primary method of slope monitoring. The Mining engineer should inspect the slope area regularly as a daily routine. The slope areas prone to failure could be identified by comparing previous inspections with current observations. The focus should be on inspecting the pit, accessways, high wall, dump top, and crest.

Surface monitoring includes all methods which can define surface changes in the area monitored. It should consist of position changes of reference points, cracks propagation, and movement of Global Positioning System (GPS) antennas.

Sub-surface monitoring is a very important method for slope monitoring. It is possible to observe changes in various parameters below ground. It is possible to measure the slope deformation (type, size, and rate). It also includes the determination of shear zones, monitoring groundwater conditions, and rock electric characteristics or seismicity of the area. The main methods are inclinometers, borehole extensometers, piezometers, and geophysical methods.

Remote monitoring methods observe slope movements from a certain distance. It does not require physical contact to track changes on a slope. It collects data by using advanced technology such as lasers, interferometry, or photogrammetry. The most popular methods are Light Detection and Ranging (LIDAR), Interferometry of Synthetic Aperture Radar (InSAR), Time Domain Reflectometry, or Slope Stability Radar (SSR).

It is recommended that visual inspection and total station with prism should be used. The scheme of monitoring by the total station is explained below.

Prisms should be installed on the slopes at regular spacing, 50m Horizontally and 50m vertically. However, minor modifications could be done for specific critical areas decided by Mine Manager. The movement of prisms should be measured regularly. It should be increased during the rainy season or when any displacements are observed. The suggested monitoring frequency has been given in **Table 8**.

The graphs of displacement, velocity, and vector movement should be plotted regularly for each end of every prism. Movements should be checked in all three directions (X, Y, and Z direction). Displacement velocity should also be plotted for prisms located in critical areas.

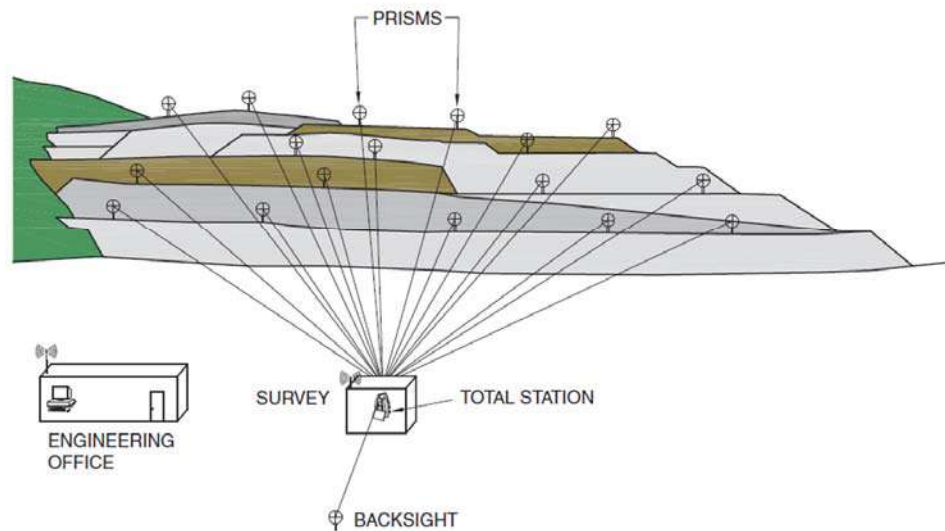


Figure 17: Components of robotic total station system

10.2 Frequency of Monitoring

The monitoring frequency will depend upon the stability of the slopes, the time of year, the rate of mining, and the nature of the mining activities that are being conducted on the surface mine slope. The frequency of monitoring should also be planned for the various instrumentation based on conditions imposed by the trigger levels. A trigger action response plan (TARP) should be established to assess the short-term performance and safety of the waste dump or mine slope.

The slope monitoring prisms should be surveyed monthly during the summer and winter months, provided that the results of the visual monitoring indicate that the slopes are stable. The monitoring frequency should be increased to weekly surveys during the rainy season. Intensive slope monitoring should only be required when mining operations are being conducted in the vicinity of unstable portions of the open pit slopes.

The monitoring process is site-specific. It starts with daily visual inspections of slopes, a check of groundwater level, and data from the monitoring system. Prakash et.al. (2015) proposed a time frame at which certain movements must be monitored table 8 & 9 summary of the movement thresholds suggested by various authors.

Table 8: Suggested monitoring frequency

Sr. No	Point undergoing movement	Frequency of monitoring
1	0 mm to 2 mm per day	Once per month
2	2 mm to 5 mm per day	Once per week
3	5 mm to 10 mm per day	One every 2 days
4	10 mm to 50 mm per day	Once per day
5	>50 mm per day	Require continuous observation l

Table 9: summary of the movement thresholds suggested by various authors

Author	Movement thresholds (mm/h)	Actions Descriptions
Rayn and call (1992)	0.5-2.0	
Martin (1993)	0.004	Initial rock mass response
	0.008 to 0.08	Strain hardening
	0.4 to 4.1	Progressive failure
Call and Nicholas (From Zavadni 2001)	12.5	
Flores and Karzulovic (2001)	0.4	Conditions normal; no indication of instability
	0.4 to 1.25	More detailed monitoring required Appearance of cracks
	1.25 to 2.1	Potential for instability (if ongoing for longer than 2 week
	2.1	no mining allowed
Zavadni (2001)	0.004	Initial response
	0.71	No failure expected within 24 hrs
	0.63	No failure expected within 48 hrs

	2.1	Indicates progressive failure (total collapse expected within 48 days)
	4.2	Clear mining area (Progressive geometry and progressive velocity)
	6.25	Clear mining area (Regressive geometry)
Naismith and Wessels (2005)	3.5	Alert: Increase monitoring assessments
	5	Alarm: Inform operations
	10	Scram: Pit evacuation
Roux, Terbrugge and Badenhorst (2006)	0.004	Red alert
	0.008	Evacuate
	0.02	Orange alert
	0.04	Red alert
	0.08	Evacuate
Sullivan (2007)	0.004 to 0.01	Definite movement of slope related to shear of displacement on structures
	0.001 to 0.02	Likely to fail sometime in future
	0.04	High chance of failure
	> 0.04	Pre-failure collapse movements

10.3 Recommendation for slope monitoring

- Special precautions are needed in the rainy season for all critical slopes; especially for soft walls and high walls of benches. The critical areas are to be identified by the safety officer from time to time depending upon the nature of the mining activities that are being conducted, the rate of mining, mining sequences, and the geometry of the slope face.
- Install conventional monitoring instruments (i.e. prism-pillar on each & every accessible slope).

- Data to be analyzed on a day-to-day basis to identify critical areas. Reading of prisms should be measured every week but it should be increased (i.e. daily) during the rainy season or when any displacement is observed.
- If any displacement is observed through the prism, then particular critical should be continued 24x7 for continuous monitoring to predict slope behavior and instability.

Visual inspections

- Inspections of the crest and active and inactive platforms should look for evidence of slumping, development of large, arcuate tension cracks, normal or subsequent scarps and/or tilting of the platform that might be indicative of a developing deep-seated instability.
- Inspections should also identify the over steepening of the crest beyond the normal angle of repose. Over steepening can result from an accumulation of wet, fine-grained material at the crest and lead to rapid onset of sliver failures. Excessive over steepening can be addressed by cutting down the crest and refilling the cut-down area with clean, coarse material.
- Tension cracks should be graded over to help prevent infiltration of runoff and maintain a smooth platform for optimum trafficability. Platforms should be graded away from the crest.
- Inspections of the slope or face of the waste dump or stockpile should look for signs of bulging or seepage breakout. Bulging at the toe can be an indication of developing instability along the interface between the embankment and the foundation, or shallow foundation failure. Bulging at the toe combined with heaving of the ground in front of the toe can be an indication of deep-seated instability.
- Waste dumps can also fail due to foundation failure. Visual indicators of foundation failure include heaving/ deformation of the foundation in front of the toe.

11.0 Water Management and Drainage

The slope of the Kerendari-'A' block is towards the south & west and is dissected by several seasonal streams. The elevation varies from 432m to 459m concerning MSL (mean sea level), within the block. In general, the entire block has a more or less flat topography. Outside the block area on the northern side, there is hilly terrain. The drainage is controlled by the Basaria Nala in the East & the Baldeori Nala in the South-Central part of the block. All the nallahs are seasonal but during the rainy season, they discharge their load into Barki River which flows on the west of the block. Barki River is an important tributary of the Chundru River. The Chundru River ultimately meets the Damodar River near Mangardaha.

The average rainfall in the region is about 1181.52 mm of which 69% precipitation is during the rainy season. The nearest rain gauging station is at Barka Gaon block office, where daily rainfall is recorded. From the records available at the block office from 1979 to 2004, it may be observed that the maximum annual rainfall of 2037.50 mm was recorded in the year 1994 and the minimum was 656.20 mm in the year 2002. In the monsoon period maximum rainfall observed was 820.30 mm in August 1994. In the non-monsoon period (November to May), the maximum rainfall recorded was 132.20 mm in March '88. The average number of rainy days is around 75. Proper garland drains shall be made before every monsoon at the periphery of the active edge of the quarry and around dumps to prevent the surface rainwater to enter the quarry.

Drainage

The influence of water is alarming; hence every attempt should be made to divert the water away from the dump and proper drainage patterns should be effectively maintained. In the construction of a dump, care must be taken to ensure that there is no impoundment of water on the top of the dump because it is highly detrimental to dump stability. A proper gradient helps for quick run-off of water.

The surface drainage of the dumps is usually not made. It is necessary to reduce infiltration and to control run-off and hence soil erosion. Care must be taken to avoid saturation of dumps by ensuring that the infiltration is minimized and adequate drainage is installed.

The dump must be provided with an effective garland drain. The drainage must always be directed away from the excavated pit. The drains should be kept clear of soil debris and effective

Department of Mining Engineering, IIT(BHU)

for the free flow of water. The discontinuance of the pre-monsoon preparation at any location will jeopardize the whole effort of maintaining the designed slopes. The mine management should get the drain cemented. The drain should be kept effective for quick run-off of rainwater from the adjacent catchment area. The overflowing drain may also cause flooding of the dump, which is a very dangerous situation so the size of the drain should match the run-off of the rainfall of the area.

The bench level/ lift should be provided with drains to collect the rainwater. The flowing rainwater should not be allowed to flow down to lower benches in an uncontrolled manner. The slope of the upper surface/ benches should be well-graded so that the rainwater goes away from the dump.

At a few locations, it may not be possible to divert the rain/ seepage water away from the pit; in that case, a proper drain pattern should be developed to divert the water into the pit sump. The water should not be allowed to enter into the dump from many channels or left uncontrolled. By guiding the flow of water in a fixed channel erosion/ failure of dump material can be checked. The unchecked erosion may lead to failure in these dump slopes in due course of time.

12.0 Conclusions and Recommendations

The stability of dump slopes and opencast slope in different conditions were carried out for Kerandari Opencast Coal Mine, NTPC. The Finite element method and limit equilibrium method have been used for the analysis of different geo-mining. The stability analysis is carried out for the internal dump at various sections separately. The factor of safety of 1.3 to 1.5 has been taken as short stability and the Factor of safety > 1.5 for long-term stability. The conclusions and suggestions of the present study are summarized below.

- The factor of safety of the slope after 5 years is more than 1.50 for the opencast mine slope. It indicates that the slope is stable for the long-term.
- The final section of mine slope is assumed based on bench parameters. The width of the bench slope is 25m and the height is 15 m. The slope angle of the bench is 75 degrees. The overall slope angle of the mine is 27 degrees. The factor of safety of the above slope is more than 1.5. It indicates that the open cast mine slope is long-term stable.
- The effect of blasting on slope stability is simulated by considering the Seismic coefficient. The stability is mainly depending on the frequency and peak particle velocity. The Graph can be used to calculate the maximum charge for a particular PPV and frequency at a desired factor of safety of slope.

Recommendations for mine slope and dump slope

- Adequate infrastructure to be provided for imparting training on slope stability to all concerned persons employed in such large open cast mines. The technical competence of the contractual supervisors shall be appropriately scrutinized before deploying them in the mine.
- It is possible that any unfavorably oriented structural discontinuity (shear plane/fault/s) may be present in the mining area. It may create unsafe mining conditions. It is difficult to identify during exploratory drilling as the drill holes are widely spaced. There is a likelihood of missing it during exploration. However, it can easily be detected during ongoing excavation. The Geologist should conduct field mapping to see the existence of faults in the fresh exposure of the pit. It will help to identify the impending failure along these undetected weak planes.
- The recommendation for bench height and width are given in the table below:

Sr No	Types of material	Maximum Height (m)	Maximum Slope angle (°)	Minimum Bench Width (m)
1	Soil/Alluvium/Clay	5	50	10
2	Mixed soil with medium hardness	6	60	10
3	Shale/Sandy shale/shaly coal	15	80	15
4	Coal	15	80	15
5	Rock Mass	15	80	15

- The distance between an internal dumping and the working place should not be less than the total height of the internal dump.
- The top soil/ clay/ soft material should be dumped separated and should not be mixed with overburden dump material or at the base of dumps. The topsoil should be placed at the uppermost surface of the dump to support the growth of vegetation and to decrease the entry of water to deeper levels of the dumps.
- The recommendation for bench height and width for the external Mine dump is given below:

Bench height = 30m	Bench width = 30m
Bench slope angle = 37°	Overall slope angle = 27°
Total Dump Height = 120 m	

- After 60m of dump height a fresh study for external and internal dump should be carried out.
- The recommendation for bench height and width for the Internal Mine dump is given below:

Bench height = 30m	Bench width = 30m
Bench slope angle = 37°	Overall slope angle = 21°
Total Dump Height = 470 m (to be review after achieving 60m height)	

- Three safety berms of 90m minimum exposed width at 90m, 180, and 300m depths from pit bottom. The minimum distance between the toe of the external dump and the toe of the working high wall should not be less than the difference in RL of the toe of the high wall and RL of the crest of the topmost bench of the external dump.
- The Slope stability of the mine and dump should be reviewed every five years. It is also recommended that the fresh geotechnical test for rock properties should be carried out with the determination of RMR for accurate design of the pit slope before the next study.

- The mapping of weak zones, faults, and bedding planes should be a regular process by the departmental geologist. The generated data will be used as an input parameter to reanalyze the stability to get a realistic picture of the stability of mine slopes in different geo-mining conditions. It will help to detect any unfavourable conditions at different stages of mining at the earliest possible.
- It is certainly to be expected that variations in different geotechnical parameters will occur as the pit is opened and progressively deepens and that confirmation of the input parameters must be continued during different stages of mining. It is strongly recommended that a fresh geotechnical study should be conducted within five years of the start of the operation of the mine or before reaching 100m depth of mine whichever is earlier. It would help in the optimization/slope steepening of the pit slope design with the latest available geotechnical data information. This fresh geotechnical study may lead to achieving better financial goals without sacrificing safety.
- The mine should have an effective garland drain/ bund, all around, to collect/ divert runoff rainwater from the catchment area before it reaches the mine slopes. these drains must be kept clear of silt and debris. Horizontal drains should be installed for de-pressurization of adverse groundwater pressure, especially where seepage is observed.
- Every attempt should be made to make a proper gradient on the top, floor, and along the benches of the dump. The drains should be effectively maintained to divert the drained water away from the dump. If this drainage system is not effectively achieved, then the dumps may fail due to an increase in saturation at the bottom of the dumps.

Recommendation for slope monitoring

- The slope does not fail without warning and may be managed through the design of sequencing, re-sloping selected areas to shallower angles, and carrying out monitoring. Slope monitoring should be established as part of the monitoring and geotechnical program for the site. A special monitoring organization cell should be created under the responsible officer for supervising and implementing all the protection measures and for monitoring the

water level in the river, abnormal seepage of water in the quarry indicates the danger of slope failure.

- The monitoring program includes a visual inspection of the pit slope and dump slope, especially the crest, slope face, and toe areas for evidence of cracking, seepage, erosion, deformation, etc. It is recommended that the shift supervisor or Assistant managers visually inspect these areas. Other observations (cracking, seepage, erosion, deformation) should also be logged properly. Benches should have a gradient in any direction for proper drainage. The proper drainage system should be adopted during the rainy season.
- Regular slope monitoring is essential to detect any instability in advance to safeguard against possible slope failure. The dump shall be regularly surveyed to produce up-to-date and accurate dump geometry.
- The stability analysis has been carried out for the dump and pit slope for working as proposed for the next five years. The results show that the slope will be stable in the long-term as well as the short-term. It is recommended that the monitoring of the slope should be carried out with the help of Total Station for the next five years.
- The monitoring stations should be installed at an interval of 100 meters on all benches in staggering manners so that the effective gap between two stations of two immediate upper and lower benches would be 50 meters only.
- The monitoring should be done of strata movement on a fortnight basis. If any crack, deformation, or movement in benches is detected, it shall be immediately informed to higher management. If the symptoms are abnormal, it must be referred to DGMS authority and the work should be stopped till further instructions from Statutory bodies.
- A proper Trigger Action Response Plan (TARP) is to be implemented (made by a geotechnical engineer and approved by mine management) in place to deal with all emergencies regarding slope instability. This TARP should include monitoring data, visual

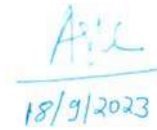
inspectional data, and the analytical data of the geotechnical engineer. Mine management should take all necessary steps to spread the knowledge of TARP among all mine officials.

- Slope stabilization is also needed along with slope monitoring to prevent deterioration of strength parameters of rock and dumped material. Slope stabilization should include garland drains, cross slopes, gabion walls & plantations for dump slopes, and Pre-splitting, garland drains, cross slopes, and gabion walls for pit slopes and dump.
- Mine management should make a structured team of trained competent persons for slope monitoring headed by a slope monitoring officer with clearly defined duties and responsibilities as per DGMS(Tech.) Circular No. 2 of 2020 dated 09.01.2020. The monitoring should be done periodically at least once in three months using a total station and the results of monitoring should be recorded in a bound-paged register or a temper-proof electronic form. These monitoring data should be regularly analyzed for the rate of movement of monitoring pillars. In case of need, help advice may be sought from expert agencies in the field of slope stability and slope monitoring.



18/9/2023

Dr Rajesh Rai
Associate Professor
Principal Consultant



18/9/2023

Dr Ashok Jaiswal
Associate Professor
Co-Consultant

DISCLAIMER

The report is based on field reconnaissance, laboratory tests as per IS codes on small size soil samples, and analysis results using Phase2 slope stability analysis software. Neither IIT (BHU) nor any of its employees make any warranty, express or implied or assume any legal liability or responsibility for the accuracy, completeness, or use of the result of such information, product, or process in the report Kerandari Opencast Project.

Garland drain, Catch drain and Siltation Pond in the dump area





Toe wall construction along dump under process



Wet drilling and water sprinkling



Water Sprinkling



Status of Conveyor









No. FU-19/2021-FSC; CN: 258081
Government of India
(भारत सरकार)
Ministry of Power
(विद्युत मंत्रालय)

Shram Shakti Bhawan, Rafi Marg,
New Delhi, 13.09.2024


OFFICE MEMORANDUM

Subject: Request for expediting construction of Railway siding for Kerandari and Chatti Bariatu Coal Mining Project of NTPC Mining Ltd. - regarding

The undersigned is directed to forward herewith a copy of NTPC Ltd. letter no. REDCM Sectt/2024/CB&KB/551 dated 14.08.2024 (*copy enclosed*) on the above mentioned subject and to say that the matter has been examined in consultation with Central Electricity Authority (CEA).

