एनटीपीसी लिमिटेड
(भारत सरकार का उद्यम)
NTPC Limited
(A Govt. of India Enterprise)
कोयला खनन परियोजनाएँ, हजारीबाग
Coal Mining Projects, Hazaribag

Ref: 1040/PBCMP/EMG/2023/F-47/111

Date: 31/05/2023

To,

The Deputy Director General of Forests (C),
MoEF & CC, Integrated Regional Office,
2nd Floor, Headquarter, Jharkhand State Housing Board,
Harmu Chowk, Ranchi (Jharkhand) - 834 002.

Dear Sir,

Sub: Six Monthly Progress Report on compliance of conditions stipulated in the Environmental Clearance by MoEF & CC and Monitoring report for the period Oct., 2022 to March 2023 for NTPC Ltd - Pakri Barwadih Coal Mining Project (15MTPA): Reg.

Ref1: EC Ltr No. J-11015/692/2007-IA-II(M) Date 19th May 2009.
Ref2: EC Amendment Ltr No J-11015/692/2007-IA-II(M) Date 29.06.2016
Ref3: EC Amendment Ltr No J-11015/692/2007-IA-II(M) Date 07.12.2017
Ref4: EC Amendment Ltr No J-11015/692/2007-IA-II(M) Date 14.08.2018
Ref5: EC Amendment Ltr No J-11015/692/2007-IA-II(M) Date 10.11.2020

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With reference to above subject please find enclosed herewith the six-monthly status report on compliance of various conditions in the Environmental Clearance accorded to NTPC Ltd - Pakri Barwadih Coal Mining Project (15MTPA) for the period Oct., 2022 to March 2023. The monitoring reports on fugitive emission, effluent quality, ambient air quality, ground and surface water quality, noise measured data etc. are also enclosed with the report.

This is for your kind information please.

Thanking you.

Yours Faithfully,

Navin Kumar 31/05/2023

[NAVIN KUMAR]
Dy. General Manager
PB & PB-NW CMP,

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Encl: A/a
Copy to:

1. **Sc. E & Regional Director, Kolkata**, Central Pollution Control Board, Southern Conclave, Block 502, 5th & 6th Floors, Rajdhanga Main road, **Kolkata–700107 (W.B)**, e-mail: [illegible]
2. **Regional Officer**, Jharkhand State Pollution Control Board, PTC Chowk, Hazaribagh, Jharkhand, E-mail - jspcb_hazaribagh@rediffmail.com
3. **Member Secretary**, Jharkhand State Pollution Control Board, Ranchi-834004 (Jharkhand), e-mail:ranchijspcb@gmail.com

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Report Period:
Oct – 2022 to March -2023

Six Monthly EC Compliance Report

NTPC LTD.

Pakri Barwadih Coal Mining Project.

COMPLIANCE STATUS OF ENVIRONMENTAL CLEARANCE CONDITIONS

Period: October – 2022 to March – 2023

EC Clearance Ltr. No.J-11015/692/2007-IA.II (M) Dated 19th May 2009

& Amendment Ltr. No J-11015/692/2007-IA-II (M) Dated 29.06.2016

Amendment Ltr. No J-11015/692/2007-IA-II (M) Dated 07.12.2017

Amendment Ltr. No J-11015/692/2007-IA-II (M) Dated 14.08.2018

Amendment Ltr. No J-11015/692/2007-IA-II (M) Dated 10.11.2020

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NTPC Ltd – PAKRI BARWADIH COAL MINING PROJECT
Sikri Site Office
PO: Barkagaon, Dist: Hazaribagh
Jharkhand – 825 311

COMPLIANCE STATUS OF ENVIRONMENTAL CLEARANCE CONDITIONS

SL No	Conditions	Compliance/ Status report for the period Oct – 2022 to March - 2023
SPECIFIC CONDITIONS		
I	The environmental clearance is restricted to Phase-1 of 39 years of opencast operations involving 3319.42 ha of ML area only for which exploration has been completed.	Noted. We shall always abide the said condition.
II	No mining operations shall be undertaken in the forestland within the ML until clearance has been obtained under the provisions of FC Act, 1980.	All necessary clearances under the provisions of FC Act, 1980 has been obtained for the 1026.438 Ha of forest land involved vide: i. ***Stage I Clearance*** obtained vide letter no. "F. No 8-56/2009, dated 11th May 2010", ii. ***Stage II Clearance*** obtained vide letter no. "F. No 8-56/2009, dated 17th Sept 2010", iii. ***Final land release letter received from the State Govt.*** vide letter no. 3/Vanbhoomi-75/2009-1240 dated 31.03.2011. The Mining operations is restricted to the area only for which forest clearance of has been accorded by MoEF under the provisions of FC Act, 1980.
III	The monolith found within the core zone shall not be disturbed by the mining operations and a minimum 500m distance along with thick green belt would be maintained between the eastern quarry and the monolith. A road would be created upto the monolith a park created around it so that the monolith could be visited. **Amendment** vide letter number-J-11015/692/2007-IA-II(M) Date-07.12.2017 The user agency would provide necessary fund to the state	To maintain thick green belt between Eastern quarry and Monolith, the existing green belt of about 500 trees with large canopy, mainly of Mahua (Madhuca longifolia), Sisham (dalbergia sisoo) and other species between eastern quarry and Monolith has not been disturbed. Further, 9935 nos. of tree saplings have been planted around the east quarry to make the area green and fast-growing seedlings have been spread over the overburdens. Detailed estimate for proposed Megalith Park and the break up for release of payment have been submitted by District Authority. However, final input is

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	Government for construction of road up to the monolith and a park around it so as that the Monolith could be visited as for tourism purpose.	awaited from District Administration for release of payment.
IV	Mining shall be carried out as per statuette from the streams/nallahs flowing within the lease. Embankment to be constructed shall be based on peak flow data and shall be at least 3m above the HFL. The slope of the embankment shall at least 2:1 towards the ML and shall be stabilized with plantation. The CWPRS would be engaged for the design and study of realignment of the drains / nalas flowing across the ML and creation of embankment, and also obtain approval of the State Government for diversion of the nalas.	As suggested the CWPRS was involved in study and designing of the Nala diversion. Also, necessary permission is already obtained from State Water Resource Dept, GoJh vide their ltr. Ref. no. 2/PMC/ND-171/2012/117 dated 10.02.2014. Based on the above study report of CWPRS and NOC/permission from water resource Dept, GoJH, realignment of Dumuhani nala has been done.
V	Topsoil should be stacked properly with proper slope at earmarked site(s) and should not be kept active and shall be used for reclamation and development of green belt.	Top soil is being stacked in available suitable land. Same is being used for spreading over the completed portion of OB Dump for development of the green belt. All the protection measures for soil erosion from top soil dumps are being taken. To prevent erosion from top soil dumps, coir mats have been laid on the slopes. Further, to avoid soil erosion plantation has been carried out on external dump along with Mixed grass variety seeds and root shoots of ***Vertiver*** grass.
VI	OB should be stacked at earmarked three external OB dump site within ML area of a maximum height of 90m.	As per approved revised Mine Plan, OB is being stacked at earmarked area. Presently height of the dump is **89.62 m with three terraces**. It will be restricted to the maximum height of 90 meter.
	Amendment vide letter number-J-11015/692/2007-IA-II(M) Date-07.12.2017 A minimum of 500m shall be maintained and thick green belt developed between the habitation of Barkagaon and OB dumps.	At present the working of mine is more than 4 km from Barkagaon village. Workings of the mine shall be restricted 500 m away from the village Barkagaon. To maintain the thick green belt between habitation of Barkagaon and OB dumps, existing greeneries between

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		mine and habitation of the Barkagaon have not been disturbed. Further, about **2500** trees have been planted along road side between East quarry and Barkagaon village. Apart from above **5500 nos. of trees** have been planted in Langatu and Arahara village falling between Mining and Barkagaon village.
	The option of raising the level of grazing land created after backfilling the quarry by 10m or so shall be examined so to reduce the overall OB dump height.	As per approved Mining Plan Grazing land of 223 Ha will be developed on back filled quarry of western & eastern part at the time of mine closure.
	Slope stability tests may be undertaken and the feasibility of backfilling depending on the type of cost-effective technology available at that stage shall be re-examined.	Slope stability tests have been conducted through the Central Institute of Mining and Fuel Research (CIMFR) Dhanbad & BIT, Sindri – Dhanbad for Dump–A and Dump-C & also for Western Mine Pit slopes. Slope stability Study of Eastern Quarry & EQ dump has been done by IIT-BHU. As per approved mining plan Internal dumping will start from 7th year of start of the mining. However internal dumping has been started from FY-2022-23 based on scientific study. Till March 2023 an area of 55.0 Ha has been backfilled.
	The ultimate slope of the dump shall not exceed 28^0.	The ultimate slope of the dump shall be restricted to 28 degree.
	Monitoring and management of reclaimed dumpsite should continue until the vegetation becomes self-sustaining.	Monitoring & management of reclaimed dump site shall be carried out till the vegetation becomes self-sustaining.
	Compliance status should be submitted to the Ministry of Environment & Forests and its Regional office located at Bhubaneswar on yearly basis.	The half yearly compliance report of EC is being submitted regularly to the MoEF & CC Regional office Ranchi. Last report submitted online on Parivesh Portal and also submitted to regional office vide letter no.- 1040/PBCMP/EMG/2022/F-47/143 dated- 26/12/2022 and through mail dated 03.01.2023 enclosed as **Annexure – 1.**
VII	Catch drains and siltation ponds of appropriate size should be constructed to arrest silt and sediment flows from soil, OB and mineral dumps. The water so collected should be utilized for watering the mine area, roads, green	To arrest silts from OB, embankment and top soil dumps, catch drains have been provided. **1200-meter** toe wall followed by garland drain along the embankment, **100-meter** toe wall along the contour of the OB Dump with

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	belt development, etc. The drains should be regularly desilted and maintained properly. Garland drains (size, gradient and length) and sump capacity should 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 should also provide adequate retention period to allow proper settling of silt material.	Garland Dain **(Dump 'C'), 450-meter** toe wall along the contour of another Top Soil dump near Itiz village followed by Garland Drain are also constructed, **350-meter** toe wall with Garland Drain along the Lathorwa/Khorra Nallah have been constructed to avoid any siltation in the nearby area. The garland drains constructed along the dumps are ultimately connected to the settling pit to allow the water to pass through it. Catch drains also provided at external dumps, workshop, offices etc. to direct the rain water to siltation pond at sump area to arrest silts and further to direct water to main sump. The sump has been constructed keeping the safety margin more than 50% over and above the maximum rainfall in the area. Water so collected is being utilized for dust suppression in mining area, transport roads and also for green belt development etc. The catch drains are regularly being de-silted and maintained properly. The main sump is in the de-coaled area at dip most side so as to provide adequate retention period to allow proper settling of silt material.
VIII	Dimension of the retaining wall at the toe of the dumps and OB benches within the mine to check run-off and siltation should be based on the rainfall data.	While construction the retaining wall all the technical parameters viz. peak rainfall of the area, stability of the wall etc was considered. Presently, more than **2.1 km** long retaining wall along toe of OB dump with adequate dimension has been constructed.
IX	Amendment: letter number- J-11015/ 692/ 2007-IA-II(M) Date 07.12.2017: The approach road of 6 km along northern boundary of mining lease shall be metalled. For development of 3-tier avenue plantation, northern sides of main approach road to be preferred in place of haul roads.	The approach road of 6 km along northern boundary of mining lease is already metalled. During this monsoon 3720 nos. of plants have been planted along the northern boundary of the mining lease also existing green belt have not been disturbed.

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	Amendment : letter number- J-11015/ 692/ 2007-IA-II(M) Date 29.06.2016 The coal shall be transported through closed belt conveyor system of a length of 13 km to Banadag railway station. The project proponent is permitted for (2) years to use State Highway/public roads for transportation of coal (approx.. 35 km) to Banadag Railway Siding by adopting all mitigative measures to control dust pollution. The project proponent shall put all the efforts to expedite completion of service road for belt conveyor so that the same can be utilized for coal transportation.	Conveyor infrastructure is partly completed and operational upto TP-10. From TP-10 to siding, a rapid loading system (RLS) for transporting and loading of coal to railway wagons is under construction, which has been delayed due to land acquisition issues. Land has been made available only on 28.04.2023 through deployment of forces by district administration and NTPC is putting its best efforts to complete the RLS at earliest. All environmental mitigative measures associated with transportation of coal by road is being followed. Photographs of the CHP is Enclosed as **Annexure-2.**
	Condition IX, Amendment vide letter number-J-11015/692/2007-IA-II(M) Date 29.06.2016, letter number-J-11015/692/2007-IA-II(M) Date 14.08.2018 and letter number- J-11015/692/2007-IA-II(M) Date 10.11.2020 Thereby extension in amendments in EC dated 19th July 2018 for a period of two years (i.e upto 28th June, 2022) by road as an interim arrangement by adopting all mitigation measures to control dust pollution, which would include regular maintenance of roads, water sprinkling, covering trucks with tarpaulin sheet etc.	Presently part of the coal produced from PBCMP is being transported through road in tarpaulin covered truck and part of the coal is transported through conveyor belt. The rapid loading system of the Conveyor system is under construction and hence 100% of the coal produced from the PBCMP could not be transported through Belt conveyor. The construction has been delayed due to land acquisition issues. In this regard, Ministry of Environment, Forest and Climate Change, Government of India has notified the Gazette Notification vide SO-1561 (E) dated 21.05.2020. As per the clause 3(i) of the notification, *"till such time enabling Rail transport/conveyer infrastructure is not available, road transportation may be undertaken in trucks, covered by tarpaulin or other means."* This is being abided by NTPC while carrying out road transportation through trucks.

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		Copy of the Notification is attached as **Annexure-3**.
	• Width of the road shall be at least 7 mts before the start of the transportation and necessary permission shall be taken from state PWD.	Road which is used for transportation of coal is wider than 7mtr. For granting of necessary permission from state PWD a letter vide letter no.1040/PBCMP /ENV/2021/F-47/44 Dt 28.06.2021 has been submitted. Copy of letter already submitted through last compliance reporting.
	• The State Pollution Control Board, while considering consent to operate for the project, shall ensure that with the proposed coal transportation by road, air quality would remain within the national ambient air quality standards.	Agree to abide the conditions.
	• The mining lease holders shall, after ceasing mining operations, undertake re-grassing the mining area and any other area which may have been distributed due to their mining activities and restore the land to a condition which is fit for growth of fodder, flora, fauna etc."	The mining activity are being carried out as per the approved mine plan and due care are being taken to minimize the adverse impact of the mining activity to surrounding areas. All the mitigation measures are being taken as per the approved EMP and Mine Closure Plan.
X	Drills should be wet operated only.	Drilling machine with inbuilt water injecting system is being utilized for drilling purpose. Also, regular water spraying is being carried out in the drilling area for minimization of the fugitive dust emission.
XI	Controlled blasting should be practiced with use of delay detonators. The mitigative measures for control of ground vibrations and to arrest the fly rocks and boulders should be implemented.	Blasting patterns have been designed based on the study conducted by CIMFR Dhanbad. As suggested by CIMFR, Dhanbad, controlled blasting technique with ***"nonel"*** is being practiced to minimize ground vibration and to avoid fly rocks & boulders. Also blast vibration monitoring is being done regularly *(and also through third party)* to determine any adverse impact due to blasting. The test results are well within the norms prescribed by the DGMS. The latest test report of the same is enclosed as **Annexure – 4.**

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XII	No additional groundwater (bore well) shall be used for mining operations. Additional water if any required for the project shall be used from recycled water or mine discharge water or rainwater collected in rainwater harvesting pits within the CML.	As stipulated, the requirement of water for other activity viz.: dust suppression, gardening and vehicle washing etc are being fulfilled through recycled water, mine seepage water, storm water. Ground water is being used mainly for domestic use.
XIII	Regular monitoring of groundwater level and quality should be carried out by establishing a network of existing wells and construction of new peizometers. The monitoring for quantity should be done four times a year in pre-monsoon (May), monsoon (August), post-monsoon (November) and winter (January) seasons and for quality in May. Data thus collected should be submitted to the Ministry of Environment & Forests and to the Central Pollution Control Board quarterly within one month of monitoring. Rainwater structures shall be erected in the core and buffer zone, in case monitoring indicates a decline in water table.	Monitoring of groundwater levels are being carried out by manual monitoring at 20 locations around the mining lease area. Apart from manual monitoring, automatic water level recorders (Piezometers) have been installed at two locations viz.: Langatu site office, Sikri site office. The data so generated is being submitted quarterly to Ministry of Environment & Forests and Climate Change & Central Pollution Control Board. Last six months water level data are enclosed as **Annexure – 5**. Water quality report of Jan. 2023 is attached as **Annexure – 6**. Roof top rain water structure has been constructed and also rejuvenated the existing ponds in nearby villages for improving the g round water of the area. Approximately **1,48,796 m^3/year** of ground water is being recharged at Pakri Barwadih Coal Mining Project.
XIV	The project authorities should meet water requirement of nearby village(s) in case the village wells go dry due to dewatering of mine.	As mentioned Regular monitoring of the ground water table in the surrounding villages are being done to determine the any adverse impact on to the ground water regime. Till date no decline in water table are observed due to dewatering from the mine. However, NTPC Ltd – PBCMP, under its social obligation, have installed 16 Nos. of hand pumps 15 nos. of Tube wells in nearby villages in FY 2022-23. Also, to meet the further water requirement of the nearby villagers 9 tankers water has been supplied through mobile water

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		tankers during this summer season.
XV	Sewage treatment plant of adequate capacity shall be installed in the colony.	Sewage Treatment Plant (STP) of **1.5 MLD** capacities has already been provided in R&R colony. Also, STP of 25 KLD of MBBR technology is installed at site office for treatment of the sewage generated at Offices. Photographs of same are enclosed as **Annexure-7.**
	ETP should also be provided for workshop and CHP wastewater.	For treatment of industrial effluents, an ETP with Electro-Mechanical process technology have been installed at Mine workshop. Effluent quality data is enclosed as **Annexure-8.**
	Treated wastewater meeting prescribed norms only shall be recycled for mining operations to the extent possible and permitted to be discharged in to the natural water courses only if it meets the prescribed standards.	Till date no discharge is being done into any natural water course. Treated waste water is being re-cycled and reused for various mining operations.
XVI	The total area that shall be brought under afforestation at the time of mine closure shall not be less than 1199 ha which includes reclaimed topsoil soil dump area (25 ha), external OB dump (632 ha), backfilled area (524 ha), along ML boundary, embankment and undisturbed area, along roads and infrastructure, green belt (18 ha), and in township outside the lease by planting native species in consultation with the local DFO/Agriculture Department. The density of the trees should be around 2500 plants per ha.	**Shall always be complied with.** So far more than **2.47 Lakhs** of tree saplings have been planted and distributed to local villagers at and around the Pakri Barwadih Coal Mining Project. Also for mass awareness, the NTPC Ltd – PBCMP is actively participating in ***"Van Mahotsav" "Tree Raksha Bandhan", "Paryavaran Mela"*** etc. being organized by State Forest Department. Details of the plantation / distribution taken up by NTPC Limited till date is enclosed as **Annexure-9.**
XVII	A Progressive Mine Closure Plan shall be implemented by reclamation of 524 ha, of the total quarry area of 1785 ha, which shall be backfilled and afforested by planting native plant species in consultation with the local DFO/ Agriculture Department. The density of the trees should be around 2500 plants per ha. Of the	**Shall always be complied with.** Till March 2023 total area of approx. 55 Ha has been backfilled. However internal dumping is in active stage and Mining / reclamation schedule being implemented at the cost of project. Escrow account has been opened and

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	total reclaimed backfilled area, 223 ha shall be grazing land and 442 ha shall be agricultural land for utilization of the villagers. Of the balance 1261 ha of quarry area, an area of 596 ha of de-colaed area/void being converted into a water reservoir shall be gently sloped and the upper benches of the reservoir shall be terraced and stabilized with plantation and the remaining 665 ha is for public use for Phase-2 of the project.	amount is being deposited annually. **Rs 7.60 Crore** have been deposited in the FY 2022-23 as 7th year Mine Closure cost. So far Rs. **52,20,09,027.77** including interest has accrued in Escrow account as part of the Mine Closure cost. Details of amounts accumulated in ESCROW is enclosed as **Annexure- 10.**
XVIII	Besides carrying out regular periodic health check up of their workers, 10% of the workers identified from workforce engaged in active mining operations shall be subjected to health check up for occupational diseases and hearing impairment, if any, through an agency such as NIOH, Ahmedabad within a period of one year and the results reported to this Ministry and to DGMS.	Regular periodic medical check-up of all mine workers as per DGMS guidelines is being carried out at project hospital. *"Occupational health study in Pakri Barwadih Coal Project with special reference to respiratory health and hearing impairment assessment"* was conducted through Regional Occupational Health Centre (Eastern), Kolkata & National Institute Of Occupational Health, Ahmedabad. Report of the same already submitted in last compliance reporting. As of now no case of occupational disease and hearing impairment has been reported.
XIX	**Condition XIX, Amendment** vide letter number-J-11015/692/2007-IA-II(M) Date 07.12.2017 A detailed R&R Plan for the life of the project comprising land losers, homestead losers and land and homestead losers, including tribals to be displaced from the project area shall be prepared and implemented in a stipulated time frame. Project proponent will implement the approved R&R plan as per phased requirement of displacement. The compensation shall be not less than that specified in the National R&R Policy. Provision shall also be made in the R&R Plan to take care of the land less	NTPC RAP has been approved vide Govt. of Jharkhand (GoJh) Gazette Notification and forwarded vide letter No. 116 /R dated 27.02.2013 which is in line with the Jharkhand R&R policy. As per the approved Govt. of Jharkhand (GoJh) Sankalp No. 116 / R dated 27.02.2013, houses have been constructed in the R&R colony at Dhenga along with all necessary infrastructure. Persistent efforts to convince the villagers, has resulted in approx 44 HSOs shifting to the R&R colony at Dhenga and more HSOs are in the process of shifting to R&R Colony. Some of the PAPs have opted for self-relocation. Based on the demands of

	labourers and the tribals. The total expenditure on R&R shall not be less than Rs. 2976 Cr, which includes private land acquisition (Rs. 982 Cr) and R&R (Rs.1492 Cr). Alternate livelihood and skill development programmes and schemes shall be implemented as part of R&R and CSR.	PAPs, a special package has been designed to compensate each self-relocating family. Till March 2023 total 1010 PAPs have been resettled. As per the Socio-economic survey which has been mentioed in Sankalp document, Sl No. 3, page no. 2, there are no ST PAF in the project area. Further, through ITI Dhenga (Being run by NTPC) capacity building of youths of the project area is being carried out by PBCMP. Other training programs for women empowerment and providing livelihood options is also being organised by PBCMP. It is also to confirm that the R&R benefits being extended are not less than as enlisted in the national R&R policy.
XX	The project authorities shall carry out a pre-mining socio-economic survey based on the UNDP Human Development Report and monitor the socio-economic status once every three years and maintain records thereof and report in their Annual Report, the socio-economic impact of R&R and CSR activities.	Pre-mining Socio economic survey has been undertaken through IIT Kharagpur and Abhigyan Samiti (Local NGO). For monitoring, socio economic status a contract for conducting Social Impact Assessment in the project affected villages of PBCMP has been awarded to M/s. DELOITTE TOUCHE TOHMATSU INDIALLP, Gurgaon dated 16.09.2020. The study report is provided in the last compliance.
XXI	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: 23 ha) 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.	The report on LULC for the period 2016-19 has already been submitted. The work for LULC study for the period 2019-22 using satellite imagery is enclosed as **Annexure-11.**
XXII	A Final Mine Closure Plan along with details of Corpus Fund should be submitted to the Ministry of	A Final Mine Closure Plan shall be submitted to MoEF & CC for approval well in advance as per stipulation.

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	Environment & Forests 5 years in advance of final mine closure for approval.	
GENERAL CONDITIONS		
I	No change in mining technology and scope of working shall be made without prior approval of the Ministry of Environment and Forests.	**Shall always be complied.** Permission from MOEF & CC will be taken in case of any change in technology and scope of work is proposed.
II	No change in the calendar plan including excavation, quantum of mineral coal and waste shall be made.	The 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, is being followed.
III	Four ambient air quality monitoring stations shall be established in the core zone as well as in the buffer zone for monitoring SPM, RPM, SO2, NO_x and heavy metals such as Hg, Pb, Cr, As, etc. Location of the stations shall be decided based on the meteorological data, topographical features and environmentally and ecologically sensitive targets in consultation with the State Pollution Control Board.	The project has established 8 nos. AAQ monitoring stations in the core as well as buffer zone of the ML area in consultation with the Jharkhand State Pollution Control Board (JSPCB). There are 4 no. of monitoring station in core zone i.e. Urub Village, Nagari Village, Langatu Village, Pakri-Barwadih village area and there are 4 nos. of monitoring stations in the buffer zone such as Kandaber village, Garikalan Village, Dhenga village and Kusumbha Village. Location map of the same is enclosed as **Annexure – 12**.
IV	Fugitive dust emissions (SPM and RSPM and heavy metals such as Hg, Pb, Cr., As, etc) from all the sources shall be controlled regularly monitored and data recorded properly. Water spraying arrangement on haul roads, wagon loading, and dump trucks (loading and unloading) points shall be provided and properly maintained.	For controlling of the fugitive dust emissions wet drilling with water injection system is being in practice during drilling operations. Permanent water sprinkling system has been installed at main haul roads. Dust suppression at mines haul roads & other dust generating areas like truck loading & unloading points is being carried out by engaging 20 nos. mobile water tankers. Details are as under: a) 12KL: 10 Nos. b) 16KL: 07 Nos. c) 28KL: 02 Nos. d) 80KL: 01 No.

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		Route map of water sprinkling system is enclosed as **Annexure – 13.** Monitoring of the fugitive emission and heavy metal are being done at CPCB prescribed intervals. Analysis reports of same are enclosed as **Annexure – 14.**
V	Data on ambient air quality (SPM, RSPM, SO2, NOx and heavy metals such as Hg, Pb, Cr, As, etc)) 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.	Environmental monitoring of ambient air quality is being done through MoEF&CC approved and NABL accredited Lab at CPCB prescribed intervals. Data for the Period Oct. 2022 to March 2023 is enclosed as **Annexure-14.** The last Six-Monthly report was submitted online on PARIVESH Portal and also submitted to regional office vide letter no.-1040/PBCMP/EMG/2022/F-47/143 dated-26/12/2022 and through mail dated 03.01.2023 enclosed as **Annexure – 1.**
VI	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.	Effective measures are well taken to minimize the noise level below 85 dB (A) in the work zone. All the equipments/machines are provided with acoustic enclosure cabins. Also, the Workers engaged in noisy operations are provided with earplugs/muffs. Noise levels are also being monitored at regular intervals the results are well within the prescribed norms. Noise monitored data is enclosed as **Annexure–15.**
VII	Industrial wastewater (workshop and wastewater from the mine) 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 before discharge of workshop	For treatment of waste water generated at HEMM Washing center, an Electro Mechanical ETP have been installed at Mine workshop and Oil and grease trap with sedimentation pit is integral part of the ETP installed. Effluent quality data are enclosed as **Annexure-8.**

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	effluents.	
VIII	Vehicular emissions shall be kept under control and regularly monitored.	Planned preventive maintenance of all vehicles plying for project is being done periodically. All the vehicles deployed at PBCMP are PUC compliant. PUC certificate of some of the vehicle is enclosed as **Annexure – 16.**
IX	Environmental laboratory shall be established with adequate number and type of pollution monitoring and analysis equipment in consultation with the State Pollution Control Board. Amendments dt 07.12.2017: The monitoring shall be done by NABL/MoEF&CC accredited Laboratory.	Presently Monitoring and analysis is being done through MoEF&CC and NABL accredited lab in consultation with the State Pollution Control Board. However, Environmental laboratory has already been setup with the following equipments: ❖ 5 nos. RDS machines, ❖ 5 nos. of fine particulate sampler, ❖ 1 no of High-volume sampler, ❖ 1 set of continuous ambient Air Quality monitoring station (AAQMS), ❖ 1 set of meteorological station, ❖ 1 set of noise level meter, ❖ 5 set of Piezometers with Automatic data recorder. ❖ 1 no. of manual water level meter, ❖ 1 no. of handy sampler for indoor air quality. ❖ 1 no. Personal Dust Sampler Photograph of the AAQMS and other equipments are enclosed as **Annexure – 17.**
X	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 programme of the workers shall be undertaken periodically to observe any contractions due to exposure to dust and to take corrective measures, if needed.	All the possible measures are being taken to control the fugitive dust emission. Apart from controlling fugitive dust emission, Personal protective respiratory devices are provided to personnel working in dusty areas & adequate training on safety & health are also being imparted. Occupational health surveillance program prepared and implemented to identify the adverse impact, if any, and to take appropriate corrective action, if required. Initial Medical Examination & Periodical Medical Examination of the workers

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		engaged in the project are being done at required intervals to observe any contractions due to exposure to dust. The various tests include PFT, X-Ray, and lung spirometry etc. Summary report of the medical checkup is enclosed as **Annexure – 18.**
XI	A separate environmental 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.	At the corporate office, a separate Environmental Management Cell is already functioning under supervision of senior executive who is reporting to Head of the Company to look after the implementation of the various pollution control measures and other Environment Management System requirements. At local level, dedicated department for Environment Management is also functional with qualified Environmental Engineer. Head of the Department directly reports to Head of the Projects. The working level staffs in Environment Cell have been deployed through MDO. The organization chart of the same is enclosed as **Annexure – 19.**
XII	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 Bhopal.	The requisite funds for environmental mitigation measures have been included in the project cost. Financial provision as stipulated towards environmental mitigative measures will not be diverted for other purposes. Amount of **Rs. 5.66 Crores** have been spent during Oct-2022 to March-2023 for the Environment Management Cost. Till March 2023 we have spent an amount **Rs. 72.023 Crores** (Rs. 61.155 Crores – Audited and Rs. 10.86 Crores - Unaudited) for the Environment Management Cost. Details of the expenditure incurred towards EMP are enclosed as **Annexure-20.**
XIII	The Regional Office of this Ministry located at Ranchi shall monitor	Full co-operation is being extended by the project authorities to the officers of

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	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.	MoEF/ RO during their inspection / site visit.
XIV	A copy of the EC will be marked to concerned Panchayat/ local NGO, if any, from whom any suggestion/representation has been received while processing the proposal.	No suggestion / representation have been received while processing the proposal. Copy of the EC letter has been sent to the local administrative offices and the EC letter has been also uploaded on the company's website www.ntpc.co.in. Further, copy of the EC has been handed over to all the Mukhiya / Surpanch concerned with the PBCMP. Copy of the receipt of EC from different Panchayats is already submitted.
XV	State Pollution Control Board shall display a copy of the clearance letter at the Regional Office, District Industry Centre and Collector's Office/Tehsildar's Office for 30 days.	Copy of the EC letter was sent to office of District Industry centre, District Collector office for display. A copy of the EC has been also marked to JSPCB for display at their Regional office.
XVI	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/. The compliance status shall also be uploaded by the project authorities in their website and regularly updated at least once in six months so as to bring the same in the public domain. The data shall also be displayed at the entrance of the project premises and mines office and in corporate office.	EC was granted on 19.05.2009 which was received at our end on 25.05.2009 and the same was published in English Daily "The Times of India" as well as in vernacular language (Hindi) daily ***"PRABHAT KHABAR"*** on 30.05.2009 which is within 7 days of receiving the granted EC. Copies of the news clippings published in Papers are enclosed herewith and marked as **Annexure- 21** The half yearly Compliance status is being updated on Company's website. https://www.ntpc.co.in/about-us/corporate-functions/environment/status-hyc-reports The data is also being displayed at entrance of the office.