2. The Chatti Bariatu and Kerandari Coal Mining Projects of NTPC, with Peak Rated Capacities (PRC) of 7 MTPA and 6 MTPA respectively, have commenced coal production— Chatti Bariatu in September 2022 and Kerandari in January 2024 respectively. Currently, coal is being transported by road to distant Railway sidings under an interim arrangement, with an amendment in Environment Clearance allowing this method until October 31, 2024.

3. NTPC is constructing a conveyor system to transport coal from these mines to the Railway siding, with completion targeted by December 2025. However, as per available information, construction of the Railway siding and the necessary railway connectivity from the conveyor terminal point is yet to start.


Pravin Ramdas Sanap
Asst. Officer (Env. Mgmt.)
NTPC Mining Limited
Kerandari Coal Mining Project
Sikri, Barkaqaon - 825311

4. Environmental and safety concerns were highlighted in the initial Environment Clearance dated March 31, 2010, which mandated the establishment of the Railway siding within three years. However, the MoEF&CC has extended this timeline to March 2025.

5. Due to increased power demand and supply of domestic coal not being commensurate with requirement, power plants resorted to import of coal for blending purpose. During 2023-24, about 10.3 MT of coal was imported by NTPC for blending purpose. Evacuation of optimum quantity from the above mines may help meeting requirement of NTPC from domestic sources and reduce import for blending.

6. Ministry of Railways is, therefore, requested to facilitate and expedite the approval of the DPR and the subsequent construction of the Railway siding to ensure timely coal evacuation and compliance with environmental regulations.

7. This issues with the approval of competent authority.

Encl: As above


(Subhash Chand/सुभाष चंद)

Under Secretary to the Government of India

अवर सचिव, भारत सरकार

Ph./फोन: 23356938

Email: s.chand72@gov.in

Ministry of Railways,
[Kind attn.: Shri Satish Kumar, Chairman]
Rail Bhawan, New Delhi.

Copy to:
CMD, NTPC



Ref no.: REDCM Sectt/2024/CB&KD/551

Date: 14.08.2024

To,
The Joint Secretary (Thermal),
Ministry of Power,
Govt. of India,
Shram Shakti Bhawan, Rafi Marg,
New Delhi -110001

Subject: Request to Ministry of Railways for expediting construction of Railway siding for Kerandari and Chatti Bariatu Coal Mining Project of NTPC Mining Ltd

Ref: NTPC letter no REDCM Sectt/2024/CB&KD/543 dated.23.02.24

Sir,

This is in reference to our letter cited above wherein your kind intervention was solicited to facilitate and expedite the construction of the Railway Siding system for the Chatti-Bariatu and Kerandari Coal Mining Project of NTPC Mining Ltd.

As mentioned earlier, the coal evacuation system for Kerandari and Chatti-Bariatu coal mines includes conveyor and railway siding system. The conveyor system is under construction by NTPC and scheduled be completed by end of 2025 while the Railway Siding system, to be constructed by Indian Railways, is still under finalization of the Detailed Project Report (DPR). As per Railways, the construction time for Railway siding is 3 years after finalization of DPR.

Given the critical importance of this infrastructure for the coal evacuation system, and as per the conditions of the initial Environment Clearance dated 31.03.2010, the Railway Siding was to be established within three years. Although the Ministry of Environment, Forest and Climate Change (MoEF&CC) has extended the timeline for construction of the Railway Siding by March 2025, it is crucial to expedite the process to avoid further delays.

We seek your intervention to request railways to facilitate and accelerate the construction of the Railway Siding system. Your intervention in this matter will significantly contribute to the timely completion of this essential infrastructure for coal evacuation connecting Kerandari CHP to Shivpur-Kathautia railway line.

Thanking you,

(Animesh Jain)

Regional Executive Director Coal Mining, NTPC
& CEO, NML



Ref no.: REDCM Sectt/2024/CB&KD/543

Date: 23.02.2024

To,

**The Joint Secretary (Thermal),
Ministry of Power,
Govt. of India,
Shram Shakti Bhawan, Rafi Marg,
New Delhi -110001**

Subject: Request to Ministry of Railways for expediting construction of Railway siding for Kerandari and Chatti Bariatu Coal Mining Projects

Sir,

Chatti-Bariatu and Kerandari Coal Mining Project, located in Hazaribagh District (Jharkhand), are adjacent coal blocks with common coal evacuation system which includes pipe conveyor and Railway siding system.

Conveyor system is under construction by NTPC and is expected to be completed by Oct'24. The Railway Siding system is to be constructed by Indian Railways and Detailed Project Report (DPR) for the same is under finalization by Railways. The expected timeline for its completion is three years post-approval by the Railway Board. The project has been delayed due to delay in forest clearance, land and local law & order issues.

Both Chatti Bariatu and Kerandari Coal Mining Project have started coal production from Sep'22 and Jan'24 respectively. As per the conditions of Environment Clearance, there shall be no transportation of coal by road. However, given that coal production has already begun, and the conveyor/Railway siding system is not yet ready, an application for amendment in the Environment Clearance for transportation of coal by road through trucks was submitted to MoEF&CC. MOEF&CC vide letter dated 05.02.2024 has extended timeline for construction of closed belt conveyor up to October 2024 & construction of railway siding by March 2025. Further, advised NTPC to request Ministry of Power to co-ordinate with Ministry of Railways for expeditious construction of Railway siding.

In view of the above, I would request your intervention to facilitate and expedite the construction of the Railway Siding system for the Chatti-Bariatu and Kerandari Coal Mining Project. Your support in this matter would significantly contribute to the timely completion of this crucial infrastructure.

Thanking You,

(Animesh Jain)
CEO, NML &

Regional ED (Coal Mining), NTPC

कोयला खनन मुख्यालय: एनटीपीसी लिमिटेड, गिन्नी प्लाजा, चुटिया थाना के सामने, चुटिया, राँची 834001 (झारखण्ड)
Coal Mining Headquarters, NTPC Limited, Ginni Plaza, Opposite Chutia Police Station, Chutia, Ranchi-834001 (Jharkhand)
Registered Office : NTPC Bhawan, SCOPE Complex, 7, Institutional Area, Lodi Road, New Delhi-110003

www.ntpc.co.in



सत्यमेव जयते

File No.: J-11015/120/2007-IA-II(M)
Government of India
Ministry of Environment, Forest and Climate Change
IA Division



Dated 05/02/2024



To,

Shri Birendra Kumar
NTPC LIMITED
NTPC Limited, NTPC Bhawan, SCOPE Complex, Institutional Area, Lodhi Road, New Delhi – 110003
, New Delhi, NEW DELHI, DELHI, , 110003
environment.ntpc@gmail.com

Subject: Kerendari 'A' Coal Mine Block (6 MTPA in project area of 1173 ha (ML area 654 Ha) of M/s National Thermal Power Corporation Ltd., located in North Karanpura Coalfields in District Hazaribagh (Jharkhand) – For Amendment of EC dated 31.03.2010 read with subsequent EC transfer on 28.10.2105-regarding

Sir/Madam,

This is in reference to your application submitted to MoEF&CC vide proposal number IA/JH/CMIN/443765/2023 dated 14/12/2023 for grant of an amendment in prior Environmental Clearance (EC) to the project under the provision of the EIA Notification 2006-and as amended thereof.

2. The particulars of the proposal are as below :

(i) EC Identification No.	EC23A0101JH5909189A
(ii) File No.	J-11015/120/2007-IA-II(M)
(iii) Clearance Type	Amendment in EC
(iv) Category	A
(v) Schedule No./ Project Activity	1(a) Mining of minerals
(vi) Sector	Coal Mining
(vii) Name of Project	Kerandari Coal Mining Project
(viii) Location of Project (District, State)	HAZARIBAGH, JHARKHAND
(ix) Issuing Authority	MoEF&CC
(x) EC Date	
(xii) Applicability of General Conditions	NO
(xiii) Status of implementation of the project	

3. Environment Clearance (EC) to the project Kerendari 'A' Coal Mining Project of 6 MTPA peak capacity in mine lease area of 654 ha was accorded by Ministry's vide letter No.: J11015/133/2007-IA. II (M) dated 31.03.2010 to M/s NTPC

IA/JH/CMIN/443765/2023

Address: IA Division, Ministry of Environment, Forest and Climate Change
Indira Paryavaran Bhawan, Jor Bagh New Delhi - 110003

Pravin Ramdas Sanap
Asst. Officer (Env't Mgnt)
NTPC Mining Limited
Kerandari Coal Mining Project
Sikri, Barkagaon - 825311

Limited.

4. Hon'ble Supreme Court of India vide Judgement dated 25th August, 2014 read with orders dated 24th September, 2014 has cancelled the allocation of 204 coal blocks which include the North Karanpura Coal Fields. In pursuance of the order of Hon'ble Supreme Court, the said coal mine was allocated again to M/s NTPC Limited vide vesting order No. 103/29/2015/NA dated 8th September, 2015 issued by the Nominated Authority in the Ministry of Coal. Pursuant to the said Notification, Ministry has transferred/revalidated EC to M/s NTPC Limited on 28.10.2015 with certain terms & conditions therein.

5. Project Proponent (M/s NTPC Limited) vide proposal number IA/JH/CMIN/443765/2023 dated 14/12/2023 has requested for a following amendment in specific conditions no. 2A (xi) and 2A (xiv) of Environment Clearance (EC) 31.03.2010 with respect to the permission for transportation of coal by road:

Sr No	As per EC dated 31.03.2010	Amendment Sought
(i)	2A (xi) Raw coal from CHP shall be transported by closed conveyors to the railway siding proposed at village Khadamdari and thereafter by rail to the linked Tanda/Barh STPP. The conveyor cum rail corridor consisting of a stretch of 13.1 km of rail and 10.5 km of overhead closed conveyors and extend upto unloading part at the Railway Siding with Silo Loading facilities and from there to linked Barh STPS/Tanda by rail. There will be no road transportation of coal.	Change in mode for transportation of coal by road through covered tippers/dumpers from mine to Shivpur, Bachra, Kusmahi, Bira Toli, Tori & Katkamsandi railway sidings (over a distance of 27 km, 38 km, 84 km, 95 km, 96 km, & 96 km respectively) for a period of three (03) years or till the associated railway siding become operational, whichever is earlier, for supply to Tanda/Barh STPP and transport of coal by road to NKSTPP (over a distance of 24 km).
(ii)	2A (xiv) Company's Railway siding at village Khadambari shall be established within 3 years from date of grant of environmental clearance.	

6. Above proposal for an amendment was considered in the 5th EAC meeting held on 22.12.2023, EAC during the meeting noted that the contract was signed with M/s L&T on 27.09.2019 for construction of conveyor belt and approximately 50% of the closed conveyor work has been completed and balance work is expected to complete by October 2024. PP committed that M/s NTPC will pursue with Ministry of Power to coordinate with Ministry of Railways for expeditious construction of Railway siding, which is in their domain to ensure railway transportation to respective linkage.

7. EAC after detailed deliberation on the information submitted and presented, recommended the proposal for grant of amendment in Environment Clearance to Kerendari 'A' Coal Mine Block (6 MTPA in project area of 1173 ha) of M/s National Thermal Power Corporation Ltd., located in North Karanpura Coalfields in District Hazaribagh (Jharkhand) by extending timeline for construction of closed belt conveyor upto October, 2024 & construction of railway siding by March, 2025 w.e.f 31st January 2024.

8. The MoEF&CC has examined the proposal in accordance with the provisions contained in the Environment Impact Assessment (EIA) Notification, 2006 & further amendments thereto and based on the recommendations of the EAC hereby accords amendment in Environment Clearance to M/s NTPC Limited for Kerendari 'A' Coal Mining Project of 6 MTPA peak capacity in mine lease area of 654 ha (project area 1173 ha) by extending timeline for construction of closed belt conveyor upto October, 2024 & construction of railway siding by March, 2025 w.e.f 31st January 2024.

9. This issues with the approval of the Competent Authority.

Copy To

1. The Secretary, Ministry of Coal, Shastri Bhawan, New Delhi
2. Deputy Director General of Forests (C), Ministry of Environment, Forest and Climate Change, Integrated Regional

Office, 2nd Floor, Headquarter- Jharkhand State Housing Board, Harmu Chowk, Ranchi, Jharkhand – 834002, Ranchi.

3. The Chairman, Central Ground Water Authority, Ministry of Water Resources, Curzon Road Barracks, A-2, W-3 Kasturba Gandhi Marg, New Delhi
4. The Regional Director, Central Ground Water Board, Mid Eastern Region, 6th& 7th Floor, Lok Nayak Jai Prakash Bhawan, Frazer Road, Dak Banglow, Patna- 800011, Bihar.
5. The Chairman, Jharkhand State Pollution Control Board, TA building, HEC complex, PO Dhurwa, Ranchi
6. The District Collector, **Hazaribagh**, Government of (Jharkhand)
7. PARIVESH Portal

Annexure 1

Specific EC Conditions for (Mining Of Minerals)

1. Specific Conditions :

S. No	EC Conditions
1.1	<i>As proposed, PP shall complete the work of conveyor and CHP by October, 2024 and railway siding by March, 2025.</i>
1.2	<i>PP shall submit the approved revised Mine Plan with progressive reclamation for change in land use / area of forest land as per approvals obtained to IRO, MoEF&CC.</i>
1.3	<i>PP shall avoid transporting coal by road through forest land without permission from concerned Forest Department.</i>
1.4	<i>PP shall not use any village road and road along sensitive locations such as schools, hospitals etc. for transportation of coal by dumpers/trucks.</i>
1.5	<i>PP shall use the road having width more than 7 mts with tarpaulin covered 40-50 (payload) dumpers/trucks. Further, State Pollution Control Board shall ensure the emissions of trucks by regular inspections.</i>
1.6	<i>M/s NTPC shall write to Ministry of Power to co-ordinate with Ministry of Railways for expeditious construction of Railway siding near to the proposed location.</i>
1.7	<i>PP shall maximum use the nearest location of railway siding (Shivpur & Bachra) for transporting the coal instead of using road for long distance.</i>
1.8	<i>As proposed, construction of road for enroute shivpur siding shall be immediately completed with water sprinkler and tree plantation along the road.</i>
1.9	<i>PP shall install atleast 10 nos of fog cannon in mine lease, overburden dump and transportation route within 6 months.</i>
1.10	<i>PP shall establish Environmental laboratory at project site by March 2024 and create Environmental Management Cell to monitor the issues related environmental degradation.</i>

S. No	EC Conditions
1.11	<i>PP shall explore at least 20% of overall fleet size of dumpers/trucks as electrical or CNG/LNG based dumpers/trucks for transportation of coal/OB etc and deploy e-vehicles for workers/staff in/out of the mine.</i>
1.12	<i>PP shall ensure the compliance of expenditure to be incurred for wildlife conservation plan submitted to the State Govt. and the details expenditure shall be submitted with six monthly EC compliance report to Ministry's IRO. Also, PP shall engage State Biodiversity Authority and local biodiversity committee for implementation of CSR activity for developing the local market.</i>
1.13	<i>PP shall create a "Public Grievance Redressal and Monitoring System" for resolving any issues related to the pollution of mines and complaint has to resolve as soon as possible not beyond 30 days. In this regard, adequate awareness to be spread among the public to address their grievance to company with simple and easy manner and for which company needs to devise the mechanism. The same shall be reported to IRO within 3 months. A logbook to be maintained by PP on "Public Grievance Redressal and Monitoring System."</i>
1.14	<i>PP shall submit certified compliance report of EC vide letter No. J-11015/120/2007-IA. II (M) dated 31st March, 2010 and later re-validated letter dated 28.10.2015.</i>
1.15	<i>PP shall commission a study for evaluating the impact of air pollution generated by its activities on the forests upto a distance of about 10 kms through an institution of MoEFCC.</i>

Additional EC Conditions

All conditions mentioned in EC letter dated 31.03.2010 read with subsequent EC transfer on 28.10.2015 shall remain unchanged.


Pravin Ramdas Sanap
 Asst. Officer (Env't Mgmt)
 NTPC Mining Limited
 Kerandari Coal Mining Project
 Sikri, Barkagaon - 825311

Months of APRIL

COMPLAINTS

Page No. 4
Date 1/1

ACTION TAKEN

Page No. 5
Date 1/1

DATE / S.NO.	NAME	FATHER'S NAME	NATURE OF COMPLAINTS	FULL DISCREPTION	DATE	REMEDY MEASURES	RESULT OBTAINED	SIGNATURE
01/ 04/04/24	Rajendra Kumar villagers ADD- PANOU	Kabralnath Prajapati	NOISE	The Complaints is that There is noise disturbance due to mining activities.	06-04-24	Since the reverse siren is mandatory as per the norms and the village is near to the mines so it is natural to reach the sound to the near by village. Although all the vehicles is being serviced at regular interval.	AS result of timely servicing of vehicle and regular monito- ring of noise we found the noise is under limit at average bases.	<i>Prakash</i>
02. 20/04/24	Pintu Kumar villagers Add- Agarr		AIR	villagers are Complaining for the dust.	21-04-24	We increase no. of trips water tanker for sprinkling.	As no. of trips for dust seperation was increate. Dust generation is reduced.	<i>Prakash</i>

COMPLAINTS

Month of MAY

Page No. 6
Date 1/1

ACTION TAKEN

Page No. 7
Date 1/1

SIN./DATE	NAME	FATHER'S NAME	NATURE of COMPLAINTS	FULL DESCRIPTION	DATE	REMEDY MEASURES	RESULT OBTAINED	SIGNATURE
01 07-05-24	MD. Daud. Add - Pandu.	MD. Faruque	AIR	People are Complaining that the ponds are getting polluted in which their animals drink water due to mining activities.	08-05-24	Frequency of the trips of water tanker for the dust separation is increase. Additionally dust separation is also done at night. water monitoring Surface water pollution quality is being monitored.	Dust generation is decrease.	<i>Prakash</i>
02 18-05-24	MD. Mukhtar Ansari Add - Rabed.	MD. Mujaffar Alam	water	Complaining for the water shortage in summer season.	19-05-24	Drinking water was provided using water tanker.	water shortage problem is resolved.	<i>Prakash</i>

Month of JUNE

COMPLAINTS

Page No. 8
Date 1/1

ACTION TAKEN

Page No. 9
Date 1/1

Sl. No / DATE	NAME	FATHER'S NAME	NATURE OF COMPLAINTS	FULL DESCRIPTION	DATE	REMEDY MEASURES	RESULT OBTAINED	SIGNATURE
01 02-06-24	Pradeep Kumar 24 Villagers Add - Pandu	Tilak Prajapati	Water	Shortage of water in their well due to summer.	03-06-24	Hiring of water tanker and is done and use for providing water in the villages to the needy.	Their water shortage problem resolved.	Pradeep
02 08-06-24	Amor Mr. Jha and their villagers Add - Torhesa	Somnath Jha	Air	Complaining for the dust.	09-06-24	Suppression chemical Dustron - EC-DS is being used for dust operation.	As result is reduced.	Pradeep

COMPLAINTS

ACTION TAKEN

S.No. / DATE	NAME	FATHER'S NAME	NATURES OF COMPLAINTS	FULL DISCRPTION	DATE	REMEDY MEASURES	RESULT OBTAINED	SIGNATURE
01. 04.08.24	Prameshwar K. Pador Add- Tarkesha	Chauthi Pador	water	He Came with the Problem saying that muddy water came into this well due to which water is not drinker anble.	05.08.24	R.O water is provided to him for drinking purpose. and ALUM and bleaching Powder is also given to him to clean water of his well.	after that his water of well get clean and it can be used.	Prakash
02. 05.08.24	Sanjay K. Verma & others Add. Basariya	-	water	They Came and said that no dirty water should be discharged directly in their land.	05.08.24	Sump water is being discharged into settling Pond and ALUM is also being used in the settling Pond to settle down the silt and clean the water before final discharged.	NO dirty water is being directly discharged and regular PH and TDS monitoring is being done.	Prakash

COMPLAINTS

Page No. 14
Date 1/1

ACTION TAKEN

Page No. 15
Date 1/1

Sl.No/ DATE	NAME	FATHER'S NAME	NATURE OF COMPLAINTS	FULL DISCRPTION	DATE	REMEDY MEASURES	RESULT OBTAINED	SIGNATURE
01. 17-09-24	Nirmal Kumar Add- Pandu	Hullas Pratapati	Accumulation of water	Residents of Pandu village raised a complaint about the accumulation of rain water in this area due to heavy rainfall over the past few days. This has been causing inconvenience for them to move around and carry out their daily activities.	18-09-24	The accumulated water have been diverted from the village using Hume pipes installed on the approach road to resolve the issue.	after that water is drained and people can do their work and continue their work.	Prakash

Status Report of Conveyor System

The contract for construction of conveyor system was awarded on **27.09.2019**. Schedule for construction of CHP is **24 months** from the date of front handover. However, due to issues in **Land Acquisition** and **R&R** there has been frequent stoppage of the construction activities thereby delaying the completion of the facility.

The status of the conveyor work as on **31.08.2024** is as follows:

- i. Electrical and Mechanical Supply : **100%**
- ii. Civil works : **75%**
- iii. Structural works : **50%**
- iv. Overall progress : **73%**

The Expected Completion Schedule is as follows:

- i. Civil works : **21.08.2025**
- ii. Structural works : **07.10.2025**
- iii. Electrical works : **18.11.2025**
- iv. Final Commissioning : **28.12.2025**



BIOCRAT ENVIRONMENTAL SERVICES (BIOCRAT ENVIRONMENTAL LAB)

GROUND WATER MONITORING AND ANALYSIS

Client Name & Address: M/s NTPC Ltd.
Kerandari Coal Mining Project, Sikri, Barkagaon, Hazaribag, Jharkhand 825311.

Ground Water Summary Reports for the month of APRIL - 2024

Ground Water Parameters	Limits as per IS 10500 :2012		BGR CAMP	KEREDARI VILLAGE	MANATU VILLAGE	BASERIA VILLAGE	PANDU VILLAGE	BENGWARI NADI TOLA	JORDAG VILLAGE	PAHRA VILLAGE
	Acceptable	Permissible								
pH	6.5-8.5	No relaxation	7.21	6.51	6.96	7.1	6.73	6.88	6.25	6.74
Turbidity	1	5	<1	<1	<1	<1	1.88	1.72	1.54	<1
Colour	5	15	<5	<5	<5	<5	<5	<5	<5	<5
Odour	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
Taste	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
Total Dissolved Solids	500	2000	346	426	361	311	624	261	162	412
Calcium (as Ca ²⁺)	75	200	31.6	54.9	61.5	33.2	64.8	33.2	21.6	39.9
Total Alkalinity (as CaCO ₃)	200	600	228	268	184	124	172	152	72	176
Total Hardness (as CaCO ₃)	200	600	79.1	333	250	120	370	133	104	170
Chloride (as Cl)	250	1000	30.1	37.7	45.2	32.1	111	9.42	9.42	39.6
Free Residual Chlorine	0.2	1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Sulphate (as SO ₄)	200	400	3.39	28.7	31.5	11.5	88.1	15.3	5.43	41.2
Magnesium (as Mg)	30	100	1.94	47.7	24.3	10.7	50.6	13.6	13.6	18.5
Nitrate (as NO ₃)	45	No relaxation	9.41	19.5	20.3	15.8	6.75	9.23	9.63	14.7
Fluoride (as F)	1	1.5	0.46	0.59	0.56	0.49	0.46	0.48	0.42	0.53

Asst. Envt. Mgmt.

Add: - Sarveshwari Nagar, Itki Road, Bajra, P.O – Hehal, Dist – Ranchi, Jharkhand, Pin -834005
Email Id: - biocratenv@gmail.com, Mobile No – 7369019812, 8340466751, 9608708172

Pravin Ramdas Sanap
Asst. Officer (Env't Mgmt)
NTPC Mining Limited
Kerandari Coal Mining Project
Sikri, Barkagaon - 825311





BIOCRAT ENVIRONMENTAL SERVICES (BIOCRAT ENVIRONMENTAL LAB)

Aluminum (as Al)	0.03	0.2	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Boron (as B)	0.5	1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Phenolic Compound(as C ₆ H ₅ OH)	0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper (as Cu)	0.05	1.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Iron (as Fe)	0.3	No relaxation	0.18	0.23	<0.1	0.16	0.19	<0.1	0.18	<0.1
Selenium (as S)	0.01	No relaxation	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc (as Zn)	5	15	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Manganese (as Mn)	0.1	0.3	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Cyanide	0.05	No relaxation	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Hexavalent Chromium (as Cr ⁶⁺)	0.05	No relaxation	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Lead (as Pb)	0.01	No relaxation	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Arsenic (as As)	0.01	0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cadmium (as Cd)	0.003	No relaxation	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Mercury (as Hg)	0.001	No relaxation	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

Arkita

Reviewed By

Pravin
Pravin Ramdas Sanap
Asstt Officer (Env't Mgmt)
NTPC Mining Limited
Kerandari Coal Mining Project
Sikri, Barkagaon - 825311



Sunil Kumar Singh

Authorized by
Technical Manager
(Sunil Kumar Singh)



BIOCRAT ENVIRONMENTAL SERVICES (BIOCRAT ENVIRONMENTAL LAB)

GROUND WATER MONITORING AND ANALYSIS

Client Name & Address: M/s NTPC Ltd.

Kerandari Coal Mining Project, Sikri, Barkagaon, Hazaribag, Jharkhand 825311.

Ground Water Summary Reports for the month of MAY - 2024

Ground Water Parameters	Limits as per IS 10500 :2012		BGR CAMP	KEREDARI VILLAGE	MANATU VILLAGE	BASERIA VILLAGE	PANDU VILLAGE	BENGWARI NADI TOLA	JORDAG VILLAGE	PAHRA VILLAGE
	Acceptable	Permissible								
pH	6.5-8.5	No relaxation	7.36	6.83	6.51	6.57	6.81	6.85	6.45	6.51
Turbidity	1	5	<1	<1	<1	<1	1.12	1.48	1.73	<1
Colour	5	15	<5	<5	<5	<5	<5	<5	<5	<5
Odour	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
Taste	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
Total Dissolved Solids	500	2000	366	455	352	323	658	269	181	404
Calcium (as Ca ²⁺)	75	200	34.9	56.5	56.5	38.2	68.2	36.6	23.3	38.2
Total Alkalinity (as CaCO ₃)	200	600	220	272	176	156	180	148	80	158
Total Hardness (as CaCO ₃)	200	600	83.3	345	245	133	383	129	112	162
Chloride (as Cl)	250	1000	32.1	43.3	41.5	28.2	124	7.54	11.3	37.7
Free Residual Chlorine	0.2	1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Sulphate (as SO ₄)	200	400	3.55	31.4	29.4	15.7	82.2	14.8	5.66	38.6
Magnesium (as Mg)	30	100	0.97	49.6	26.2	10.7	51.6	10.7	14.6	13.1
Nitrate (as NO ₃)	45	No relaxation	9.82	20.1	19.6	16.6	7.22	8.86	10.29	13.1

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BIOCRAT ENVIRONMENTAL SERVICES (BIOCRAT ENVIRONMENTAL LAB)

Fluoride (as F)	1	1.5	0.51	0.61	0.51	0.52	0.5	0.43	0.46	0.46
Aluminum (as Al)	0.03	0.2	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Boron (as B)	0.5	1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Phenolic Compound (as C ₆ H ₅ OH)	0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper (as Cu)	0.05	1.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Iron (as Fe)	0.3	No relaxation	0.21	0.25	<0.1	0.19	0.21	<0.1	0.2	<0.1
Selenium (as S)	0.01	No relaxation	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc (as Zn)	5	15	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Manganese (as Mn)	0.1	0.3	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Cyanide	0.05	No relaxation	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Hexavalent Chromium (as Cr ⁶⁺)	0.05	No relaxation	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Lead (as Pb)	0.01	No relaxation	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Arsenic (as As)	0.01	0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cadmium (as Cd)	0.003	No relaxation	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Mercury (as Hg)	0.001	No relaxation	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

Apkita
Reviewed By

Pravin
Pravin Ramdas Sanap
Asst Officer (Env't Mgmt)
NTPC Mining Limited
Kerandari Coal Mining Project
Sikri, Barkagaon - 825311



Sunil
Authorized by
Technical Manager
(Sunil Kumar Singh)

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BIOCRAT ENVIRONMENTAL SERVICES (BIOCRAT ENVIRONMENTAL LAB)

GROUND WATER MONITORING AND ANALYSIS

Client Name & Address: M/s NTPC Ltd.

Kerandari Coal Mining Project, Sikri, Barkagaon, Hazaribag, Jharkhand 825311.

Ground Water Summary Reports for the month of JUNE - 2024

Ground Water Parameters	Limits as per IS 10500 :2012		BGR CAMP	KEREDARI VILLAGE	MANATU VILLAGE	BASERIA VILLAGE	PANDU VILLAGE	BENGWARI NADI TOLA	JORDAG VILLAGE	PAHRA VILLAGE
	Acceptable	Permissible								
pH	6.5-8.5	No relaxation	7.48	6.78	6.87	6.81	6.81	6.92	6.51	6.39
Turbidity	1	5	<1	<1	<1	<1	1.12	1.39	1.68	<1
Colour	5	15	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Odour	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
Taste	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
Total Dissolved Solids	500	2000	361	468	363	333	658	275	175	396
Calcium (as Ca ²⁺)	75	200	32	59.2	60.8	41.6	68.2	40	20.8	35.2
Total Alkalinity (as CaCO ₃)	200	600	212	280	184	164	180	152	76	148
Total Hardness (as CaCO ₃)	200	600	80	352	256	136	383	136	108	156
Chloride (as Cl)	250	1000	36	46	48	32	124	9.99	9.99	34
Free Residual Chlorine	0.2	1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	< 0.2	<0.2
Sulphate (as SO ₄)	200	400	3.54	34.2	32.5	17.8	82.2	16.7	5.02	35.9
Magnesium (as Mg)	30	100	1.94	51.6	27.2	9.74	51.6	10.7	15.5	18.5
Nitrate (as NO ₃)	45	No relaxation	9.54	20.8	20.5	17.3	7.22	9.45	9.51	12.8

Artika

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Pravin
Pravin Ramdas Sanap
Asst Officer (Env Mgmt)
NTPC Mining Limited
Kerandari Coal Mining Project
Sikri, Barkagaon - 825311

Page | 1





BIOCRAT ENVIRONMENTAL SERVICES

(BIOCRAT ENVIRONMENTAL LAB)

Fluoride (as F)	1	1.5	0.47	0.64	0.57	0.56	0.5	0.49	0.42	0.42
Aluminum (as Al)	0.03	0.2	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Boron (as B)	0.5	1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Phenolic Compound (as C ₆ H ₅ OH)	0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper (as Cu)	0.05	1.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Iron (as Fe)	0.3	No relaxation	0.19	0.21	<0.1	0.2	0.21	<0.1	0.18	<0.1
Selenium (as S)	0.01	No relaxation	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc (as Zn)	5	15	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Manganese (as Mn)	0.1	0.3	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Cyanide	0.05	No relaxation	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Hexavalent Chromium (as Cr ⁶⁺)	0.05	No relaxation	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Lead (as Pb)	0.01	No relaxation	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Arsenic (as As)	0.01	0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cadmium (as Cd)	0.003	No relaxation	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Mercury (as Hg)	0.001	No relaxation	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

Arpit
Reviewed By



Sunil Kumar Singh
Authorized by
Technical Manager
(Sunil Kumar Singh)

Pravin
Pravin Ramdas Sanap
Asstt. Officer (Env. Mgmt.)
NTPC Mining Limited
Kerandari Coal Mining Project
Sikri, Barkaqaon - 825311



BIOCRAT ENVIRONMENTAL SERVICES (BIOCRAT ENVIRONMENTAL LAB)

GROUND WATER MONITORING AND ANALYSIS

Client Name & Address: M/s NTPC Ltd.

Kerandari Coal Mining Project, Sikri, Barkagaon, Hazaribag, Jharkhand 825311.

Ground Water Summary Reports for the month of JULY - 2024

Ground Water Parameters	Limits as per IS 10500 :2012		BGR CAMP	KEREDARI VILLAGE	MANATU VILLAGE	BASERIA VILLAGE	PANDU VILLAGE	BENGWARI NADI TOLA	JORDAG VILLAGE	PAHRA VILLAGE
	Acceptable	Permissible								
pH	6.5-8.5	No relaxation	6.51	6.69	6.67	6.72	6.56	6.79	6.67	6.51
Turbidity	1	5	<1	<1	<1	1.81	1.54	1.52	2.1	<1
Colour	5	15	<5	<5	<5	<5	<5	<5	<5	<5
Odour	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
Taste	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
Total Dissolved Solids	500	2000	402	477	371	341	679	288	192	402
Calcium (as Ca ²⁺)	75	200	38.4	64.8	65.6	44.8	76.8	46.4	24	38.4
Total Alkalinity (as CaCO ₃)	200	600	156	296	196	172	196	160	84	156
Total Hardness (as CaCO ₃)	200	600	160	360	264	144	400	144	116	160
Chloride (as Cl)	250	1000	37.9	49.9	51.9	37.9	141	11.9	13.9	37.9
Free Residual Chlorine	0.2	1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Sulphate (as SO ₄)	200	400	39.6	36.4	34.9	19.2	92.5	18.3	6.37	39.6
Magnesium (as Mg)	30	100	17.5	51.6	26.2	9.74	52.5	8.76	15.5	17.5
Nitrate (as NO ₃)	45	No relaxation	13.4	21.5	21.8	17.6	7.48	9.78	10.2	13.4

Add: - Sarveshwari Nagar, Itki Road, Bajra, P.O – Hehal, Dist – Ranchi, Jharkhand. Pin -834005

Email Id: - biocratenv@gmail.com. Mobile No – 7369019812, 8340466751, 9608708172

Pravin Ramdas Sanap
Asst Officer (Env't Mgmt)
NTPC Mining Limited
Kerandari Coal Mining Project
Sikri, Barkagaon - 825311

Page



Annexure 17

Asst. Officer



BIOCRAT ENVIRONMENTAL SERVICES (BIOCRAT ENVIRONMENTAL LAB)

Fluoride (as F)	1	1.5	0.48	0.68	0.59	0.57	0.58	0.52	0.51	0.48
Aluminum (as Al)	0.03	0.2	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Boron (as B)	0.5	1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Phenolic Compound (as C ₆ H ₅ OH)	0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper (as Cu)	0.05	1.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Iron (as Fe)	0.3	No relaxation	<0.1	0.24	<0.1	0.22	0.21	<0.1	0.2	<0.1
Selenium (as S)	0.01	No relaxation	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc (as Zn)	5	15	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Manganese (as Mn)	0.1	0.3	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Cyanide	0.05	No relaxation	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Hexavalent Chromium (as Cr ⁶⁺)	0.05	No relaxation	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Lead (as Pb)	0.01	No relaxation	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Arsenic (as As)	0.01	0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cadmium (as Cd)	0.003	No relaxation	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Mercury (as Hg)	0.001	No relaxation	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001


Reviewed By




Authorized by
Technical Manager
(Sunil Kumar Singh)



BIOCRAT ENVIRONMENTAL SERVICES (BIOCRAT ENVIRONMENTAL LAB)

GROUND WATER MONITORING AND ANALYSIS

Client Name & Address: M/s NTPC Ltd.

Kerandari Coal Mining Project, Sikri, Barkagaon, Hazaribag, Jharkhand 825311.

Ground Water Summary Reports for the month of AUGUST - 2024

Ground Water Parameters	Limits as per IS 10500 :2012		BGR CAMP	KEREDARI VILLAGE	MANATU VILLAGE	BASERIA VILLAGE	PANDU VILLAGE	BENGWARI NADI TOLA	JORDAG VILLAGE	PAHRA VILLAGE
	Acceptable	Permissible								
pH	6.5-8.5	No relaxation	6.96	7.5	6.58	6.56	6.42	6.51	6.49	6.64
Turbidity	1	5	<1	<1	<1	1.92	1.78	1.46	2.14	<1
Colour	5	15	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Odour	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
Taste	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
Total Dissolved Solids	500	2000	380	503	408	352	501	296	184	415
Calcium (as Ca ²⁺)	75	200	36.8	113	73.6	48	115	48	22.4	40
Total Alkalinity (as CaCO ₃)	200	600	232	308	172	180	212	172	76	164
Total Hardness (as CaCO ₃)	200	600	96	396	280	152	388	152	116	172
Chloride (as Cl)	250	1000	39.9	51.9	35.9	39.9	93.9	13.5	11.9	39
Free Residual Chlorine	0.2	1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Sulphate (as SO ₄)	200	400	4.25	56.8	30.7	21.5	48.3	16.9	5.37	41
Magnesium (as Mg)	30	100	0.97	27.2	23.3	7.77	24.3	7.77	14.6	17.5
Nitrate (as NO ₃)	45	No relaxation	11.4	23.1	22.6	18.4	7.53	9.81	9.61	14.8

Apkila

Add: - Sarveshwari Nagar, Itki Road, Bajra, P.O - Hehal, Dist - Ranchi, Jharkhand. Pin -834005

Email Id: - biocratenv@gmail.com, Mobile No - 7369019812, 8340466751, 9608708172

Pravin Ramdas Sanap
Asst. Officer (Env't Mgmt)
NTPC Mining Limited
Kerandari Coal Mining Project
Sikri, Barkagaon - 825311

Page |





BIOCRAT ENVIRONMENTAL SERVICES (BIOCRAT ENVIRONMENTAL LAB)

Fluoride (as F)	1	1.5	0.52	0.71	0.63	0.59	0.61	0.56	0.48	0.52
Aluminum (as Al)	0.03	0.2	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Boron (as B)	0.5	1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Phenolic Compound (as C ₆ H ₅ OH)	0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper (as Cu)	0.05	1.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Iron (as Fe)	0.3	No relaxation	0.25	0.25	<0.1	0.2	0.21	<0.1	0.18	<0.1
Selenium (as S)	0.01	No relaxation	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc (as Zn)	5	15	<2	<2	<2	<2	<2	<2	<2	<2
Manganese (as Mn)	0.1	0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Cyanide	0.05	No relaxation	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Hexavalent Chromium (as Cr ⁶⁺)	0.05	No relaxation	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Lead (as Pb)	0.01	No relaxation	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Arsenic (as As)	0.01	0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cadmium (as Cd)	0.003	No relaxation	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Mercury (as Hg)	0.001	No relaxation	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

Ankita
Reviewed By



Sunil Kumar Singh
Authorized by
Technical Manager
(Sunil Kumar Singh)



BIOCRAT ENVIRONMENTAL SERVICES (BIOCRAT ENVIRONMENTAL LAB)

GROUND WATER MONITORING AND ANALYSIS

Client Name & Address: M/s NTPC Ltd.