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3	The Ministry or any other competent authority may stipulate any further condition for environmental protection.	The additional conditions stipulated by MoEF vide amendment letter no. J-11015/692/2007-IA.II(M) Dated 29.06.2016, 07.12.2017, 14.08.2018 & 10.11.2020 towards environment protection have been complied.
4	Failure to comply with any of the conditions mentioned above may result in withdrawal of this clearance and attract the provisions of the Environment (Protection) Act, 1986.	Noted and will be complied.
5	The above conditions will be enforced *inter-alia*, under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986 and the Public Liability Insurance Act, 1991 along with their amendments and Rules. The proponent shall ensure to provide for the costs incurred for taking up remedial measures in case of soil contamination, contamination of groundwater and surface water, and occupational and other diseases due to the mining operations.	Noted and will be complied under the provision of these acts and rules.

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एनटीपीसी लिमिटेड
(भारत सरकार का उद्यम)
NTPC Limited
(A Govt. of India Enterprise)
कोयला खनन परियोजनाएँ, हजारीबाग
Coal Mining Projects, Hazaribag

Ref: 1040/PBCMP/EMG/2022/F-47/ 143

Date: 26/12/2022

To,

The Additional Principal Chief Conservator of Forest (C),
Ministry of Environment, Forest and Climate Change,
Regional Office (ECZ),
Bungalow No. A-2, Shyamli Colony,
Ranchi (Jharkhand) - 834 002.

Dear Sir,

Sub: Six Monthly Progress Report on compliance of conditions stipulated in the Environmental Clearance by MoEF & CC and Monitoring report for the period April 2022 to September 2022 for NTPC Ltd - Pakri Barwadih Coal Mining Project (15MTPA): Reg.

Ref1: EC Ltr No. J-11015/692/2007-IA-II(M) Date 19th May 2009.
Ref2: EC Amendment Ltr No J-11015/692/2007-IA-II(M) Date 29.06.2016
Ref3: EC Amendment Ltr No J-11015/692/2007-IA-II(M) Date 07.12.2017
Ref4: EC Amendment Ltr No J-11015/692/2007-IA-II(M) Date 14.08.2018
Ref5: EC Amendment Ltr No J-11015/692/2007-IA-II(M) Date 10.11.2020

***

With reference to above subject please find enclosed herewith the six-monthly status report on compliance of various conditions in the Environmental Clearance accorded to NTPC Ltd - Pakri Barwadih Coal Mining Project (15MTPA) for the period April 2022 to September 2022. The monitoring reports on fugitive emission, effluent quality, ambient air quality, ground and surface water quality, noise measured data etc are also enclosed with the report.

This is for your kind information please.

Thanking you.

Received
30/12/22

Yours Faithfully,

[BIRENDRA KUMAR]
Addl. G.M. (Envt.Mgmt.)
PB,PB NAI & Badam CMP

बीरेन्द्र कुमार / BIRENDRA KUMAR
अपर महाप्रबंधक / ADDL. GENERAL MANAGER
(पर्यावरण प्रबंधन) / (ENVIRONMENT MANAGEMENT)
कोयला खनन परियोजनाएँ / COAL MINING PROJECTS
एनटीपीसी लिमिटेड / NTPC Limited
हजारीबाग / HAZARIBAG

Encl.: A/a
Copy to:

1. **Sc. E & Regional Director, Kolkata**, Central Pollution Control Board, Sou[illegible] Govt. NTPC Bldg, 502, 5th & 6th Floors, Rajdhanga Main road, **Kolkata–700107 (W.B)**, e-mail: mkbiswas.cpcb@nic.in.
2. **Regional Officer**, Jharkhand State Pollution Control Board, PTC Chowk, Hazaribagh, Jharkhand.
3. **Member Secretary**, Jharkhand State Pollution Control Board, Ranchi-834004 (Jharkhand), e-mail:ranchijspcb@gmail.com

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navneet kumar <nk@thrivenisainik.com>

Six Monthly Progress Report on compliance of conditions stipulated in the Environmental Clearance by MoEF & CC and Monitoring report for the period April 2022 to September 2022 for NTPC Ltd - Pakri Barwadih Coal Mining Project (15MTPA): Reg.

1 message

EMG_PBCMP <emg_pbcmp@ntpc.co.in> Tue, Jan 3, 2023 at 2:09 PM
To: "jspcb_hazaribagh@rediffmail.com" <jspcb_hazaribagh@rediffmail.com>, "ro.ranchi-mef@gov.in" <ro.ranchi-mef@gov.in>, "ranchijspcb@gmail.com" <ranchijspcb@gmail.com>, "mkbiswas.cpcb@nic.in" <mkbiswas.cpcb@nic.in>
Cc: TSPAKRI <tspakri@ntpc.co.in>, PBENV <pb_env@ntpc.co.in>, Upendra Kumar Pandit <UPENDRAKUMARPANDIT@ntpc.co.in>, NAVIN <NAVINKUMAR03@ntpc.co.in>, Birendra Kumar <BIRENDRAKUMAR01@ntpc.co.in>, Amudala <AMUDALAPRATHAP@ntpc.co.in>, SHIVAM SRIVASTAVA <SHIVAMSRIVASTAVA@ntpc.co.in>

D.No.-143, Date-26.12.2022 EC Compliance 3.pdf

Ref1: EC Ltr No. J-11015/692/2007-IA-II(M) Date 19th May 2009.
Ref2: EC Amendment Ltr No J-11015/692/2007-IA-II(M) Date 29.06.2016
Ref3: EC Amendment Ltr No J-11015/692/2007-IA-II(M) Date 07.12.2017
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This is for your kind information please.

Thanking you.

Yours Faithfully,

Birendra Kumar
Addl. General Manager
PB, PB-NW & Badam CMP,
NTPC Ltd.

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रजिस्ट्री सं. डी.एल.- 33004/99 REGD. No. D. L.-33004/99

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The Gazette of India

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CG-DL-E-21052020-219495

असाधारण
EXTRAORDINARY
भाग II—खण्ड 3—उप-खण्ड (ii)
PART II—Section 3—Sub-section (ii)

प्राधिकार से प्रकाशित
PUBLISHED BY AUTHORITY

सं. 1400] नई दिल्ली, बृहस्पतिवार, मई 21, 2020/वैशाख 31 , 1942
No. 1400] NEW DELHI, THURSDAY, MAY 21, 2020/VAISAKHA 31, 1942

पर्यावरण, वन और जलवायु परिवर्तन मंत्रालय

अधिसूचना

नई दिल्ली, 21 मई, 2020

का.आ. 1561(अ).—जबकि केन्द्रीय सरकार ने पर्यावरण (संरक्षण) नियमावली, 1986 के नियम 5 के साथ पठित पर्यावरण (संरक्षण) अधिनियम, 1986 (1986 का 29) की धारा 3, धारा 6 और धारा 25 के तहत अपनी शक्तियों का प्रयोग करते हुए, ऐश सामग्री (ऐश कंटेंट) को 34% तक की सीमा सहित कोयले का उपयोग करने के लिए ताप विद्युत संयंत्रों की कतिपय श्रेणियों को अधिदेशित करते हुए भारत के राजपत्र, असाधारण में सा.का.नि. 02 (अ), तारीख 2 जनवरी, 2014 द्वारा पर्यावरण (संरक्षण) नियमावली, 1986 के नियम 3 के उपनियम 8 का संशोधन प्रकाशित किया।

और जबकि सा.का.नि. 02 (अ), तारीख 2 जनवरी, 2014 द्वारा उक्त अधिसूचना द्वारा निम्नलिखित समय-सीमा तक कच्चे अथवा मिश्रित अथवा लाभकारी कोयले (बेनिफिसिएटिड कोल), जिसमें ऐश सामग्री चौंतीस प्रतिशत (34%) से अधिक ना हो, का उपयोग करने के लिए त्रैमासिक आधार पर कोयला आधारित ताप विद्युत संयंत्रों को अधिदेशित किया गया है :

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क्रम सं.	विद्युत संयंत्र की श्रेणी	गर्तमुख(पिट-हैड)/कोयला खान से ताप विद्युत संयंत्र के अवस्थान की दूरी	समय-सीमा
(क)	एकल ताप विद्युत संयंत्र (किसी भी क्षमता के) और कैटिप्ट ताप विद्युत संयंत्र (100 मेगावाट और अधिक क्षमता सहित)	गर्तमुख विद्युत संयंत्रों को छोड़कर गर्तमुख से दूरी पर ध्यान दिए बिना शहरी क्षेत्रों,या परिस्थितिकीय रूप से संवेदनशील क्षेत्रों या अत्यधिक प्रदूषित क्षेत्रों में अवस्थित	2 जून, 2014 से प्रभावी।
(ख)		1000 किमी से अधिक दूर	2 जून, 2014 से प्रभावी।
(ग)		750-1000 किमी के बीच	1 जनवरी, 2015 से प्रभावी।
(घ)		500-749 किमी के बीच	5 जून, 2016 से प्रभावी।

और जबकि, केंद्रीय सरकार ने पर्यावरण (संरक्षण) नियमावली के नियम 5 के उप-नियम (3) के साथ पठित पर्यावरण (संरक्षण) अधिनियम, 1986 (1986 का 29) की धारा 6 और धारा 25 के अधीन अपनी शक्तियों का प्रयोग करते हुए भारत के राजपत्र, असाधारण में स.का.आ. 3305 (अ), तारीख 7 दिसंबर, 2015 और सा.का.नि.593 (अ), तारीख 28 जून, 2018 द्वारा विद्युत उत्पादन की क्षमता और विद्युत संयंत्र की संस्थापना की तारीख और समय-बद्ध रीति से प्राप्त किए जाने के आधार पर ताप विद्युत संयंत्रों की विभिन्न श्रेणियों के लिए उत्सर्जन मानकों और विनिर्दिष्ट जल उपभोग को प्रकाशित किया था।

और जबकि, पर्यावरण, वन और जलवायु परिवर्तन मंत्रालय ने विद्युत मंत्रालय द्वारा दिनांक 13 अक्तूबर, 2017 को प्रस्तुत की गई यथा संशोधित योजना के अनुसार विभिन्न ताप विद्युत संयंत्रों को वर्ष 2022 तक प्रदूषण नियंत्रण उपकरण संस्थापित करने के लिए पर्यावरण (संरक्षण) अधिनियम, 1986 की धारा 5 के तहत निर्देश जारी करने के लिए केंद्रीय प्रदूषण नियंत्रण बोर्ड को दिनांक 7 दिसंबर, 2017 के फा.सं. क्यू-15017/40/2007-सीपीडब्ल्यू द्वारा निदेश दिए।

और जबकि, विद्युत मंत्रालय ने अन्य बातों के साथ-साथ यह अभ्यावेदन किया है कि प्रदूषण नियंत्रण प्रौद्योगिकियों के उन्नत होने के साथ ही ताप विद्युत संयंत्र दहन प्रक्रिया से उत्पन्न फ्लाई-ऐश का पता लगाने में बेहतर उपकरणों से सुसज्जित हुए हैं और बिना धुला कोयला अधिक कुशलता और मितव्ययता से प्रयोग किया जा सकता है; ताप विद्युत संयंत्रों को राख अवयवों की विभिन्न किस्मों के साथ कोयले के लिए डिजाइन किया गया है और इनमें सूखी राख (ड्राई ऐश) निकालने, उसका रखरखाव करने और राख के उपयोग के लिए आपूर्ति प्रणालियों को उपलब्ध कराया गया है; धुले कोयले के उपयोग से बिजली उत्पादन महंगा हो जाता है; ताप विद्युत संयंत्रों में उत्पन्न फ्लाई-ऐश सीमेंट निर्माण, ईंटें बनाने, सड़क बिछाने, खनन के उपरांत रिक्त हुए स्थलों और निचले क्षेत्रों को भरने के लिए बैक-फिल सामग्री जैसे कई लाभकारी उपयोगों के लिए प्रयोग की जा रही है; औसतन ऐश की मात्रा 34% तक बनाए रखने की आवश्यकता उद्योगों को कोयले का आयात करने के लिए प्रेरित करती है जिससे विदेशी मुद्रा इत्यादि का बहिर्वाह (आऊटफ्लो) होता है।

और जबकि, कोयला मंत्रालय ने अन्य बातों के साथ-साथ अभ्यावेदन किया है कि कोयला खानें वर्षों से कच्चे कोयले की गुणवत्ता, आकार और बाहरी सामग्री में सुधार के लिए निरंतर कड़े प्रयास कर रही हैं जिससे सभी संबंधित उपकरणों की टूट-फूट में उल्लेखनीय कमी आई है, कोयला धुलाई प्रक्रिया में कई प्रकार का रखरखाव होता है और कोयला खानों से धुलाई-स्थलों (वाशरीज़) तक कोयले की बड़ी मात्रा को सड़क द्वारा ले जाने और फिर आगे

विद्युत संयंत्रों तक ले जाने के लिए रेल साइडिंग्ज़ तक ले जाने से बचना; धुलाई की प्रक्रिया केवल कोयले को धुले हुए कोयले और वाशरी अवशिष्ट में बाँटती है जबकि खनित कोयले की राख की मात्रा वही रहती है; निम्न श्रेणी कोयला वाशरी अवशिष्ट कई छोटे उपयोगकर्ता उद्योगों में, अधिक प्रदूषण आदि सृजित करते हैं।

और जबकि, कोयला मंत्रालय और विद्युत मंत्रालय ने इसलिए अनुरोध किया है कि दिनांक 2 जनवरी, 2014 की अधिसूचना पर पुन: विचार द्वारा, विद्युत संयंत्रों को धुले हुए कोयले के प्रयोग के लिए अधिदेशित करने पर गौर किया जाना अपेक्षित है जिससे पर्यावरण पर प्रतिकूल प्रभाव डाले बिना कोयले की लंबी दूरी की ढुलाई के लिए बिजली के उत्पादन में आसानी होगी।

और जबकि, नीति आयोग ने अपनी रिपोर्ट में वाशरीज़, कोयला खनन, परिवहन और विद्युत संयंत्रों में कोयले की खपत की दृष्टि से इस विषय का विश्लेषण करने के बाद अन्य बातों के साथ-साथ संक्षिप्त में यह अभ्यावेदन किया है कि समीपवर्ती उद्योगों में वाशरी अवशिष्ट का इस्तेमाल अधिक प्रदूषण पैदा करता है; चूंकि वाशरी अवशिष्ट अनेक छोटे उद्योगों में वितरित होते हैं, इसलिए विद्युत संयंत्र पर उत्पन्न प्रदूषण की तुलना में अनेक स्थलों पर उत्पन्न प्रदूषण को नियंत्रित करना अधिक कठिन होता है; धुलाई प्रक्रिया में उत्पन्न राख (ऐश) कोयला कणों के साथ-साथ पानी को भी प्रदूषित करती है और इसका लाभकारी उपयोग नहीं किया जा सकता, कोयला धुलाई प्रक्रिया में पानी का अधिक प्रयोग होता है, अपशिष्ट सृजन होता है; वाशरी अवशिष्ट के निपटान का पर्यावरण पर प्रतिकूल प्रभाव होता है क्योंकि इसमें बड़ी मात्रा में निम्न श्रेणी कोयला अवशिष्ट, तरल अपशिष्ट प्रवाह, कोयला भण्डारण, कोयला मिट्टी का रखरखाव, अपवाह और उड़ने वाली धूल का रखरखाव और निपटान करना होता है, कोयला धुलाई का स्थलाकृति, जल निकास स्वरूप और गुणवत्ता, जल निकायों, बड़े पैमाने पर प्रतिवेशी वायु गुणवत्ता पर भी प्रतिकूल प्रभाव पड़ता है; धुलाई प्रक्रिया से विद्युत उत्पादन की लागत में भी वृद्धि होती है जिसका कोई पर्यावरणीय लाभ इत्यादि भी नहीं होता।

और जबकि, नीति आयोग ने इसलिए सिफारिश की है कि पर्यावरणीय और प्रदूषण मानकों का निर्धारण करना और उन्हें लागू करना विवेकपूर्ण होगा, जिन्हें कोयले में ऐश की मात्रा प्रतिबंधित किए जाने के बजाए, परिवहन दूरी के आधार पर विद्युत उत्पादकों के साथ जोड़ा जाना चाहिए।

और जबकि, पर्यावरण, वन और जलवायु परिवर्तन मंत्रालय ऊर्जा मंत्रालय, कोयला मंत्रालय के अभ्यावेदनों, नीति आयोग और कई हितधारकों की रिपोर्ट पर विवेचन करने तथा सावधानीपूर्वक विचार करने के बाद एवं जनहित में निम्नलिखित निष्कर्ष पर पहुंचा है—

i) खनित कोयले में ऐश सामग्री की मात्रा समान रहती है। वाशरी से ऐश सामग्री दो स्थानों (वाशरी और विद्युत संयंत्र) में विभाजित हो जाती है जबकि बिना धुला कोयला विद्युत संयंत्र में प्रयोग किया जाता है, ऐश सामग्री का निपटान केवल एक स्थान अर्थात विद्युत संयंत्र में किया जाता है;

ii) ताप विद्युत संयंत्र प्रदूषण नियंत्रण, ऐश प्रबंधन के लिए तकनीकी रूप से सुसज्जित होते हैं क्योंकि उनमें फ्लाई-ऐश का निराकरण करने के लिए उच्च क्षमता वाले उपकरण होते हैं, ड्राई ऐश निष्क्रमण और हैंडलिंग सिस्टम, ऐश उपयोग के लिए सप्लाई सिस्टम और फ्लू गैसों को तितर-बितर करने के लिए बड़े टाल (स्टैक) होते हैं;

iii) पर्यावरण, वन और जलवायु परिवर्तन मंत्रालय ने उत्सर्जन मानक अधिसूचित किए हैं जिनमें क्रमश: ताप विद्युत संयंत्रों को समयबद्ध रीति से इन मानकों का पालन करने के लिए अधिदेशित किया गया है;

और जबकि, फ्लाई ऐश प्रबंधन और विभिन्न स्तरों पर बिना धुले कोयले के संसाधन के दौरान उत्पन्न अन्य संबंधित पर्यावरणीय पहलुओं सहित बिना धुले कोयले की हैंडलिंग के लिए यथासंभव उत्कृष्ट कार्यढांचे को अपनाना समयोचित है।

और जबकि, कोयला मंत्रालय ने अभ्यावेदन किया है कि मौजूदा अप्रत्याशित कोविड-19 महामारी और इसके फलस्वरूप देश में ऊर्जा उत्पादन के लिए कोयला क्षेत्र की मांग को प्रोत्साहित कर घरेलू कोयले के उपयोग की तत्काल आवश्यकता को देखते हुए यह वांछनीय है कि तत्काल अधिसूचना जारी की जाए।

अब, इसलिए, केंद्रीय सरकार पर्यावरण (संरक्षण) नियमावली, 1986 के नियम 5 के उपनियम (4) के साथ पठित पर्यावरण संरक्षण अधिनियम, 1986 (1986 का 29) की धारा 3, धारा 6 और धारा 25 के तहत अपनी शक्तियों का प्रयोग करते हुए, उक्त नियमावली के नियम 5 के उपनियम (3) के भाग (अ) के तहत सूचना देने की अनिवार्यता को हटा देने के उपरांत जनहित में पर्यावरण (संरक्षण) नियमावली, 1986 को आगे संशोधित करते हुए एतद्वारा निम्नलिखित नियम बनाती है, अर्थात्:

1. (1) इन नियमों को पर्यावरण (संरक्षण) संशोधन नियमावली, 2020 कहा जाएगा।

(2) ये सरकारी गज़ट में प्रकाशित होने की तारीख से लागू होंगे।

2. पर्यावरण (संरक्षण) नियमावली, 1986 में, नियम 3 में, उपनियम (8) के लिए निम्नलिखित उपनियम प्रतिस्थापित होगा, अर्थात् :-

"(8) ताप विद्युत संयंत्रों को, ऐश सामग्री अथवा दूरी संबंधी अनुबंधों के बिना, निम्नलिखित शर्तों के अध्याधीन कोयले के प्रयोग की अनुमति होगी:

(1) उत्सर्जन मानदण्डों के लिए प्रौद्योगिकीय समाधान निर्धारित करना:

i. वर्तमान अधिसूचनाओं और केंद्रीय प्रदूषण नियंत्रण बोर्ड द्वारा समय-समय पर जारी अनुदेशों के अनुसार विविक्त सामग्री के लिए विनिर्दिष्ट मानदंडों का अनुपालन करना।

ii. वाशरी के मामले में मिडलिंग और अवशिष्टों का एफबीसी(तरलीकृत तल दहन) प्रौद्योगिकी आधारित विद्युत संयंत्रों में उपयोग किया जाए। एफबीसी संयंत्रों में मिडलिंग और अवशिष्टों के लिए वाशरी में संयोजन (लिंकेज) होना चाहिए।

2. ऐश पॉन्ड का प्रबंधन:

i. ताप विद्युत संयंत्र धुले हुए कोयले से बिना धुले हुए कोयले पर स्विच करने के कारण फ्लाई-ऐश पॉन्ड(मौजूदा विद्युत उत्पादन क्षमता) की अतिरिक्त क्षमता की पात्रता प्राप्त किए बिना, समय-समय पर जारी की गई अधिसूचनाओं में यथा-अधिसूचित शर्तों का पालन करें।

ii. ऐश प्रबंधन के लिए जल की खपत को अनुकूल करने हेतु समुचित प्रौद्योगिकी समाधान लागू हों;

iii. यदि आवश्यक हो तो फ्लाई-ऐश का अधिकतम उपयोग सुनिश्चित करने के लिए स्थल विशिष्ट स्थितियों के आधार पर ऐश का पृथक्करण इलैक्ट्रो-स्टेटिक अवक्षेपक (प्रेसीपिटेटर) स्तर पर किया जाए।

iv. ताप विद्युत संयंत्र उपर्युक्त 2(i) के अध्याधीन, छोड़ी हुई अथवा चालू खानों (वर्किंग माइन्स) में (खान मालिकों द्वारा सुविधाजनक बनाया जाए) पर्यावरणीय सुरक्षा उपायों के साथ फ्लाई-ऐश का निपटान करें।

3. परिवहन:

नवीन कुमार / NAVIN KUMAR
उप महाप्रबंधक (पर्यावरण प्रबंधन) / DGM (ENVT. MGMT.)
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कोयला खनन परियोजनाएँ/ COAL MINING PROJECTS
हजारीबाग / Hazaribag

i. ढके हुए रेलवे वैगन (तिरपाल अथवा किसी अन्य माध्यम से ढके हुए रेलवे वैगन) और/अथवा खान-क्षेत्र से परे ढके हुए वाहक (कन्वेयर) द्वारा ही कोयले का परिवहन किया जाए। तथापि, जब तक रेल परिवहन/वाहक इन्फ्रास्ट्रक्चर उपलब्ध नहीं हो जाता, सड़क परिवहन ट्रकों द्वारा किया जाए जो तिरपाल अथवा किसी अन्य माध्यम से ढके हुए हों।

ii. ताप विद्युत संयंत्र द्वारा सुनिश्चित किया जाए कि

(क) रेल अथवा कन्वेयर द्वारा परिवहन के लिए विद्युत संयंत्र में अथवा इसके समीप रेल साइडिंग सुविधा अथवा कन्वेयर सुविधा स्थापित हो; और

(ख) यदि रेल अथवा कन्वेयर सुविधा की अनुपलब्धता के कारण परिवहन न हो पाए, तो यह सुनिश्चित किया जाए कि संबंधित खान के डिलीवरी स्थान से कोयले का परिवहन ढके हुए ट्रकों (तिरपाल अथवा किसी अन्य माध्यम द्वारा), अथवा किसी अन्य यंत्रीकृत बंद ट्रक से सड़क द्वारा हो।

(4) इसे वित्तीय वर्ष 2020-21 और उसके बाद के लिए संबंधित परियोजनाओं हेतु संगत पर्यावरणीय स्वीकृति की अतिरिक्त शर्तें भी समझा जाएगा। मौजूदा पर्यावरणीय स्वीकृतियों को संशोधित किया जाएगा ताकि संगत क्षेत्रों के लिए उपरोक्त शर्तों को प्रवर्तनशील बनाया जा सके। तदनुसार संबंधित राज्य प्रदूषण नियंत्रण बोर्ड द्वारा प्रचालन की अनुमति जारी की जाएगी।

[फा.सं. 13014/01/2020–आईए-I(टी)]

गीता मेनन, संयुक्त सचिव

टिप्पण—मूल नियम भारत के राजपत्र में सं.का.आ. 844(अ), तारीख 19 नवंबर 1986 द्वारा प्रकाशित किए गए थे और पश्चातवर्ती संशोधन सं.का.आ. 82(अ), तारीख 16 फरवरी, 1987; का.आ. 64(अ), तारीख 18 जनवरी, 1988; सा.का.नि. 931(अ), तारीख 27 अक्तूबर,1989; का.आ. 23(अ), तारीख 16 जनवरी, 1991; सा.का.नि. 95(अ), तारीख 12 फरवरी, 1992; सा.का.नि. 329(अ), तारीख 13 मार्च, 1992; सा.का.नि. 562(अ), तारीख 27 मई, 1992; सा.का.नि. 884(अ), तारीख 20 नवंबर, 1992; सा.का.नि. 386 (अ), तारीख 22 अप्रैल, 1993; सा.का.नि. 422 (अ), तारीख 19 मई, 1993; सा.का.नि. 801 (अ), तारीख 31 दिसंबर, 1993; सा.का.नि. 320 (अ), तारीख 16 मार्च, 1994; सा.का.नि. 560 (अ), तारीख 19 सितंबर, 1997; सा.का.नि. 378 (अ), तारीख 30 जून, 1998; सा.का.नि. 07 (अ), तारीख 22 दिसंबर, 1998; सा.का.नि. 407 (अ), तारीख 31 मई, 2001; सा.का.नि. 826 (अ), तारीख 16 नवंबर, 2009; सा.का.नि. 513 (अ), तारीख 28 जून, 2012; सा.का.नि. 02 (अ), तारीख 02 जनवरी, 2014; का.आ. 3305 (अ), तारीख 07 दिसंबर, 2015; सा.का.नि. 593 (अ), तारीख 28 जून, 2018; और का.आ. 236 (अ), तारीख 16 जनवरी, 2020 द्वारा किए गए।

MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE

NOTIFICATION

New Delhi, the 21st May, 2020

S.O. 1561(E).—Whereas the Central Government had, in exercise of its powers under Section 3, Section 6 and Section 25 of Environment (Protection) Act, 1986 (29 of 1986) read with rule 5 of Environment (Protection) Rules, 1986, published draft rules further to amend sub-rule (8) of rule 3 of Environment (Protection) Rules, 1986, in the Gazette of India, Extraordinary, *vide* number G.S.R. 02(E), dated the

2nd January, 2014 mandating certain categories of thermal power plants to use coal with ash content restricted to 34%.

And whereas, the said Notification *vide* number G.S.R. 02(E) dated the 2nd January, 2014, mandated coal based thermal power plants to use raw or blended or beneficiated coal with ash content not exceeding thirty-four percent (34%), on quarterly basis, by the time lines given below:

Sl. No.	Category of Power Plant	Distance of location of Thermal Power Plant from pit-head/coal mine	Time lines
(a)	Stand-alone Thermal Power Plants (any capacity), and Captive Thermal Power Plants (with capacity of 100 MW and above)	Located in urban areas, or ecologically sensitive areas or critically polluted areas, irrespective of distance from pit-head, except pit-head power plants.	With effect from 2nd June, 2014.
(b)		beyond 1000 km	With effect from 2nd June, 2014.
(c)		between 750-1000 km	With effect from 1st January, 2015.
(d)		between 500-749 km	With effect from 5th June, 2016.

And whereas, the Central Government had, in exercise of its powers under sections 6 and 25 of the Environment (Protection) Act, 1986 (29 of 1986) read with sub-rule (3) of rule 5 of the Environment (Protection) Rules, in the Gazette of India, Extraordinary, *vide* number S.O. 3305 (E), dated the 7th December, 2015 and G.S.R. 593 (E), dated the 28th June, 2018 published the emission standards and specific water consumption for various category of thermal power plants, based on capacity of power generation and date of installation of power plant and to be achieved in time bound manner.

And whereas, the Ministry of Environment, Forest and Climate Change directed the Central Pollution Control Board vide F.No.Q-15017/40/2007-CPW dated the 7th December, 2017 to issue Directions under Section 5 of Environment (Protection) Act, 1986, to various Thermal Power Plants to install pollution control equipment as per the revised plan submitted by the Ministry of Power dated the 13th October, 2017 by 2022.

And whereas, the Ministry of Power has, *inter alia*, represented that with advancement in pollution control technologies, thermal power plants are better equipped to capture fly-ash generated in combustion process and unwashed coal can be used more efficiently and economically; thermal power plants are designed for coal with wide variety of ash content and are equipped with dry ash evacuation, handling and supply systems for ash utilisation; using washed coal makes power generation costlier; fly ash generated in thermal power plants is being used in several beneficial uses like cement manufacturing, brick making, road laying, back-fill material for reclamation of mine voids and low lying areas; requirement of maintaining average ash content to 34% prompts industries to undertake import of coal, resulting in outflow of foreign exchange etc.

And Whereas, the Ministry of Coal has, *inter alia*, represented that the coal mines are constantly striving to improve raw coal in terms of quality, size and extraneous material over the years which has considerably reduced wear and tear of all related equipment, coal washing process involves multiple handling and avoidable road transportation of huge quantities of coal from coal mines to washeries and then to rail sidings for onward transport to power plants; the washing process only divides the coal into washed coal and washery rejects while the ash content of mined coal remains the same; use of low grade coal washery rejects, in the multiple small user industries, generates more pollution etc.

And Whereas, the Ministry of Coal and Ministry of Power have, therefore, represented that the mandating power plants to use washed coal requires to be revisited by reconsidering the notification dated the 2nd January, 2014 which will help ease power generation for long distance haulage of coal without adverse impact on the environment.

And Whereas, the **NITI Aayog**, in its report after analysing the issue from the perspective of washeries, Coal mining, transportation and consumption of coal at power plants has, *inter alia*, summed up that use of washery rejects in nearby industries generates more pollution; since washery rejects are distributed in number of smaller industries, the pollution control at numerous points is more difficult than controlling the

pollution at power plant end; Ash generated in the washing process pollutes water along with coal particles and cannot be gainfully utilised; Coal washing process involves increased water use, effluent generation; Disposal of washery rejects has negative environmental impact as it has to handle and dispose huge quantity of low grade coal washery rejects, liquid effluent streams, coal storage, handling coal dust, runoff and fugitive dust; Coal washing also adversely impacts topography, water drainage pattern and quality, water bodies, surrounding air quality at large scale; Washing process increases the cost of power generation with no commensurate environmental advantages etc.

And Whereas, NITI Aayog has, therefore, recommended that it may be prudent to determine and enforce the environmental and pollution norms, to be complied with by the power generators, rather than restricting the ash content in coal, based on distance of transportation.

And Whereas, the Ministry of Environment, Forest and Climate Change, after deliberating the representations from Ministry of Power, Ministry of Coal, report of NITI Aayog and various stakeholders and after careful considerations & in larger public interest, arrived at the following:

(i) The extent of ash content in mined coal remains the same. With washeries, the ash content gets divided at two places (washeries and the power plant), whereas if unwashed coal is used in power plant, the ash content is handled at only one place viz. the power plant;

(ii) Thermal power plants are technologically equipped to address pollution control, ash management as they have high efficiency equipment to capture fly ash, dry ash evacuation and handling systems, ash supply systems for ash utilisation and tall stacks for wider dispersal of flue gases;

(iii) The Ministry of Environment, Forest and Climate Change has notified emission norms, mandating respective thermal power plants to adhere to such norms in a time bound manner;

And Whereas, it is expedient to adopt best possible framework towards handling of unwashed coal including management of fly ash and other associated environmental aspects arising out of processing of unwashed coal at different stages.