Kerandari Coal Mining Project, Sikri, Barkagaon, Hazaribag, Jharkhand 825311.

Ground Water Summary Reports for the month of SEPTEMBER - 2024

Ground Water Parameters	Limits as per IS 10500 :2012		BGR CAMP	KEREDARI VILLAGE	MANATU VILLAGE	BASERIA VILLAGE	PANDU VILLAGE	BENGWARI NADI TOLA	JORDAG VILLAGE	PAHRA VILLAGE
	Acceptable	Permissible								
pH	6.5-8.5	No relaxation	7.15	7.21	6.71	6.66	6.79	6.92	6.61	6.82
Turbidity	1	5	<1	<1	<1	1.76	1.85	1.55	2.21	<1
Colour	5	15	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Odour	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
Taste	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
Total Dissolved Solids	500	2000	321	560	416	361	592	301	145	338
Calcium (as Ca ²⁺)	75	200	41.6	109	76.8	52.8	123	52.8	19.2	36.8
Total Alkalinity (as CaCO ₃)	200	600	240	296	176	196	224	180	72	160
Total Hardness (as CaCO ₃)	200	600	108	372	292	180	404	164	104	168
Chloride (as Cl)	250	1000	43.9	47.9	43.9	41.9	97.9	17.9	11.9	35.9
Free Residual Chlorine	0.2	1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Sulphate (as SO ₄)	200	400	3.94	49.6	34.9	26.5	55.5	18.2	4.9	38.2
Magnesium (as Mg)	30	100	2.91	26.2	26.2	13.6	25.2	9.72	15.5	20.4
Nitrate (as NO ₃)	45	No relaxation	12.7	21.7	23.6	19.7	7.69	10.8	8.54	49.8

Add: - Sarveshwari Nagar, Itki Road, Bajra, P.O - Hehal, Dist - Ranchi, Jharkhand, Pin -834005

Email Id: - biocratenv@gmail.com, Mobile No - 7369019812, 8340466751, 9608708172


Pravin Ramdas Sanap
Asstt Officer (Envl Mgmt)
NTPC Mining Limited
Kerandari Coal Mining Project
Sikri, Barkagaon - 825311

Page | 1





BIOCRAT ENVIRONMENTAL SERVICES (BIOCRAT ENVIRONMENTAL LAB)

Fluoride (as F)	1	1.5	0.59	0.68	0.61	0.58	0.64	0.59	0.41	0.5
Aluminum (as Al)	0.03	0.2	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Boron (as B)	0.5	1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Phenolic Compound (as C ₆ H ₅ OH)	0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper (as Cu)	0.05	1.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Iron (as Fe)	0.3	No relaxation	0.22	0.21	<0.1	0.21	0.22	<0.1	0.15	<0.1
Selenium (as S)	0.01	No relaxation	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc (as Zn)	5	15	<2	<2	<2	<2	<2	<2	<2	<2
Manganese (as Mn)	0.1	0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Cyanide	0.05	No relaxation	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Hexavalent Chromium (as Cr ⁶⁺)	0.05	No relaxation	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Lead (as Pb)	0.01	No relaxation	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Arsenic (as As)	0.01	0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cadmium (as Cd)	0.003	No relaxation	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Mercury (as Hg)	0.001	No relaxation	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

Arshita
Reviewed By



Sunil Kumar Singh
Authorized by
Technical Manager
(Sunil Kumar Singh)

Pravin Ramdas Sanap
Pravin Ramdas Sanap
Asst. Officer (Env't Mgmt)
NTPC Mining Limited
Kerandari Coal Mining Project
Sikri, Barkasgan - 825311

Piezometer installed at Pagar Sub Station and Fagu Saw School

1. Pagar Sub Station

2. Fagu Saw School



Rain Water Harvesting System



KERANDARI COAL MINING PROJECT
ROOFTOP RAINWATER HARVESTING
SYSTEM
LOCATION:- BGR WORKSHOP
TOTAL ROOFTOP AREA:-7100 m²
TOTAL RECHARGE:-7796 m³/YEAR
GPS COORDINATES :-
LAT 23° 52' 11" N, LONG 85° 05' 04" E

Effluent Treatment Plant





भारत सरकार
जल शक्ति मंत्रालय
जल संसाधन, नदी विकास
और गंगा संरक्षण विभाग
केन्द्रीय भूमि जल प्राधिकरण
Government of India
Ministry of Jal Shakti
Department of Water Resources,
River Development & Ganga Rejuvenation
Central Ground Water Authority

(भूजल निकासी हेतु अनापत्ति प्रमाण पत्र)

NO OBJECTION CERTIFICATE (NOC) FOR GROUND WATER ABSTRACTION

Project Name:		Kerendari A Coal Block												
Project Address:		Ntpc Mining Limited, Kerendari A Coal Mining Project, Post: Kerendari												
Village:		Tarhesa		Block:		Kerendari								
District:		Hazaribagh		State:		Jharkhand								
Pin Code:														
Communication Address:		Ntpc Mining Limited, Kerendari Coal Mining Project, P.o Barkagaon, Kerendari, Hazaribagh, Jharkhand - 825311												
Address of CGWB Regional Office :		Central Ground Water Board Mid Eastern Region, 6th & 7th Floor, Lok Nayak Jai Prakash Bhawan, Frazer Road Dak Banglow, Patna, Bihar - 800011												
1. NOC No.:	CGWA/NOC/MIN/REN/1/2024/9595			2. Date of Issuance	06/06/2024									
3. Application No.:	21-4/235/JH/MIN/2017			4. Category: (GWRE 2023)	Safe									
5. Project Status:	Existing With Additional Ground Water Requirment			6. NOC Type:	Renewal									
7. Valid from:	10/06/2023			8. Valid up to:	09/06/2025									
9. Ground Water Abstraction Permitted:														
Fresh Water		Saline Water		Dewatering		Total								
m ³ /day	m ³ /year	m ³ /day	m ³ /year	m ³ /day	m ³ /year	m ³ /day	m ³ /year							
46.00	16790.00			869.00	317185.00	915.00	333975.00							
10. Details of ground water abstraction /Dewatering structures														
Total Existing No.:0							Total Proposed No.:5							
	DW	DCB	BW	TW	MP	MPu	DW	DCB	BW	TW	MP	MPu		
Abstraction Structure*	0	0	0	0	0	0	0	0	3	0	0	0		
Dewatering Structure*	0	0	0	0	0	0	0	0	0	0	0	2		
*DW- Dug Well; DCB-Dug-cum-Bore Well; BW-Bore Well; TW-Tube Well; MP-Mine Pit;MPu-Mine Pumps														
11. Ground Water Abstraction/Restoration Charges paid (Rs.):							2617012.00							
12. Environment Compensation (if applicable) paid (Rs.):							0.00							
13. Number of Piezometers(Observation wells) to be constructed/ monitored & Monitoring mechanism.							No. of Piezometers		Monitoring Mechanism					
									Manual		DWLR**		DWLR With Telemetry	
**DWLR - Digital Water Level Recorder							2		0		1		1	

18/11, जामनगर हाउस, मानसिंह रोड, नई दिल्ली - 110011 / 18/11, Jamnagar House, Mansingh Road, New Delhi-110011

Phone: (011) 23383561 Fax: 23382051, 23386743

Website: cgwa-noc.gov.in

पानी बचाये - जीवन बचाये
SAVE WATER - SAVE LIFE

Pravin Ramdas Sanap
Asst Officer (Envr Mgmt)
NTPC Mining Limited
Kerendari Coal Mining Project
Sikri, Barkagaon - 825311

(Compliance Conditions given overleaf)

This is an auto generated document & need not to be signed.


CENTRAL GROUND WATER AUTHORITY

18/11, जामनगर हाउस, मानसिंह रोड, नई दिल्ली - 110011 / 18/11, Jamnagar House, Mansingh Road, New Delhi-110011

Phone: (011) 23383561 Fax: 23382051, 23386743

Website: cgwa-noc.gov.in

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Asst. Officer (Env't Mgmt)
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Kerandari Coal Mining Project
Sikri, Barkagaon - 825311

Validity of this NOC shall be subject to compliance of the following conditions:

Mandatory conditions:

- 1) Installation of tamper proof digital water flow meter with telemetry on all the abstraction structure(s) shall be mandatory for all users seeking No Objection Certificate and intimation regarding their installation shall be communicated to the CGWA within 30 days of grant of No Objection Certificate.
- 2) Proponents shall mandatorily get water flow meter calibrated from an authorized agency once in a year.
- 3) Construction of purpose-built observation wells (piezometers) for ground water level monitoring shall be mandatory as per Section 14 of Guidelines. Water level data shall be made available to CGWA through web portal. Detailed guidelines for construction of piezometers are given in Annexure-II of the guidelines.
- 4) Proponents shall monitor quality of ground water from the abstraction structure(s) once in a year. Water samples from bore wells/ tube wells / dug wells shall be collected during April/May every year and analysed in NABL accredited laboratories for basic parameters (cations and anions), heavy metals, pesticides/ organic compounds etc. Water quality data shall be made available to CGWA through the web portal.
- 5) In case of mining projects, additional key wells shall be established in consultation with the Regional Director, CGWB for ground water level monitoring four (4) times a year (January, May, August and November) in core as well as buffer zones of the mine.
- 6) In case of mining project the firm shall submit water quality report of mine discharge/ seepage from Govt. approved/ NABL accredited lab.
- 7) The firm shall report compliance of the NOC conditions online in the website (www.cgwa-noc.gov.in) within one year from the date of issue of this NOC.
- 8) Industries abstracting ground water in excess of 100 m³/d shall undertake annual water audit through certified auditors and submit audit reports within three months of completion of the same to CGWA. All such industries shall be required to reduce their ground water use by at least 20% over the next three years through appropriate means.
- 9) Application for renewal can be submitted online from 90 days before the expiry of NOC. Ground water withdrawal, if any, after expiry of NOC shall be illegal & liable for legal action as per provisions of Environment (Protection) Act, 1986.
- 10) This NOC is subject to prevailing Central/State Government rules/laws/norms or Court orders related to construction of tube well/ground water abstraction structure / recharge or conservation structure/discharge of effluents or any such matter as applicable.

General conditions:

- 11) No additional ground water abstraction and/or de-watering structures shall be constructed for this purpose without prior approval of the Central Ground Water Authority (CGWA).
- 12) The proponent shall seek prior permission from CGWA for any increase in quantum of groundwater abstraction (more than that permitted in NOC for specific period).
- 13) Proponents shall install roof top rain water harvesting in the premise as per the existing building bye laws in the premise.
- 14) The project proponent shall take all necessary measures to prevent contamination of ground water in the premises failing which the firm shall be responsible for any consequences arising thereupon.
- 15) In case of industries that are likely to contaminate the ground water, no recharge measures shall be taken up by the firm inside the plant premises. The runoff generated from the rooftop shall be stored and put to beneficial use by the firm.
- 16) Wherever feasible, requirement of water for greenbelt (horticulture) shall be met from recycled / treated waste water.
- 17) Wherever the NOC is for abstraction of saline water and the existing wells (s) is /are yielding fresh water, the same shall be sealed and new tubewell(s) tapping saline water zone shall be constructed within 3 months of the issuance of NOC. The firm shall also ensure safe disposal of saline residue, if any.
- 18) Unexpected variations in inflow of ground water into the mine pit, if any, shall be reported to the concerned Regional Director, Central Ground Water Board.
- 19) In case of violation of any NOC conditions, the applicant shall be liable to pay the penalties as per Section 16 of Guidelines.
- 20) This NOC does not absolve the proponents of their obligation / requirement to obtain other statutory and administrative clearances from appropriate authorities.
- 21) The issue of this NOC does not imply that other statutory / administrative clearances shall be granted to the project by the concerned authorities. Such authorities would consider the project on merits and take decisions independently of the NOC.
- 22) In case of change of ownership, new owner of the industry will have to apply for incorporation of necessary changes in the No Objection Certificate with documentary proof within 60 days of taking over possession of the premises.
- 23) This NOC is being issued without any prejudice to the directions of the Hon'ble NGT/court orders in cases related to ground water or any other related matters.
- 24) Proponents, who have installed/constructed artificial recharge structures in compliance of the NOC granted to them previously and have availed rebate of upto 50% (fifty percent) in the ground water abstraction charges/ground water restoration charges, shall continue to regularly maintain artificial recharge structures.
- 25) Industries which are likely to cause ground water pollution e.g. Tanning, Slaughter Houses, Dye, Chemical/ Petrochemical, Coal washeries, pharmaceutical, other hazardous units etc. (as per CPCB list) need to undertake necessary well head protection measures to ensure prevention of ground water pollution as per Annexure III of the guidelines.
- 26) In case of new infrastructure projects having ground water abstraction of more than 20 m³/day, the firm/entity shall ensure implementation of dual water supply system in the projects.
- 27) In case of infrastructure projects, paved/parking area must be covered with interlocking/perforated tiles or other suitable measures to ensure groundwater infiltration/harvesting.
- 28) In case of coal and other base metal mining projects, the project proponent shall use the advance dewatering technology (by construction of series of dewatering abstraction structures) to avoid contamination of surface water.
- 29) The NOC issued is conditional subject to the conditions mentioned in the Public notice dated 27.01.2021 failing which penalty/EC/cancellation of NOC shall be imposed as the case may be.
- 30) This NOC is issued subject to the clearance of Expert Appraisal Committee (EAC) (if applicable).
- 31) In the self-compliance report, the PP shall submit details of Drilling Agency/ Agencies, which has/ have constructed BW(s)/ TW(s) along with undertaking to the effect that all necessary measures have been taken as per directions of Hon'ble Supreme Court provided in Annexure-VII of guidelines dated 24.09.2020 in respect of abandoned/ failed BW(s)/ TW(s)/Piezometer(s), if any. The PP is advised to engage registered drilling agency/ agencies. In the event of any mishap/ unfortunate incident due to negligence in taking measures for prevention of accident due to falling in Bore Well, both PP and concerned drilling agency shall jointly be held responsible and penal action as per extant Government rules shall be taken.


(Non-compliance of the conditions mentioned above is likely to result in the cancellation of NOC and legal action against the proponent.)

18/11, जामनगर हाउस, मानसिंह रोड, नई दिल्ली - 110011 / 18/11, Jamnagar House, Mansingh Road, New Delhi-110011

Phone: (011) 23383561 Fax: 23382051, 23386743

Website: cgwa-noc.gov.in

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SAVE WATER - SAVE LIFE**


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Kerandari Coal Mining Project
Sikri, Barkagaon - 825311

CENTRAL GROUND WATER AUTHORITY
Department of Water Resources, River Development and Ganga Rejuvenation
Ministry of Jal Shakti, Govt. of India

Receipt

(As per the guideline Gazette Notification S.O. 3281(E) regarding the New Guidelines dated 24.09.2020 of CGWA, MoJS, Govt. of India)
<https://cgwa-noc.gov.in>


Application No.:	21-4/235/JH/MIN/2017	Date of Issuance:	06/06/2024
Name of Firm:	KERENDARI A COAL BLOCK		
AppType Category:	Coal		
Application Type:	Mining		
PAN/GSTIN No. of Firm/Individual:	/		

S N	Description	Amount (Rs.)
1.	Application Processing Fee	5000.00
2.	Ground Water Abstraction charges	2617012.00
3.	Ground Water Restoration charges	0
4.	Environmental Compensation Charges (ECRGW) (Date From to) Days-	
5.	Penalty for non-Compliance of NOC conditions Condition to be mentioned	10000.00
6.	Adjustment Charges	
7.	Rebate	
8.	Charges for correction/modification in the existing issued No Objection Certificate	
S.No.	Description	Rate
(i)	Change in User ID	Rs. 1000
(ii)	Change in firm Name	Rs. 5000
(iii)	Extension of No Objection Certificate	Rs. 5000
(iv)	Issuance of duplicate No Objection Certificate	Rs. 5000
(v)	Issuance of corrigendum to No Objection Certificate	Rs. 5000
(vi)	Any other items/correction etc.	Rs. 500
Rs. Rupees Twenty Six Lakh Thirty Two Thousand Twelve Only		2632012.00

This is an system generated invoice, hence, does not require ink signed.

18/11, जामनगर हाउस, मानसिंह रोड, नई दिल्ली - 110011 / 18/11, Jamnagar House, Mansingh Road, New Delhi-110011
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SAVE WATER - SAVE LIFE


Pravin Ramdas Sanap
Asst. Officer (Envmt Mgmt)
NTPC Mining Limited
Kerandari Coal Mining Project
Sikri, Barkagaon - 825311

Term and conditions:

- i. All disputes are subject to Delhi Jurisdiction.
- ii. Any complaint in regard to the rates will not be entertained.

Member-Secretary
CGWA, New Delhi

CENTRAL GROUND WATER AUTHORITY

Plantation in the Dump Area





कार्यालय – वन प्रमंडल पदाधिकारी,
हजारीबाग पश्चिमी वन प्रमंडल, वन भवन, हजारीबाग
☎ 06546-222339, Email- dfo.hazaribagwest@rediffmail.com & dfo-hazaribagwest@gov.in

सेवा में,

पत्रांक :- 5755

दिनांक :- 4/10/2024

उप महाप्रबन्धक (खनन)
एन.टी.पी.सी. लिमिटेड
केरेडारी कोयला खनन परियोजना,
सिकरी साईट, बड़कागाँव, हजारीबाग

विषय:- एन0टी0पी0सी0लि0 के नार्थ कर्णपूरा कोयला क्षेत्र अन्तर्गत केरेडारी "A " कोल ब्लॉक में माइनिंग परियोजना हेतु 243.32 हे0 (हजारीबाग पश्चिमी वन प्रमंडल – 184.77 हे0) वन भूमि अपयोजन प्रस्ताव के संबंध में।

प्रसंग:- आपका पत्रांक 1078/NTPC/ KDCMP/EMG/2024/16 दिनांक 04.10.2024।

महाशय,

उपर्युक्त विषयक प्रसंगाधीन पत्र के संबंध में सूचित करना है कि एन0टी0पी0सी0 लिमिटेड के केरेडारी "A" कोल ब्लॉक कोल खनन परियोजना अंतर्गत Site-specific Wildlife Management Plan हेतु वर्ष 2022-23 से वर्ष 2031-32 तक Rs. 2476.044 (in lakh) [Hazaribag West Forest Division - Rs. 1850.004 (in lakh) & Chatra South Division - Rs.626.04 (in lakh)] की योजना Principal Chief Conservator of Forests, Wildlife & Chief Wildlife Warden, Jharkhand से स्वीकृत है, जिसका क्रियान्वयन वन प्रमंडल पदाधिकारी, हजारीबाग पश्चिमी वन प्रमंडल द्वारा किया जा रहा है।

NTPC Keredari द्वारा समर्पित योजना की संक्षिप्त विवरणी इस पत्र के साथ संलग्न है और NTPC Keredari द्वारा योजना में स्वीकृत कुल राशि Rs. 2476.044 (in lakh) Ad-hoc CAMPA fund में जमा किया जा चुका है। वर्ष 2022-23 एवं 2023-24 में हजारीबाग पश्चिमी वन प्रमंडल द्वारा कैम्पा मद अंतर्गत उक्त योजना से क्रमशः Rs. 150.00 (in lakh) एवं Rs. 75.00 (in lakh) कुल Rs. 225.00 (in lakh) राशि का व्यय किया गया है।

सूचनार्थ समर्पित।

अनुलग्नक-यथोक्त।

आपका विश्वासी

वन प्रमंडल पदाधिकारी
हजारीबाग पश्चिमी प्रमंडल



**Office of the Principal Chief Conservator of Forests,
Wildlife & Chief Wildlife Warden, Jharkhand.**

Van Bhawan, Doranda, Ranchi-834002

Email:pccf-wildlife@gov.in,Phone No. 0651-2481744



Office Order No. **40**.....

Dated. **11/10/2019**.....

Sanction Order of the Site-Specific Wildlife Management Plan with reference to diversion of 243.32 ha of forest land in Chatra South and Hazaribagh West forest divisions in favour of M/s NTPC Limited – Kerandari 'A' Coal Mining Project (North Karanpura Coalfields).

At the outset it would be appropriate to present here a brief outline of the background under which the instant Site-Specific Wildlife Management Plan (referred to as '*the SSWMP*' hereinafter) with reference to diversion of 243.32 ha of forest land for coal mining by M/S NTPC Ltd. (referred to as '*the User Agency*' hereinafter) under Kerandari 'A' Coal Mining Project (referred to as '*the Project*' hereinafter) has been submitted by the Regional Chief Conservator of Forests, Hazaribagh for its due sanction by the undersigned.

The Ministry of Environment & Forests (MoEF), GoI, vide F. No. 8-53/2011-FC dated 1st February, 2012, has granted In-principle (Stage-I) approval for diversion of 243.32 ha of forest land for the Project in favour of the User Agency subject to the following condition:

"18. The user agency will prepare a conservation plan for the project area under the guidance of the State Forest Department for maintenance and eco-restoration of the area at the project cost."

Thereafter, the Ministry of Environment, Forests and Climate Change (MoEF&CC), GoI, vide F. No. 8-53/2011-FC dated 28th August, 2019, has granted Final Approval (Stage-II) for diversion of forest (**Forest Clearance**) land under the said Project in favour of the User Agency subject to the following condition:

*"The user agency shall pay the cost of implementation of Wildlife Management Plan, on pro-rata basis, prepared by the State Government for the entire North Karanpura field, as per the undertaking submitted by them and accepted by State Government along with the Stage-I compliance. **Forest land shall be handed over to the user agency, after realizing the proportionate cost from the user agency....."***

The MoEF, GoI, vide Letter No. J-11015/133/2007-IA.II(M) dated 31st March, 2010, has accorded **Environmental Clearance** to the Project subject to the following condition:

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P. Pravin
Pravin Ramdas Sanap
Asst. Officer (Env't Mgmt)
NTPC Mining Limited
Kerandari Coal Mining Project
Sikri, Barkagaon - 825311

"(xxv) A Conservation Plan (In-situ and Ex-situ) for endangered Schedule-I and II faunal species reported in the study area and for the medicinal plants found in and around the project area shall be prepared and implemented in consultation with the State Forest and Wildlife Departments. The implementation of the various activities there under and the status thereof shall be regularly reported to this Ministry and the MoEF Regional Office, Bhubaneshwar and uploaded on the company's website. **The proponent shall also participate in the Regional Wildlife Conservation Plan to be prepared by the State Wildlife Depart. and shall also contribute financially for implementation of RAP".(Regional Wildlife Conservation Plan)**

The Integrated/Regional Wildlife Management Plan (referred to as 'the IWMP hereinafter) with reference to North Karanpura Coalfields has been prepared by a three-member Expert team constituted by the Department of Forests, Environment & Climate Change, Govt. of Jharkhand. The said IWMP has been vetted by the Wildlife Institute of India, Dehradun (WII). The Chief Wildlife Warden, Jharkhand, vide his office order no. 6 dated 12.02.2019 has approved the Plan subject to certain conditions. The Plan was also considered by the State Board for Wildlife (SBWL) in its meeting held on 13.02.2019. The following conditions (relevant to the sanction of the instant SSWMP) laid by the CWLW, Jharkhand while according approval of the IWMP, have also been agreed to by the SBWL:

- (a) That the budget for 10-year plan shall be Rs. 2089.80 crores and the coal companies working in the North Karanpura Coal Block (NKCB) would be contributing towards the Initial Environmental Compensatory Fund at the rate of Rs. 3.786 lakh per ha of mining lease area.
- (b) That Site-Specific Wildlife Management Plans would be prepared in all cases where condition with regard to IWMP has been stipulated or shall be stipulated in future at the time of grant of Stage-I clearance. These SSWMPs shall be prepared following general guidelines provided under the IWMP in consonance with the framework decided in the meeting of senior forest officials held on 09.02.2019.
- (c) The said SSWMPs shall be implemented after getting approval thereof from the competent authority.
- (d) That in those cases where the condition with regard to IWMP has not been laid by MoEF&CC while granting Stage-I approval, the modalities etc. shall be decided in consultation with the MoEF&CC.
- (e) That the recommendations of the Wildlife Institute of India, Dehradun made in its Evaluation Report communicated vide letter no. WII/DWII/Misc/2016 dated 06.10.2016 shall be adhered to.

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11/12

- (f) That the wildlife corridors/connectivity/passages as delineated in Chapter 9 of the IWMP shall be secured as inviolate for the purposes of allocation of mining leases.
- (g) That the special provisions prescribed under Chapter 10 of the IWMP, for conservation of Mahudi hills and Satpahar shall be adhered to.

At this stage it is also noteworthy to mention that the Department of Forests, Environment & Climate Change, Govt. of Jharkhand, vide Letter no. 04/Vanyapran-117-25/2014-851 dated 18.02.2014, clearly stipulates that in addition to preparation of a comprehensive Wildlife and Biodiversity Conservation and Management Plan, every User Agency is required to prepare a Site-Specific Wildlife and Biodiversity Conservation Plan.

Considering the facts on record including the conditions laid by the Central Government and the directions issued by the State Government it is clear that apart from contributing towards the Initial Environmental Compensatory Fund at the rate of Rs. 3.786 lakh per ha of lease area, the User Agency shall be required to frame a Site-Specific Wildlife Management Plan with respect to the specific lease area under consideration and bear the cost of implementation of the said Site-Specific Plan.

It is also pertinent here to note that the condition laid by GoI with regard to Environmental Clearance granted in favour of the User Agency also stipulates in no uncertain terms that the User Agency shall prepare and implement the Conservation Plan (In-situ and Ex-situ) for endangered Schedule-I and II faunal species found in the area in consultation with the Forest Department along with contributing financially towards the implementation of the Regional/Integrated Wildlife Management Plan.

In this context, it may further be noted that as per the Stage-II condition laid by the MoEF&CC, the User Agency is required to pay the cost of implementation of Wildlife Management Plan, on pro-rata basis, prepared for the entire North Karanpura field. The said condition further stipulates that forest land shall be handed over to the user agency, after realizing the proportionate cost from the user agency. Thus, the timing of realization of the funds for implementation of the instant Site-Specific Wildlife Management Plan may be decided by the State Government and it may not be considered as a pre-requisite for handing over the forest land to the User Agency at the first instance. However, it is being observed that this issue requires to be deliberated upon at the level of the State Government. Further, the modus operandi of the utilization of the corpus created out of the funds collected from all individual user agencies involved in mining activities within the

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entire North Karanpura area on pro-rata basis may be decided by the State Government. Since the timing of realization of contributions of individual user agencies towards Initial Environmental Compensatory Fund may be staggered across the time frame it would be incumbent upon the State Government to decide the mode and extent of utilization of the funds deposited in the said corpus.

In the above stated background, the User Agency has prepared the instant SSWMP in consultation with the concerned forest officials. Regional Chief Conservator of Forests, Hazaribagh (RCCF, Hazaribagh), vide his letter no. 1633 dated 18.08.2021, has submitted the Plan to the office of the undersigned for its due sanction.

While considering the Plan for its approval, an online presentation was arranged by the undersigned on 25.09.2021 through Google meet in which the User Agency made a power point presentation. The meet was attended by concerned forest officials including the RCCF, Hazaribagh.

The plan contains year-wise detailed description of activities and corresponding cost estimates. The activities/management interventions have been proposed in both the forest divisions, namely Chatra South and Hazaribagh West Forest divisions where the forest land proposed to be diverted, are located. The total forest land to be diverted towards mining is 243.32 ha out of which 58.55 ha falls in Chatra South Forest Division and 184.77 ha falls in Hazaribagh West Forest Division. The summary of the proposed interventions (componentwise) under the plan with the objective of conservation of forest and wildlife resources as also to mitigate the impacts of mining on forests and wildlife is as follows:

Sl. No.	Work Components	Cost Estimates (Rs. In lakh) – Hazaribagh West Forest Division	Cost Estimates (Rs. In lakh) – Chatra South Forest Division	Financial Outlay (Rs. in lakh)
1.	Habitat Management			
	(a) Management of Food	429.403	143.295	572.698
	(b) Management of Water	540.000	160.500	700.500
	(c) Management of Shelter	91.500	30.000	121.500
2.	Eco-development Work	146.875	54.450	200.925
3.	Research & Monitoring	66.170	20.500	86.670
4.	Awareness and Training Programme	36.000	12.750	48.750

5.	Biodiversity Conservation	38.500	14.000	52.500
6.	Miscellaneous Activities	193.222	86.205	279.827
7.	Sub-total	1541.670	521.700	2063.370
8.	Cost Escalation	308.334	104.340	412.674
9.	Grand Total	1850.004	626.040	2476.044

The plan with a total financial outlay of Rs. 2476.04 lakh extends over a period of 10 years (Year 2021-22 to 2030-31).

Considering the proposals under the plan, sanction is hereby accorded to the instant SSWMP subject to the following conditions:

- (i) That the User Agency shall ensure that its officials/contractors and the work force engaged into mining and allied operations shall not commit or abet any forest/wildlife offence in their area of operation. They will also promptly report any forest/wildlife offence in the area to the nearest forest office/official. Further, they will extend their full cooperation to the forest officials in control/mitigation of any incident, natural or man made, detrimental to forest and wildlife in their area of operation.
- (ii) **That the cost of the instant SSWMP shall be in addition to the amount deposited by the User Agency in CAMPA account towards the Initial Environmental Compensatory Fund at the rate of Rs. 3.786 lakh per ha of lease area. However, the modality with regard to the timing of realization of the funds for implementation of the instant SSWMP may be decided by the State Government and it may not be considered as a pre-requisite for handing over the forest land to the User Agency. Since there are a number of similarly placed mining lease areas within the North Karanpura coalfields against which Integrated/Regional Wildlife Management Plan has been prepared by the Expert Team and vetted by the Chief Wildlife Warden, Jharkhand as well as approved by the State Board for Wildlife, the issue of realization of funds for implementation of Site-Specific Plans corresponding to each of the individual forest land diversion cases falling within North Karanpura Coalfields may be decided by the State Government as a matter of policy.**
- (iii) That the total amount of Rs. 2476.04 lakh involved in the instant SSWMP shall be deposited in the CAMPA account as and when it is decided by the State Government to do so, as explained in the preceding para. The funds so received shall be utilized

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by the State Forest Department through the Divisional Forest Officer, Hazaribagh West Forest Division (DFO, Hazaribagh West) and the the Divisional Forest Officer, Chatra South Forest Division (DFO, Chatra South), both referred to as the 'Implementing Agencies' hereinafter, as per the prevailing norms under the Jharkhand Forest Department.

- (iv) That the Implementing Agencies shall prepare detailed Annual Plans of Operations (APOs) with respect to areas under their control, as provided in the instant Plan following all the rules, regulations, Schedule of Rates etc. issued from time to time by the State Government/ Forest Department. Regional Chief Conservator of Forests, Hazaribagh (RCCF, Hazaribagh) shall accord sanction to the said APOs following due process and he/she will closely monitor the implementation/progress of the activities undertaken by both the forest divisions as per directions issued by the Forest Department from time to time.
- (v) That the Conservator of Forests, Hazaribagh Circle (CF, Hazaribagh) and Conservator of Forests, Chatra Circle (CF, Chatra) shall supervise all the activities within their jurisdiction as per directions issued by the Forest Department from time to time.
- (vi) That the Implementing Agencies shall carry out the activities under the Plan strictly as per the duly sanctioned APOs.
- (vii) That the Implementing Agencies shall ensure that no violation of duly sanctioned Working Plan of Hazaribagh West Forest Division and Chatra South Forest Division takes place during implementation of any of the activities involved in this plan over notified and demarcated forest land.
- (viii) That the instant SSWMP is dynamic and shall be revisited after every 2 years and a revised Plan may be formulated as per need of the mining impacted area and convenience of the implementing agencies. The revised plan, if any, shall be put up before the Principal Chief Conservator of Forests, Wildlife & Chief Wildlife Warden, Jharkhand for its due approval.
- (ix) That though adequate provisions have been made towards cost escalation in the plan, yet the User Agency shall submit an Undertaking to the Implementing Agencies to the effect that they will deposit extra cost of the plan beyond the cost escalation provision owing to increase in wage rate, cost of materials etc. in due course of time as well as consequent upon revision of the plan, if any, as and when given effect to by the competent authority.

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Sd/-

Principal Chief Conservator of Forests
Wildlife & Chief Wildlife Warden,
Jharkhand, Ranchi.

Memo No.

Dated:

Copy forwarded to Additional Director General (Wildlife), Ministry of Environment, Forests and Climate Change, New Delhi/ Additional Chief Secretary, Deptt. Of Forest, Environment and Climate Change, Jharkhand, Ranchi/ Principal Chief Conservator of Forests, Jharkhand, Ranchi for information.

Sd/-

Principal Chief Conservator of Forests
Wildlife & Chief Wildlife Warden,
Jharkhand, Ranchi.

Memo No.

Dated:

Copy forwarded to PCCF-cum-Executive Director, Wasteland Development Board, Jharkhand, Ranchi/Addl. PCCF, CAMPA, Jharkhand, Ranchi with a copy of the Plan for information and necessary action.

Sd/-

Principal Chief Conservator of Forests
Wildlife & Chief Wildlife Warden,
Jharkhand, Ranchi.

Memo No.

Dated:

Copy forwarded to Regional Chief Conservator of Forests, Hazaribagh/ Conservator of Forests, Hazaribagh/ Conservator of Forests, Chatra/ DFO, Hazaribagh West Forest Division/ DFO, Chatra South Forest Division for information and necessary action.

Sd/-

Principal Chief Conservator of Forests
Wildlife & Chief Wildlife Warden,
Jharkhand, Ranchi.

Memo No. 1594

Dated: 11/10/2021




Copy forwarded to Sh. U. Sadananda Chary, DGM (Mining), Kerandari Coal Mining Project, NTPC Ltd., Hazaribagh for information and necessary action.

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11/10/21

Principal Chief Conservator of Forests
Wildlife & Chief Wildlife Warden,
Jharkhand, Ranchi.




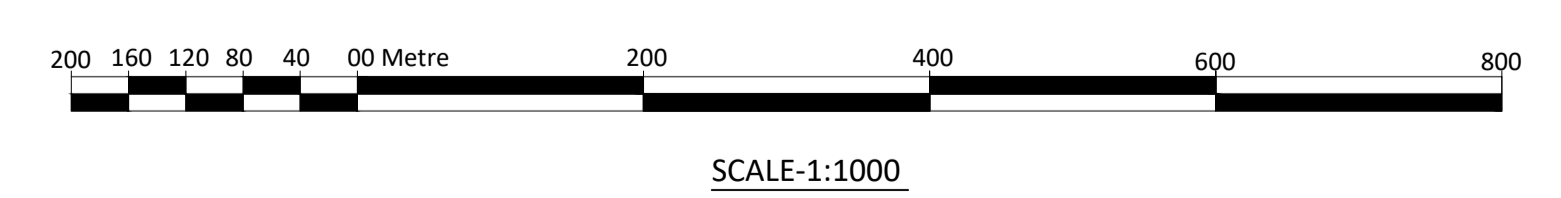
-:LEGENDS :-

Sl.	Particulars	Symbol
1.	Kerandari Lease/Mine Boundary	
2.	Proposed Excavation Boundary	
3.	Proposed Dumping Area	



AARAV UNMANNED SYSTEMS
 # 35, 1st Floor,
 Jairam Nagar, Jakkur,
 Bengaluru, Karnataka 560064
www.aus.co.in

	NTPC LIMITED
PROJECT	KERANDARI COAL MINING PROJECT
TITLE	DRONE IMAGE
SCALE	1:1000
DATE	Dec'2022





झारखण्ड राज्य प्रदूषण नियंत्रण पर्वद,
क्षेत्रीय कार्यालय-सह-प्रयोगशाला, पी0टी0सी0 चौक, मटवारी रोड, हजारीबाग।

Ref.....876.....

Date..18/8/23

From,

A.K. Yadav,
Regional Officer, Hazaribag,

To,

The GM(HOP),
M/s Kerendari Coal Mining project
of NTPC Ltd,
Hazaribag.

Sub:- For approval of locations for Environmental monitoring Stations at Kerendari Coal Mining Project of NTPC Ltd., Hazaribag.

Ref. no. Your letter no. KDCMP/Mining/2023/205 dt. 12.08.2023

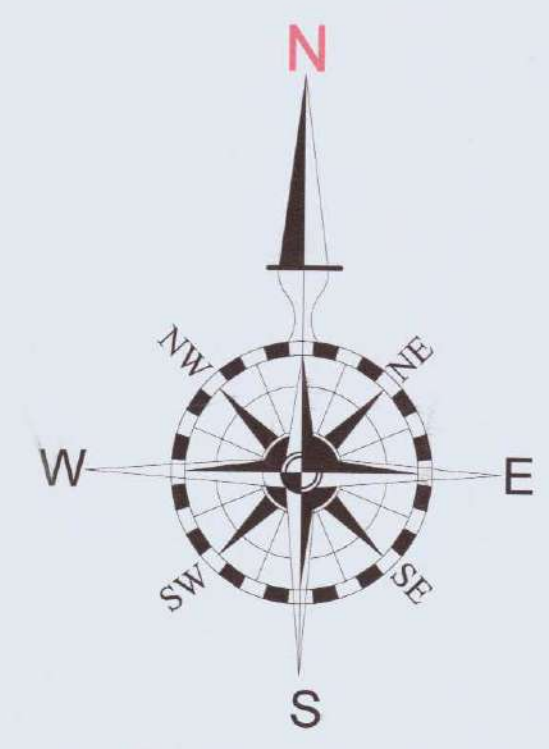
Sir,

With reference to the above subject this is to informed you that the site was inspected on 18.08.2023 and found the all marked location to install the monitoring devices are suitable.

The stations may be fixed at marked locations.