And Whereas, the Ministry of Coal has represented that in view of the existing unprecedented COVID-19 pandemic and the resultant immediate requirement of utilization of domestic coal by stimulating coal sector demand for power generation in the country, it is desirable to issue the notification at the earliest.

Now, therefore, in exercise of the powers conferred by Section 3, Section 6 and Section 25 of the Environment Protection Act, 1986 (29 of 1986) read with sub-rule (4) of rule 5 of the Environment (Protection) Rules, 1986, the Central Government, after having dispensed with the requirement of notice under clause (a) of sub-rule (3) of rule 5 of the said rules, in public interest, hereby makes the following rules to further amend the Environment (Protection) Rules, 1986, namely :-

1. (1) These rules may be called the Environment (Protection) Amendment Rules, 2020

   (2) They shall come into force on the date of their publication in the Official Gazette.

2. In the Environment (Protection) Rules, 1986, in rule 3, for sub-rule (8), the following sub-rule shall be substituted, namely :-

"(8) Use of coal by Thermal Power Plants, without stipulations as regards ash content or distance, shall be permitted subject to following conditions:

(1) **Setting Up Technology Solution for emission norms:**

(i) Compliance of specified emission norms for Particulate Matter, as per extant notifications and instructions of Central Pollution Control Board, issued from time to time.

(ii) In case of washeries, Middling and rejects to be utilized in FBC (Fluidised Bed Combustion) technology based thermal power plants. Washery to have linkage for middling and rejects in Fluidised Bed Combustion plants.

(2) **Management of Ash Ponds:**

(i) The thermal powers plants shall comply with conditions, as notified in the Fly Ash notification issued from time to time, without being entitled to additional capacity of fly ash pond (for existing power generation capacity) on ground of switching from washed coal to unwashed coal.

(ii) Appropriate Technology solutions shall be applied to optimise water consumption for Ash management;

(iii) The segregation of ash may be done at the Electro-Static Precipitator stage, if required, based on site specific conditions, to ensure maximum utilization of fly ash;

(iv) Subject to 2(i) above, the thermal power plants to dispose flyash in abandoned or working mines (to be facilitated by mine owner) with environmental safeguards.

(3) **Transportation:**

(i) Coal transportation may be undertaken by covered Railway wagon (railway wagons covered by tarpaulin or other means) and/or covered conveyer beyond the mine area. However, till such time enabling Rail transport/conveyer infrastructure is not available, road transportation may be undertaken in trucks, covered by tarpaulin or other means.

(ii) It shall be ensured by the thermal power plant that

a. Rail siding facility or conveyor facility is set up at or near the power plant, for transportation by rail or conveyor; and

b. If transportation by rail or conveyor facility is not available, ensure that the coal is transported out from the Delivery Point of the respective mine in covered trucks (by tarpaulin or other means), or any mechanized closed trucks by road.

(4) This shall also be deemed to be additional conditions of the relevant Environmental Clearances for respective projects for financial year 2020-21 and onwards. The existing Environmental Clearances shall stand modified so as to make the above conditions operative for relevant sectors. The Consent to Operate shall be issued by respective State Pollution Control Boards accordingly."

[F.No.13014/01/2020-IA.I(T)]

GEETA MENON, Jt. Secy.

Note:-The principal rules were published in the Gazette of India *vide* number S.O. 844(E), dated the 19th November,1986 and subsequently amended *vide* numbers S.O. 82(E), dated 16th February, 1987; S.O. 64(E), dated18th January, 1988; G.S.R. 931(E), dated 27th October, 1989; S.O. 23(E), dated 16th January, 1991; G.S.R. 95(E), dated 12th February, 1992; G.S.R.329(E), dated 13th March, 1992; G.S.R. 562(E), dated 27th May, 1992; G.S.R. 884(E), dated 20th November, 1992; G.S.R. 386(E), dated 22nd April, 1993; G.S.R. 422(E), dated 19th May, 1993; G.S.R. 801(E), dated 31st December, 1993; G.S.R. 320(E), dated 16th March, 1994; G.S.R. 560(E), dated 19th September, 1997; G.S.R. 378(E), dated 30th June, 1998;G.S.R. 7(E), dated 22nd December, 1998; G.S.R. 407(E), dated 31st May, 2001; G.S.R. 826(E), dated 16th November, 2009; G.S.R. 513(E), dated 28th June, 2012; G.S.R. 02(E) dated 2nd January, 2014; S.O. 3305 (E), dated 7th December, 2015; G.S.R. 593(E), dated 28th June, 2018 and S.O. 236 (E), dated 16th January, 2020.

नवीन कुमार / NAVIN KUMAR
उप महाप्रबंधक (पर्यावरण प्रबंधन) / DGM (ENVT. MGMT.)
एनटीपीसी लिमिटेड/ NTPC Limited
कोयला खनन परियोजनाएँ/ COAL MINING PROJECTS
हजारीबाग / Hazaribag

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Instantel

Event Report

Date/Time	Tran at 14:18:44 March 2, 2023
Trigger Source	Geo: 0.700 mm/s, Mic: 127.0 dB(L)
Range	Geo: 254.0 mm/s
Record Time	3.0 sec at 1024 sps
Operator/Setup:	Operator/factory,MMB

Serial Number	UM20049 V 10-90GC Micromate ISEE
Battery Level	3.6 Volts
Unit Calibration	October 19, 2022 by UES New Delhi
File Name	UM20049_20230225141844.IDFW

Notes

Location:	RAMGARH
Client:	NTPC/TATA/CCL
User Name:	SOLAR INDUSTRIES INDIA LTD
General:	COAL MINES

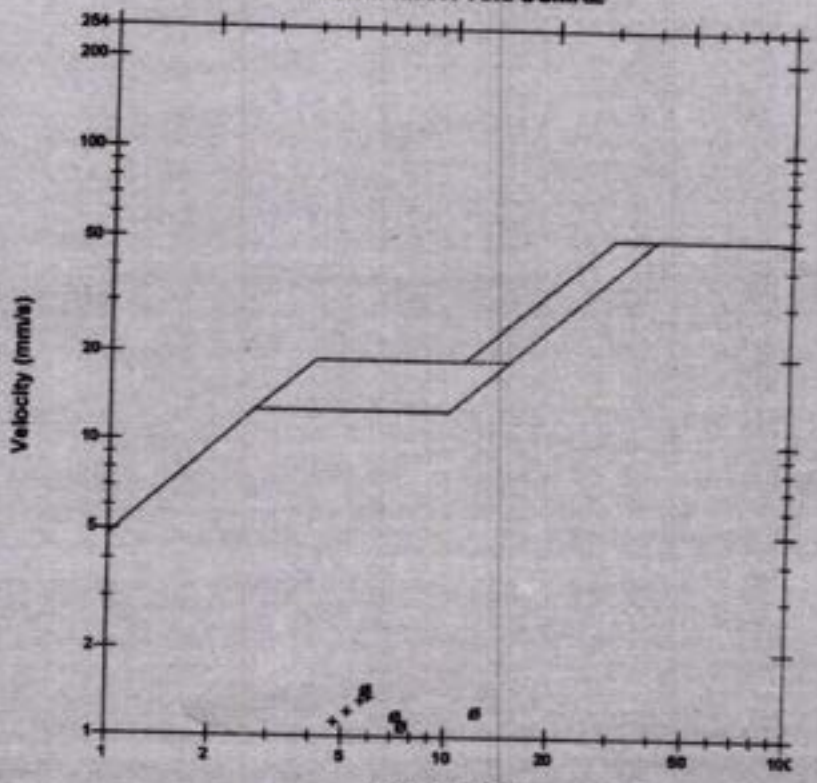
Extended Notes

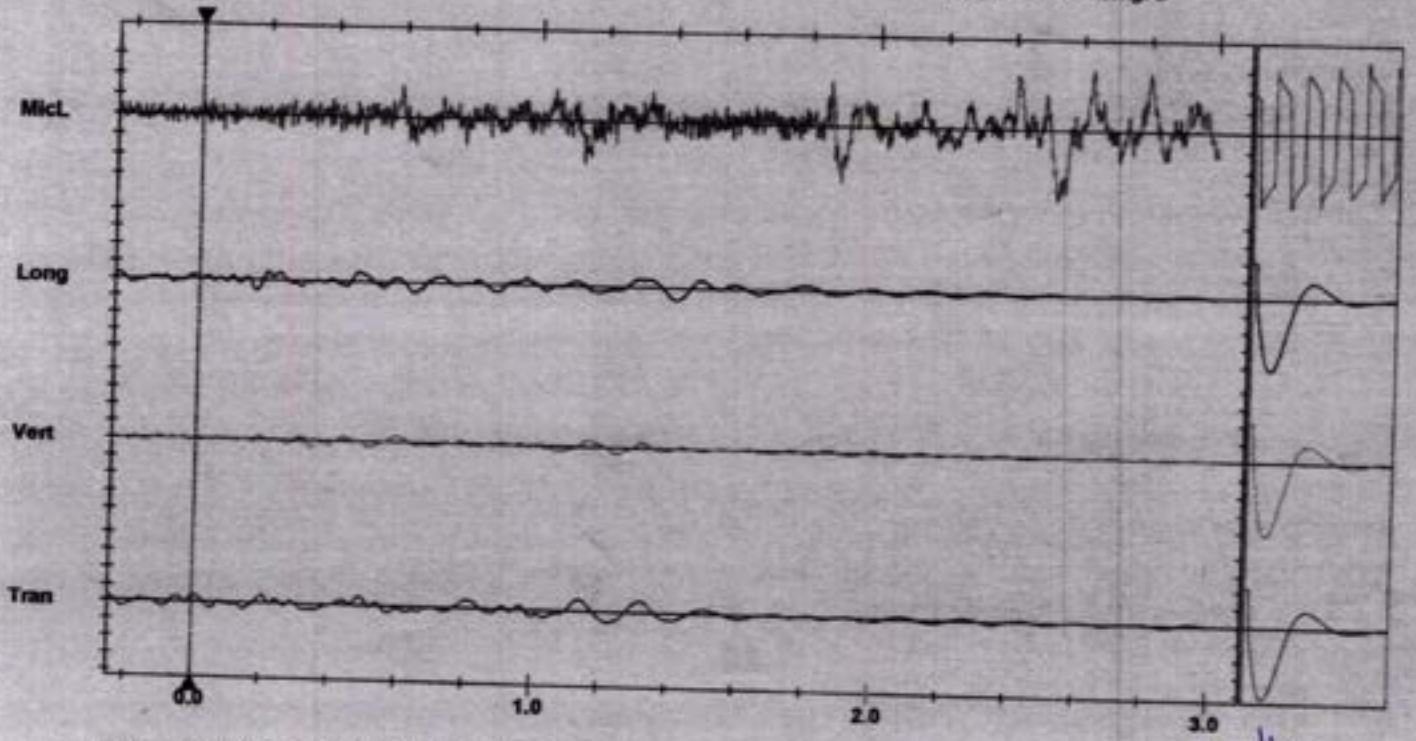
Microphone	Linear Weighting
PSPL	111.0 dB(L) at 2.526 sec
ZC Freq	8.4 Hz
Channel Test	Passed (Freq = 20.5 Hz Amp = 1235 mv)

	Tran	Vert	Long	
PPV	1.356	0.741	1.466	mm/s
ZC Freq	6.1	6.0	6.0	Hz
Time (Rel. to Trig)	1.141	1.157	1.410	sec
Peak Acceleration	0.009	0.007	0.012	g
Peak Displacement	0.036	0.018	0.038	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.3	7.5	7.3	Hz
Overswing Ratio	4.2	4.3	4.3	

Peak Vector Sum 1.689 mm/s at 1.323 sec

USBM RI8507 And OSMRE





Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div Mic: 2.000 pa.(L)/div
Trigger =

नवीन कुमार / NAVIN KUMAR
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एनटीपीसी लिमिटेड/ NTPC Limited
कोयला खनन परियोजनाएँ/ COAL MINING PROJECTS
हजारीबाग / Hazaribag

Printed: March 11, 2023 (V 10.72 - 10.72)

Instantel

Event Report

Date/Time	Vert at 14:19:02 March 21, 2023
Trigger Source	Geo: 0.510 mm/s
Range	Geo: 31.75 mm/s
Record Time	1.0 sec at 1024 sps
Job Number:	1

Serial Number	BE20626 V 10.72-1.1 Minimate Blaster
Battery Level	6.2 Volts
Unit Calibration	January 18, 2023 by UES New Delhi
File Name	__TEMP.EVT

Notes
Location:
Client:
User Name:
General:

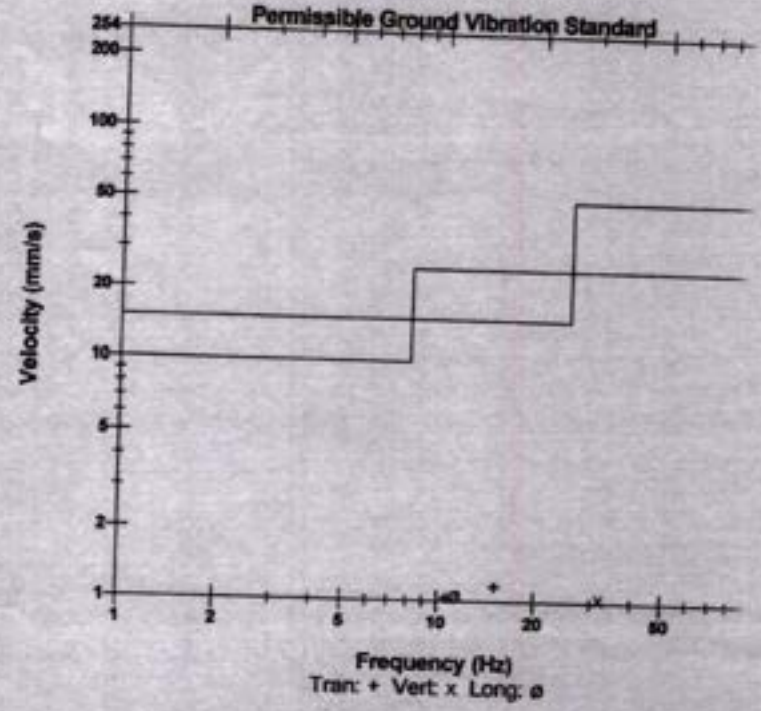
Post Event Notes
At Near New Pit Office 310 MT From Blasting Patch

Microphone	Linear Weighting
PSPL	91.48 dB(L) at 0.621 sec
ZC Freq	64 Hz
Channel Test	Passed (Freq = 19.7 Hz Amp = 496 mv)

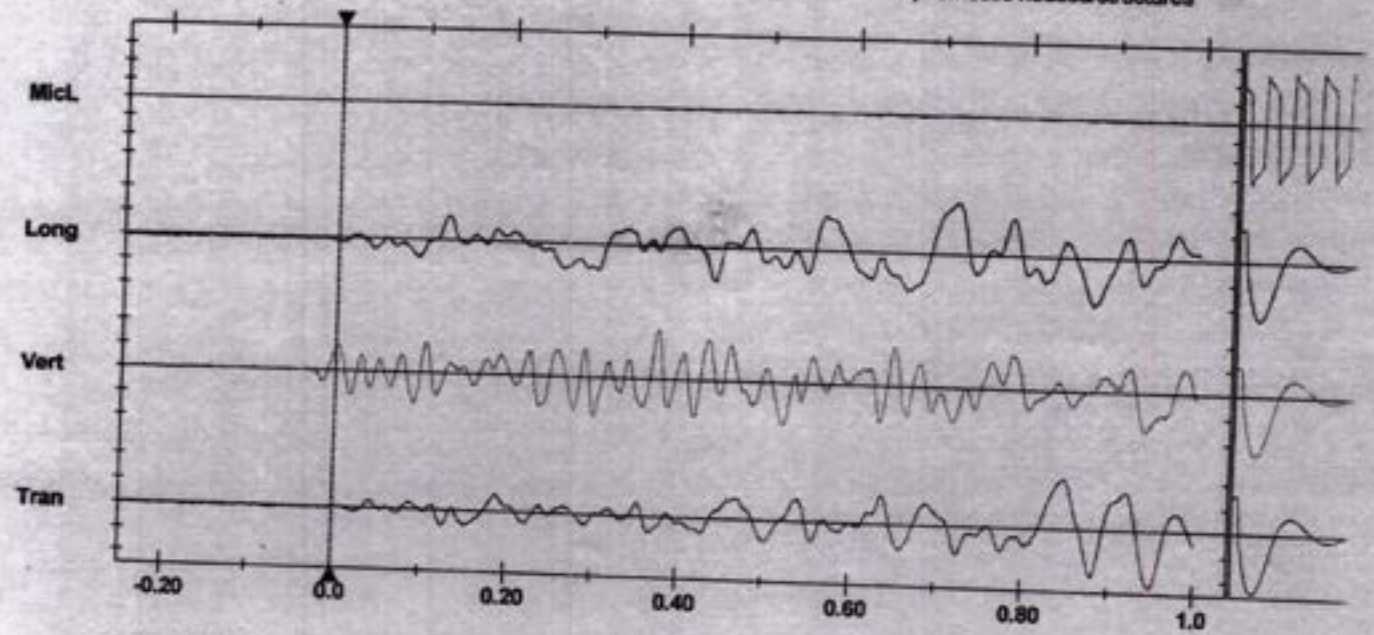
	Tran	Vert	Long	
PPV	1.159	1.048	1.064	mm/s
PPV	52.28	51.41	51.54	dB
ZC Freq	15	32	11	Hz
Time (Rel. to Trig)	0.949	0.373	0.717	sec
Peak Acceleration	0.013	0.027	0.013	g
Peak Displacement	0.014	0.011	0.021	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.5	7.6	7.5	Hz
Overswing Ratio	3.3	3.6	3.4	

Peak Vector Sum 1.307 mm/s at 0.949 sec

DGMS India (B)



a) Industrial buildings
b)Domestic houses/structures



Time Scale: 0.10 sec/div **Amplitude Scale:** Geo: 0.500 mm/s/div Mic: 10.000 pa.(L)/div
Trigger =

Sensor Che

Printed: March 24, 2023 (V 10.72 - 10.72)

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हजारीबाग / Hazaribag

Instantel

Event Report

Instantel

Date/Time	MicL at 14:27:06 February 17, 2023
Trigger Source	Mic: 100.00 dB(L)
Range	Geo: 254.0 mm/s
Record Time	3.0 sec at 2048 sps
Operator/Setup:	Operator/NTPC OCP.MMB

Serial Number	UM15577 V 10-72 Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 3, 2022 by CIMFR Dhanbad
File Name	__TEMP.EVT

Notes

Location:	PBCMP NTPC
Client:	NTPC
User Name:	IDL EXPLOSIVES LTD
General:	COAL MINES

Post Event Notes

Extended Notes
Distance 500 Mtr.
Near Nagri School

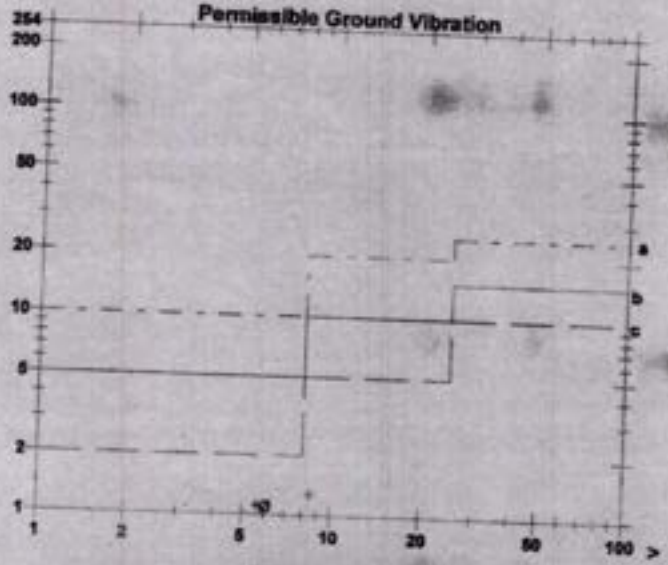
Microphone	Linear Weighting
PSPL	108.1 dB(L) at 2.081 sec
ZC Freq	4.2 Hz
Channel Test	Passed (Freq = 20.5 Hz Amp = 1231 mv)

	Tran	Vert	Long	
PPV	1.277	0.914	1.127	mm/s
ZC Freq	8.5	7.8	6.1	Hz
Time (Rel. to Trig)	-0.175	0.503	-0.188	sec
Peak Acceleration	0.013	0.012	0.013	g
Peak Displacement	0.024	0.019	0.022	mm
Sensor Check	Passed	Passed	Passed	

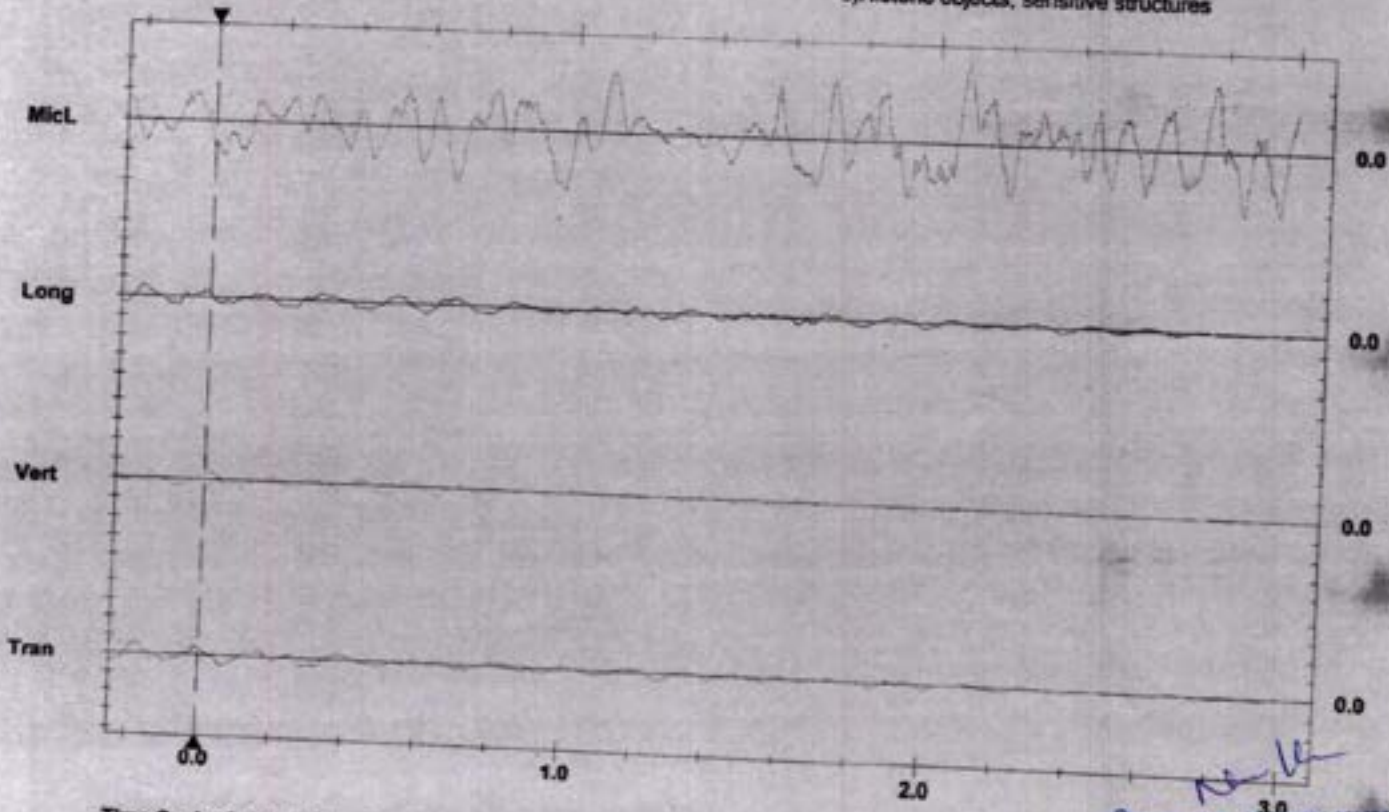
Peak Vector Sum 1.618 mm/s at -0.185 sec

DGMS India (A)

Permissible Ground Vibration



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div Mic: 2.000 pa.(L)/div
Trigger =

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एनटीपीसी लिमिटेड/ NTPC Limited
कोयला खनन परियोजनाएँ/ COAL MINING PROJECTS
हजारीबाग / Hazaribag

Instantel

Event Report

Instantel

Date/Time	MicL at 14:19:12 February 25, 2023
Trigger Source	Mic: 100.00 dB(L)
Range	Geo: 254.0 mm/s
Record Time	3.0 sec at 2048 sps
Operator/Setup:	Operator/NTPC OCP.MMB

Serial Number	UM15577 V 10-72 Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 3, 2022 by CIMFR Dhanbad
File Name	__TEMP.EVT

Post Event Notes

Notes

Location:	PBCMP NTPC
Client:	NTPC
User Name:	IDL EXPLOSIVES LTD
General:	COAL MINES

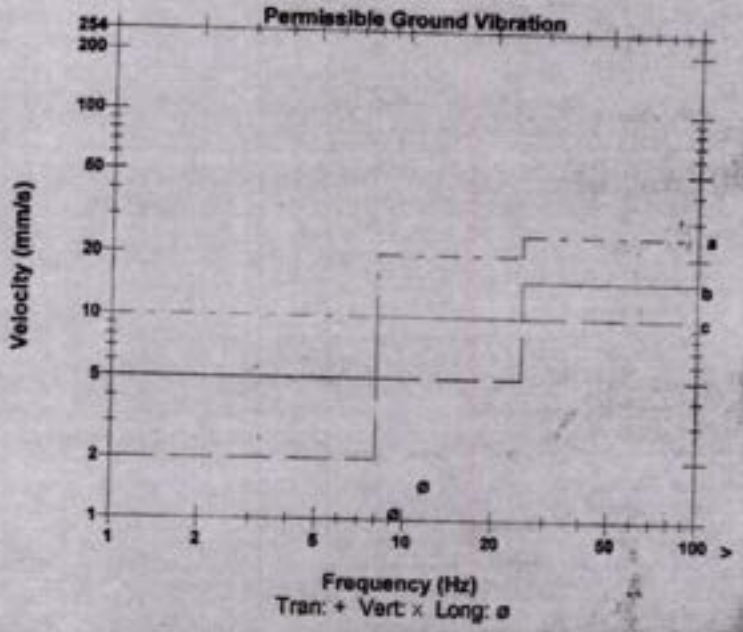
Extended Notes
Distance 600 Mtr.
Near Nagri School

Microphone	Linear Weighting
PSPL	106.4 dB(L) at 2.792 sec
ZC Freq	10.2 Hz
Channel Test	Passed (Freq = 20.5 Hz Amp = 1183 mv)

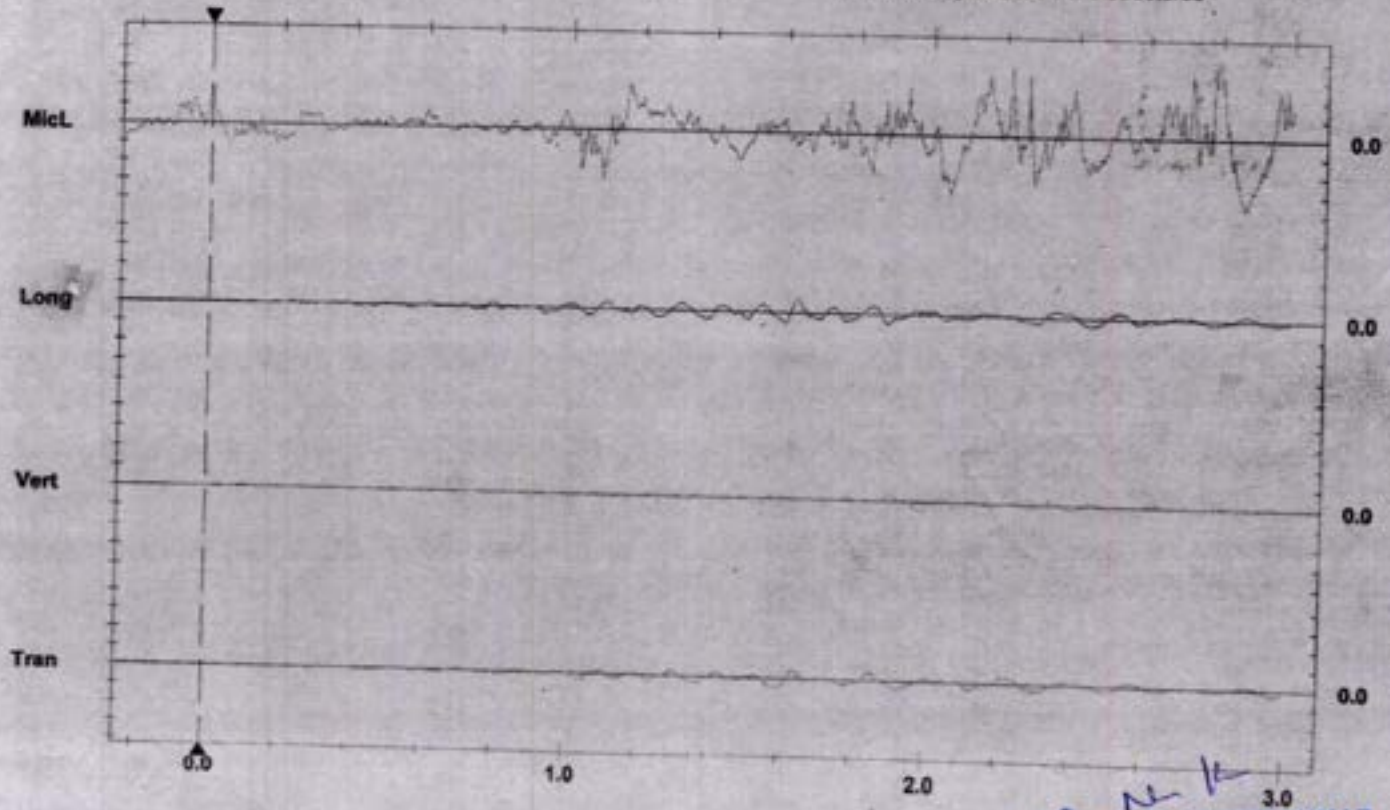
	Tran	Vert	Long	
PPV	0.993	0.899	1.498	mm/s
ZC Freq	7.2	7.8	11.8	Hz
Time (Rel. to Trig)	1.584	1.981	1.635	sec
Peak Acceleration	0.012	0.013	0.018	g
Peak Displacement	0.023	0.015	0.021	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 1.684 mm/s at 1.637 sec

DGMS India (A)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div Mic: 1.000 pa.(L)/div
Trigger =

नवीन कुमार / NAVIN KUMAR
उप महाप्रबंधक (पर्यावरण प्रबंधन) / DGM (ENVT. MGMT.)
एनटीपीसी लिमिटेड/ NTPC Limited
कोयला खनन परियोजनाएँ/ COAL MINING PROJECTS
हजारीबाग / Hazaribag

Instantel

Event Report

Date/Time	Tran at 14:29:09 January 6, 2023
Trigger Source	Geo: 0.700 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.0 sec at 1024 sps
Operator/Setup:	Operator/factory MMB

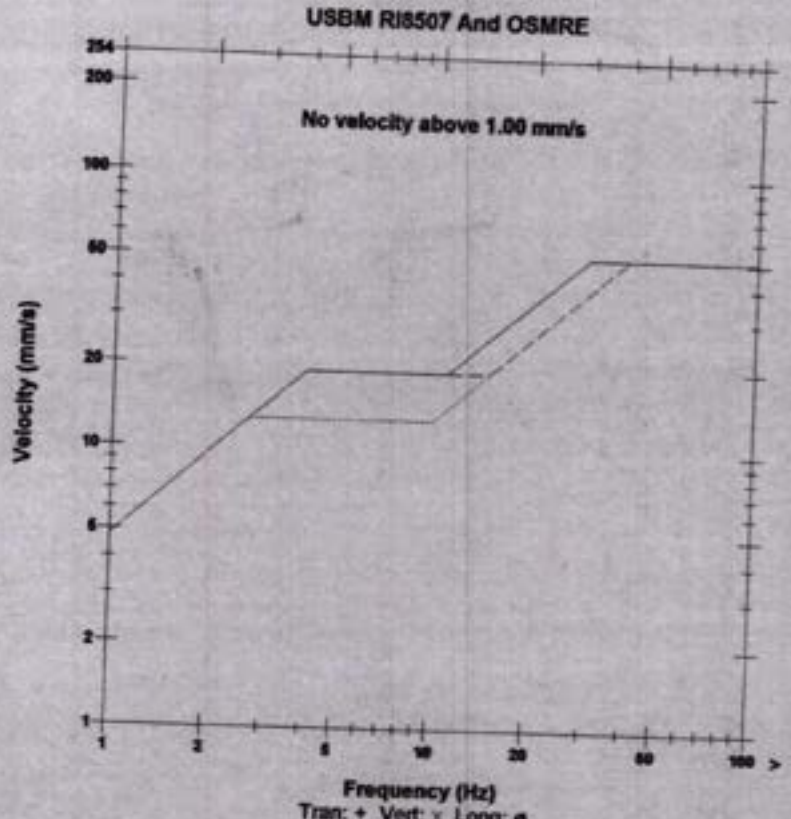
Serial Number	UM9191 V 10-90GC Micromate ISEE
Battery Level	3.5 Volts
Unit Calibration	June 30, 2021 by CIMFR Dhanbad
File Name	__TEMP.EVT

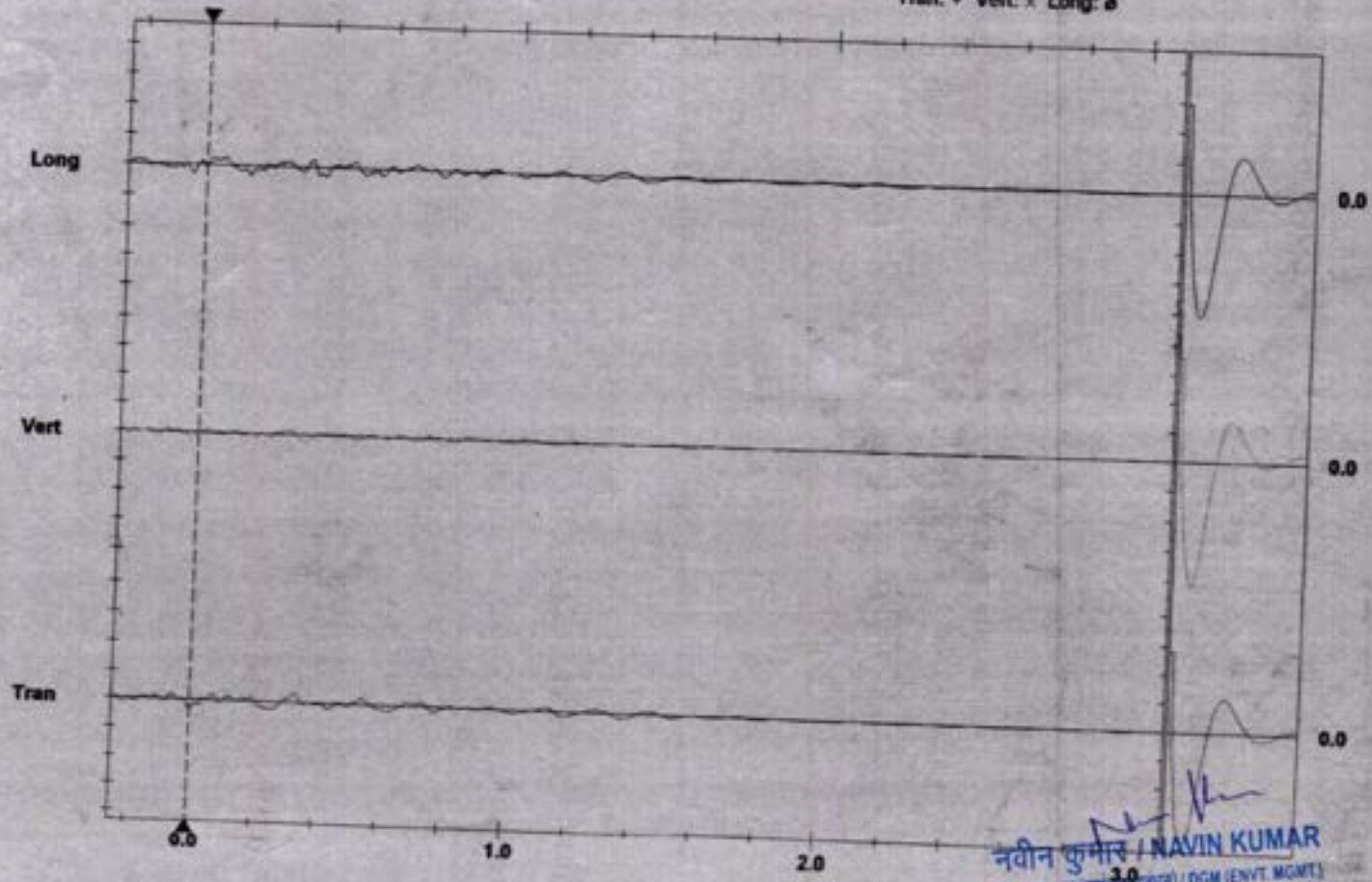
Notes

Location:	RAMGARH
Client:	TATA/NTPC/CCL
User Name:	SOLAR INDUSTRIES INDIA LIMITED
General:	COAL MINES

	Tran	Vert	Long	
PPV	0.701	0.552	0.607	mm/s
PPV	47.92	45.83	46.66	dB
ZC Freq	7.1	8.3	4.5	Hz
Time (Rel. to Trig)	0.000	0.333	0.137	sec
Peak Acceleration	0.012	0.007	0.010	g
Peak Displacement	0.015	0.010	0.014	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.5	7.7	7.3	Hz
Overswing Ratio	3.5	3.0	3.4	

Peak Vector Sum 0.937 mm/s at 0.333 sec





Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger =

Sensor Check

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हजारीबाग / Hazaribag

Printed: January 8, 2023 (V 10.72 - 10.72)

Instantel

Event Report

Date/Time	MicL at 15:43:27 January 20, 2023
Trigger Source	Geo: 2.000 mm/s, Mic: 2.000 pa.(L)
Range	Geo: 254.0 mm/s
Record Time	3.0 sec at 1024 sps
Operator/Setup:	Operator/factory.MMB

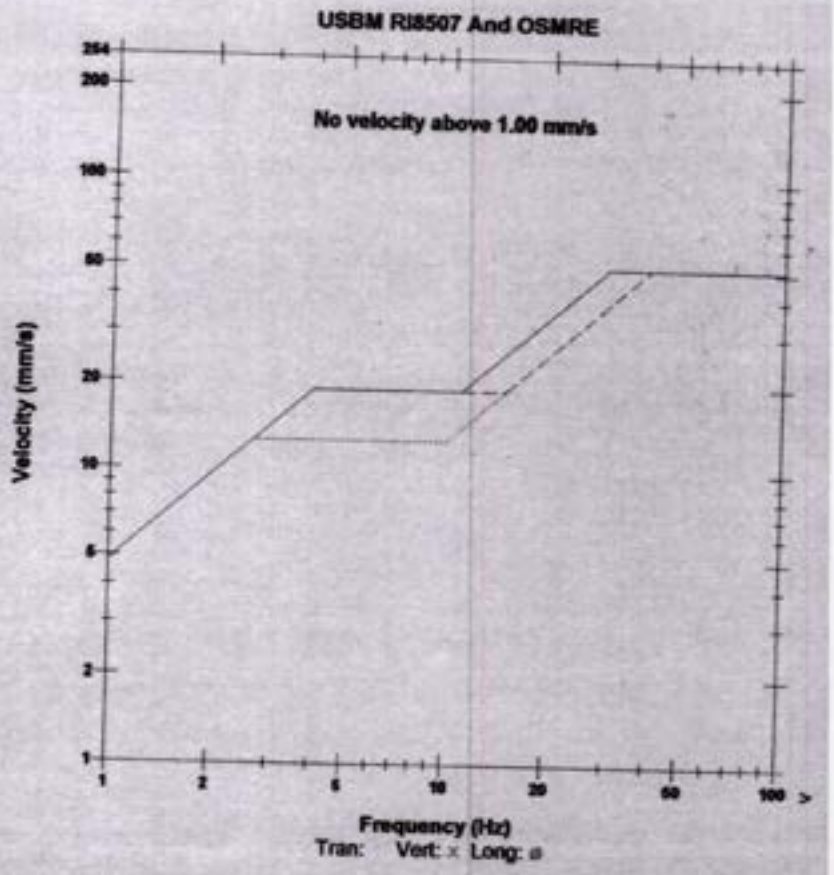
Serial Number	UM20049 V 10-90GC Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	October 19, 2022 by UES New Delhi
File Name	__TEMP.EVT

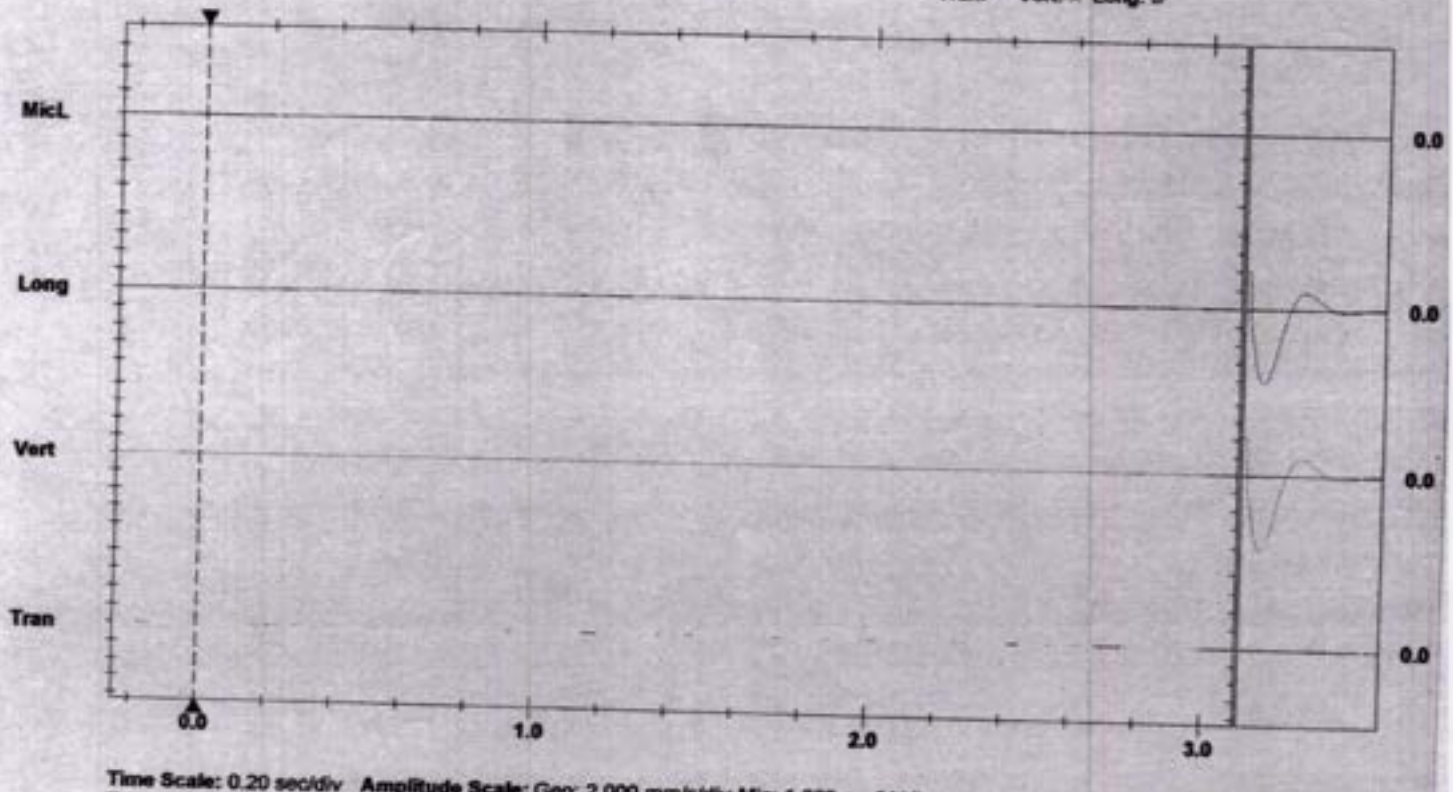
Notes
Location:
Client:
User Name: SOLAR INDUSTRIES INDIA LTD
General:

Microphone	Linear Weighting
PSPL	2.824 pa.(L) at 1.344 sec
ZC Freq	57 Hz
Channel Test	Passed (Freq = 20.5 Hz Amp = 1292 mv)

	Tran	Vert	Long	
PPV	0.095	0.047	0.079	mm/s
PPV	30.52	24.50	28.93	dB
ZC Freq	4.6	47	4.5	Hz
Time (Rel. to Trig)	2.728	-0.025	2.729	sec
Peak Acceleration	0.005	0.004	0.005	g
Peak Displacement	0.003	0.000	0.002	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.3	7.5	7.3	Hz
Overswing Ratio	4.2	4.3	4.4	

Peak Vector Sum 0.112 mm/s at 2.728 sec





Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div Mic: 1.000 pa.(L)/div
Trigger =

Sensor Check

Printed: January 25, 2023 (V 10.72 - 10.72)

नवीन कुमार / NAVIN KUMAR
उप महाप्रबंधक (पर्यावरण प्रबंधन) / DGM (ENVT. MGMT.)
एनटीपीसी लिमिटेड/ NTPC Limited
कोयला खनन परियोजनाएँ/ COAL MINING PROJECTS
हजारीबाग / Hazaribag

Instantel

Event Report

Date/Time	Tran at 01:41:23 December 3, 2022
Trigger Source	Geo: 0.510 mm/s, Mic: 137.0 dB(L)
Range	Geo: 31.75 mm/s
Record Time	4.0 sec at 1024 sps

Serial Number	BE20626 V 10.72-1.1 Minimate Blaster
Battery Level	6.1 Volts
Unit Calibration	January 29, 2022 by UES New Delhi
File Name	__TEMP.EVT

Post Event Notes
At Near Nagari School 295 Mt From Blasting patch

Notes

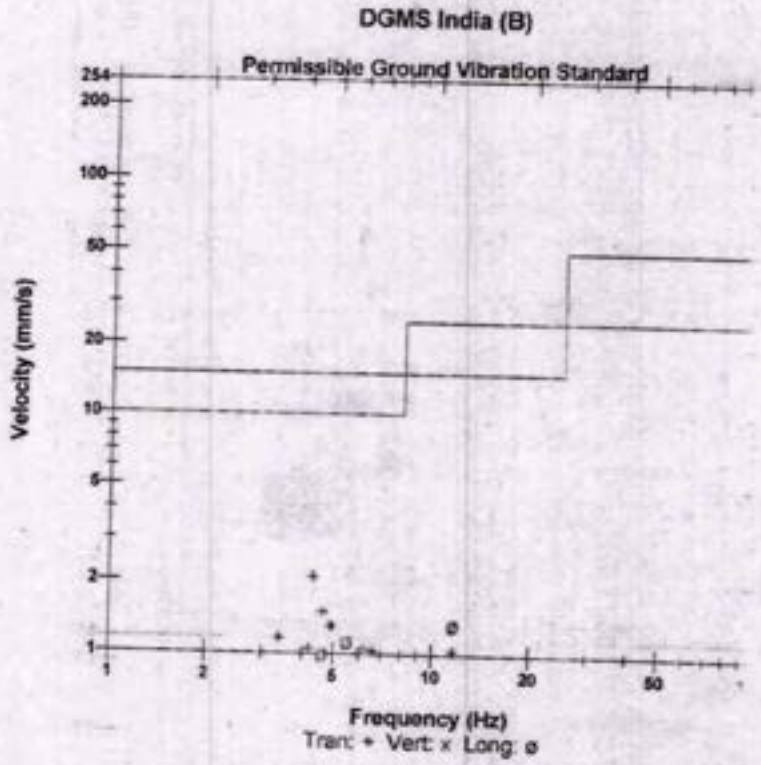
Location:	On Ground Surface
Client:	Pakri Barwadhi Coal Mines
User Name:	Black Diamond Explosives Pvt Ltd
General:	

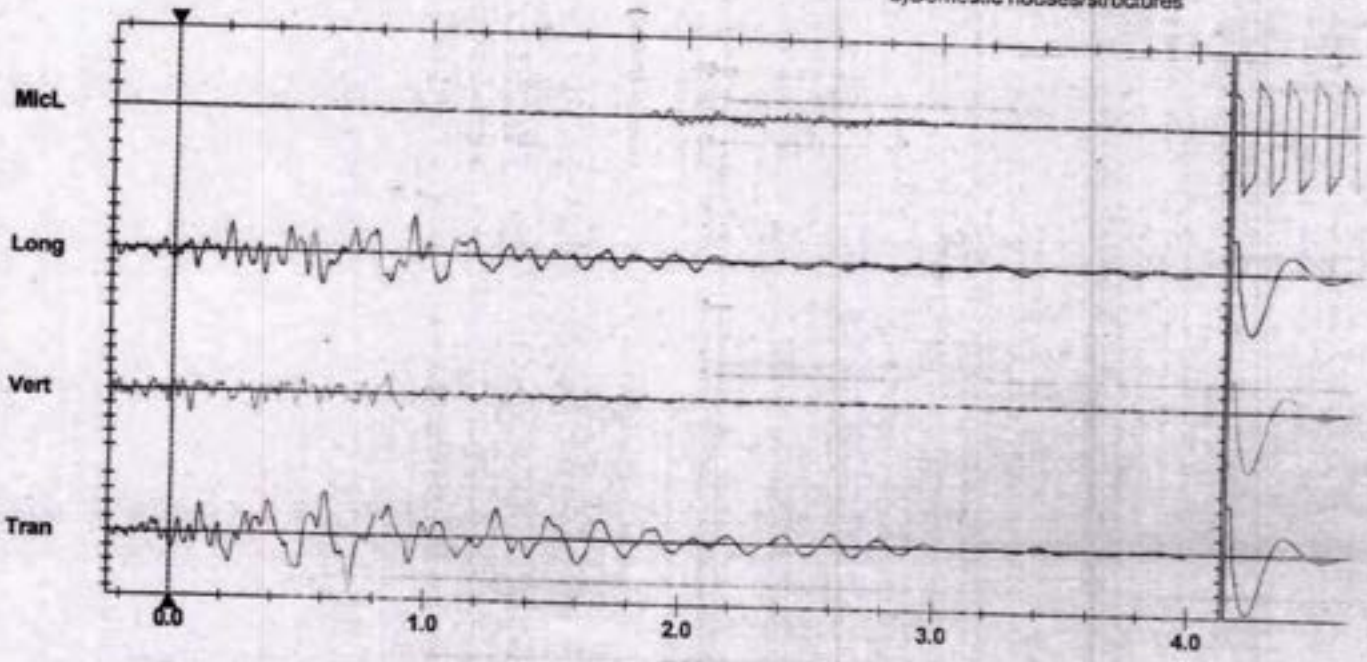
Extended Notes

Microphone	Linear Weighting
PSPL	106.0 dB(L) at 1.926 sec
ZC Freq	16 Hz
Channel Test	Passed (Freq = 20.1 Hz Amp = 557 mv)

	Tran	Vert	Long	
PPV	2.095	0.762	1.333	mm/s
PPV	57.43	48.64	53.50	dB
ZC Freq	4.3	18	12	Hz
Time (Rel. to Trig)	0.707	0.071	0.938	sec
Peak Acceleration	0.013	0.012	0.013	g
Peak Displacement	0.046	0.010	0.030	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.6	7.6	7.5	Hz
Overswing Ratio	3.3	3.6	3.4	

Peak Vector Sum 2.278 mm/s at 0.708 sec





Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 0.500 mm/s/div Mic: 10.000 pa.(L)/div
Trigger =

Sensor Chec

Printed: December 8, 2022 (V 10.72 - 10.72)

नवीन कुमार / NAVIN KUMAR
उप महाप्रबंधक (पर्यावरण प्रबंधन) / DGM (ENVT. MGMT.)
एनटीपीसी लिमिटेड/ NTPC Limited
कोयला खनन परियोजनाएँ/ COAL MINING PROJECTS
हजारीबाग / Hazaribag

Instantel

Event Report

Instantel

Date/Time	MicL at 14:57:28 December 28, 2022
Trigger Source	Mic: 100.00 dB(L)
Range	Geo: 254.0 mm/s
Record Time	3.0 sec at 2048 sps
Operator/Setup:	Operator/NTPC OCP.MMB

Serial Number	UM15577 V 10-72 Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 3, 2022 by CIMFR Dhanbad
File Name	__TEMP.EVT

Post Event Notes

Notes
Location: PBCMP NTPC
Client: NTPC
User Name: IDL EXPLOSIVES LTD
General: COAL MINES

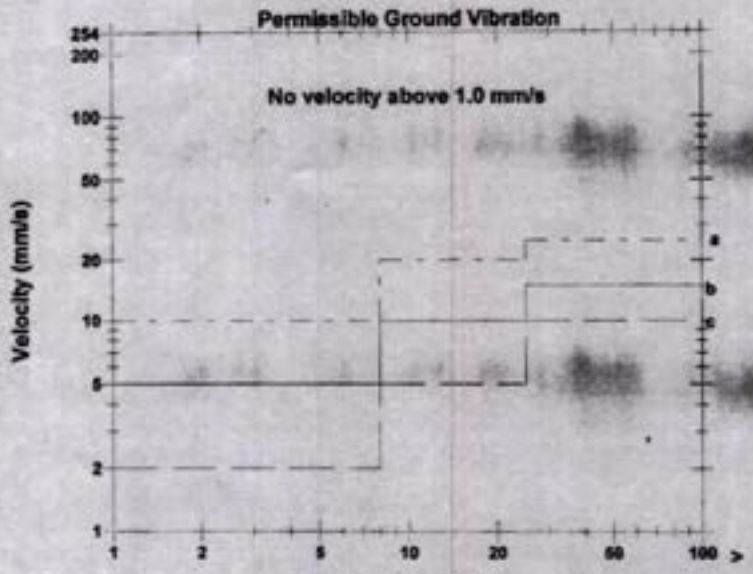
Extended Notes
Distance 500 Mtr.
Near Nagri School

Microphone	Linear Weighting
PSPL	107.0 dB(L) at 0.002 sec
ZC Freq	<1.0 Hz
Channel Test	Check (Freq = 0.0 Hz Amp = 0 mv)

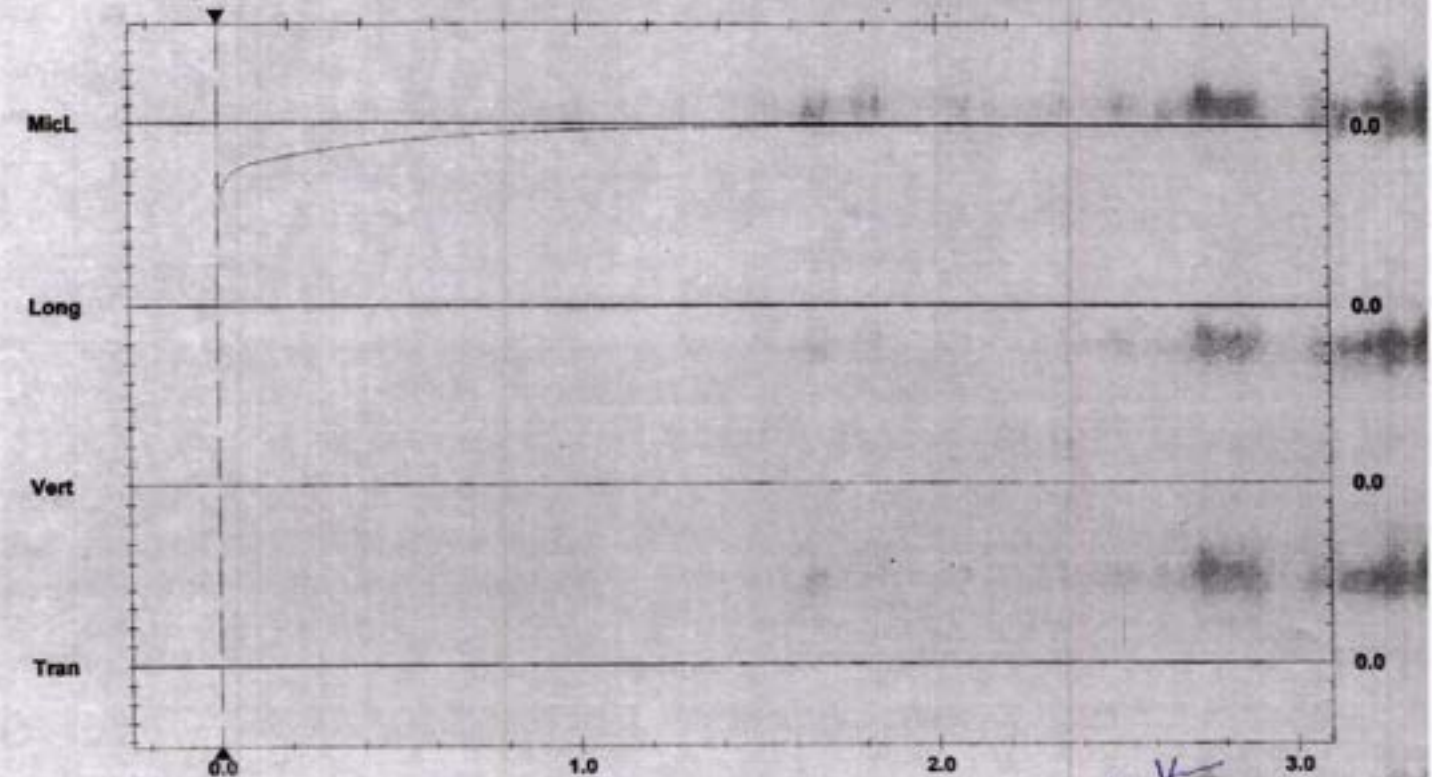
	Tran	Vert	Long	
PPV	0.118	0.110	0.087	mm/s
ZC Freq	N/A	N/A	4.5	Hz
Time (Rel. to Trig)	0.721	1.262	1.027	sec
Peak Acceleration	0.008	0.012	0.012	g
Peak Displacement	0.000	0.000	0.003	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 0.155 mm/s at 1.026 sec
N/A: Not Applicable

DGMS India (A)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div Mic: 1.000 pa.(L)/div
Trigger =

नवीन कुमार / NAVIN KUMAR
उप महाप्रबंधक (पर्यावरण प्रबंधन) / DGM (ENVT. MGMT.)
एनटीपीसी लिमिटेड/ NTPC Limited
कोयला खनन परियोजनाएँ/ COAL MINING PROJECTS
हजारीबाग / Hazaribag

Instantel

Event Report

Date/Time	Tran at 01:43 11 November 4, 2022
Trigger Source	Geo: 0.510 mm/s Mic: 137.0 dB(L)
Range	Geo: 31.75 mm/s
Record Time	4.0 sec at 1024 sps

Serial Number	BE20626 V 10.72-1.1 Minimate Blaster
Battery Level	6.1 Volts
Unit Calibration	January 29, 2022 by UES New Delhi
File Name	_TEMP EVT
Post Event Notes	At Near Urub School 295mt From Blasting Patch

Notes

Location:	On Ground Surface
Client:	Pakri Barwadhi Coal Mines
User Name:	Black Diamond Explosives Pvt Ltd
General:	

Extended Notes

Microphone	Linear Weighting
PSPL	109.5 dB(L) at 3.768 sec
ZC Freq	4.8 Hz
Channel Test	Passed (Freq = 19.7 Hz Amp = 486 mv)

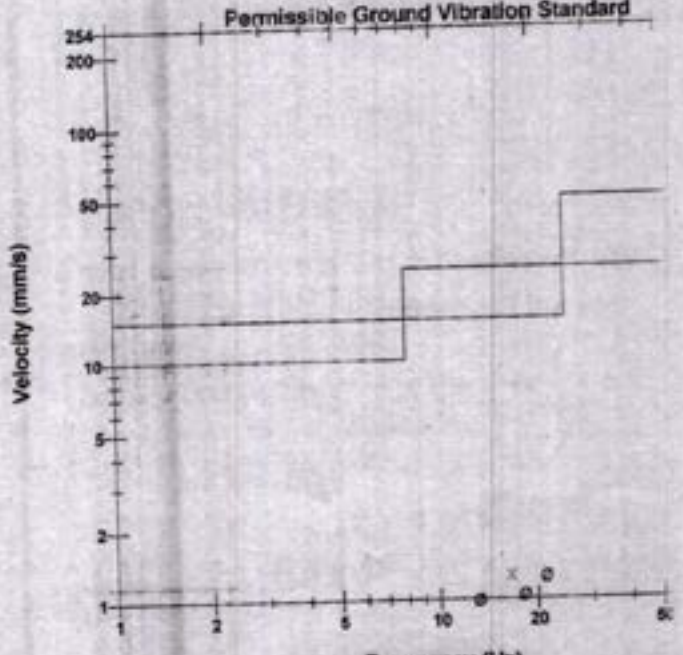
	Tran	Vert	Long	
PPV	0.937	1.476	1.508	mm/s
PPV	50.43	54.38	54.57	dB
ZC Freq	7.8	N/A	N/A	Hz
Time (Rel. to Trig)	3.905	3.999	3.973	sec
Peak Acceleration	0.015	0.023	0.022	g
Peak Displacement	0.017	0.013	0.015	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.5	7.7	7.6	Hz
Overswing Ratio	3.2	3.5	3.3	