Yours faithfully

A 18/8/2023
(A.K. Yadav)
Regional Officer



LEGENDS

- CAAQMS
- GW (GROUND WATER)
- A (AIR)
- N (NOISE)
- SO (SOIL)
- SW (SURFACE WATER)

Sl. No	Village	Monitoring Stations
1	Basaria	SO1, A1, N1, SW4 and GW3
2	BGR Workshop	CAAQMS, SO2, N2, A2 and GW2
3	Baledewri	SW3
4	Pandu	GW1
5	Bengwari	A3, N3, SO3 and GW4
6	Tarhesa	A4, N4, SW2 and SO4
7	Hewai	SW1
8	Manatu	SW5, A5, N5, GW5 AND SO5
9	Pahra	SO6, N6, A6 and GW6
10	Jordag	N7, GW7, A7 and SO7
11	Bukru	SW8
12	Keredari	SO8, GW8, N8, A8 and SW7
13	Garri Kalan	SW6

NTPC LIMITED
PROJECT: KERANDARI COAL MINING PROJECT
TITLE: ENVIRONMENT Monitoring Stations
SCALE: Not to Scale
PLAN NO: NTPC_KDCMP_EMS01 DATE: 07.08.2023

Certified that the Plan is correct and updated

[Signature]
 BIRENDRA KUMAR
 ADDL GENERAL MANAGER
 (ENVIRONMENT) (ENVIRONMENT MANAGEMENT)
 कोयला खनन एवं विद्युत प्रकल्पों के लिए पर्यावरण प्रशासन, NTPC लिमिटेड
 हज़ारिबाग

[Signature]
 Prepared By
 Pawan Ramesh Sanap

[Signature]
 Checked By

[Signature]
 Verified By
 B. VENKATA RAMESH KUMAR
 MINE MANAGER
 कोयला खनन एवं विद्युत प्रकल्पों के लिए पर्यावरण प्रशासन, NTPC लिमिटेड
 हज़ारिबाग

Approved By
 JSPCB R.O. (Hazaribagh)



BIOCRAT ENVIRONMENTAL SERVICES (BIOCRAT ENVIRONMENTAL LAB)

Annexure 22

AMBIENT AIR QUALITY MONITORING AND ANALYSIS

Client Name & Address: M/s NTPC Ltd.

Kerandari Coal Mining Project, Sikri, Barkagaon, Hazaribag, Jharkhand 825311.

Ambient Air Quality Summary Reports for the month of APRIL - 2024

Parameters	Unit	Norms	Baseria Village (NTPC Camp) (Core Zone)		BGR Workshop (Core Zone)		Bengwari Nadi Tola (Core Zone)		Tarhesa Village (Core Zone)		Manatu Village (Buffer Zone)		Pahra Village (Buffer Zone)		Jordag Village (Buffer Zone)		Kerandari Village (Buffer Zone)	
			1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
Sox	$\mu\text{g}/\text{m}^3$	80	11.16	10.82	16.51	16.82	11.28	11.19	16.08	16.75	11.57	11.19	10.80	11.25	16.27	16.42	22.49	22.22
Nox	$\mu\text{g}/\text{m}^3$	80	21.57	23.61	24.82	26.25	20.60	22.03	22.44	24.35	16.08	18.96	15.58	17.27	26.66	28.40	31.25	33.54
PM ₁₀	$\mu\text{g}/\text{m}^3$	100	89.00	92.37	85.52	88.58	91.19	93.81	90.86	94.77	78.79	82.48	80.60	85.63	91.38	88.51	82.51	86.60
PM _{2.5}	$\mu\text{g}/\text{m}^3$	60	41.53	44.61	40.21	43.37	49.18	52.42	51.46	54.10	39.46	42.85	37.64	40.13	55.60	51.74	41.53	44.70


Reviewed By





Authorized by
Technical Manager
(Sunil Kumar Singh)

Add: - Sarveshwari Nagar, Itki Road, Bajra, P.O - Hehal, Dist - Ranchi, Jharkhand. Pin -834005

Email Id: - biocratenv@gmail.com. Mobile No - 7369019812, 8340466751, 9608708172

Page | 1


Pravin Ramdas Sanap
Asst. Officer (Env't Mgmt)
NTPC Mining Limited
Kerandari Coal Mining Project
Sikri, Barkagaon - 825311



BIOCRAT ENVIRONMENTAL SERVICES (BIOCRAT ENVIRONMENTAL LAB)

AMBIENT AIR QUALITY MONITORING AND ANALYSIS

Client Name & Address: M/s NTPC Ltd.

Kerandari Coal Mining Project, Sikri, Barkagaon, Hazaribag, Jharkhand 825311.

Ambient Air Quality Summary Reports for the month of MAY - 2024

Parameters	Unit	Norms	Baseria Village (NTPC Camp) (Core Zone)		BGR Workshop (Core Zone)		Bengwari Nadi Tola (Core Zone)		Tarhesa Village (Core Zone)		Manatu Village (Buffer Zone)		Pahra Village (Buffer Zone)		Jordag Village (Buffer Zone)		Kerandari Village (Buffer Zone)	
			1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
Sox	$\mu\text{g}/\text{m}^3$	80	12.55	12.65	15.82	15.67	12.78	12.25	18.49	19.09	12.42	13.12	12.21	12.70	15.44	15.73	22.42	24.72
Nox	$\mu\text{g}/\text{m}^3$	80	24.34	25.17	25.86	24.94	24.11	25.66	23.24	24.66	20.27	22.08	19.29	21.39	26.66	27.14	35.06	38.37
PM ₁₀	$\mu\text{g}/\text{m}^3$	100	87.26	89.21	85.23	83.88	89.34	91.00	90.55	91.71	86.16	91.28	88.12	90.62	85.40	88.29	90.37	91.41
PM _{2.5}	$\mu\text{g}/\text{m}^3$	60	40.30	43.56	39.57	39.25	48.41	52.19	52.58	50.69	45.59	49.07	42.34	45.40	49.11	48.32	47.49	49.58


Reviewed By





Authorized by
Technical Manager
(Sunil Kumar Singh)

Add: - Sarveshwari Nagar, Itki Road, Bajra, P.O – Hehal, Dist – Ranchi, Jharkhand. Pin -834005

Email Id: - biocratenv@gmail.com, Mobile No – 7369019812, 8340466751, 9608708172

Page | 2


Pravin Ramdas Sanap
Asst. Officer (Env't Mgmt)
NTPC Mining Limited
Kerandari Coal Mining Project
Sikri, Barkagaon - 825311



BIOCRAT ENVIRONMENTAL SERVICES (BIOCRAT ENVIRONMENTAL LAB)

AMBIENT AIR QUALITY MONITORING AND ANALYSIS

Client Name & Address: M/s NTPC Ltd.

Kerandari Coal Mining Project, Sikri, Barkagaon, Hazaribag, Jharkhand 825311.

Ambient Air Quality Summary Reports for the month of JUNE - 2024

Parameters	Unit	Norms	Baseria Village (NTPC Camp) (Core Zone)		BGR Workshop (Core Zone)		Bengwari Nadi Tola (Core Zone)		Tarhesa Village (Core Zone)		Manatu Village (Buffer Zone)		Pahra Village (Buffer Zone)		Jordag Village (Buffer Zone)		Kerandari Village (Buffer Zone)	
			1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
Sox	$\mu\text{g}/\text{m}^3$	80	13.26	10.37	17.92	12.90	15.51	10.23	20.37	10.56	15.21	7.95	13.08	10.45	17.87	8.09	23.83	13.26
Nox	$\mu\text{g}/\text{m}^3$	80	28.12	18.58	27.13	14.79	29.63	16.49	29.92	17.10	26.27	15.15	24.10	16.85	30.13	19.33	40.39	20.25
PM ₁₀	$\mu\text{g}/\text{m}^3$	100	95.05	86.60	89.71	80.57	96.58	88.45	97.31	89.85	96.60	84.86	94.53	90.64	95.73	89.86	97.51	90.25
PM _{2.5}	$\mu\text{g}/\text{m}^3$	60	48.57	36.43	44.06	33.36	55.64	37.51	53.57	37.92	53.33	31.22	48.66	29.22	54.61	35.07	53.40	33.53


Reviewed By




Authorized by
Technical Manager
(Sunil Kumar Singh)



BIOCRAT ENVIRONMENTAL SERVICES (BIOCRAT ENVIRONMENTAL LAB)

AMBIENT AIR QUALITY MONITORING AND ANALYSIS

Client Name & Address: M/s NTPC Ltd.

Kerandari Coal Mining Project, Sikri, Barkagaon, Hazaribag, Jharkhand 825311.

Ambient Air Quality Summary Reports for the month of JULY - 2024

Parameters	Unit	Norms	Baseria Village (NTPC Camp) (Core Zone)		BGR Workshop (Core Zone)		Bengwari Nadi Tola (Core Zone)		Tarhesa Village (Core Zone)		Manatu Village (Buffer Zone)		Pahra Village (Buffer Zone)		Jordag Village (Buffer Zone)		Kerandari Village (Buffer Zone)	
			1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
Sox	$\mu\text{g}/\text{m}^3$	80	9.44	8.84	10.27	10.98	9.47	8.89	8.44	8.01	10.23	9.09	9.50	8.90	10.75	9.92	15.34	13.29
Nox	$\mu\text{g}/\text{m}^3$	80	16.47	13.42	13.39	12.36	15.02	13.48	14.80	12.35	13.32	12.18	13.55	11.92	16.40	14.77	18.02	16.33
PM ₁₀	$\mu\text{g}/\text{m}^3$	100	76.63	70.05	70.35	67.42	79.76	74.20	78.11	71.52	76.58	69.28	78.65	71.03	77.14	69.51	79.47	71.87
PM _{2.5}	$\mu\text{g}/\text{m}^3$	60	30.81	26.66	27.58	24.40	31.30	28.77	29.38	25.35	27.67	24.46	24.54	21.66	29.18	24.75	28.88	25.36


Reviewed By


Pravin Ramdas Sanap
Asst Officer (Env't Mgmt)
NTPC Mining Limited
Kerandari Coal Mining Project
Sikri, Barkagaon - 825311

Add: - Sarveshwari Nagar, Itki Road, Bajra, P.O - Hehal, Dist - Ranchi, Jharkhand. Pin -834005

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(Sunil Kumar Singh)



BIOCRAT ENVIRONMENTAL SERVICES (BIOCRAT ENVIRONMENTAL LAB)

AMBIENT AIR QUALITY MONITORING AND ANALYSIS

Client Name & Address: M/s NTPC Ltd.

Kerandari Coal Mining Project, Sikri, Barkagaon, Hazaribag, Jharkhand 825311.

Ambient Air Quality Summary Reports for the month of AUGUST - 2024

Parameters	Unit	Norms	Baseria Village (NTPC Camp) (Core Zone)		BGR Workshop (Core Zone)		Bengwari Nadi Tola (Core Zone)		Tarhesa Village (Core Zone)		Manatu Village (Buffer Zone)		Pahra Village (Buffer Zone)		Jordag Village (Buffer Zone)		Kerandari Village (Buffer Zone)	
			1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
Sox	$\mu\text{g}/\text{m}^3$	80	8.80	7.30	9.28	8.40	8.93	7.62	7.75	6.93	8.84	7.25	7.30	6.57	8.47	8.08	12.24	13.47
Nox	$\mu\text{g}/\text{m}^3$	80	11.59	11.76	14.62	13.04	11.77	10.17	11.82	10.34	10.20	8.76	8.82	8.93	13.16	11.72	19.23	22.19
PM ₁₀	$\mu\text{g}/\text{m}^3$	100	66.29	61.37	64.48	60.16	69.93	65.47	67.72	62.67	68.92	59.92	65.64	69.33	65.39	61.38	68.32	66.72
PM _{2.5}	$\mu\text{g}/\text{m}^3$	60	23.15	21.59	21.42	20.42	25.36	21.57	22.43	20.09	23.28	20.48	19.08	21.70	21.11	19.86	22.60	20.78


Reviewed By




Authorized by
Technical Manager
(Sunil Kumar Singh)



BIOCRAT ENVIRONMENTAL SERVICES

(BIOCRAT ENVIRONMENTAL LAB)

AMBIENT AIR QUALITY MONITORING AND ANALYSIS

Client Name & Address: M/s NTPC Ltd.

Kerandari Coal Mining Project, Sikri, Barkagaon, Hazaribag, Jharkhand 825311.

Ambient Air Quality Summary Reports for the month of SEPTEMBER - 2024

Parameters	Unit	Norms	Baseria Village (NTPC Camp) (Core Zone)		BGR Workshop (Core Zone)		Bengwari Nadi Tola (Core Zone)		Tarhesa Village (Core Zone)		Manatu Village (Buffer Zone)		Pahra Village (Buffer Zone)		Jordag Village (Buffer Zone)		Kerandari Village (Buffer Zone)	
			1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
Sox	µg/m ³	80	6.85	5.62	7.22	6.17	6.61	6.54	6.22	5.26	6.52	5.89	5.20	5.31	7.40	6.24	11.39	10.11
Nox	µg/m ³	80	9.65	8.39	11.10	9.62	9.78	9.68	9.69	8.34	8.27	6.92	6.86	7.02	10.88	9.71	19.26	17.93
PM ₁₀	µg/m ³	100	57.71	55.58	56.44	52.44	61.39	58.63	58.60	54.78	55.35	51.63	60.14	56.55	56.52	51.45	61.10	55.11
PM _{2.5}	µg/m ³	60	21.85	19.13	19.62	18.84	19.57	17.01	20.88	18.35	18.56	16.30	19.58	17.53	17.83	15.70	18.76	16.80
Mercury (Hg)	ng/m ³	Not Specified	< 0.12		< 0.12		< 0.12		< 0.12		< 0.12		< 0.12		< 0.12		< 0.12	
Arsenic (As)	ng/m ³	06 ng/m ³ (Annual)	< 0.3		< 0.3		< 0.3		< 0.3		< 0.3		< 0.3		< 0.3		< 0.3	
Nickel (Ni)	ng/m ³	20 ng/m ³ (Annual)	< 0.6		< 0.6		< 0.6		< 0.6		< 0.6		< 0.6		< 0.6		< 0.6	
Cadmium (Cd)	ng/m ³	Not Specified	< 0.6		< 0.6		< 0.6		< 0.6		< 0.6		< 0.6		< 0.6		< 0.6	
Chromium (Cr)	ng/m ³	Not Specified	< 13		< 13		< 13		< 13		< 13		< 13		< 13		< 13	


 Reviewed By




 Authorized by
 Technical Manager
 (Sunil Kumar Singh)

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Email Id: - biocratenv@gmail.com, Mobile No - 7369019812, 8340466751, 9686278788

CAAQMS & Display Board



KERANDARI COAL MINING PROJECT		
PARAMETER	VALUE	UNIT
CO	2.86	ppb
NO	17.52	ppb
NO2	2.63	ppb
NOx	20.15	ppb
27/09/2024		11:35 AM

KERANDARI COAL MINING PROJECT		
PARAMETER	VALUE	UNIT
SO2	27.4	ppb
PM10	84.6	µg/m ³
PM2.5	41.5	µg/m ³
27/09/2024		11:25 AM

VASTHI INSTRUMENTS PRIVATE LIMITED

IT'S ALL ABOUT SAFETY

Plot No. 21 & 22, Phase IV, Auto Nagar, Guntur - 522002.
info@vasthi.com Tele No. 0863-2238 667, Fax No. 0863-2262 667



TEST AND CALIBRATION REPORT

DATE: 09.10.2024

CUSTOMER: BGR Mining & Infra Ltd, kerandari A coal block MDO Project of NTPC, pandu village, barkagaon, hazaribagh, Jharkhand, 825311.

Po.No: BGR/KRD/PO/1502/CAAQMS/CEMC/2023-2024 ; Po.Date: 24.06.2023

Name of the Equipment : SO2 Gas Analyser
SI no : IN230099
Model no : MEZUS 110
Range : 0-1000 ppb
Calibration Date: 09.10.2024, Re-Cal Date: 08.04.2025

Testing Equipment used

1. Dynamic Calibrator SI No: VI202300160
2. Zero Air Generator SI No : IN22032
3. Cylinder concentrations : SO2- 45 PPM

ZERO CALIBRATION:

SI No	Zero Air Generator	Zero Air Fed from Calibrator	Concentration On Display (Before Calibration)	Concentration On Display (After Calibration)
1	---	00.0ppb	00.0ppb	00.0ppb

SPAN CALIBRATION WITH SO2 -45 PPM

SI No	Gas Concentration Fed From Calibrator	Concentration On Display (Before Calibration)	Concentration On Display (After Calibration)
1	950.0ppb	959.0ppb	952.0 ppb

MULTI POINT MEASUREMENTS:

SI No	Concentration Of Gas Fed To Analyser	Concentration Value On Display	Difference	Error (%)
1	500 ppb	503.0ppb	3.0ppb	0.3
2	250 ppb	253.0ppb	3.0ppb	0.3
3	100 ppb	102.0ppb	2.0ppb	0.2
4	50 ppb	51.0ppb	1.0ppb	0.1

TESTED BY

P.Swaroopa



CHECKED BY

D.Govindaraju

Pravin Ramdas Sanap
Asst. Officer (Env. Mgmt)
NTPC Mining Limited
Kerandari Coal Mining Project
Sikri, Barkagaon - 825311

VASTHI INSTRUMENTS PRIVATE LIMITED

IT'S ALL ABOUT SAFETY



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TEST AND CALIBRATION REPORT

DATE: 09.10.2024

CUSTOMER: BGR Mining & Infra Ltd, kerandari A coal block MDO Project of NTPC ,pandu village ,barkagaon,hazaribagh, Jharkhand,825311.

Po.No: BGR/KRD/PO/1502/CAAQMS/CEMC/2023-2024 ; Po.Date: 24.06.2023

Name of the Equipment : CO Gas Analyser
SI no : IN230101
Model no : MEZUS 310
Range : 0-100 PPM

Calibration Date:09.10.2024 , Re –Cal Date: 08.04.2025

Testing Equipment used

- 1.Dynamic Calibrator SI No: VI202300160
- 2.Zero Air Generator SI No : IN22032
- 3.Cylinder concentrations : CO– 105 PPM

ZERO CALIBRATION:

SI No	Zero Air Generator	Zero Air Fed from Calibrator	Concentration On Display (Before Calibration)	Concentration On Display (After Calibration)
1	---	00.0ppm	0.05ppm	00.0ppm

SPAN CALIBRATION WITH CO -90 PPM

SI No	Gas Concentration Fed From Calibrator	Concentration On Display (Before Calibration)	Concentration On Display (After Calibration)
1	90.0ppm	93.0ppm	90.0ppm

MULTI POINT MEASUREMENTS:

SI No	Concentration Of Gas Fed To Analyser	Concentration Value On Display	Difference	Error (%)
1	80.0ppm	80.0ppm	0.0ppm	0.0
2	50.0ppm	50.0ppm	0.0ppm	0.0
3	26.0ppm	26.0ppm	0.0ppm	0.0
4	5.0ppm	5.0ppm	0.0ppm	0.0

TESTED BY

P.Swaroopa



CHECKED By

D.Govindarajulu

Pravin Ramdas Sanap
Asst-Officer (Env't Mgmt)
NTPC Mining Limited
Kerandari Coal Mining Project
Sikri, Barkagaon - 825311

VASTHI INSTRUMENTS PRIVATE LIMITED

IT'S ALL ABOUT SAFETY

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TEST AND CALIBRATION REPORT

DATE: 09.10.2024

CUSTOMER: BGR Mining & Infra Ltd, kerandari A coal block MDO Project of NTPC ,pandu village ,barkagaon,hazaribagh, Jharkhand,825311.

Po.No: BGR/KRD/PO/1502/CAAQMS/CEMC/2023-2024 ; Po.Date: 24.06.2023

Name of the Equipment : NOx Gas Analyser
SI no : IN230105
Model no : MEZUS 210
Range : 0-1000 ppb
Calibration Date:09.10.2024 , Re -Cal Date: 08.04.2025

Testing Equipment used

1. Dynamic Calibrator SI No: VI202300160
2. Zero Air Generator SI No : IN22032
3. Cylinder concentrations : NO- 45 PPM

ZERO CALIBRATION:

SI No	Zero Air Generator	Zero Air Fed from Calibrator	Concentration On Display (Before Calibration)	Concentration On Display (After Calibration)
1	---	00.0ppb	00.0ppb	00.0ppb

SPAN CALIBRATION WITH NO - 45PPM

SI No	Gas Concentration Fed From Calibrator	Concentration On Display (Before Calibration)	Concentration On Display (After Calibration)
	950.0ppb	954.0ppb	951.0 ppb

MULTI POINT MEASUREMENTS:

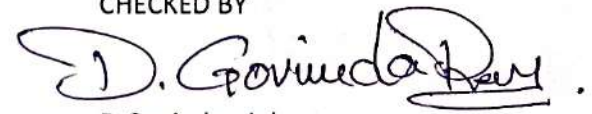
SI No	Concentration Of Gas Fed To Analyser	Concentration Value On Display	Difference	Error (%)
1	500 ppb	503.0ppb	3.0ppb	0.3
2	250 ppb	251.0ppb	1.0ppb	0.1
3	100 ppb	103.0ppb	3.0ppb	0.3
4	50 ppb	55.0ppb	5.0ppb	0.5


TESTED BY


P.Swaroopa



CHECKED BY


D.Govindarajulu


Pravin Ramdas Sanap
Asst Officer (Envr Mgmt)
NTPC Mining Limited
Kerandari Coal Mining Project
Sikri, Barkagaon - 825311

VASTHI INSTRUMENTS PRIVATE LIMITED



IT'S ALL ABOUT SAFETY

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TEST & CALIBRATION REPORT

Date of Calibration: 09.10.2024

Calibration Due Date: 08.04.2025

CUSTOMER: M/s BGR Mining & Infra Ltd, Kerandri A coal block MDO of NTPC, Pandu -vill, barkagaon, Hazaribagh, Jharkhand, 825311.	Po.No : BGR/KRD/PO/1502/CAAQMS/CEMC/2023-2024 Dt. :24.06.2023 Instrument Type: PM 10 Monitor Range : 0-2000µg/m3
--	---

Type : PM 10 Monitor
Model No : S600
Range : 0-2000µg/m3
Equipment Sl.No : VI230087P2

FUNCTIONAL TESTS:

Kept system on running condition for 76 Hours.

a. Repeatability Test: Test on blank film on 10 times and Standard film 10 times.

Record counts.

S/N	Count value Of Blank Film	Count Value Of Standard Film
1	1315732	3334531
2	1314421	3335842
3	1314452	3345351
4	1313541	3334631
5	1315416	3334431
6	1313371	3335532
7	1315628	3337631
8	1316831	3339683
9	1314137	3333264
10	1313542	3334633
Max Error	0.28%	0.33%

b. Tested Flow Error : Found ok

c. Tested Paper Broken : Found ok

d. Tested Detector Error : Found ok

e. Tested Process Test : Found ok

CHECKED BY


B.Kishore



APPROVED BY


K. Murali

VASTHI INSTRUMENTS PRIVATE LIMITED

IT'S ALL ABOUT SAFETY

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TEST & CALIBRATION REPORT

Date of Calibration: 09.10.2024

Calibration Due Date: 08.04.2025

CUSTOMER: M/s BGR Mining & Infra Ltd, Kerandri A coal block MDO of NTPC, Pandu -vill, barkagaon, Hazaribagh, Jharkhand, 825311..	Po.No BGR/KRD/PO/1502/CAAQMS/CEMC/2023-2024 Dt. :24.06.2023 Instrument Type: PM 2.5 Monitor Range : 0-2000µg/m3
---	--

Type : PM 2.5 Monitor
Model No : S600(CYCLONE)
Range : 0-2000µg/m3
Equipment Sl.No : IN230008P2

FUNCTIONAL TESTS:

Kept system on running condition for 76 Hours.

b. Repeatability Test: Test on blank film on 10 times and Standard film 10 times.

Record counts.

S/N	Count value Of Blank Film	Count Value Of Standard Film
1	1315732	3334531
2	1314421	3335842
3	1314452	3345351
4	1313541	3334631
5	1315416	3334431
6	1313371	3335532
7	1315628	3337631
8	1316831	3339683
9	1314137	3333264
10	1313542	3334633
Max Error	0.28%	0.33%

b. Tested Flow Error : Found ok
c. Tested Paper Broken : Found ok
d. Tested Detector Error : Found ok
e. Tested Process Test : Found ok

CHECKED BY

B. Kishore

B. Kishore



APPROVED BY

K. Murali

K. Murali



BIOCRAT ENVIRONMENTAL SERVICES

(BIOCRAT ENVIRONMENTAL LAB)

AMBIENT AIR QUALITY MONITORING AND ANALYSIS

Client Name & Address: M/s NTPC Ltd.

Kerandari Coal Mining Project, Sikri, Barkagaon, Hazaribag, Jharkhand 825311.

Ambient Air Quality Summary Reports for the month of SEPTEMBER - 2024

Parameters	Unit	Norms	Baseria Village (NTPC Camp) (Core Zone)		BGR Workshop (Core Zone)		Bengwari Nadi Tola (Core Zone)		Tarhesa Village (Core Zone)		Manatu Village (Buffer Zone)		Pahra Village (Buffer Zone)		Jordag Village (Buffer Zone)		Kerandari Village (Buffer Zone)	
			1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
Sox	µg/m ³	80	6.85	5.62	7.22	6.17	6.61	6.54	6.22	5.26	6.52	5.89	5.20	5.31	7.40	6.24	11.39	10.11
Nox	µg/m ³	80	9.65	8.39	11.10	9.62	9.78	9.68	9.69	8.34	8.27	6.92	6.86	7.02	10.88	9.71	19.26	17.93
PM ₁₀	µg/m ³	100	57.71	55.58	56.44	52.44	61.39	58.63	58.60	54.78	55.35	51.63	60.14	56.55	56.52	51.45	61.10	55.11
PM _{2.5}	µg/m ³	60	21.85	19.13	19.62	18.84	19.57	17.01	20.88	18.35	18.56	16.30	19.58	17.53	17.83	15.70	18.76	16.80
Mercury (Hg)	ng/m ³	Not Specified	< 0.12		< 0.12		< 0.12		< 0.12		< 0.12		< 0.12		< 0.12		< 0.12	
Arsenic (As)	ng/m ³	06 ng/m ³ (Annual)	< 0.3		< 0.3		< 0.3		< 0.3		< 0.3		< 0.3		< 0.3		< 0.3	
Nickel (Ni)	ng/m ³	20 ng/m ³ (Annual)	< 0.6		< 0.6		< 0.6		< 0.6		< 0.6		< 0.6		< 0.6		< 0.6	
Cadmium (Cd)	ng/m ³	Not Specified	< 0.6		< 0.6		< 0.6		< 0.6		< 0.6		< 0.6		< 0.6		< 0.6	
Chromium (Cr)	ng/m ³	Not Specified	< 13		< 13		< 13		< 13		< 13		< 13		< 13		< 13	


Reviewed By


Pravin Kamdas Sanap
Asst. Officer (Env. Mgmt)
NTPC Mining Limited
Kerandari Coal Mining Project
Sikri, Barkagaon - 825311

Add: - Surveshwari Nagar, Itki Road, Bajra, P.O - Hehal, Dist - Ranchi, Jharkhand - 834001

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Authorized by
Technical Manager
(Sunil Kumar Singh)



BIOCRAT ENVIRONMENTAL SERVICES (BIOCRAT ENVIRONMENTAL LAB)

AMBIENT NOISE MONITORING AND ANALYSIS


Client Name & Address: M/s NTPC Ltd.

Kerandari Coal Mining Project, Sikri, Barkagaon, Hazaribag, Jharkhand 825311.

Ambient Noise Levels Summary Reports for the month of APRIL - 2024

Parameters	Baseria Village (NTPC Camp) (Core Zone)		BGR Workshop (Core Zone)		Bengwari Nadi Tola (Core Zone)		Tarhesa Village (Core Zone)		Manatu Village (Buffer Zone)		Pahra Village (Buffer Zone)		Jordag Village (Buffer Zone)		Kerandari Village (Buffer Zone)	
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
Norms	75	70	75	70	75	70	75	70	75	70	75	70	75	70	75	70
Minimum Noise Level dB(A)	52.5	48.3	52.7	46.2	47.9	44	45.7	38.6	52.6	42.3	53.5	39.7	41.2	39.7	55.9	45.7
Maximum Noise Level dB(A)	78.1	69.6	77.2	68.5	74.1	62.8	65.8	62.3	73.1	62.8	73.8	63.1	70.4	61.2	77.5	69.3
Leq dB(A)	69.2	53.5	65.8	51.9	64.1	55.2	60.6	47.1	64.9	54.4	66.1	49.8	63.4	46.7	68.4	55.1


Reviewed By


Pravin Ramdas Sanap
Asst-Officer (Envl Mgmt)
NTPC Mining Limited
Kerandari Coal Mining Project
Sikri, Barkagaon - 825311

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(Sunil Kumar Singh)



BIOCRAT ENVIRONMENTAL SERVICES (BIOCRAT ENVIRONMENTAL LAB)

AMBIENT NOISE MONITORING AND ANALYSIS


Client Name & Address: M/s NTPC Ltd.

Kerandari Coal Mining Project, Sikri, Barkagaon, Hazaribag, Jharkhand 825311.

Ambient Noise Levels Summary Reports for the month of MAY - 2024

Parameters	Baseria Village (NTPC Camp) (Core Zone)		BGR Workshop (Core Zone)		Bengwari Nadi Tola (Core Zone)		Tarhesa Village (Core Zone)		Manatu Village (Buffer Zone)		Pahra Village (Buffer Zone)		Jordag Village (Buffer Zone)		Kerandari Village (Buffer Zone)	
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
Norms	75	70	75	70	75	70	75	70	75	70	75	70	75	70	75	70
Minimum Noise Level dB(A)	53.7	49.1	53.2	47.5	48.3	44.9	46.1	39.3	53.1	42.6	52.9	39.1	46.7	39.5	54.8	44.5
Maximum Noise Level dB(A)	78.8	70.3	76.9	69.2	75	63.4	66.5	62.7	73.9	63.7	72.5	62.8	71.3	64.5	76.9	69.8
Leq dB(A)	70.1	54.6	66.5	52.7	64.4	55.7	61.5	48.3	65.6	55.3	65.7	49.2	64.7	47.3	69.3	55.5


Reviewed By


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BIOCRAT ENVIRONMENTAL SERVICES

(BIOCRAT ENVIRONMENTAL LAB)

AMBIENT NOISE MONITORING AND ANALYSIS

Client Name & Address: M/s NTPC Ltd.

Kerandari Coal Mining Project, Sikri, Barkagaon, Hazaribag, Jharkhand 825311.

Ambient Noise Levels Summary Reports for the month of JUNE - 2024

Parameters	Baseria Village (NTPC Camp) (Core Zone)		BGR Workshop (Core Zone)		Bengwari Nadi Tola (Core Zone)		Tarhesa Village (Core Zone)		Manatu Village (Buffer Zone)		Pahra Village (Buffer Zone)		Jordag Village (Buffer Zone)		Kerandari Village (Buffer Zone)	
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
Norms	75	70	75	70	75	70	75	70	75	70	75	70	75	70	75	70
Minimum Noise Level dB(A)	54.8	48.8	52.9	48.6	49.2	45	45.3	38.8	53.6	43.8	51.8	40.5	47.2	38.7	53.7	43.9
Maximum Noise Level dB(A)	79.6	69.5	77.6	69.7	75.4	64.2	65.8	62.4	74.5	64.2	72.3	63.1	72.6	65	75.5	69.1
Leq dB(A)	71.6	53.8	68.9	53.1	65.3	56.9	60.7	48	66.2	56.1	66.1	49.6	64.8	48.2	69.8	56.2


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BIOCRAT ENVIRONMENTAL SERVICES (BIOCRAT ENVIRONMENTAL LAB)

AMBIENT NOISE MONITORING AND ANALYSIS

Client Name & Address: M/s NTPC Ltd.

Kerandari Coal Mining Project, Sikri, Barkagaon, Hazaribag, Jharkhand 825311.

Ambient Noise Levels Summary Reports for the month of JULY - 2024

Parameters	Baseria Village (NTPC Camp) (Core Zone)		BGR Workshop (Core Zone)		Bengwari Nadi Tola (Core Zone)		Tarhesa Village (Core Zone)		Manatu Village (Buffer Zone)		Pahra Village (Buffer Zone)		Jordag Village (Buffer Zone)		Kerandari Village (Buffer Zone)	
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
Norms	75	70	75	70	75	70	75	70	75	70	75	70	75	70	75	70
Minimum Noise Level dB(A)	55.3	48.2	53.4	47.9	48.5	46.8	46.3	37.9	53.2	44.4	52.6	40.3	47.8	39.2	54.4	43.5
Maximum Noise Level dB(A)	78.6	69.8	78.7	69.5	74.9	65	66.2	61.7	73.6	64.8	73.3	63.7	73.5	65.6	76.8	68.7
Leq dB(A)	70.2	54.5	69	53.6	66.2	57.1	61.5	47.8	65.9	57.2	66.9	50.1	65.3	48.7	70.4	56.9


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BIOCRAT ENVIRONMENTAL SERVICES (BIOCRAT ENVIRONMENTAL LAB)

AMBIENT NOISE MONITORING AND ANALYSIS

Client Name & Address: M/s NTPC Ltd.

Kerandari Coal Mining Project, Sikri, Barkagaon, Hazaribag, Jharkhand 825311.

Ambient Noise Levels Summary Reports for the month of AUGUST - 2024

Parameters	Baseria Village (NTPC Camp) (Core Zone)		BGR Workshop (Core Zone)		Bengwari Nadi Tola (Core Zone)		Tarhesa Village (Core Zone)		Manatu Village (Buffer Zone)		Pahra Village (Buffer Zone)		Jordag Village (Buffer Zone)		Kerandari Village (Buffer Zone)	
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
Norms	75	70	75	70	75	70	75	70	75	70	75	70	75	70	75	70
Minimum Noise Level dB(A)	54.6	46.3	54.9	47.3	49.1	47.3	45.8	38.2	53.9	45.5	53.4	41.8	48.2	39.8	54.7	44.6
Maximum Noise Level dB(A)	77.2	67.1	79.2	70.8	75.6	65.7	67.3	60.6	74.2	65.7	73.9	64.3	76.5	64.1	77.3	69.9
Leq dB(A)	69.9	53.8	70.3	54.1	66.9	58.2	61.1	48.4	66.3	57.9	67.2	51.5	66.9	49.5	71.6	57.4

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Page | 5

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BIOCRAT ENVIRONMENTAL SERVICES (BIOCRAT ENVIRONMENTAL LAB)

AMBIENT NOISE MONITORING AND ANALYSIS


Client Name & Address: M/s NTPC Ltd.

Kerandari Coal Mining Project, Sikri, Barkagaon, Hazaribag, Jharkhand 825311.

Ambient Noise Levels Summary Reports for the month of SEPTEMBER - 2024

Parameters	Baseria Village (NTPC Camp) (Core Zone)		BGR Workshop (Core Zone)		Bengwari Nadi Tola (Core Zone)		Tarhesa Village (Core Zone)		Manatu Village (Buffer Zone)		Pahra Village (Buffer Zone)		Jordag Village (Buffer Zone)		Kerandari Village (Buffer Zone)	
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
Norms	75	70	75	70	75	70	75	70	75	70	75	70	75	70	75	70
Minimum Noise Level dB(A)	51.8	43.6	52.4	45.1	50.3	49.6	46.9	37.4	52.7	43.8	51.6	42.3	46.7	38.9	53.2	42.1
Maximum Noise Level dB(A)	76.2	65.9	77.6	68.2	76.8	67.5	68.1	59.6	72.5	64.1	72.5	65.7	74.9	62.1	76.4	67.5
Leq dB(A)	68.5	51.7	69.9	52.7	67.2	59.1	63.4	47.7	65.1	55.2	66.1	51.8	64.1	48.2	70.5	56.4


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Effluent Treatment Plant





BIOCRAT ENVIRONMENTAL SERVICES (BIOCRAT ENVIRONMENTAL LAB)

EFFLUENT WATER QUALITY MONITORING AND ANALYSIS

Client Name & Address: M/s NTPC Ltd.

Kerandari Coal Mining Project, Sikri, Barkagaon, Hazaribag, Jharkhand 825311.

Effluent Water Quality Summary Reports for the month of APRIL - 2024				
Parameters	Unit	Limits of Inland Surface water as per notified vide GSR 422(E) dated 19.05.1993	ETP INLET	ETP OUTLET
pH	---	5.5 – 9.0	7.77	7.93
Total Suspended Solids	mg/l	100	188	56
Total Dissolved Solids	mg/l	Not Specified	892	720
COD	mg/l	250	298	170
BOD	mg/l	30	35.8	10.2
Oil & Grease	mg/l	10	25.8	7.6
Dissolved Oxygen	mg/l	Not Specified	4.9	5.3


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BIOCRAT ENVIRONMENTAL SERVICES

(BIOCRAT ENVIRONMENTAL LAB)

EFFLUENT WATER QUALITY MONITORING AND ANALYSIS


Client Name & Address: M/s NTPC Ltd.


Kerandari Coal Mining Project, Sikri, Barkagaon, Hazaribag, Jharkhand 825311.

Effluent Water Quality Summary Reports for the month of MAY - 2024				
Parameters	Unit	Limits of Inland Surface water as per notified vide GSR 422(E) dated 19.05.1993	ETP INLET	ETP OUTLET
pH	---	5.5 – 9.0	7.51	7.63
Total Suspended Solids	mg/l	100	190	60
Total Dissolved Solids	mg/l	Not Specified	888	714
COD	mg/l	250	294	166
BOD	mg/l	30	36	10.3
Oil & Grease	mg/l	10	26.6	7.8
Dissolved Oxygen	mg/l	Not Specified	4.8	5.1


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Sikri, Barkagaon - 825311



BIOCRAT ENVIRONMENTAL SERVICES (BIOCRAT ENVIRONMENTAL LAB)

EFFLUENT WATER QUALITY MONITORING AND ANALYSIS

Client Name & Address: M/s NTPC Ltd.

Kerandari Coal Mining Project, Sikri, Barkagaon, Hazaribag, Jharkhand 825311.

Effluent Water Quality Summary Reports for the month of JUNE - 2024				
Parameters	Unit	Limits of Inland Surface water as per notified vide GSR 422(E) dated 19.05.1993	ETP INLET	ETP OUTLET
pH	---	5.5 – 9.0	7.51	7.35
Total Suspended Solids	mg/l	100	190	40
Total Dissolved Solids	mg/l	Not Specified	888	714
COD	mg/l	250	294	166
BOD	mg/l	30	35	10.3
Oil & Grease	mg/l	10	26.6	7.8
Dissolved Oxygen	mg/l	Not Specified	4.8	5.1

Ankita
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Sikri, Barkagaon - 825311



BIOCRAT ENVIRONMENTAL SERVICES (BIOCRAT ENVIRONMENTAL LAB)

EFFLUENT WATER QUALITY MONITORING AND ANALYSIS

Client Name & Address: M/s NTPC Ltd.

Kerandari Coal Mining Project, Sikri, Barkagaon, Hazaribag, Jharkhand 825311.