Peak Vector Sum 1.762 mm/s at 3.973 sec

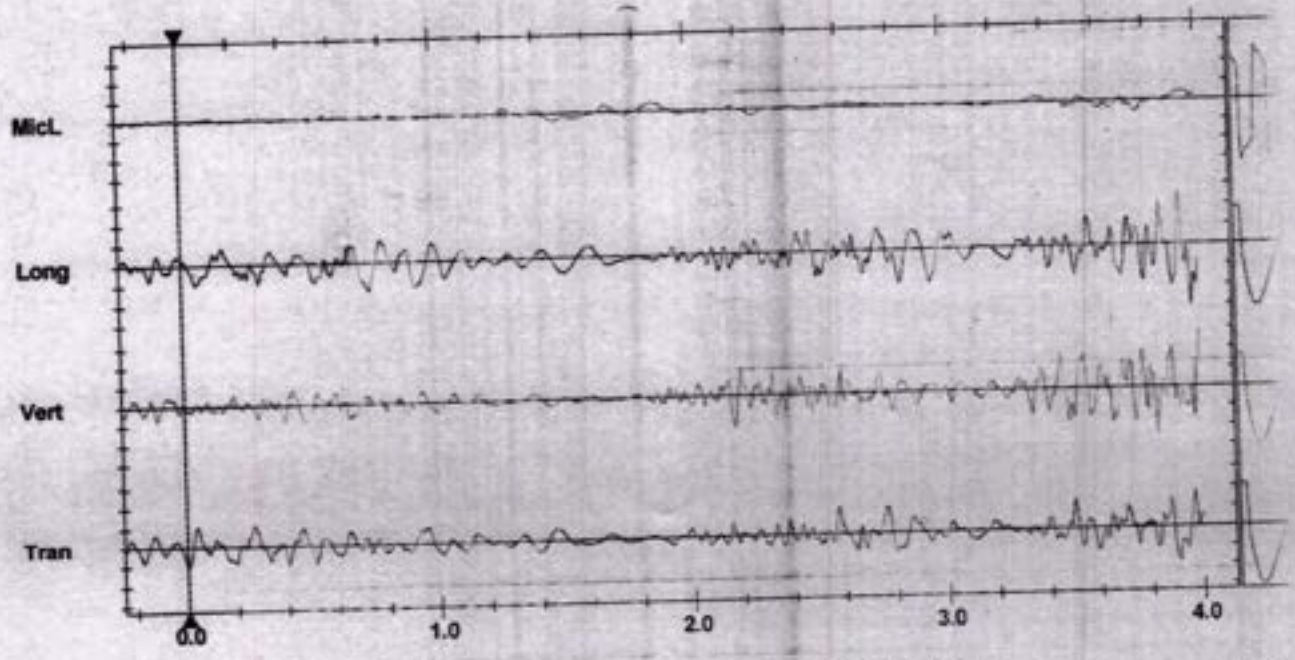
N/A: Not Applicable

DGMS India (B)

Permissible Ground Vibration Standard



a) Industrial buildings
b)Domestic houses/structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 0.500 mm/s/div Mic: 10.000 pa (L)/div

Trigger =

Sen

Printed: November 4, 2022 (V 10.72 - 10.72)

नवीन कुमार / NAVIN KUMAR
उप महाप्रबंधक (पर्यावरण प्रबंधन) / DGM (ENVT. MGMT.)
एनटीपीसी लिमिटेड/ NTPC Limited
कोयला खनन परियोजनाएँ/ COAL MINING PROJECTS
हजारीबाग / Hazaribag

Instantel

Event Report

Date/Time	Long at 01:45:14 November 12, 2022
Trigger Source	Geo: 0.510 mm/s, Mic: 137.0 dB(L)
Range	Geo: 31.75 mm/s
Record Time	4.0 sec at 1024 sps

Serial Number	BE20626 V 10.72-1.1 Minimate Blaster
Battery Level	6.1 Volts
Unit Calibration	January 29, 2022 by UES New Delhi
File Name	__TEMP.EVT
Post Event Notes	

At Near Nagari School 310 Mt From Blasting Patch

Notes

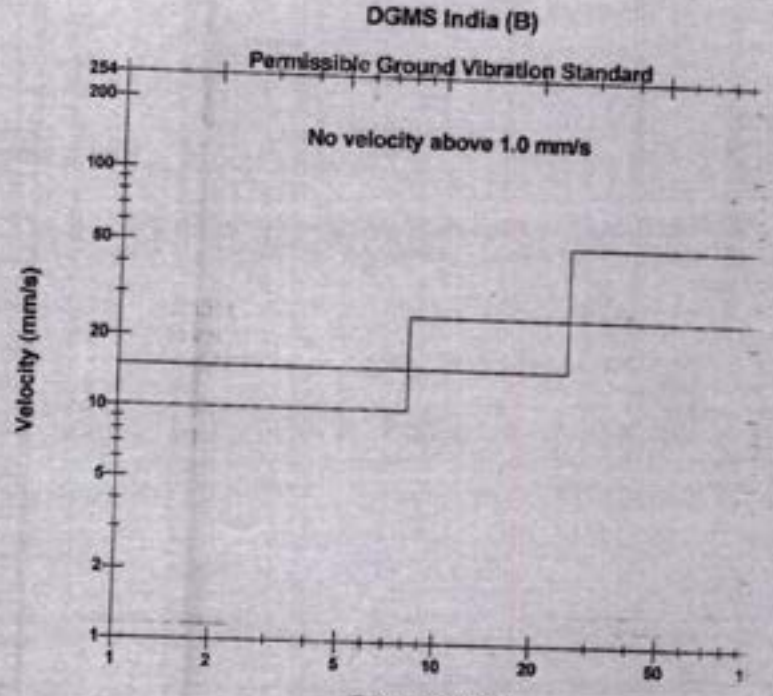
Location:	On Ground Surface
Client:	Pakri Barwadhi Coal Mines
User Name:	Black Diamond Explosives Pvt Ltd
General:	

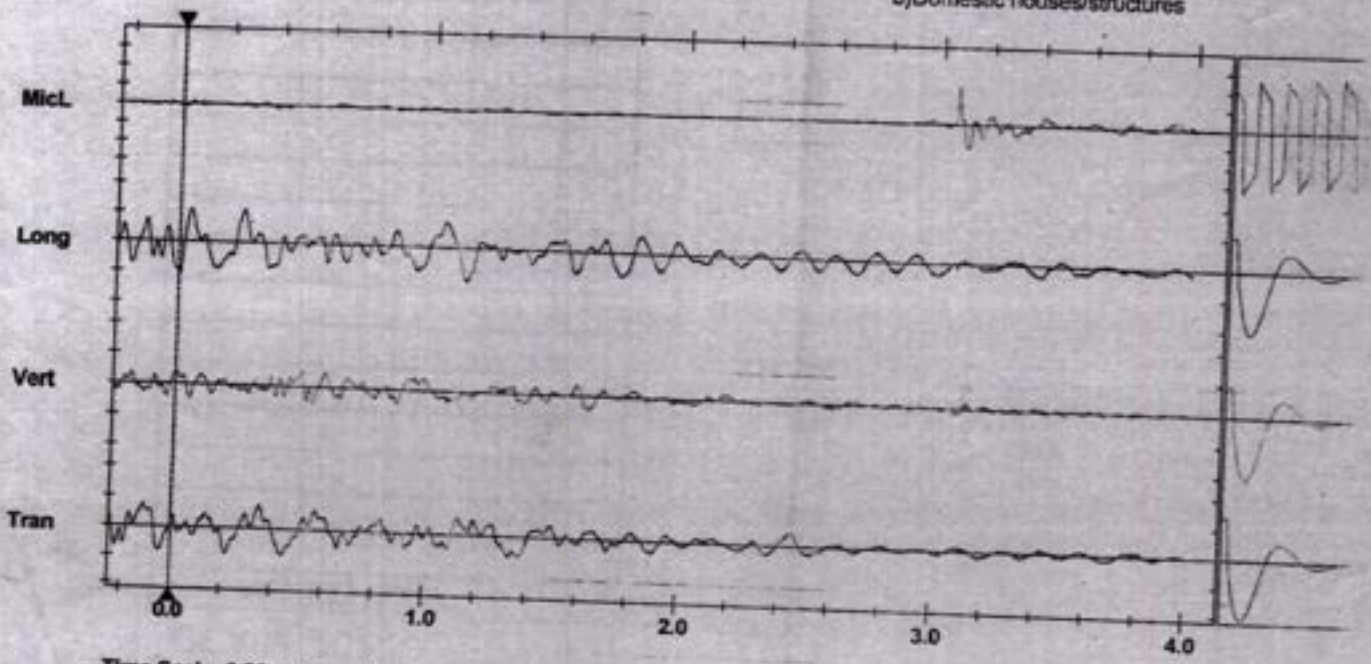
Extended Notes

Microphone	Linear Weighting
PSPL	120.0 dB(L) at 3.063 sec
ZC Freq	11 Hz
Channel Test	Passed (Freq = 20.1 Hz Amp = 483 mv)

	Tran	Vert	Long	
PPV	0.460	0.286	0.571	mm/s
PPV	44.26	40.12	46.14	dB
ZC Freq	4.7	15	8.3	Hz
Time (Rel. to Trig)	0.446	0.548	0.256	sec
Peak Acceleration	0.007	0.007	0.008	g
Peak Displacement	0.014	0.007	0.016	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.5	7.6	7.4	Hz
Overswing Ratio	3.3	3.6	3.4	

Peak Vector Sum 0.611 mm/s at 1.135 sec





Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 0.500 mm/s/div Mic: 10.000 pa.(L)/div
Trigger =

Printed: November 17, 2022 (V 10.72 - 10.72)

Sensor Chec

नवीन कुमार / NAVIN KUMAR
उप महाप्रबंधक (पर्यावरण प्रबंधन) / DGM (ENVT. MGMT.)
एनटीपीसी लिमिटेड/ NTPC Limited
कोयला खनन परियोजनाएँ/ COAL MINING PROJECTS
हजारीबाग / Hazaribag

Instantel

Event Report

Date/Time	Tran at 14:38:09 October 21, 2022
Trigger Source	Geo: 0.700 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.0 sec at 1024 sps
Operator/Setup:	Operator/factory.MMB

Serial Number	UM9191 V 10-90GC Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 30, 2021 by CIMFR Dhanbad
File Name	__TEMP.EVT

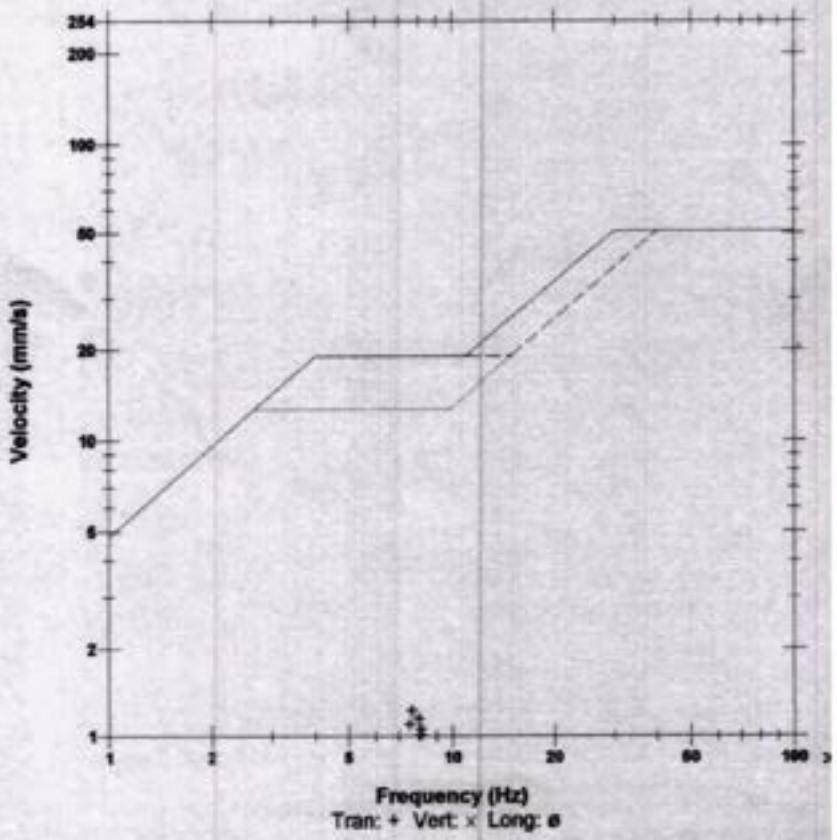
Notes

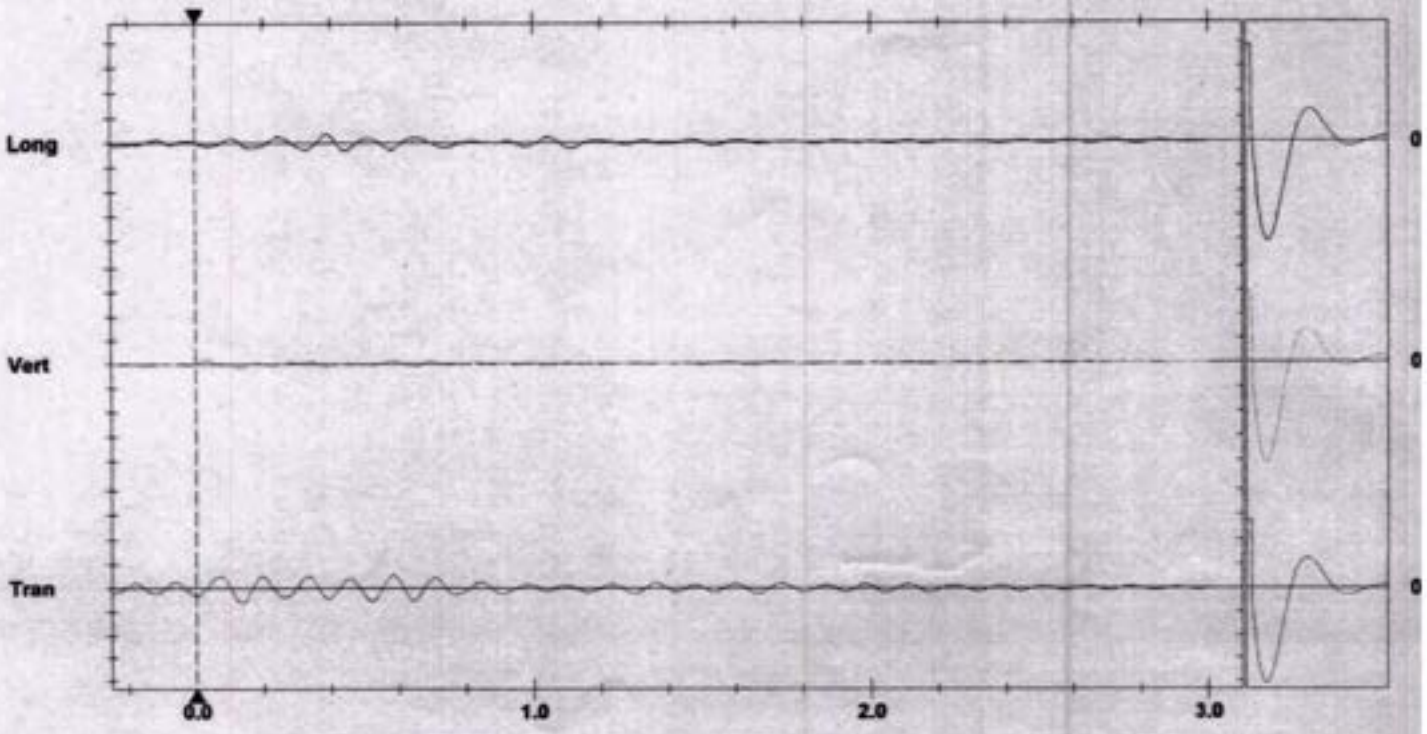
Location:	RAMGARH
Client:	TATA/NTPC/CCL
User Name:	SOLAR INDUSTRIES INDIA LIMITED
General:	COAL MINES

	Tran	Vert	Long	
PPV	1.222	0.418	0.725	mm/s
PPV	52.74	43.42	48.21	dB
ZC Freq	7.6	7.8	8.8	Hz
Time (Rel. to Trig)	0.134	0.031	0.388	sec
Peak Acceleration	0.014	0.006	0.007	g
Peak Displacement	0.026	0.007	0.012	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.5	7.7	7.1	Hz
Overswing Ratio	3.3	2.9	3.2	

Peak Vector Sum 1.290 mm/s at 0.582 sec

USBM RI8507 And OSMRE





Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div

Trigger = ▶——————◀

Sensor Check

नवीन कुमार / NAVIN KUMAR
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एनटीपीसी लिमिटेड/ NTPC Limited
कोयला खनन परियोजनाएँ/ COAL MINING PROJECTS
हजारीबाग / Hazaribag

PAKRI BARWADIH COAL MINING PROJECT

Ground Water Level Monitoring Report (in meter) October-2022 to March-2023

Sl.No.	Monitoring Location	Total Depth of Well	Height from surface	GPS Location	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23
1	SINDUARI	10 meter	0.10 meter	N- 23° 53' 33.3" E- 85° 12' 08.3"	7.50	7.55	7.60	8.00	8.00	7.95
2	KANDABER	20 meter	0.95 meter	N- 23° 54' 26.4" E- 85° 09' 34.7"	8.85	8.90	8.95	9.25	9.30	9.45
3	SIRMA	9 meter	0.40 meter	N- 23° 53' 36.1" E- 85° 10' 42.5"	6.40	6.40	6.50	6.75	6.75	6.80
4	PAKRI BARWADIH	10 meter	0.55 meter	N- 23° 52' 16.6" E- 85° 13' 55.5"	4.60	4.65	4.70	5.00	5.05	5.15
5	AMBAJEET	11 meter	0.45 meter	N- 23° 51' 07.8" E- 85° 17' 12.0"	8.10	8.15	8.25	8.50	8.55	8.60
6	HORAM	10.5 meter	0.45 meter	N- 23° 50' 28.0" E- 85° 15' 09.6"	7.70	7.75	7.85	8.15	8.15	8.20
7	DHENGA	11 meter	0.40 meter	N- 23°50' 48.2" E- 85°13' 30.9"	5.50	5.50	5.55	6.05	6.10	6.20
8	DEWORIA KHURD (1)	9 meter	0.85 meter	N- 23° 53' 06.7" E- 85° 11' 06.9"	6.95	7.05	7.10	7.50	7.50	7.60
9	KANKIDARI	9 meter	0.5 meter	N- 23° 53' 05.5" E- 85° 12' 38.2"	7.05	7.10	7.15	7.65	7.65	7.70
10	DARIKALAN	15.1 meter	0.25 meter	N-23°52'29.208" E- 85° 13'5.714"	9.25	9.35	9.45	9.85	9.85	10.00
11	LANGATU	14 meter	0.30 meter	N- 23° 51'0.889" E-85°12'54.623"	9.60	9.65	9.70	10.20	10.20	10.30
12	BARKAGAON	10 meter	0.75 meter	N- 23° 53' 05.5" E- 85° 12' 38.2"	7.90	8.00	8.05	8.35	8.35	8.45
13	SONBARSA (1)	8 meter	0.30 meter	N-23°52'48.579" E-85°12'15.253"	5.50	5.60	5.70	5.95	5.95	6.10
14	ITU	13 meter	0.35 meter	N-23°55'33.715" E- 85° 11'3.872"	6.80	6.90	7.00	7.15	7.20	7.30
15	KERIGARA	11 meter	0.25 meter	N-23°51'51.562" E- 85°12' 12.15"	9.20	9.25	9.30	9.75	9.75	9.85
16	NAGRI	4.5 meter	0.20 meter	N- 23° 54' 30.4" E- 85° 12' 06.6"	1.95	2.05	2.10	2.45	2.45	2.55
17	SONBARSA (2)	7.90 meter	0.40 meter	N-23°52'39.66" E-85°12'19.51"	5.05	5.10	5.20	5.55	5.60	5.70
18	DEWORIA KHURD (2)	10 meter	0.50 meter	N-23°53'7.01" E- 85° 11'39.01"	6.40	6.45	6.50	6.80	6.80	6.90
19	CHURCHU	8.80meter	0.30 meter	N-23°53'24.24" E- 85°11' 49.23"	6.15	6.20	6.30	6.75	6.75	6.85
20	URUB	14.30 meter	0.40 meter	N- 23° 54' 9.34" E- 85° 11' 16.01"	11.05	11.10	11.15	11.75	11.75	11.85

नवीन कुमार / NAVIN KUMAR
उप महाप्रबंधक (पर्यावरण प्रबंधन) / DGM (ENVT. MGMT.)
एनटीपीसी लिमिटेड / NTPC Limited
कोयला खनन परियोजनाएँ / COAL MINING PROJECTS
हजारीबाग / Hazaribag

PAKRI BARWADIH COAL MINING PROJECT

Automatic Water Level Reading in meter (Piezometer -1), Location - Langatu Site Office

Date	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23
1	42.01	42.81	45.79	50.39	46.63	52.18
2	41.28	43.77	41.91	47.21	49.39	52.40
3	42.65	43.57	40.59	46.87	45.57	52.44
4	39.36	45.26	41.17		50.11	52.01
5	36.43	46.71	47.94		48.77	52.14
6	39.15	44.01	46.03	49.84	47.43	51.87
7	40.21	41.92	48.96	47.10	48.78	52.21
8	40.14	43.83	44.44	45.56	51.08	50.56
9	44.56	43.63	43.64	46.79	51.28	49.37
10	46.19	42.31	44.32	50.79	50.46	50.46
11	44.85	42.44	43.79	50.96	52.23	52.26
12	45.53	42.80	48.11	52.00	50.69	52.36
13	50.78	44.63	44.77	49.95	49.87	50.70
14	44.29	46.24	45.19	51.98	52.18	50.61
15	48.11	45.43	46.51	50.97	50.72	52.29
16	47.64	45.73	46.79	49.22	50.43	52.27
17	47.81	46.97	50.36	50.70	50.51	51.81
18	45.58	44.79	49.33	51.35	50.37	52.24
19	44.89	47.52		49.90	49.67	50.86
20	46.51	46.29	52.38	48.71	49.27	51.25
21	46.20	45.83	50.42	49.62	50.50	50.67
22	47.62	48.07	49.01	48.32	50.06	50.30
23	44.16	47.21	47.33	50.06	50.38	50.68
24	44.68	47.59	47.81	48.22	51.30	52.02
25	45.73	46.82	50.63	47.83	51.22	50.93
26	46.33	45.79	50.27	50.21	52.35	52.73
27	46.37	42.41	50.73	47.92	52.04	51.69
28	45.81	42.84	49.16	46.55	52.24	51.67
29	44.07	46.01	52.03	44.81		51.84
30	42.28	46.85	50.17	46.72		52.60
31	41.55		50.48	46.61		52.17
Avg.	**44.28**	**45.00**	**47.34**	**48.87**	**50.20**	**51.60**

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कोयला खनन परियोजनाएँ/ COAL MINING PROJECTS
हजारीबाग / Hazaribag

PAKRI BARWADIH COAL MINING PROJECT

Automatic Water Level Reading in meter (Piezometer -2), Location - NTPC Office, Sikri

Date	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23
1	2.87	3.15		4.58		
2	2.77	3.22	5.39	4.40		
3	3.22	3.37	5.35	4.51		
4	3.05	3.45	5.11	4.59		
5	2.72	3.56	4.83			
6	2.54	3.74	5.49	4.76	5.79	
7	2.45	3.74	5.35	5.40	5.58	
8	2.55	3.71	4.89	4.93		
9	2.73	3.85	4.60	4.73		
10	2.65	3.93			6.13	6.96
11	2.60	4.32				6.55
12	2.56	4.40			5.97	
13	2.58	4.37	5.13		6.07	
14	2.69	4.43	5.29		6.57	
15	2.71	4.73	5.38		6.66	
16	2.70	4.72	5.69	5.36	6.50	7.21
17	2.69	5.16	5.74	5.04		6.93
18	2.67	4.93	5.54	5.11		6.55
19	2.75	4.66	5.69	5.47		6.46
20	2.74		5.61	5.41	6.59	6.75
21	2.80		5.18	5.69		6.60
22	2.85	5.43	5.35	5.25		6.71
23	2.94	4.99	5.54	5.24		6.63
24	2.73	4.79	5.51	5.33		7.00
25	2.66	5.09	5.34	5.95		6.81
26	2.75	5.49	5.18	5.46		6.69
27	2.84	5.60	5.34	5.72		6.85
28	3.03	5.25	5.17	5.71		7.13
29	3.12	4.95	4.97	5.13		7.45
30	2.96		4.76			7.76
31	2.98		5.19			7.75
Avg.	**2.77**	**4.41**	**5.28**	**5.17**	**6.21**	**6.93**

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GLOBAL ENVIRO Laboratories

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MOBILE : +91-9810317145, +91-8826028116
E-mail : global_enviro@rediffmail.com, globalenvirolab@gmail.com
MoEF&CC Recognized Environmental Laboratory

SURFACE WATER SAMPLING AND ANALYSIS SUMMARY REPORT

FOR THE MONTH OF JAN 2023

Name and Address of Customer: M/S PAKRI BARWADIH COAL MINING NTPC LTD., LANGATU, BARKAGAON, HAZARIBAGH, JHARKHAND. (INDIA)

SURFACE WATER (16.01.2023)						
S. No	Parameter	Unit	RESULT			
			LATHORWA NALA, NEAR SIRMA-UPSTREAM (SW-1)	PAKWA NALA, WHILE ENTERING THE LEASE AREA-UPSTREAM (SW-2)	PAKWA NALA, WHILE LEAVING THE LEASE AREA- DOWNSTREAM (SW-3)	LATHORWA NALA, BEFORE CONFLUENCE WITH GHAGRANADI-DOWNSTREAM (SW-4)
1	Colour	Hazen	25	28	30	26
2	Turbidity	NTU	2	5	3	2.5
3	pH	---	7.18	7.12	7.14	7.23
4	Residual Free Chlorine(as Cl2)	mg/l	ND	ND	ND	ND
5	Total Dissolved Solids	mg/l	234	148	216	234
6	Total Suspended Solids	mg/l	26	22	18	13
7	Total Hardness (as CaCO3)	mg/l	138	118	136	132
8	Calcium (as Ca)	mg/l	24.5	21.5	27.2	26.4
9	Magnesium	mg/l	16.8	14.3	16.5	16.0
10	DO	mg/l	5.6	6.2	6.8	6.4
11	Chloride (as Cl)	mg/l	19	13	28	26
12	Sulphate (SO_4)	mg/l	28	19	24	29
13	Iron (as Fe)	mg/l	0.56	0.24	0.36	0.34
14	Copper(as Cu)	mg/l	BDL	BDL	BDL	BDL
15	Boron	mg/l	0.22	0.24	0.29	0.32
16	Nitrate (as No_2)	mg/l	4.3	2.6	2.1	2.9
17	Fluoride (as F)	mg/l	0.39	0.35	0.27	0.33
18	Phenolic Compound (as C_6H_5OH)	mg/l	BDL	BDL	BDL	BDL
19	Mercury(as Hg)	mg/l	BDL	BDL	BDL	BDL
20	Cadmium (as Cd)	mg/l	BDL	BDL	BDL	BDL
21	Selenium (as Se)	mg/l	BDL	BDL	BDL	BDL
22	Arsenic (as As)	mg/l	BDL	BDL	BDL	BDL
23	Cyanide (as CN)	mg/l	BDL	BDL	BDL	BDL
24	Lead (as Pb)	mg/l	BDL	BDL	BDL	BDL

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MOBILE : +91-9810317145, +91-8826028116
E-mail : global_enviro@rediffmail.com, globalenvirolab@gmail.com
MoEF&CC Recognized Environmental Laboratory

S. No		Unit	LATHORWA NALA, NEAR SIRMA-UPSTREAM (SW-1)	PAKWA NALA, WHILE ENTERING THE LEASE AREA-UPSTREAM (SW-2)	PAKWA NALA, WHILE LEAVING THE LEASE AREA- DOWNSTREAM (SW-3)	LATHORWA NALA, BEFORE CONFLUENCE WITH GHAGRANADI-DOWNSTREAM (SW-4)
25	Zinc (as Zn)	mg/l	0.15	0.12	0.16	BDL
26	Anionic Detergent (MBAS)	mg/l	BDL	BDL	BDL	BDL
27	Mineral Oil	mg/l	BDL	BDL	BDL	BDL
28	Total Alkalinity (as CaCO3)	mg/l	92	68	74	98
29	Aluminum (as Al)	mg/l	BDL	BDL	BDL	BDL
30	Barium (as Ba)	mg/l	BDL	BDL	BDL	BDL
31	Ammonia (Total Ammonia –N)	mg/l	2.9	3.2	3.7	3.1
32	Silver (as Ag)	mg/l	BDL	BDL	BDL	BDL
33	Nickel (as Ni)	mg/l	0.1	BDL	BDL	0.22
34	Chromium (as Cr^{+6})	mg/l	BDL	BDL	BDL	BDL
35	Chemical Oxygen Demand	mg/l	18	26	34	28
36	Manganese (as Mn)	mg/l	0.18	0.13	0.16	0.24
37	E.coli	Coli/100ml	Present	Present	Present	Present
38	Total Coli forms	MPN/100ml	>1600	>1600	>1600	>1600
39	Sodium	mg/l	56	19	37	32
40	Potassium	mg/l	13	5	9	7
41	Biochemical Oxygen Demand (at 27°C for 3 days)	mg/l	4	5	6.5	4.5
42	Conductivity (25° C)	mS/cm	360	228	332	360
43	Silica (Sio_2)	mg/l	1.8	2.4	2.6	2.1
44	Phosphate (PO_4)	mg/l	0.43	0.57	0.62	0.50

***END OF TEST REPORT ***

FOR GLOBAL ENVIRO LABORATORIES

CHECKED BY
(INTEKHAB KHAN)

नवीन कुमार / NAVIN KUMAR
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कोयला खनन परियोजनाएँ/ COAL MINING PROJECTS
हजारीबाग / Hazaribag

AUTHORISED SIGNATORY
(ARVIND KUMAR)

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MOBILE : +91-9810317145, +91-8826028116
E-mail : global_enviro@rediffmail.com, globalenvirolab@gmail.com
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SURFACE WATER SAMPLING AND ANALYSIS SUMMARY REPORT

FOR THE MONTH OF JAN 2023

Name and Address of Customer: M/S PAKRI BARWADIH COAL MINING NTPC LTD., LANGATU, BARKAGAON, HAZARIBAGH, JHARKHAND. (INDIA)

SURFACE WATER (16.01.2023)					
S. No	Parameter	Unit	RESULT		
			GHAGRA NADI NEAR PANDURIYA D/S OF CONFLUENCE WITH HORHORINADI-DOWNSTREAM (SW-5)	HORHORINADI, NEAR KANRTRI-(SW-6)	POND NEAR CHEOAKHURD-(SW-7)
1	Colour	Hazen	24	30	34
2	Turbidity	NTU	3.6	2.8	3.8
3	pH	.....	7.2	7.19	7.13
4	Residual Free Chlorine(as Cl2)	mg/l	ND	ND	NO
5	Total Dissolved Solids	mg/l	218	222	286
6	Total Suspended Solids	mg/l	19	26	27
7	Total Hardness (as CaCO3)	mg/l	142	125	147
8	Calcium (as Ca)	mg/l	28.4	25	29.4
9	Magnesium	mg/l	17.2	15.2	17.8
10	DO	mg/l	5.9	7.1	6.4
11	Chloride (as Cl)	mg/l	45	61	41
12	Sulphate (SO_4)	mg/l	38	31	25
13	Iron (as Fe)	mg/l	0.91	0.68	1.3
14	Copper(as Cu)	mg/l	BDL	BDL	BDL
15	Boron	mg/l	0.41	0.26	0.38
16	Nitrate (as No_3)	mg/l	3.4	4.8	5.1
17	Fluoride (as F)	mg/l	0.54	0.25	0.31
18	Phenolic Compound (as C_6H_5OH)	mg/l	BDL	BDL	BDL
19	Mercury(as Hg)	mg/l	BDL	BDL	BDL
20	Cadmium (as Cd)	mg/l	BDL	BDL	BDL
21	Selenium (as Se)	mg/l	BDL	BDL	BDL
22	Arsenic (as As)	mg/l	BDL	BDL	BDL
23	Cyanide (as CN)	mg/l	BDL	BDL	BDL
24	Lead (as Pb)	mg/l	BDL	BDL	BDL

नवीन कुमार / NAVIN KUMAR
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MOBILE : +91-9810317145, +91-8826028116
E-mail : global_enviro@rediffmail.com, globalenvirolab@gmail.com
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S. No		Unit	GHAGRA NADI NEAR PANDURIYA D/S OF CONFLUENCE WITH HORHORINADI-DOWNSTREAM (SW-5)	HORHORINADI, NEAR KANRTRI-(SW-6)	POND NEAR CHEOAKHURD-(SW-7)
25	Zinc (as Zn)	mg/l	0.18	0.08	BDL
26	Anionic Detergent (MBAS)	mg/l	BDL	BDL	BDL
27	Mineral Oil	mg/l	BDL	BDL	BDL
28	Total Alkalinity (as CaCO3)	mg/l	105	77	68
29	Aluminum (as Al)	mg/l	BDL	BDL	BDL
30	Barium (as Ba)	mg/l	BDL	BDL	BDL
31	Ammonia (Total Ammonia –N)	mg/l	4.2	3.5	3.8
32	Silver (as Ag)	mg/l	BDL	BDL	BDL
33	Nickel (as Ni)	mg/l	BDL	0.16	0.26
34	Chromium (as Cr^{+6})	mg/l	BDL	BDL	BDL
35	Chemical Oxygen Demand	mg/l	36	44	24
36	Manganese (as Mn)	mg/l	0.18	0.26	0.16
37	E.Coli	Coli/100ml	Present	Present	Present
38	Total Coli forms	MPN/100ml	>1600	>1600	>1600
39	Sodium	mg/l	42	36	45
40	Potassium	mg/l	12	11	15
41	Biochemical Oxygen Demand (at 27°C for 3 days)	mg/l	6	8	5.5
42	Conductivity (25° C)	mS/cm	335	342	440
43	Silica (Sio_2)	mg/l	2.3	3.4	4.5
44	Phosphate (PO_4)	mg/l	0.55	0.81	1.07

***END OF TEST REPORT ***

FOR GLOBAL ENVIRO LABORATORIES

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AUTHORISED SIGNATORY
(ARVIND KUMAR)

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MOBILE : +91-9810317145, +91-8826028116
E-mail : global_enviro@rediffmail.com, globalenvirolab@gmail.com
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GROUND WATER SAMPLING AND ANALYSIS SUMMARY REPORT

FOR THE MONTH OF JAN 2023

Name and Address of Customer: M/S PAKRI BARWADIH COAL MINING NTPC LTD.,
LANGATU, BARKAGAON, HAZARIBAGH, JHARKHAND. (INDIA)

PAKRI BARWADIH COAL MINES

GROUND WATER REPORT (16.01.2023)							Acceptable Limit	Permissible limit
S. No	PARAMETER	Unit	RESULT					
			WELL AT SINDUARI-(GW-1)	WELL AT KANDABER -(GW-2)	WELL AT SIRMA-(GW-3)	WELL AT PAKRI BARWADIH -(GW-4)	IS: 10500:2012	
1	Colour	Hazen	<5.0	<5.0	<5.0	<5.0	5 Max	15 Max
2	Odour	---	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
3	Taste	---	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
4	Turbidity	NTU	3.5	4.2	4.6	5.1	1	5
5	pH	---	7.18	7.25	7.18	7.32	6.5-8.5	No relaxation
6	Residual Free Chlorine(as Cl2)	mg/l	ND	ND	ND	ND	0.2	1
7	Total Dissolved Solids	mg/l	518	536	378	521	500	2000
8	Total Hardness (as CaCO3)	mg/l	247	255	180	248	200	600
9	Calcium (as Ca)	mg/l	49.3	51.0	36.0	49.6	75	200
10	Magnesium	mg/l	29.9	31.0	21.9	30.1	30	100
11	Chloride (as Cl)	mg/l	140	144.9	102.2	140.8	250	1000
12	Sulphate	mg/l	56.3	58.3	41.1	56.6	200	400
13	Iron (as Fe)	mg/l	0.16	0.21	0.25	0.23	0.3	No relaxation
14	Copper(as Cu)	mg/l	BDL	BDL	BDL	BDL	0.05	1.5
15	Boron	mg/l	BDL	BDL	BDL	BDL	0.5	1
16	Nitrate (as No_3)	mg/l	6.5	7.8	4.7	6.5	45	No relaxation
17	Fluoride (as F)	mg/l	0.22	0.26	0.29	0.32	1	1.5
18	Phenolic Compound (as C_6H_5OH)	mg/l	BDL	BDL	BDL	BDL	0.001	0.002
19	Mercury(as Hg)	mg/l	BDL	BDL	BDL	BDL	0.001	No relaxation
20	Cadmium (as Cd)	mg/l	BDL	BDL	BDL	BDL	0.003	No relaxation
21	Selenium (as Se)	mg/l	BDL	BDL	BDL	BDL	0.01	No relaxation
22	Arsenic (as As)	mg/l	BDL	BDL	BDL	BDL	0.01	0.05

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GROUND WATER REPORT								
23	Cyanide (as CN)	mg/l	BDL	BDL	BDL	BDL	0.05	No relaxation
24	Lead (as Pb)	mg/l	BDL	BDL	BDL	BDL	0.01	No relaxation
25	Zinc (as Zn)	mg/l	BDL	BDL	BDL	BDL	5	15
26	Total Alkalinity	mg/l	185	191	135	186	200	600
27	Aluminium (as Al)	mg/l	BDL	BDL	BDL	BDL	0.03	0.2
28	Barium (as Ba)	mg/l	BDL	BDL	BDL	BDL	0.7	No relaxation
29	Ammonia (Total Ammonia -N)	mg/l	BDL	BDL	BDL	BDL	0.5	No relaxation
30	Silver (as Ag)	mg/l	BDL	BDL	BDL	BDL	0.1	No relaxation
31	Nickel (as Ni)	mg/l	BDL	BDL	BDL	BDL	0.02	No relaxation
32	Chromium (as Cr^{+3})	mg/l	BDL	BDL	BDL	BDL	0.05	No relaxation
33	Manganese (as Mn)	mg/l	BDL	BDL	BDL	BDL	0.1	0.3
34	E.Coli	/100 ml	Absent	Absent	Absent	Absent	-----	NOT DETECTABLE IN 100 ML SAMPLE
35	Total Coli forms	MPN/100 ml	Absent	Absent	Absent	Absent	-----	NOT DETECTABLE IN 100 ML SAMPLE
36	Conductivity	µS/cm	803	812	571	808	NOT SPECIFIED	NOT SPECIFIED
BDL- Below Detection Limit								

***END OF TEST REPORT ***

FOR GLOBAL ENVIRO LABORATORIES

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(INTEKHAB KHAN)

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(ARVIND KUMAR)

GLOBAL ENVIRO Laboratories

PLOT NO. 4, KHASRA NO. 45, OPPOSITE SHREE MANAN DHAM TEMPLE, 8TH K.M. MILE STONE, INDUSTRIAL AREA, MEERUT ROAD,GHAZIABAD -201003 (U.P.)
MOBILE : +91-9810317145, +91-8826028116
E-mail : global_enviro@rediffmail.com, globalenvirolab@gmail.com
MoEF&CC Recognized Environmental Laboratory

GROUND WATER SAMPLING AND ANALYSIS SUMMARY REPORT FOR THE MONTH OF JAN 2023

Name and Address of Customer: M/S PAKRI BARWADIH COAL MINING NTPC LTD.,
LANGATU, BARKAGAON, HAZARIBAGH, JHARKHAND. (INDIA)

PAKRI BARWADIH COAL MINES

S. No	PARAMETER	UNIT	GROUND WATER REPORT (16.01.2023) RESULT				Acceptable Limit	Permissible limit
			WELL AT AMBAJIT-(GW-5)	WELL AT HORAM (GW-6)	WELL AT BARKAGAON (GW-7)	WELL AT DEWORIA KHURD- (GW-8)	IS: 10500:2012	
1	Colour	Hazen	<5.0	<5.0	<5.0	<5.0	5 Max	15 Max
2	Odour	....	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
3	Taste	....	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
4	Turbidity	NTU	3.8	2.1	2.4	3.0	1	5
5	pH	....	7.12	7.22	7.19	7.14	6.5-8.5	No relaxation
6	Residual Free Chlorine(as Cl2)	mg/l	ND	ND	ND	ND	0.2	1
7	Total Dissolved Solids	mg/l	395	362	458	355	500	2000
8	Total Hardness (as CaCO3)	mg/l	188	172	218	169	200	600
9	Calcium (as Ca)	mg/l	37.6	34.5	43.6	33.8	75	200
10	Magnesium	mg/l	22.8	20.9	26.5	20.5	30	100
11	Chloride (as Cl)	mg/l	106.8	97.8	123.8	95.9	250	1000
12	Sulphate	mg/l	42.9	39.3	49.8	38.6	200	400
13	Iron (as Fe)	mg/l	0.2	0.34	0.38	0.19	0.3	No relaxation
14	Copper(as Cu)	mg/l	BDL	BDL	BDL	BDL	0.05	1.5
15	Boron	mg/l	BDL	BDL	BDL	BDL	0.5	1
16	Nitrate (as No2)	mg/l	4.9	3.2	5.7	5.6	45	No relaxation
17	Fluoride (as F)	mg/l	0.24	0.13	0.15	0.19	1	1.5
18	Phenolic Compound (as C6H5OH)	mg/l	BDL	BDL	BDL	BDL	0.001	0.002
19	Mercury(as Hg)	mg/l	BDL	BDL	BDL	BDL	0.001	No relaxation
20	Cadmium (as Cd)	mg/l	BDL	BDL	BDL	BDL	0.003	No relaxation
21	Selenium (as Se)	mg/l	BDL	BDL	BDL	BDL	0.01	No relaxation
22	Arsenic (as As)	mg/l	BDL	BDL	BDL	BDL	0.01	0.05

नवीन कुमार / NAVIN KUMAR
उप महाप्रबंधक (पर्यावरण प्रबंधन) / DGM (ENVT. MGMT.)
एनटीपीसी लिमिटेड/ NTPC Limited
कोयला खनन परियोजनाएँ/ COAL MINING PROJECTS
हजारीबाग / Hazaribag

GLOBAL ENVIRO Laboratories

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GROUND WATER REPORT								
23	Cyanide (as CN)	mg/l	BDL	BDL	BDL	BDL	0.05	No relaxation
24	Lead (as Pb)	mg/l	BDL	BDL	BDL	BDL	0.01	No relaxation
25	Zinc (as Zn)	mg/l	BDL	BDL	BDL	BDL	5	15
26	Total Alkalinity	mg/l	141	129	164	127	200	600
27	Aluminum (as Al)	mg/l	BDL	BDL	BDL	BDL	0.03	0.2
28	Barium (as Ba)	mg/l	BDL	BDL	BDL	BDL	0.7	No relaxation
29	Ammonia (Total Ammonia –N)	mg/l	BDL	BDL	BDL	BDL	0.5	No relaxation
30	Silver (as Ag)	mg/l	BDL	BDL	BDL	BDL	0.1	No relaxation
31	Nickel (as Ni)	mg/l	BDL	BDL	BDL	BDL	0.02	No relaxation
32	Chromium (as Cr +6)	mg/l	BDL	BDL	BDL	BDL	0.05	No relaxation
33	Manganese (as Mn)	mg/l	BDL	BDL	BDL	BDL	0.1	0.3
34	E. Coli	/100 ml	Absent	Absent	Absent	Absent	-----	NOT DETECTABLE IN 100 ML SAMPLE
35	Total Coli forms	MPN/ 100 ml	Absent	Absent	Absent	Absent	------	NOT DETECTABLE IN 100 ML SAMPLE
36	Conductivity	µS/cm	612	552	710	543	NOT SPECIFIED	NOT SPECIFIED
BDL- Below Detection Limit								

***END OF TEST REPORT ***

FOR GLOBAL ENVIRO LABORATORIES

CHECKED BY
(INTEKHAB KHAN)

AUTHORISED SIGNATORY
(ARVIND KUMAR)

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Photograph# 1.5 MLD STP for treatment of Sewage with the latest technology of MBBR System

नवीन कुमार / NAVIN KUMAR
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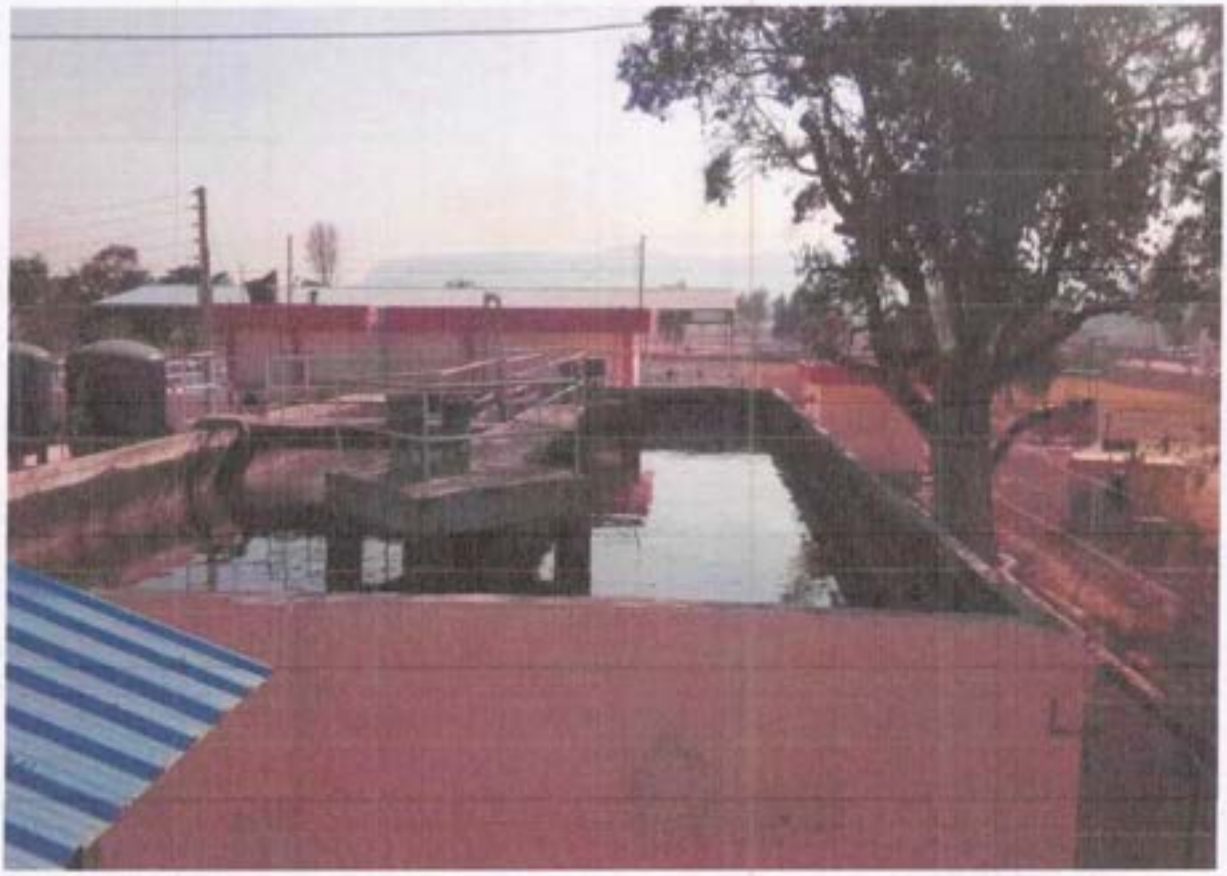

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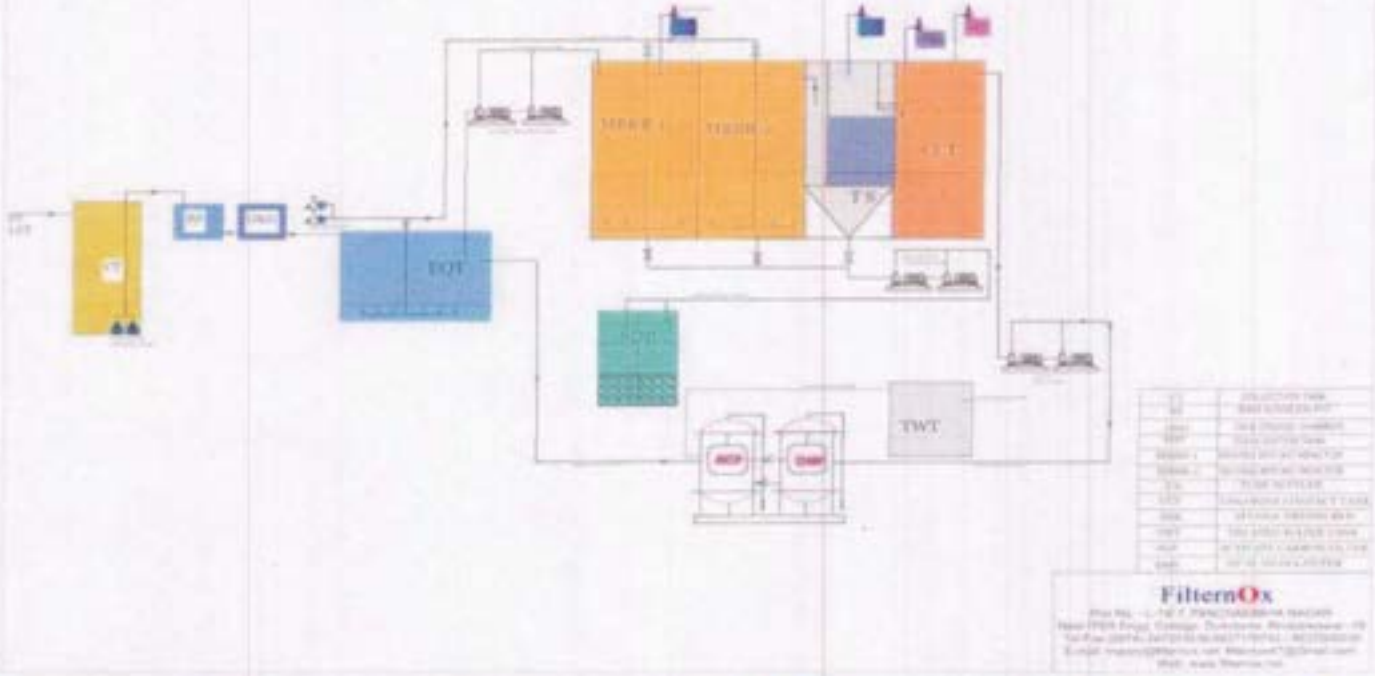
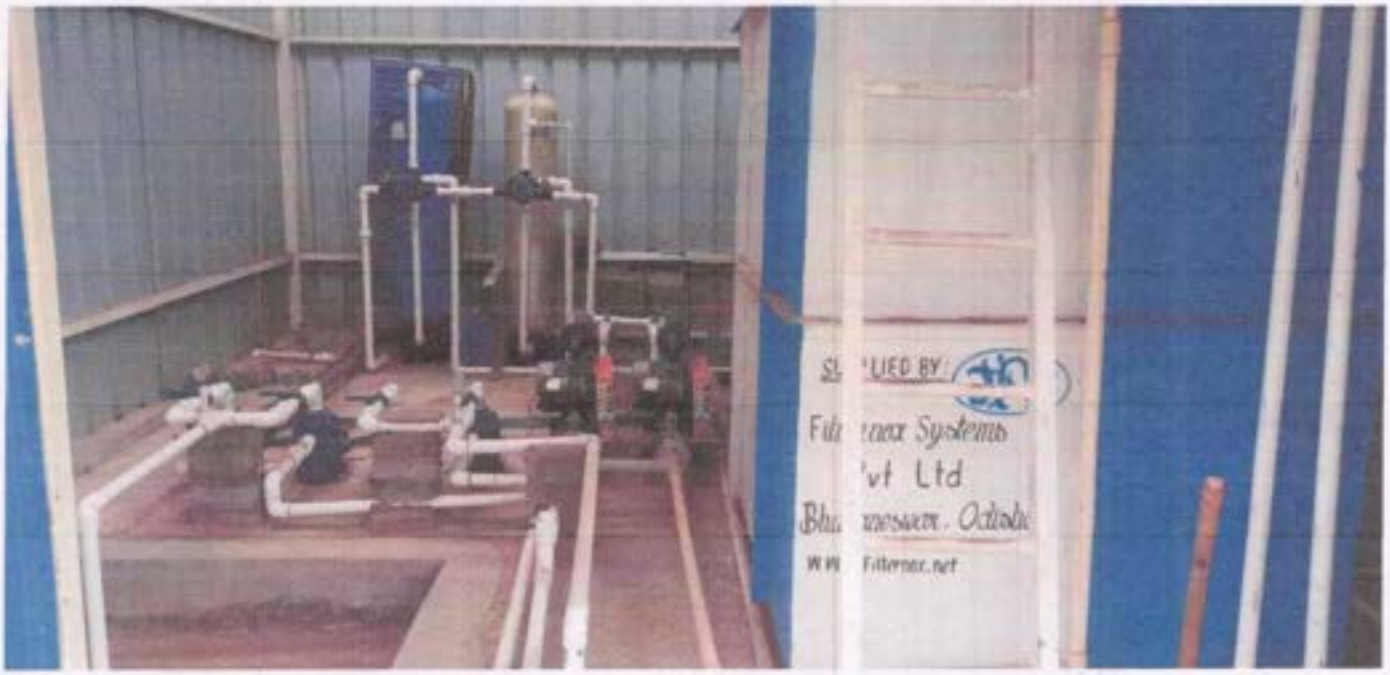
Photograph# 25 KLD STP for Treatment of Sewage with the latest technology of MBBR System

PAKRI BARWADIH COAL MINING PROJECT

Environment Management Cell
25 KLD Sewage Treatment Plant

एनटीपीसी NTPC





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PAKRI BARWADIH COAL MINING PROJECT

ETP Inlet & Outlet Analysis Data Month of March-2023

Sl. No.	Parameter	Unit	Inlet Result		Outlet Result		Standards (CPCB)	Protocoal
			02.03.2023	16.03.2023	02.03.2023	16.03.2023		
1	pH	.....	6.95	7.03	7.36	7.28	5.5-9.0	APHA-4500-H+
2	Total Suspended Solid (TSS)	mg/L	574	594	58	61	100 mg/l	APHA-2540-B
3	Total Disloved Solid (TDS)	mg/L	1742	1927	621	574	Not Specified	APHA-2540-C
4	Oil & Greses (O&G)	mg/L	14.5	12.7	3.2	2.7	10 mg/l	APHA-5520-C
5	Biological Oxygen Demand (BOD3 day, at 27 0C)	mg/L	69	78	25	28	30 mg/l	APHA-5210-B
6	Chemical Oxygen Demand	mg/L	271.8	307.3	98.5	113.7	250 mg/l	APHA-5220-B
7	Maganese (Mn)	mg/L	N.D	N.D	N.D	N.D	2 mg/l	APHA-3111 (B)
8	Chloride (Cl)	mg/L	698.0	567.0	226.0	219.0	Not Specified	APHA -4500 (Cl)

February-23

Sl. No.	Parameter	Unit	Inlet Result		Outlet Result		Standards (CPCB)	Protocoal
			02.02.2023	16.02.2023	02.02.2023	16.02.2023		
1	pH	.....	6.91	6.87	7.12	7.26	5.5-9.0	APHA-4500-H+
2	Total Suspended Solid (TSS)	mg/L	594	541	53	47	100 mg/l	APHA-2540-B
3	Total Disloved Solid (TDS)	mg/L	1874	1964	573	542	Not Specified	APHA-2540-C
4	Oil & Greses (O&G)	mg/L	11.9	12.4	3.9	2.8	10 mg/l	APHA-5520-C
5	Biological Oxygen Demand (BOD3 day, at 27 0C)	mg/L	71	67	26	27	30 mg/l	APHA-5210-B
6	Chemical Oxygen Demand	mg/L	352	327	101	129	250 mg/l	APHA-5220-B
7	Maganese (Mn)	mg/L	N.D	N.D	N.D	N.D	2 mg/l	APHA-3111 (B)
8	Chloride (Cl)	mg/L	797.0	821.0	119.0	124.0	Not Specified	APHA -4500 (Cl)

January-23

Sl. No.	Parameter	Unit	Inlet Result		Outlet Result		Standards (CPCB)	Protocoal
			02.01.2023	16.01.2023	02.01.2023	16.01.2023		
1	pH	.....	6.98	6.74	7.36	7.33	5.5-9.0	APHA-4500-H+
2	Total Suspended Solid (TSS)	mg/L	348	298	58	49	100 mg/l	APHA-2540-B
3	Total Disloved Solid (TDS)	mg/L	1746	1546	568	532	Not Specified	APHA-2540-C
4	Oil & Greses (O&G)	mg/L	13.0	10.5	4.1	3.5	10 mg/l	APHA-5520-C
5	Biological Oxygen Demand (BOD3 day, at 27 0C)	mg/L	92	54	24	22	30 mg/l	APHA-5210-B
6	Chemical Oxygen Demand	mg/L	612.0	310.0	120.0	114.0	250 mg/l	APHA-5220-B
7	Maganese (Mn)	mg/L	N.D	N.D	N.D	N.D	2 mg/l	APHA-3111 (B)
8	Chloride (Cl)	mg/L	812.0	762.0	124.0	138.0	Not Specified	APHA -4500 (Cl)

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December-22

Sl. No.	Parameter	Unit	Inlet Result		Outlet Result		Standards (CPCB)	Protocoal
			01.12.2022	16.12.2022	01.12.2022	16.12.2022		
1	pH	.....	6.95	6.93	7.43	7.34	5.5-9.0	APHA-4500-H+
2	Total Suspended Solid (TSS)	mg/L	567.0	543.0	78.0	69.0	100 mg/l	APHA-2540-B
3	Total Disloved Solid (TDS)	mg/L	1849.0	1873.0	461.0	449.0	Not Specified	APHA-2540-C
4	Oil & Greses (O&G)	mg/L	11.3	11.7	2.8	2.2	10 mg/l	APHA-5520-C
5	Biological Oxygen Demand (BOD3 day, at 27 0C)	mg/L	57.0	65.0	27.0	28.0	30 mg/l	APHA-5210-B
6	Chemical Oxygen Demand	mg/L	220.6	256.1	107.7	113.1	250 mg/l	APHA-5220-B
7	Maganese (Mn)	mg/L	N.D	N.D	N.D	N.D	2 mg/l	APHA-3111 (B)
8	Chloride (Cl)	mg/L	827.0	836.0	167.0	174.0	Not Specified	APHA -4500 (Cl)

November-22

Sl. No.	Parameter	Unit	Inlet Result		Outlet Result		Standards (CPCB)	Protocoal
			01.11.2022	15.11.2022	01.11.2022	15.11.2022		
1	pH	.....	6.88	6.92	7.22	7.16	5.5-9.0	APHA-4500-H+
2	Total Suspended Solid (TSS)	mg/L	584	561	78	69	100 mg/l	APHA-2540-B
3	Total Disloved Solid (TDS)	mg/L	1904	1896	478	459	Not Specified	APHA-2540-C
4	Oil & Greses (O&G)	mg/L	11.5	12.2	3.1	2.4	10 mg/l	APHA-5520-C
5	Biological Oxygen Demand (BOD3 day, at 27 0C)	mg/L	49	55	28	29	30 mg/l	APHA-5210-B
6	Chemical Oxygen Demand	mg/L	207	241	122	135	250 mg/l	APHA-5220-B
7	Maganese (Mn)	mg/L	N.D	N.D	N.D	N.D	2 mg/l	APHA-3111 (B)
8	Chloride (Cl)	mg/L	827.0	836.0	174.0	191.0	Not Specified	APHA -4500 (Cl)

October-22

Sl. No.	Parameter	Unit	Inlet Result		Outlet Result		Standards (CPCB)	Protocoal
			01.10.2022	15.10.2022	01.10.2022	15.10.2022		
1	pH	.....	6.83	6.97	7.19	7.15	5.5-9.0	APHA-4500-H+
2	Total Suspended Solid (TSS)	mg/L	592	578	67	72	100 mg/l	APHA-2540-B
3	Total Disloved Solid (TDS)	mg/L	1896	1933	469	485	Not Specified	APHA-2540-C
4	Oil & Greses (O&G)	mg/L	11.2	11.7	2.5	2.7	10 mg/l	APHA-5520-C
5	Biological Oxygen Demand (BOD3 day, at 27 0C)	mg/L	34	43	26	27	30 mg/l	APHA-5210-B
6	Chemical Oxygen Demand	mg/L	167	208	125	135	250 mg/l	APHA-5220-B
7	Maganese (Mn)	mg/L	N.D	N.D	N.D	N.D	2 mg/l	APHA-3111 (B)
8	Chloride (Cl)	mg/L	834.0	852.0	183.0	197.0	Not Specified	APHA -4500 (Cl)

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कोयला खान परियोजनाएं/ COAL MINING PROJECTS
हजारीबाग / Hazaribag

PAKRI BARWADIH COAL MINING PROJECT,					
NTPC LIMITED, HAZARIBAGH , JHARKHAND					
A. PLANTATION / DISTRIBUTION DONE BY NTPC LTD					
Sl No	Year	No of plants planted / Distributed	Cum no. of plants	Location	Remarks
1	2008	200	200	Inside Site Office, Barkagaon	Misc shady plants
2	2010	70	270	Rani talab, Budua mahadev mandir	Mango plants
3	2010	200	470	Distributed to villagers	Fruit bearing plants
4	2011	125	595	Distributed to villagers	Fruit bearing plants
5	2012	225	820	Distributed to villagers	Fruit bearing plants
6	2012	130	950	Plantation at Vinobha bhave university	Shady plants
7	2013	480	1430	Distributed to villagers	fruit bearing and shady plants
8	2013	40	1470	Infront of site office, barkagaon	Casurina, Bottle plam
9	2013	30	1500	on the bund barka ahar	pakribarwadih
10	2013	25	1525	Ramsagra talab , back of site office	Barkagaon
11	2014	300	1825	Distribution	
12	2015	118	1943	ITI	
13	2015	30	1973	Site office, barkagaon	Kanel , bouganvilia
14	2015	90	2063	Utkramith madya vidyalay, kusumbha	Kanel , bouganvilia
15	2015	220	2283	Chhath talab, hazaribagh	
16	2015	417	2700	Distributed to villagers	Shady plants
17		1000	3700	Distributed to villagers	Shady and fruit bearing plants
18	2016	4500	8200	In and around langathu site office and approach road	Shady plants through MDO
19	2017	690	8890	In and around Sikri township and langathu site office	On 05.06.17, 09.06.17, Misc shady and fruit bearing plants
20	2017	5000	13890	In and around Hazaribagh, Neem , Karanj, Jamun , Kathal,	Distributed through SDM, Hazaribagh in and around Hazaribagh on 17.06.17
21	2017	800	14690	In Village Langathu at the vacant place, Gulmohar, Neem, Arjun, Karanj, Imli, Jamun, Kathal, Amrud	Involving the villagers of Langathu on 20.06.17
22	2017	500	15190	In Village Langathu at the vacant place, Gulmohar, Neem, Arjun, Karanj, Imli, Jamun, Kathal, Amrud	Involving the employees on 21.06.17
23	2017	580	15770	In Village Langathu at the vacant place, Gulmohar, Neem, Arjun, Karanj, Imli, Jamun, Kathal, Amrud	Involving the employees on 22.06.17
24	2017	150	15920	Plantation at SSB Camp, Nagari , Neem and Karanj	Involving the SSB security Personnnel
25	2017	1550	17470	For plantation in and around Hazaribagh, Neem , Karanj, Jamun , Kathal,	Distributed through DFO, Hazaribagh West Forest Division in and around Hazaribagh on 13.07.17
26	2017	2500	19970	In Village Langathu at the vacant place, Gulmohar, Neem, Arjun, Karanj, Imli, Jamun, Kathal, Amrud	On 15.07.17 during Van Mahotsav involving villagers and employees
27	2017	500	20470	Plantation along the dividers, sides of the haul road, Kanel	At the mining premise
28	2017	935	21405	Plantation near the top soil dump	At the mining premise on topsoil dump along with the grass seeding
29	2017	1000 Kg	--	Mixed Grass seeding on the top soil dump	At the Mine
30	2017	260	21665	In Village Arahara near the dump, garland drain and fencing, Mine approach. Gulmohar, Neem, Arjun, Karanj,	On 17.07.17 during Van Mahotsav involving villagers and employees
31	2017	2450	24115	In Village Arahara at the vacant place, Gulmohar, Neem, Arjun, Karanj, Jamun, Kathal.	Mix Plantation