Effluent Water Quality Summary Reports for the month of JULY - 2024				
Parameters	Unit	Limits of Inland Surface water as per notified vide GSR 422(E) dated 19.05.1993	ETP INLET	ETP OUTLET
pH	---	5.5 – 9.0	6.69	7.36
Total Suspended Solids	mg/l	100	170	65
Total Dissolved Solids	mg/l	Not Specified	745	702
COD	mg/l	250	244	131
BOD	mg/l	30	33.3	9.6
Oil & Grease	mg/l	10	28.4	8.8
Dissolved Oxygen	mg/l	Not Specified	4.4	5.6

Apkita
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Sikri, Barkagaon - 825311



BIOCRAT ENVIRONMENTAL SERVICES (BIOCRAT ENVIRONMENTAL LAB)

EFFLUENT WATER QUALITY MONITORING AND ANALYSIS


Client Name & Address: M/s NTPC Ltd.


Kerandari Coal Mining Project, Sikri, Barkagaon, Hazaribag, Jharkhand 825311.

Effluent Water Quality Summary Reports for the month of AUGUST - 2024				
Parameters	Unit	Limits of Inland Surface water as per notified vide GSR 422(E) dated 19.05.1993	ETP INLET	ETP OUTLET
pH	---	5.5 – 9.0	7.11	6.78
Total Suspended Solids	mg/l	100	181	78
Total Dissolved Solids	mg/l	Not Specified	721	698
COD	mg/l	250	220	140
BOD	mg/l	30	27.6	8.9
Oil & Grease	mg/l	10	25.6	8.8
Dissolved Oxygen	mg/l	Not Specified	5	6.1


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Kerandari Coal Mining Project
Sikri, Barkagaon - 825311



BIOCRAT ENVIRONMENTAL SERVICES (BIOCRAT ENVIRONMENTAL LAB)

EFFLUENT WATER QUALITY MONITORING AND ANALYSIS

Client Name & Address: M/s NTPC Ltd.


Kerandari Coal Mining Project, Sikri, Barkagaon, Hazaribag, Jharkhand 825311.

Effluent Water Quality Summary Reports for the month of SEPTEMBER - 2024				
Parameters	Unit	Limits of Inland Surface water as per notified vide GSR 422(E) dated 19.05.1993	ETP INLET	ETP OUTLET
pH	---	5.5 – 9.0	6.8	7.11
Total Suspended Solids	mg/l	100	163	89
Total Dissolved Solids	mg/l	Not Specified	412	380
COD	mg/l	250	200	120
BOD	mg/l	30	24.4	8.9
Oil & Grease	mg/l	10	21.4	8.7
Dissolved Oxygen	mg/l	Not Specified	4.6	5.2


Reviewed By



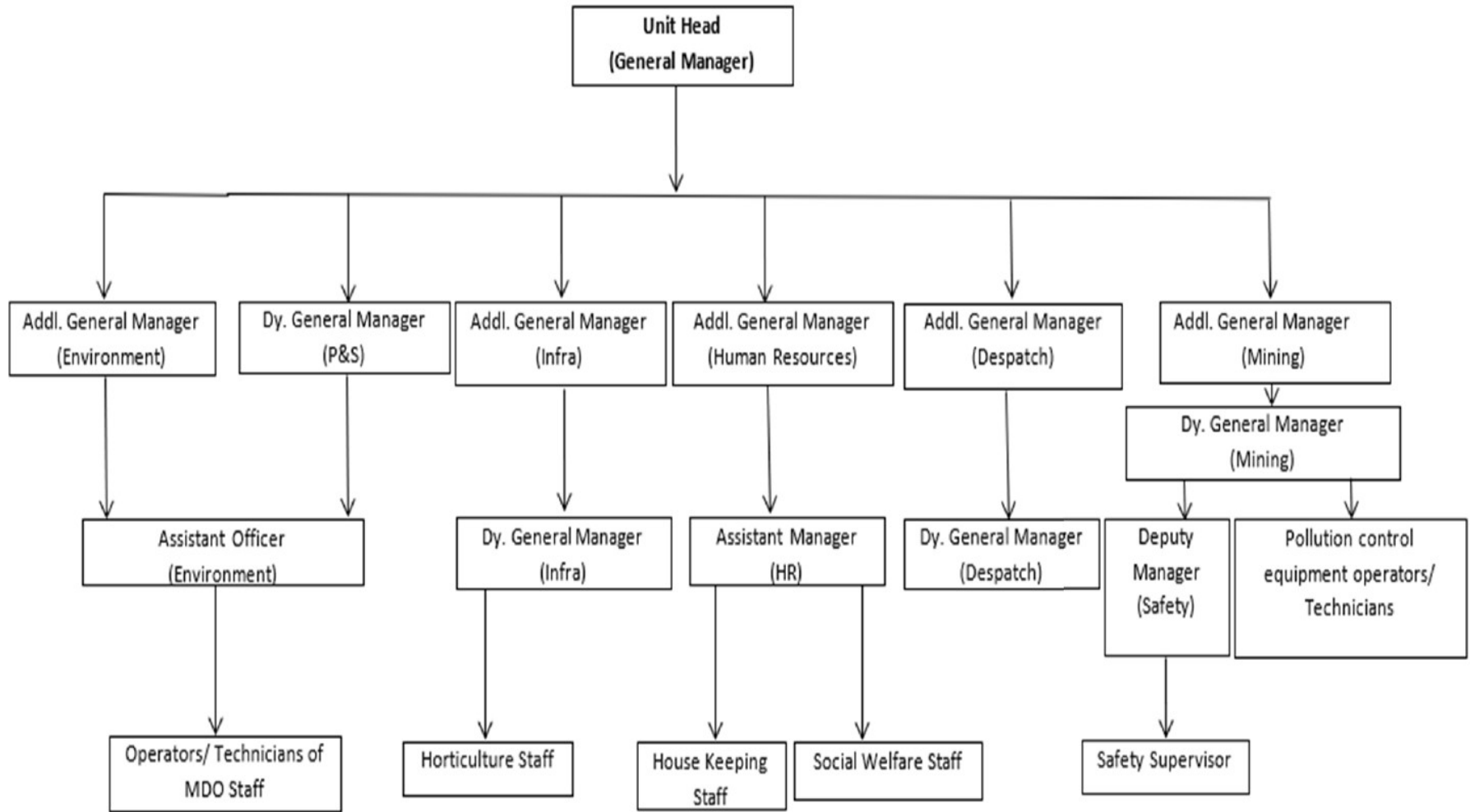

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Kerandari Coal Mining Project
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Tarpaulin covered coal transportation vehicles



Environment Management Cell



Prabhat Khabar Dhanbad - 06/04/10 0220

जरसा-मैथन

प्रभात खबर

7

धनबाद, मंगलवार, 6 अप्रैल, 2010

गोना नागरिक असंवैधानिक

नेताओं की शिकंसा पार्टी भीनीती सोनिया गांधी से होगी। नेताइय ने कहा कि विधायक महान मल्लिक 2011 में कारखाना खोलने की घोषणा करते हैं तो सही है, लेकिन पूर्व सांसद दुर्दै दुर्दै ने 2011 में कारखाना खोलने की घोषणा की थी तो वे झूठे थे, बताते चले कि घनबाद विधायक महान मल्लिक के नागरिक कारखाना से कछेरिया में विवाद है। पूर्व सांसद दुर्दै दुर्दै के संसर्कों ने उनके खिलाफ नोर्वा खोल दिया है। हालांकि नगर अध्यक्ष सोमनाथ दुर्दै ने कहा कि नगर अध्यक्ष हैं, किसी गुट में नहीं हूँ।

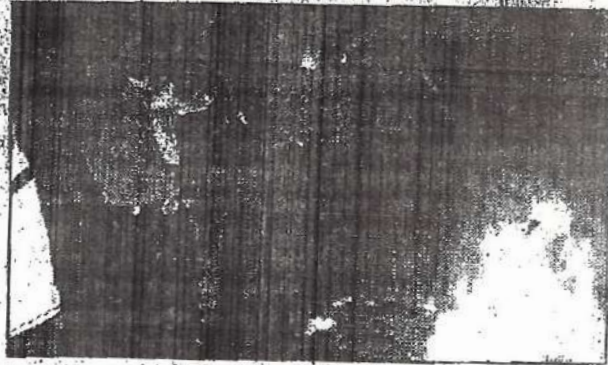
गोना में एक घंटे तक रुकी रही पुरुषोत्तम एक्सप्रेस

गोना : गोना तथा निमियाघाट स्टेशन के बीच रोपड़ स्पेशल मालगाड़ी के इंजन में तकनीकी खराबी आने के कारण अप लाइन पर एक घंटा ट्रेनों का परिचालन बाधित रहा। जानकारी के अनुसार उक्त मालगाड़ी के इंजन में खराबी आ गयी। जिसका फायदा उठाकर कोयला चोरों ने मालगाड़ी को आइसोलेट कर जमकर कोयला उतारा। घटना को सूचना पाकर आरपीएफ के जवान घटनास्थल पहुंचे। मालगाड़ी के चालक ने किसी तरह ट्रेन को धीरे-धीरे निमियाघाट तक ले गये, जिसके बाद अप लाइन पर ट्रेनों का परिचालन सामान्य हुआ। इस दौरान 2801 अप पुरुषोत्तम एक्सप्रेस गोना स्टेशन पर एक घंटे तक रुकी रही।

स्कूटर सवार घायल

देवली : सोमवार की दोपहर लगभग एक बजे गोविंदपुर बाणी मंदिर के समीप जीटी रोड पर बीकार 175-2381 नंबर स्कूटर पर सवार जो चक्कर आ जाने के कारण असंतुलित होकर गिर पड़ा।

कपिल सिब्बल का पुतला फूका



पुतला चढ़ान करती बाबुसबावी छात्र फेडरेशन के सदस्य।

निरसा : मार्क्सवादी छात्र फेडरेशन ने सोमवार को देर शाम निरसा चौक पर केंद्रीय मानव संसाधन मंत्री कपिल सिब्बल का पुतला फूका। इससे पूर्व फेडरेशन के सदस्यों ने निरसा हडिया मोड़ से निरसा चौक तक मुक्तेश्वर यादव व दीपक कुमार के नेतृत्व में मशाल जुलूस निकाला। उनके पर फेडरेशन के केंद्रीय संयोजक सोमनाथ चक्रवर्ती ने कहा कि केंद्रीय मानव संसाधन मंत्री शिक्षा की दोहरी नीति अपना रहे हैं। उन्होंने

कहा कि धनबाद में कोयलांचल विश्वविद्यालय गठन के प्रति भी सरकार गंभीर नहीं है। जब धनबाद में विश्वविद्यालय का गठन नहीं होता है, उनकी लड़ाई जारी रहेगी। कार्यक्रम में अमर दास, रवि चौरसिया, नीरज दे, विजय आनंद, रंजीत साव, सुपी पासवान, जेटू सिंह, रणवीर कुमार, भोला चौहान, फूचन चक्रवर्ती, विकी मिश्रा, संतोष सिंह, धीरज सिंह, दीपाकर पांडेय, पाथों धीवर आदि उपस्थित थे।

इसीएल की जमीन को ले मारपीट



निरसा बाजार : निरसा थाना क्षेत्र के सी-नोबिली स्कूल युगमा के पास दो पर्वों में मारपीट हुई, जिससे दो युवक घायल हो गये। मारपीट का कारण जमीन पर गोबर फेंकने



एक युवक का कारण है। दोनों पर्वों ने अलग-अलग शिकंसा दया योगेंद्र सिंह का कहना है कि उनकी जमीन पर रंजीत यादव व अन्य जबरन गोबर फेंकते हैं। आज भी जब उन्होंने गोबर फेंका, तो युवक विरोध किया। गुल्ते में आकर उन लोगों ने हमला कर उनके युवक योगेंद्र सिंह के साथ मारपीट की। वहीं इंटर यादव ने कहा कि युवक योगेंद्र सिंह दबंग बनकर इसे अपना बता रहा है। उन्होंने उनके बेटे ने पहले हमला कर मेरा सिर फोड़ दिया। उन्होंने कहा है। बताया जाता है कि जिस जमीन के लिए दोनों युवक, वह जमीन इसीएल की है।

कार्यकर्ता की गिरफ्तारी पर आक्रोश

मुंगगा : भाजपा की बैंक मुग्गा स्थित पार्टी कार्यालय में बाबल गोस्वामी की अध्यक्षता में हुई बैठक में पार्टी कार्यकर्ता अजय कुमार सिंह उनके पिता सिंह की गिरफ्तारी पर आक्रोश व्यक्त किया गया। बैठक में शिवप्रसाद, गर्जेन्द्र, बापी रवानी, विपिन बिहारी मंडल, सुजहा सिन्हा, यासमीन बानो, राजू झा, अरुण, प्रदीप, धनंजय, अभिनव, वरुण आदि उपस्थित थे।

एन टी पी सी लिमिटेड
(राज्य सरकार का उद्यम)

केन्द्रीय कोल माइनिंग प्रोजेक्ट
हजारीबाग
ब्रुघना

केन्द्रीय 'प' कोल माइनिंग प्रोजेक्ट, हजारीबाग, एन टी पी सी लिमिटेड को पर्यावरण एवं वन मंत्रालय द्वारा पर्यावरण स्वीकृति प्रदान कर दी गई है और स्वीकृति पत्र की प्रति कारखाने राज्य प्रदूषण नियंत्रण बोर्ड में उपलब्ध है तथा पर्यावरण एवं वन मंत्रालय को भेजना है <http://www.mppn.org.in> पर भी देदी जा सकती है।

जल संरक्षण - जीवन संरक्षण

टेलीफोन सेवा बाधित

धिरकुंड : धिरकुंड-कुमारघुमी क्षेत्र में बीएसएनएल व रिलाईंस मोबाइल सेवा की स्थिति खराब रहने से उपभोक्ताओं को काफी परेशानी हो

भारत कोकिंग कोल लिमिटेड
(कोल इण्डिया लिमिटेड का एक अंग)

संविधान सुरक्षा

Shrawan Kumar Awards to 9 for serving elders

TIMES NEWS NETWORK

Patna: Nine persons would be awarded the Shrawan Kumar award 2009 for looking after their parents or parents-in-law with sincerity in 2009.

The award is given by the Mahavir Mandir Trust. The selection committee is headed by Justice (ret'd) S Naha.

The first prize carries Rs one lakh and a citation while the second and third prizes are of Rs 50,000 and Rs 25,000 respectively. There are also inspiration awards.

Trust secretary Kishore Kunal said no one has been found eligible for the first prize this year. The second prize goes to Kiran Devi of Marwa village in Bhagalpur. A Dalit, she has been serving her paralysed moth-

er for 20 years. Her name was recommended by the district administration.

Sunil Upadhyay of Sadabah village in Bikram (Patna) and Pankaj Kumar of Kurooni village in Sheikhpura were selected for the third prize. Six persons have been selected for the inspiration awards of Rs 5,000 each. They are Keshav Kumar of Sheohar, Raj Kumar Mandal of Araria, Subodh Kumar Singh of Vaishali, Shriprakash Choudhary of Motihari, Nilu Kumari of Madhubani and Ram Uditi Mahto of Jehanabad.

Kunal said the awards would be given on Janaki Navami falling on May 23. For the year 2010, recommendations will be received from individuals and organizations in January 2011.

ed Dalit uplift'

is the NSCC chief he time earlier to evaluation of the Bihar e said he has to look es.

ocities against the Bihar stands fourth al level after Uttar ya Pradesh and Oris-

chief along with com-

mission members Satya Bhasin, Mrityunjay Nayak, Mahendra Boddh and N M Kamble is in Bihar to evaluate the performance of the state government.

The commission members talked to the leaders of scheduled caste organizations, chief secretary, DGP and the heads of different departments of the state government, Singh said.

CENTRAL RAILWAY

ATTENTION PASSENGERS!

REVISION OF 2365/2366

RANCHI-PATNA JANSHATABDI EXPRESS

Ranchi-Patna-Janshatabdi Express will have two Chair Car and one AC Chair Car of effect from 09.04.2010 Ex - Patna to Ranchi. The revised composition of 2365/2366 will

Position	Revised Composition
Chair Car-2	Brake Van cum Chair Car - 2
3	Chair Car - 10
1-1	AC Chair Car - 2
	Total - 14

CPTM, E.C.Rly., Hajipur

Engaging Customers with a smile"

Patna: Bharat Sanchar Nigam Limited (BSNL)'s cash counter in the Patna circle will remain closed on April 9. "This is because we are implementing a new billing system," BSNL PRO Veena Mishra said and added after the Saturday and Sunday holidays, the counter would reopen on April 12 at 11 am, instead of 9 am.

0221

New higher education director

TIMES NEWS NETWORK

Patna: Patna University's sociology department teacher J P Singh on Tuesday joined as the new director of higher education, government of Bihar. He succeeds S N Kumar, who has returned to his parent organization.



TAMIL NADU CIVIL SUPPLIES CORPORATION LIMITED

12, Thambusamy Road, Kilpauk, Chennai - 600 010

TENDER NOTIFICATION FOR THE PURCHASE OF RBD PALMOLEIN OIL (LOOSE)

Sealed tenders are invited from the manufacturers/wholesaler/Traders for the supply of 170 MTs of RBD Palmolein oil (Loose) during the month of May 2010 for issues to PTMGRMMP. Delivery shall be made at the T.N.C.S.C. godowns in Tamil Nadu.

EMD	Rs.72,000/-
Sale of Tender form	Upto 12.00 Noon on 23.04.2010
Submission of tender form	Upto 3.00 p.m. on 23.04.2010
Opening of tender	At 3.30 p.m. on 23.04.2010
Cost of tender form	Rs.1,040/- (including taxes) to obtain in person. Rs.1,240/- to get by post.

Tender document can be viewed and downloaded from www.tncsc.tn.gov.in/ / www.tenders.tn.gov.in at free of cost.

MANAGING DIRECTOR

SIIPR/346/Tender/10

Visit us at: www.tenders.tn.gov.in



NTPC Limited

(A Govt. of India Enterprise)

Keradari Coal Mining project Hazaribag

NOTICE

'Keradari 'A' Coal Mining project, Hazaribag, NTPC Limited has been accorded environmental clearance from Ministry of Environmental & Forests and a copy of clearance letter is available with the Jharkhand State Pollution Control Board and may also be seen at the website of the Ministry of Environmental & Forests at <http://envfor.nic.in>

CONSERVE WATER - SAVE LIFE



IIIT-Delhi

Website: www.iiitd.ac.in
NIT Campus, Sector 3, Triloka, New Delhi - 110020

ADMISSION TO M.TECH. PROGRAM

Indraprastha Institute of Information Technology, Delhi (IIIT-D) is a research-led teaching institution. Applications are invited for M.Tech. in Computer Science with specialization in Information Security for the session commencing from July, 2010.

M.Tech. in Computer Science with specialization in Information Security: This is a very challenging program with main objective of developing manpower for high-end jobs in security in the industry. Some key features of the program are:

- IIIT-Delhi has one of the largest groups among the academic institutions in the country in the area of information security.
- Some of the courses that students may take: Digital Forensics, Cyber/Information Security, Privacy, Network Security, Data Base Security, Secure Programming and Cryptography.
- IIIT-Delhi has made arrangements with some national and multi-national corporations to host students from this program as interns.

Some selected students will get fees waiver. For further information on the program, eligibility, and admission process, visit <http://www.iiitd.ac.in/mtech2010.php> or send an email to mtech-admissions@iiitd.ac.in. Last date for receiving M.Tech. application is April 26, 2010.

(PG Programme Co-ordinator, IIIT-D)

Website: <http://www.iiitd.ac.in/mtech2010.php>

Times of India Patna - 07/04/10

Pravin Ramdas Sanap
Asst. Officer (Env. Mgmt)
NTPC Mining Limited
Keradari Coal Mining Project
Sikri, Barkaganj - 825311