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Sl No	Year	No of plants planted / Distributed	Cum no. of plants	Location	Remarks
32	2017	1150	25265	In the village Devaria Khurd, on the edge of Khora Nala, Neem, Arjun, Karanj, Jamun, Gulmohar	Block Plantation near Khora Nalla
33	2017	450	25715	In the village Arahara, on the edge of Khora Nala, Neem, Arjun, Karanj, Jamun, Gulmohar	Mix Plantation
34	2017	1300	27015	On the Dump Slope, Neem, Arjun, Karanj, Jamun, Gulmohar	Mix Plantation
35	2017	845	27860	In the village Devaria Khurd, on the edge of Khora Nala, Neem, Arjun, Karanj, Jamun, Gulmohar	Mix Plantation
36	2017	935	28795	Dispatch Road on the edge of Khora Nala, Neem, Arjun, Karanj, Jamun, Gulmohar	Mix Plantation
37	2018	2000	30795	Hazaribag, Jharkhand	Misc shady plants
38	2018	200	30995	GDM Girls High School	Misc shady plants
39	2018	250	31245	Middle School, Sonbarsa	Flower & Shady plants
40	2018	7500	38745	Safety Zone Plantation - Deworia Village, Urub Village	Misc shady plants
41	2018	3750	42495	Along the Pakwa Nala - East Quarry	Mix Plantation
42	2018	8750	51245	Near Sikri township, East Quarry dump area, langathu office.	Misc shady plants
43	2019	25500	76745	OB Dump"C" Slope	Misc shady plants
44	2019	520	77265	Along the dispatch Raod (Langatu to Substation)	Misc shady plants
45	2019	2000	79265	Vacant land, Sonbarsa Village, Near Nursery	Misc shady plants
46	2019	8500	87765	Safety Zone Plantation - Deworia Village, Urub Village	Misc shady plants
47	2019	6200	93965	Dump"D" Slope East Quarry	Misc shady plants
48	2019	3200	97165	Plantation Program in Township area, Sikri	Misc shady plants
49	2019	1000	98165	R&R Colony	Misc shady plants
50	2019	2200	100365	Along the Pakwa Nala - East Quarry	Misc shady plants
51	2019	300	100665	Distributed to villagers and School	Misc shady plants
53	2019	500	101165	Gandhi Maidan, Matwari, Hazaribagh	Misc shady plants
54	2019	1080	102245	Banadag Railway Siding	Misc shady plants
55	2020	14766	117011	Along the Nallah Side (Embankment)	Misc shady plants
57	2020	24340	141351	OB Dump "C" Slope	Misc shady plants
58	2020	2770	144121	OB Dump "C" Surface	Misc shady plants
59	2020	400	144521	Banadag Railway Siding	Misc shady plants
60	2020	160	144681	Along the dispatch Raod (Sonbarsa village to Langatu)	Misc shady plants
61	2021	9065	153746	Along the Lathorwa Nala	Misc shady plants
62	2021	54763	208509	OB Dump "C" Slope	Misc shady plants
63	2021	3437	211946	OB Dump "C" Surface	Misc shady plants
64	2021	1630	213576	Along the Pakwa Nala	Misc shady plants
65	2021	2204	215780	In and around Sikri township	Misc shady plants
66	2021	3018	218798	Along the Nallah Side (Embankment)	Misc shady plants
67	2021	142	218940	Along the dispatch Raod (Sonbarsa village to Langatu)	Misc shady plants
68	2021	5735	224675	Lathorwa Nala	Misc shady plants
69	2021	575	225250	Distributed to villagers	Misc shady plants
70	2022	13175	238425	Dump"A" Slope	Misc shady plants
71	2022	100	238525	Vacant Land, Arahara Village, Near CHP	Fruity & shady plants
72	2022	1620	240145	OB Dump "C" Slope & Surface	Misc shady plants
73	2022	3720	243865	Along the northern sides of main approach road, Conveyor Line	Misc shady plants
74	2022	3735	247600	East Quarry	Misc shady plants

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हजारीबाग / Hazaribag

NTPC LIMITED

Detail of ESCROW deposits for the FY 2022-23:

Unit name	FY 2022-23						
	Bls as on 01.04.2022	Deposit	Reimbursement	Miscellaneous Withdrewal (if any)	Interest	TDS	Bls as on 31.03.2023
NTPC Limited Pakri Barwadih CMP	43,17,23,360.72	7,60,00,000.00	-	-	1,58,75,231.05	15,89,564.00	52,20,09,027.77
NTPC Limited Dulanga CMP	17,21,06,946.76	3,67,00,000.00	-	-	64,40,074.08	6,44,012.00	21,46,03,008.84
NTPC Limited Talaipalli CMP	19,29,11,869.88	4,11,08,000.00	-	-	75,51,015.24	7,55,108.00	24,08,15,777.12
NTPC Limited Chatti Bariatu CMP	2,74,90,392.00	2,88,00,000.00	-	-	10,55,043.47	1,05,506.00	5,72,39,929.47
Total	82,42,32,569.36	18,76,08,000.00	-	-	3,09,21,363.84	30,94,190.00	1,03,46,67,743.20

Confirmed

12/5/23

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अमरेन्द्र कुमार
Amarendra Kumar
अपर महाप्रबंधक (वित्त) एवं एच पी
Addl. General Manager (Finance) S/CC
एनटीपीसी लिमिटेड / कोयला खनन परियोजना-हैदराबाद
NTPC Limited / Coal Mining PO-Ranchi

PROJECT REPORT

SATELLITE IMAGE & DIGITIZATION FOR LAND USE LAND COVER PRE AND POST MINING FOR YEAR 2019 & 2022 AT PAKRI BARWADI COAL MINING PROJECT NTPC (PBCMP) HAZARIBAGH, JHARKHAND

DR. AJAY KUMAR SINGH

Department of Forestry, Wildlife & Environmental Sciences

Guru Ghasidas Vishwavidyalaya (A Central University)

Bilaspur, Chhattisgarh

Satellite Image & Digitization for Land Use Land Cover Pre and Post Mining for Year 2019 & 2022 at Pakri Barwadi Coal Mining Project NTPC (PBCMP) Hazaribagh, Jharkhand

A Consultancy Project Report

2022

By

Dr. Ajay Kumar Singh

Assistant Professor

Department of Forestry, Wildlife & Environmental Sciences

Guru Ghasidas Vishwavidyalaya

(A Central University) Bilaspur, Chhattisgarh

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Document Control Sheet

Report Type	:	Consultancy Project Report
Title of Report	:	Satellite Image & Digitization for Land Use Land Cover Pre and Post Mining for Year 2019 & 2022 at Pakri Barwadi Coal Mining Project NTPC (PBCMP) Hazaribagh, Jharkhand
Author	:	Dr. Ajay Kumar Singh Assistant Professor, Department of Forestry, Wildlife & Environmental Sciences, Guru Ghasidas Vishwavidyalaya, Bilaspur, Chhattisgarh.
Supporting Team	:	Mr. Alok Kumar Chandrakar Mr. Sudhir Ranjan Choudhary Mr. Ashutosh Anand
User Agency	:	NTPC Ltd.
Project name	:	Pakri Barwadi Coal Mining Project
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Introduction

Coal Mining

Coal is the most important and abundant fossil fuel in India. It accounts for 55% of the country's energy need. The country's industrial heritage was built upon indigenous coal. Commercial primary energy consumption in India has grown by about 700% in the last four decades. The current per capita commercial primary energy consumption in India is about 350 kgoe/year, which is well below that of developed countries. Energy use in India is anticipated to increase as a result of the country's booming economy, growing population, and desire for a better quality of life. Coal will continue to play a major role in India's energy picture due to the low reserve potentiality of petroleum and natural gas, eco-conservation restrictions on hydropower projects, and the geopolitical perspective of nuclear power.

Being an affordable source of energy with substantial reserve, coal is going to stay as major source of energy in the foreseeable future. Despite push for renewables, country will require base load capacity of coal-based generation for stability and also for energy security. Coal is also used as an intermediary by many industries such as steel, sponge iron, cement, paper, brick-kilns etc. Similarly, with increase in growth of industries using coal, their demand for coal has also been increasing; hence, there has been an overall increase in the demand of coal over the years.

Indian coal offers a unique eco-friendly fuel source to domestic energy market for the next century and beyond. Hard coal deposit spread over 27 major coalfields, are mainly confined to eastern and south central parts of the country. The Geological Survey of India estimates that the potential coal reserves of India are dispersed in the patches covering around 42,953 sq. km out of which about 32% of the coal reserves fall within Chhattisgarh, Jharkhand and Odisha.

As a developing country, the energy requirement in India is increasing day by day and the coal mining industries are eventually increasing their production to meet the requirement of energy production through thermal power plants, where coal is used for generation of electricity. There is no doubt that the coal mining expansion

benefits the local GDP significantly, but also causes environmental degradation and destroy original ecosystem balance due to the destruction of original land cover types. Mining area caused a great deal of changes in landscape structure and enormous environmental disturbances, among them open-pit coal mine is one of the greatest landscape altering activities, and it's difficult to restore surface coal mine to the original ecological landscape. In this context, it is essential to scrutinize the effect of mining on land use land cover change to minimize its impact on environment as well as for proper land management and decision making.

In view of the urgent need of creating the geo-environmental database of coalfields for monitoring the impact of coal mining on land use and land cover, M/s Pakri Barwadi Coal Mining Project NTPC (PBCMP) Hazaribag, Jharkhand directed Guru Ghasidas Viashwavidyalaya, Bilaspur to take up the study through the techniques of Remote Sensing.

Land Use Land Cover Change

Change detection is the process of identifying differences in the state of an object or phenomenon by observing it at different times. The earth's surface changes are divided into two categories i.e. land use and land cover (LULC). The term land use stands for the purpose for which the specific piece of land is used for e.g. agriculture, urbanization, mining, etc. The term land cover stands for the features which are present on the earth's surface for e.g. buildings, pavement, trees etc.

From environmental point of view, the dynamic process of land use/land cover change is an indispensable concern all over the world, which indicates global environmental change and this has been recount as the most remarkable regional anthropogenic disruption of environment. Although land is the natural resource of utmost importance and original source of all material wealth of human being, the mining of natural resources is invariably associated with land use land cover changes. Modern techniques of mining using heavy equipment can produce dramatic alternations in land cover, both ecologically and hydrologically. Further mining activities result in change of topography and drainage pattern and principal environmental impact comes out as physical disturbance such as landscape change and degradation, soil erosion and degradation and general environmental changes.

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Land use and land cover (LULC) is one of the major factor which is a combination of natural and human-induced phenomenon controlled by the physico-chemical aspects of the terrain and anthropogenic activity. Spatial pattern of LULC of an area indicates the nature of terrain setting, gradient, human activity and climate. Its occurrence and spread reflect the geological condition of an area, degree of evolution of landforms due to the process of weathering and denudation, soil composition, slope aspect, availability of water resources besides amount of rainfall. The combination of these factors is reflected by the presence of LULC exhibited in the form of different land cover classes. Since LULC is the external reflection of the internal setting of terrain, any change in its pattern may be attributed to certain deviation in the above parameters and would have impact on the local environment.

The study of LULC is essential to determine the natural resources, land capability reflecting limitations of terrain condition and to understand the sustainable capacity of an area. Disturbance in the surface objects or LULC brought on by industrial, infrastructure, mining, and related development activities may always have an impact on the environment. Periodic monitoring of LULC nearby is necessary to determine the extent of such influence and their effect on the environment. For this purpose, the usefulness of remote sensing satellite image (RSI) is well recognised. Because of the nature of synoptic view, repetitive coverage under uniform illumination, and temporal RSI data help in extracting significant information about LULC at a periodical interval. The interpretation of the RSI to generate information of LULC could be transformed into a geo-referenced spatial database using Geographic Information System (GIS). This helps in understanding the spatial distribution and scope of LULC categories.

Acquiring timely remote sensing data and application of GIS technology are very useful to observe and analyze the periodical changes of land forms and land cover and thus these two technologies together perform a multifaceted and cost effective way for LULC change study. The space borne imagery helps in assessing and monitoring the environmental impacts due to its synaptic and repetitive coverage and this tool is very useful for cost effective decision making. Usually, the most standard method used for land use land cover change detection is the post classification comparison method, which entails the comparison of independently produced classified images.

Objective

The objective of the present study is to prepare a regional land use and land cover map of Pakri Barwadi Coal Mining Project NTPC (PBCMP) Hazaribag, Jharkhand on 1:50,000 scale based on IRS R2 LISS-IV satellite data of the year 2022, using digital image processing technique for accessing the impact of coal mining and associated industrial activities on the land use/ land cover in the coalfield area with respect to the earlier study carried out in the year 2019.

Study area

The Pakri Barwadih Coal Block is located in the North Eastern part of North Karanpura Coalfields. Its Longitudes 85°10' E to 85°15' E and Latitude 23°51'30" N to 23°55'30" N and is under the Survey of India Toposheet No. 73E/1 & 73E/5 (R.f 1:50000). The coal block has been allocated to NTPC Limited by Government of India, Ministry of Coal, New Delhi in 2004 for Captive Coal Mining. The total project area is 33194.20 sq. km and the rated capacity of the mine is 15 MTPA. The notice of mine opening was given in May 2016 but active mines operations have started from December 2016.

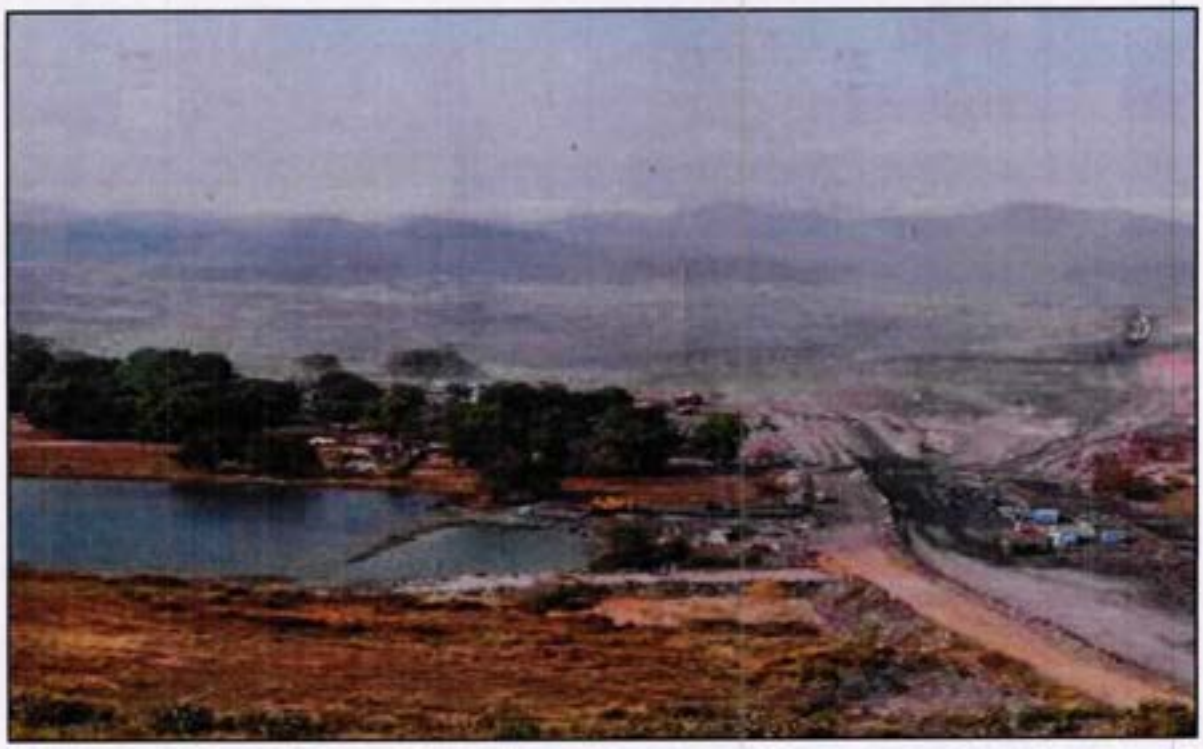

Figure 1 – Study site of Pakri Barwadi Coal Mining Project NTPC (PBCMP)

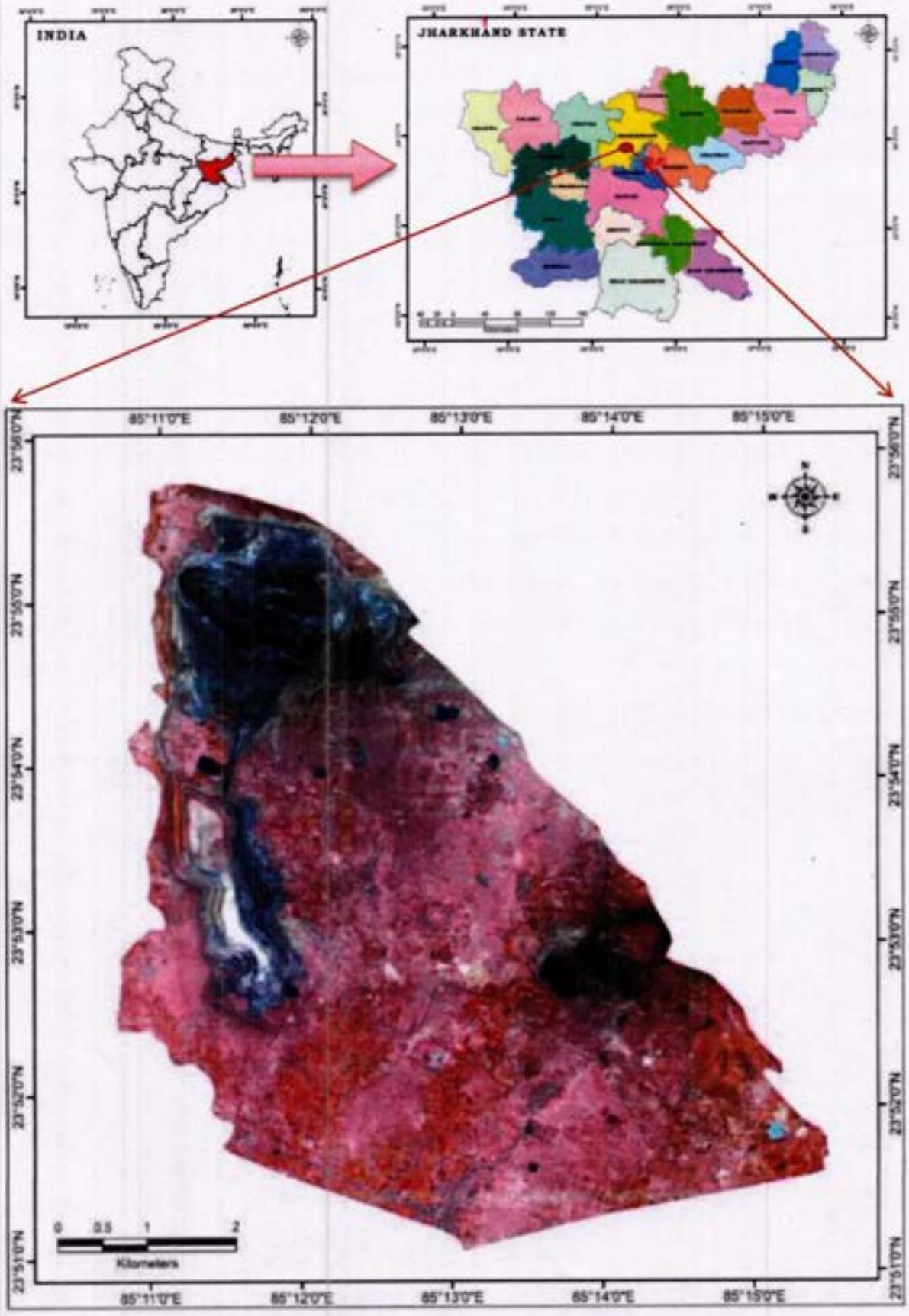

Figure 2 - Location Map of Pakri Barwadi Coal Mining Project NTPC (PBCMP)

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The terrain of the study area is mountainous and hilly with scattered plains and valleys. The hard rock terrain is often covered with wooded area of varying density with multitudes of flora and fauna. Such floral distribution gives rise to mixed forest cover of varying density of vegetation cover such as dense, sparse, open and degraded forest. The altitude of the area ranges around 430 m above MSL near the plains and around 560 m above MSL in the hilly region. These varying altitudes provide environment for growth of scrubs, shrubs, climbers and tall trees such as Palas, Pipal, Kend, Sal,Jamun, Ghorneem, Arjun, Mahua, Babul, Teak, Bel and Mango. Similarly shrubs such as Sisal, Satawar, Ber, Calotropis and Amarbel climbers are reported from the study area along with Bamboo and Munj. This vegetative cover may be thin and degraded in some places either naturally or due to anthropogenic activity which may cause some degradation in the forest cover. Similarly, many trees stand as isolated groves or in singles are also seen. Plains in the study area encompass vast tracts of agricultural land.

Figure 3 – Topography of the Study area

There are number of villages present in the 10 Km buffer range of the mining area named: Kadwa, Garri Kalan, Patra Kalan, Badam, Langatu, Chepa khurd, Chepa Kalan, Pakri Balwadih, Sinduari, Sirma, Jugra and Barkagaon. There is no major town in the buffer area and among these villages Barkagaon is relatively a

larger settlement. The buffer area is drained by few first order seasonal streams and some nalas such as Lathorwa nala, Pakwa nala are seen. Higher order streams such as river Hendraj, river Ghagra and river Horhori are observed within the study area.

Climate in the study area enjoys tropical to sub-tropical with monsoon - southwest monsoon and northeast monsoon - summer and winter climatic periods. The Southwest monsoon is the most predominant period contributing major precipitation (nearly 80%) in the study area recording an average rainfall of 1200 mm. The summer period extends from March to mid-June recording temperature as high as 41°C and winter the lowest temperature varies in the range of 11°C to 4°C.

Geomorphologically, the study area is predominated with structural hills, buried pediments, residual hills, pediment, intermontane valley, plains and erosional surface. Since landform is intrinsically related to soil, slope and drainage, it has an effective influence on the LULC of the study area. Because of such intrinsic nature any disturbance in the terrain is reflected on LULC pattern and the impact of such disturbances could be inferred, especially in the case of mining activities.

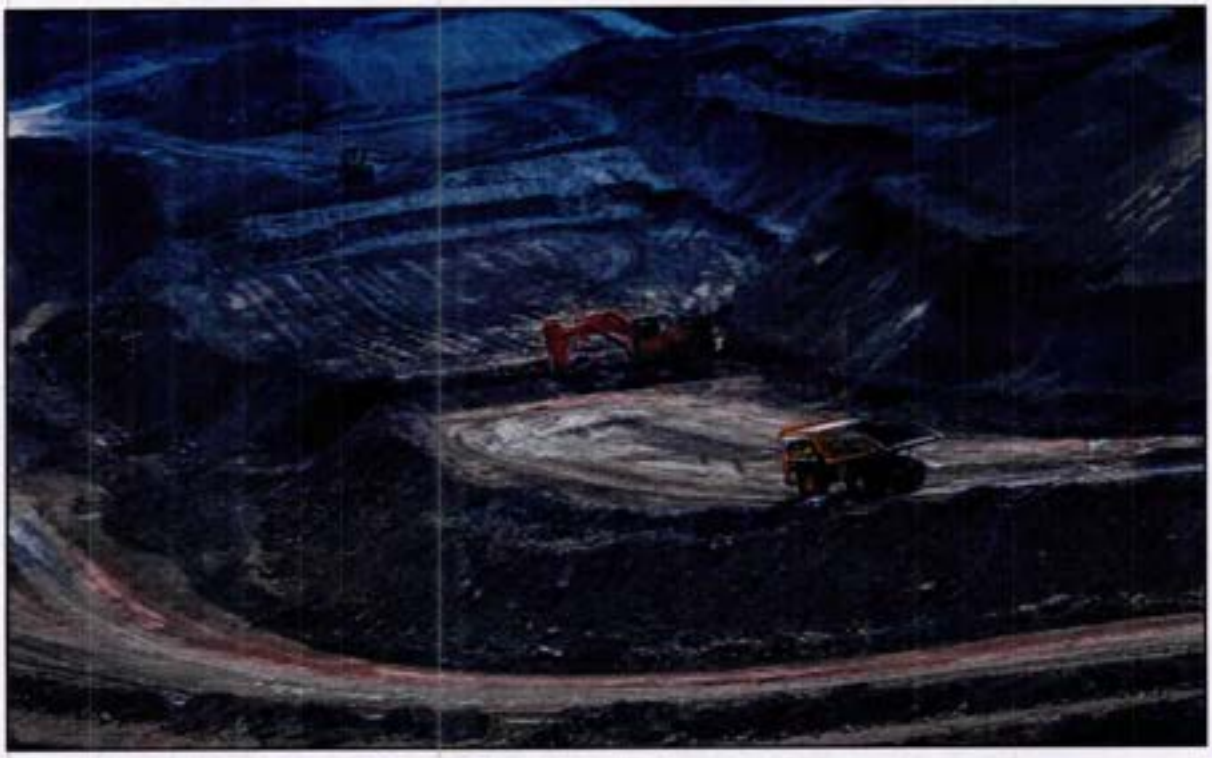

Figure 4 – Mining Activities in the Study area

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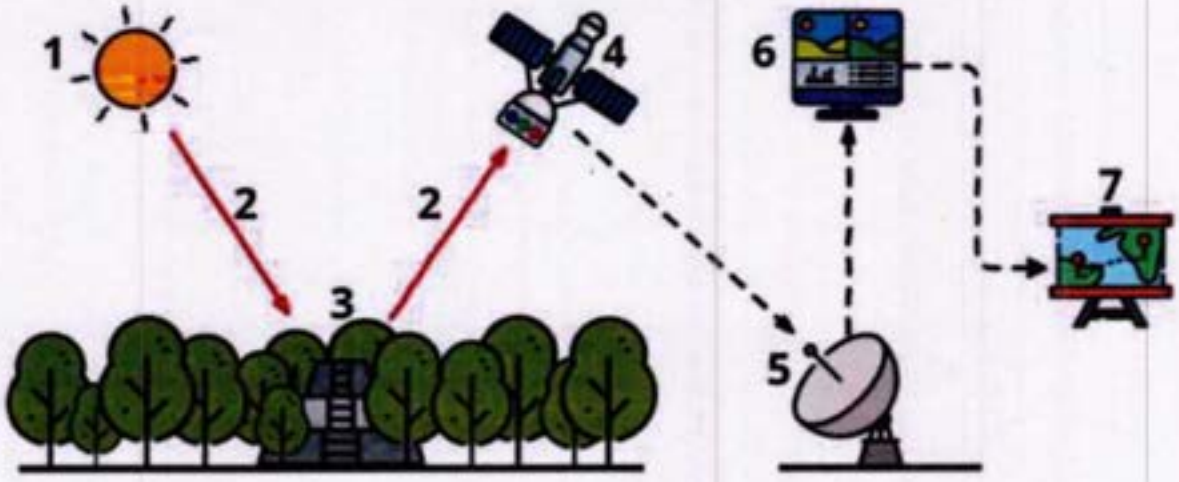
Remote Sensing Concepts and Methodology

Remote Sensing

Remote sensing is the science and art of obtaining information about an object or area through the analysis of data acquired by a device that is not in physical contact with the object or area under investigation. The term remote sensing is commonly restricted to methods that employ electro-magnetic energy (such as light, heat and radio waves) as the means of detecting and measuring object characteristics.

All physical objects on the earth surface continuously emit electromagnetic radiation because of the oscillations of their atomic particles. Remote sensing is largely concerned with the measurement of electro-magnetic energy from the Sun, which is reflected, scattered or emitted by the objects on the surface of the earth. Figure - 5 schematically illustrate the generalised processes involved in electromagnetic remote sensing of the earth resources.



Elements Involved in Remote Sensing:

1. Energy Source or Illumination
2. Radiation and the Atmosphere
3. Interaction with the Object
4. Recording of Energy by the Sensor
5. Transmission, Reception and Processing
6. Interpretation and Analysis
7. Application

Figure 5 – General process of Remote Sensing

Electromagnetic Radiation Spectrum

The electromagnetic radiation (EMR) spectrum is the continuum of energy that ranges from meters to nanometres in wavelength and travels at the speed of light. Different objects on the earth surface reflect different amounts of energy in various wavelengths of the EM spectrum.

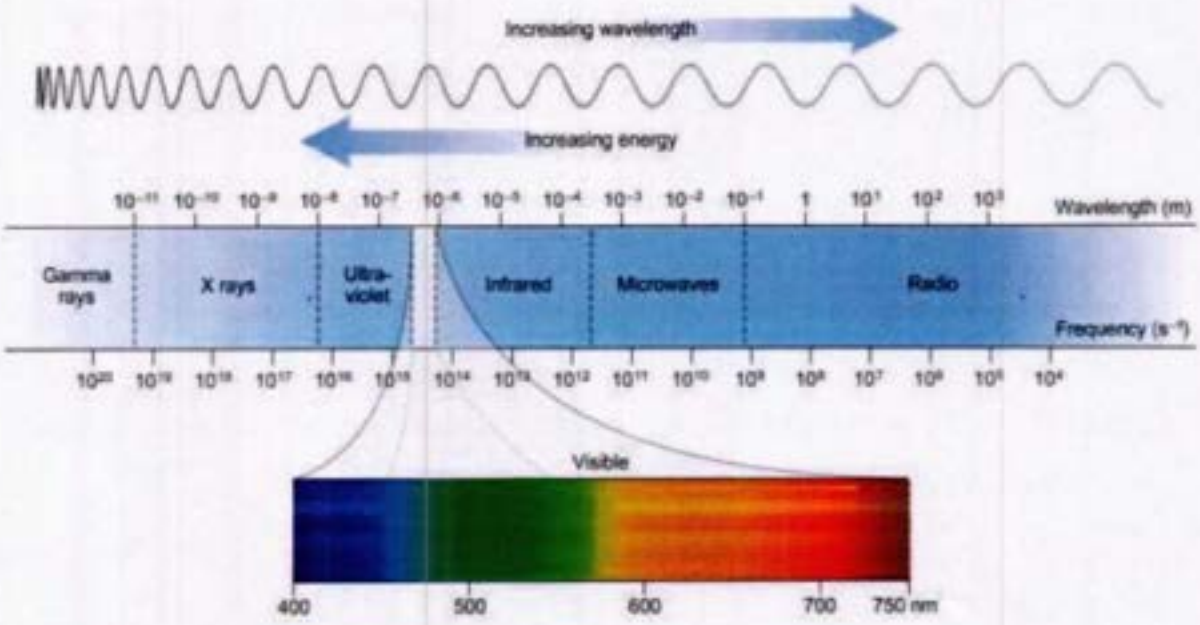


Figure 6 – Electromagnetic Radiation Spectrum

Figure - 6 shows the electromagnetic spectrum, which is divided on the basis of wavelength into different regions that are described in Table - 1. The EM spectrum ranges from the very short wavelengths of the gamma-ray region to the long wavelengths of the radio region. The visible region (0.4 - 0.7 µm wavelengths) occupies only a small portion of the entire EM spectrum.

Energy reflected from the objects on the surface of the earth is recorded as a function of wavelength. During daytime, the maximum amount of energy is reflected at 0.5 µm wavelengths, which corresponds to the green band of the visible region, and is called the reflected energy peak. The earth also radiates energy both day and night, with the maximum energy 9.7 µm wavelength. This radiant energy peak occurs in the thermal band of the IR region.

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Table 1 - Electromagnetic spectral regions

Region	Wavelength				Remarks
Gamma ray		<	0.03	**nm**	Incoming radiation is completely absorbed by the upper atmosphere and is not available for remote sensing.
X-ray	0.03	to	3.00	**nm**	Completely absorbed by atmosphere. Not employed in remote sensing.
Ultraviolet	0.03	to	0.40	**µm**	Incoming wavelengths less than 0.3mm are completely absorbed by Ozone in the upper atmosphere.
Photographic UV band	0.30	to	0.40	**µm**	Transmitted through atmosphere. Detectable with film and photo detectors, but atmospheric scattering is severe.
Visible	0.40	to	0.70	**µm**	Imaged with film and photo detectors. Includes reflected energy peak of earth at 0.5mm.
Infrared	0.70	to	100.00	**µm**	Interaction with matter varies with wavelength. Absorption bands separate atmospheric transmission windows.
Reflected IR band	0.70	to	3.00	**µm**	Reflected solar radiation that contains no information about thermal properties of materials. The band from 0.7-0.9mm is detectable with film and is called the *photographic IR band.*
Thermal IR band	3.00 8.00	to to	5.00 14.00	**µm** **µm**	Principal atmospheric windows in the thermal region. Images at these wavelengths are acquired by optical-mechanical scanners and special vediocon systems but not by film.
Microwave	0.10	to	30.00	**cm**	Longer wavelengths can penetrate clouds, fog and rain. Images may be acquired in the active or passive mode.
Radar	0.10	to	30.00	**cm**	Active form of microwave remote sensing. Radar images are acquired at various wavelength bands.
Radio		>	30.00	**cm**	Longest wavelength portion of electromagnetic spectrum. Some classified radars with very long wavelength operate in this region.

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The earth's atmosphere absorbs energy in the gamma-ray, X-ray and most of the ultraviolet (UV) region; therefore, these regions are not used for remote sensing. Wavelength regions with high transmission are called atmospheric windows and are used to acquire remote sensing data. The general reflection spectrum of some earth surface objects is shown in Figure - 7. Detection and measurement of the recorded energy enables identification of surface objects (by their characteristic wavelength patterns or spectral signatures), both from air-borne and space-borne platforms.

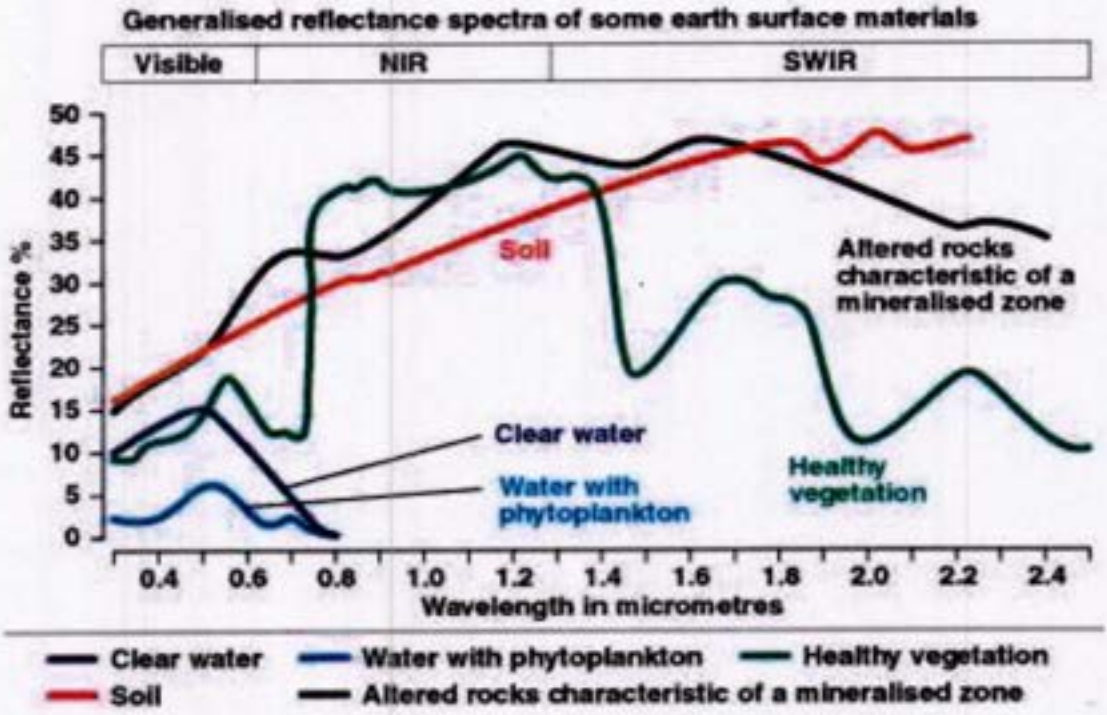

Figure 7 – General reflectance spectrum of some earth surface materials

Scanning System

The sensing device in a remotely placed platform (aircraft/satellite) records EM radiation using a scanning system. In scanning system, a sensor, with a narrow field of view is employed; this sweeps across the terrain to produce an image. The sensor receives electromagnetic energy radiated or reflected from the terrain and converts them into signal that is recorded as numerical data. In a remote sensing satellite, multiple arrays of linear sensors are used, with each array recording simultaneously a separate band of EM energy. The array of sensors employs a spectrometer to disperse the incoming energy into a spectrum. Sensors (or detectors) are positioned to record specific wavelength bands of energy. The

information received by the sensor is suitably manipulated and transported back to the ground receiving station. The data are reconstructed on ground into digital images. The digital image data on magnetic/optical media consist of picture elements arranged in regular rows and columns. The position of any picture element, pixel, is determined on an x-y coordinate system. Each pixel has a numeric value, called digital number (DN) that records the intensity of electromagnetic energy measured for the ground resolution cell represented by that pixel. The range of digital numbers in an image data is controlled by the radiometric resolution of the satellite's sensor system. The digital image data are further processed to produce master images of the study area. By analysing the digital data/imagery, digitally/visually, it is possible to detect, identify and classify various objects and phenomenon on the earth surface.

Remote sensing technique (airborne/satellite) in conjunction with traditional techniques harbours in an efficient, speedy and cost-effective method for natural resource management due to its inherited capabilities of being multi-spectral, repetitive and synoptic areal coverage. Generation of environmental 'Data Base' on land use, soil, forest, surface and subsurface water, topography and terrain characteristics, settlement and transport network, etc., and their monitoring in near real - time is very useful for environmental management planning; this is possible only with remote sensing data.

Data Source

The following data are used in the present study:

Primary Data: Remote Sensing Satellite data viz. IRS R2 LISS-IV of year 2022 having 5 m. spatial resolution was used in the present study. The raw digital satellite data was obtained from NRSC, Hyderabad, on CD-ROM media.

Secondary Data: Secondary (ancillary) and ground data constitute important baseline information in remote sensing, as they improve the interpretation accuracy and reliability of remotely sensed data by enabling verification of the interpreted details and by supplementing it with the information that cannot be obtained directly from the remotely sensed data.

Characteristics of Satellite/Sensor

Table - 2 illustrates the basic properties of Resourcesat satellite/sensor that was used in the present study. The basic properties of a satellite's sensor system can be summarised in terms of (a) Spectral coverage/resolution, i.e., band locations/width; (b) Spectral dimensionality: number of bands; (c) Radiometric resolution: quantisation; (d) Spatial resolution/instantaneous field of view or IFOV; and (e) Temporal resolution.

Table 2 - Characteristics of the satellite/sensor used in the present project work

Platform	Sensor	Spectral Bands (in µm)	Radiometric Resolution	Spatial Resolution
RESOURCESAT (R2)	LISS-IV	B2 0.28 - 0.31 Green B3 0.25 - 0.38 Red B4 0.27 - 0.30 NIR	10-bit	5.8 m 5.8 m 5.8 m

Data Processing

The details of data processing carried out in the present study are shown in Figure 8. The processing methodology involves the following major steps:

(a) Geometric correction, rectification and geo-referencing;

(b) Image enhancement;

(c) Training set selection;

(d) Signature generation and classification;

(e) Creation/overlay of vector database;

(f) Validation of classified image;

(g) Final thematic map preparation.

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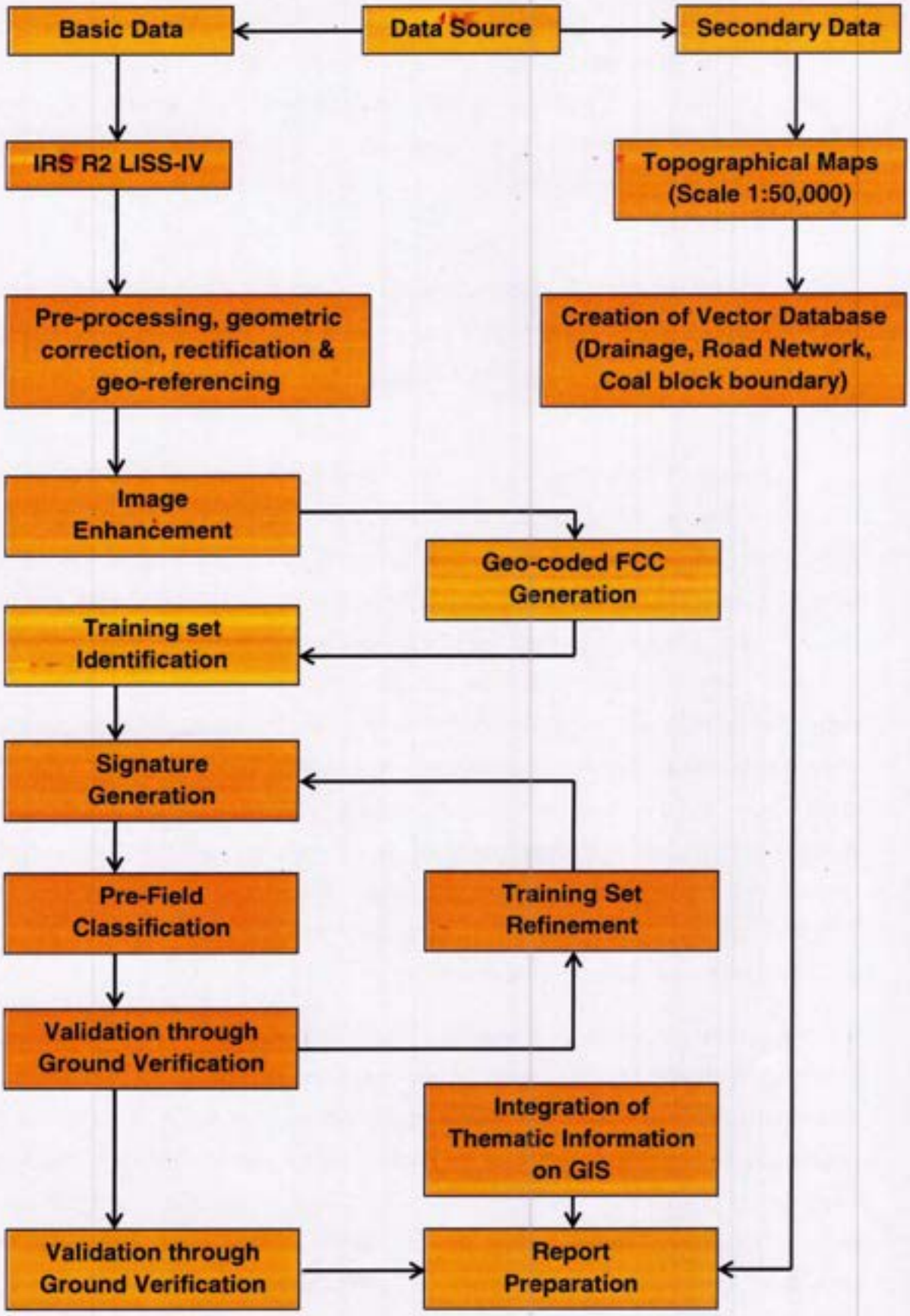

Figure 8 – Methodology of Land Use / Land Cover Analysis

(A) Geometric correction, rectification and geo-referencing

Inaccuracies in digital imagery may occur due to 'systematic errors' attributed to earth curvature and rotation as well as 'non-systematic errors' attributed to intermittent sensor malfunctions, etc. Systematic errors are corrected at the satellite receiving station itself while non-systematic errors/ random errors are corrected in pre-processing stage.

In spite of 'System / Bulk correction' carried out at supplier end; some residual errors in respect of attitude attributes still remains even after correction. Therefore, fine tuning is required for correcting the image geometrically using ground control points (GCP).

Raw digital images contain geometric distortions, which make them unusable as maps. A map is defined as a flat representation of part of the earth's spheroidal surface that should conform to an internationally accepted type of cartographic projection, so that any measurements made on the map will be accurate with those made on the ground. Any map has two basic characteristics: (a) scale and (b) projection. While scale is the ratio between reduced depiction of geographical features on a map and the geographical features in the real world, projection is the method of transforming map information from a sphere (round Earth) to a flat (map) sheet. Therefore, it is essential to transform the digital image data from a generic co-ordinate system (i.e. from line and pixel co-ordinates) to a projected co-ordinate system. In the present study geo-referencing was done with the help of Survey of India (SoI) topo-sheets so that information from various sources can be compared and integrated on a GIS platform, if required.

An understanding of the basics of projection system is required before selecting any transformation model. While maps are flat surfaces, Earth however is an irregular sphere, slightly flattened at the poles and bulging at the Equator. Map projections are systemic methods for "flattening the orange peel" in measurable ways. When transferring the Earth and its irregularities onto the plane surface of a map, the following three factors are involved: (a) geoid (b) ellipsoid and (c) projection. Figure - 9 illustrates the relationship between these three factors. The geoid is the rendition of the irregular spheroidal shape of the Earth; here the variations in gravity are taken into account. The observation made on the geoid is

then transferred to a regular geometric reference surface, the ellipsoid. Finally, the geographical relationships of the ellipsoid (in 3-D form) are transformed into the 2-D plane of a map by a transformation process called map projection. As shown in Figure - 9, the vast majority of projections are based upon cones, cylinders and planes.

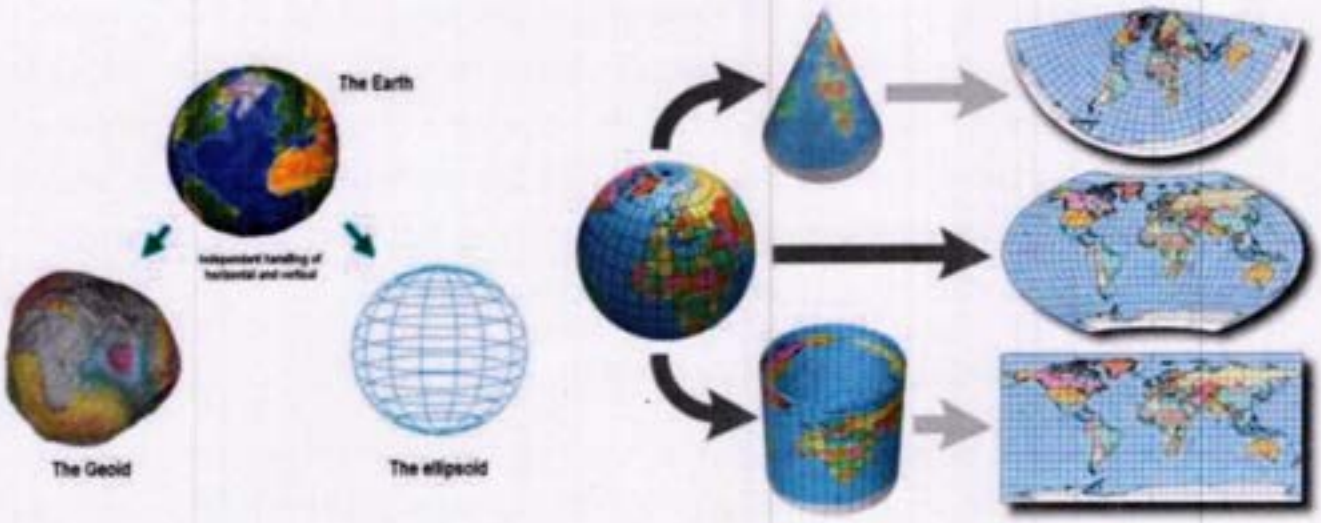

Figure 9 - Geoid – Ellipsoid – Projection Relationship

Maps prepared using these projections are a compromise of many properties; it is neither conformal perspective nor equal area. Distances, areas and shapes are true only along central meridian. Distortion increases away from central meridian. Image transformation from generic co-ordinate system to a projected co-ordinate system was carried out using Arc GIS digital image processing system.

(B) Image enhancement

To improve the interpretability of the raw data, image enhancement is necessary. Most of the digital image enhancement techniques are categorised as either point or local operations. Point operations modify the value of each pixel in the image data independently. However, local operations modify the value of each pixel based on brightness value of neighbouring pixels. Contrast manipulations/ stretching technique based on local operation was applied on the image data using Arc GIS software.

(C) Training set selection

The image data were analysed based on the interpretation keys. These keys are evolved from certain fundamental image-elements such as tone/colour, size, shape, texture, pattern, location, association and shadow. Based on the image-elements and other geo-technical elements like land form, drainage pattern and physiography; training sets were selected/identified for each land use/cover class. Field survey was carried out by taking selective traverses in order to collect the ground information (or reference data) so that training sets are selected accurately in the image. This was intended to serve as an aid for classification. Based on the variability of land use/cover condition and terrain characteristics and accessibility, around 150 points were selected to generate the training sets.

(D) Signature generation and classification

Image classification was carried out using the maximum likelihood algorithm. The classification proceeds through the following steps: (a) calculation of statistics [i.e. signature generation] for the identified training areas, and (b) the decision boundary of maximum probability based on the mean vector, variance, covariance and correlation matrix of the pixels.

After evaluating the statistical parameters of the training sets, reliability test of training sets was conducted by measuring the statistical separation between the classes that resulted from computing divergence matrix. The overall accuracy of the classification was finally assessed with reference to ground truth data. The aerial extent of each land use class in the coalfield was determined using Arc GIS software.

(E) Creation/overlay of vector database

Plan showing coal block boundary was superimposed on the image as vector layer in the Arc GIS database. Road network, rail network and drainage network were also digitised on Arc GIS database and superimposed on the classified image.

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(F) Validation of classified image

Ground truth survey was carried out for validation of the interpreted results from the study area. Based on the validation, classification accuracy matrix was prepared.

Figure 10 – Ground truthing of study area

(G) Final land use/ land cover map preparation

Final land use/ land cover map was prepared using Arc GIS software and attached in the report.

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Land Use Land Cover Mapping

Land is one of the most important natural resource on which all human activities are based. Therefore, knowledge on different type of lands as well as its spatial distribution in the form of map and statistical data is vital for its geospatial planning and management for optimal use. In mining industry, the need for information on land use/ vegetation cover pattern has gained importance due to the all-round concern on environmental impact of mining. The information on land use/ cover inventory that includes type, spatial distribution, aerial extent, location, rate and pattern of change of each category is of paramount importance for assessing the impact of coal mining on land use/ cover.

Remote sensing data with its various spectral and spatial resolution offers comprehensive and accurate information for mapping and monitoring of land use/cover pattern, dynamics of changing pattern and trends over a period of time.. By analysing the data of different cut-off dates, impact of coal mining on land use and vegetation cover can be determined.

Land Use Land Cover Classification

The array of information available on land use/cover requires to be arranged or grouped under a suitable framework in order to facilitate the creation of a land use/cover database. Further, to accommodate the changing land use/cover pattern, it becomes essential to develop a standardised classification system that is not only flexible in nomenclature and definition, but also capable of incorporating information obtained from the satellite data and other different sources.

The present framework of land use/cover classification has been primarily based on the '**Manual of Nationwide Land Use/ Land Cover Mapping Using Satellite Imagery**' developed by National Remote Sensing Center (NRSC), Hyderabad. Land use map was prepared on the basis of image interpretation carried out based on the satellite data for the year 2022 for Pakri Barwadi Coal Mining Project NTPC (PBCMP) coalfields and following land use/cover classes are identified (Table - 3).

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Table 3 - Land use/cover classes identified in the study area

S. No.	Level-I Major LULC Category	Level-II Land use unit
1	Build-Up Land	Village Town Industries / Infrastructure Buildings Roads, Railway Line
2	Agricultural Land	Crop land Fallow land Trees grove/ Plantation
3	Forest	Dense Mixed Forest Sparse Mixed Forest Open Mixed Forest Degraded Forest Forest Blank
4	Waste Land	Land with Scrub Barren / Rocky/ Stony waste Mining / Dump Area
5	Water bodies	Tanks / Ponds Rivers / Streams

The cloud free satellite data from Resourcesat 2 (LISS- IV) of the year 2022 was acquired and processed using Arc GIS image processing software in order to interpret the various land use/cover classes present in the study area of Pakri Barwadi Coal Mining Project NTPC (PBCMP).

The delineated LULC features were verified in the field for their accuracy. For this purpose, field visits were carried out from 24th March 2022 to 26th March 2022, 27th May 2022, and 23rd June 2022. The geo-referenced LULC features were verified in the field using hand held GPS (Global Positioning System) and available secondary baseline data such as toposheets and mining project plan.

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Figure 10 - Different Land Use/cover classes including mining area, infrastructure, dumping area, roads, water bodies, croplands etc.

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Post-field corrections were introduced wherever necessary and final LULC maps of 10 km and 2 km radial buffer areas and Mining lease (ML) area were generated. Images were enhanced and enlarged for extracting LULC information around 10 km and 2 km buffer zones and within the ML area of Pakri Barwadi Coal Mining Project NTPC (PBCMP).

Data Analysis & Change Detection

The comparison of LULC maps of year 2022 with LULC maps of year 2019 was used to extract the LULC information and detection of change in each land use/cover class. Description of various LULC and their spatial extent are discussed in the following section.

LULC pattern within 10 km radial buffer around the ML

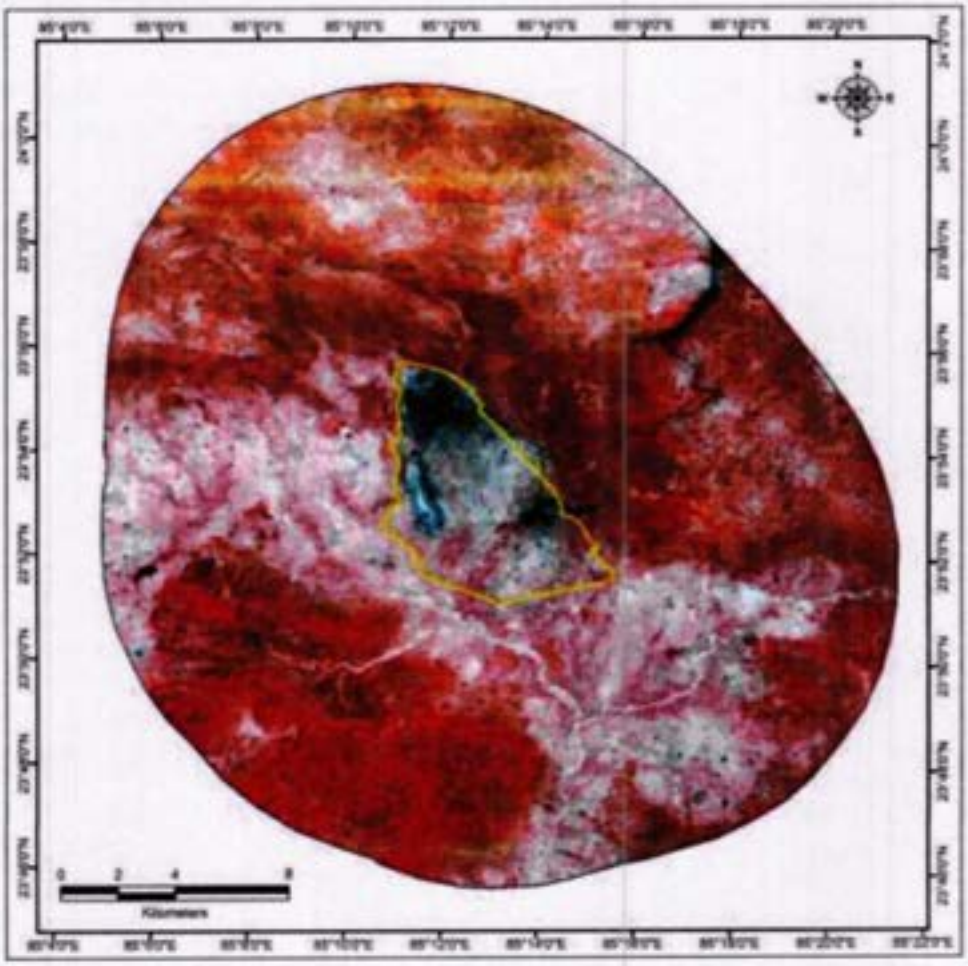

Figure 11 - IRS R2 LISS IV Satellite Data showing 10 km buffer area around the ML

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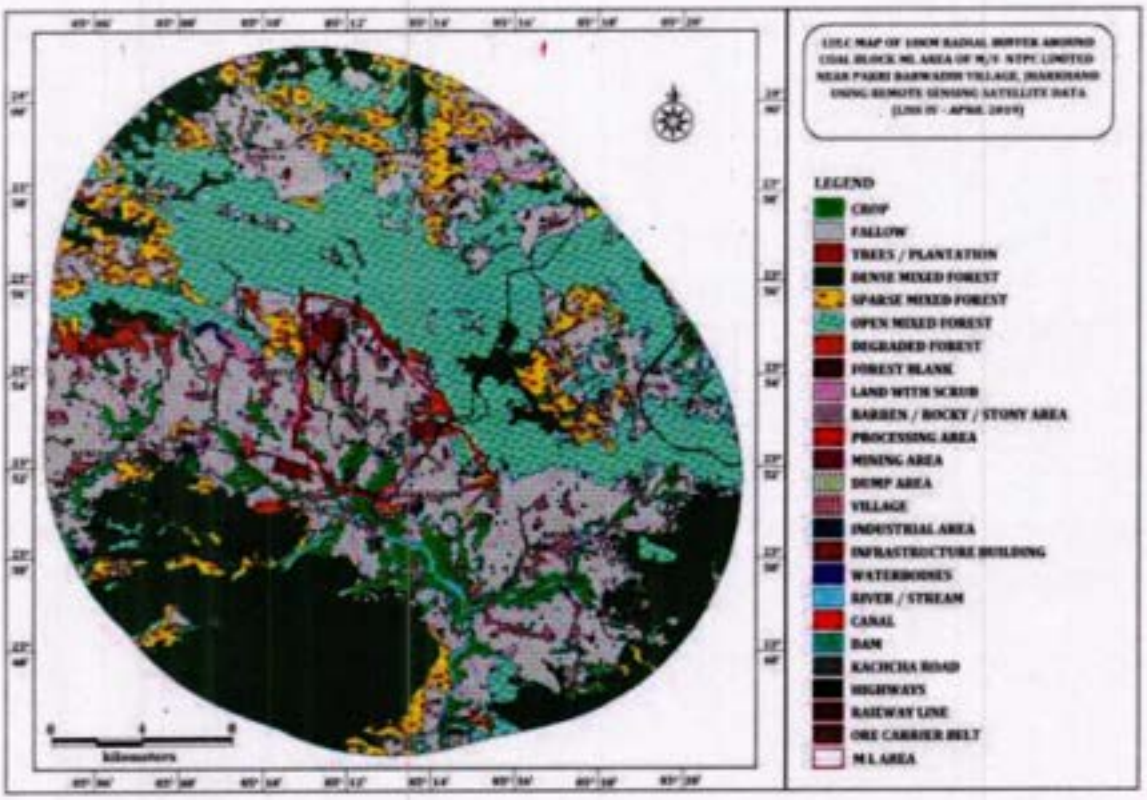

Figure 12 - LULC Map of 2019 for the 10 km radial buffer around coal ML area
(Source: LULC map from 2019 report by Geosensing Information Pvt. Ltd., Chennai)

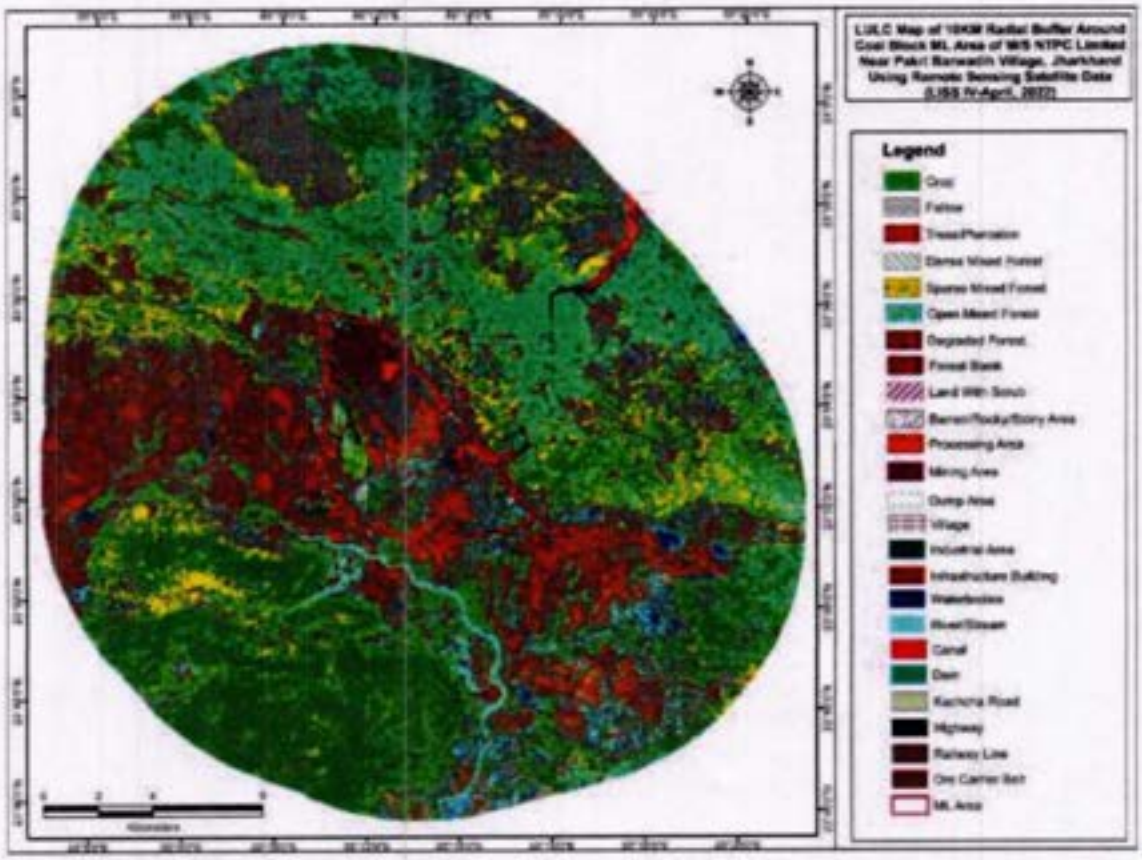

Figure 13 - LULC Map of 2022 for the 10 km radial buffer around coal ML area

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The LULC maps of 10 Km radial buffer area around ML area of Pakri Barwadi Coal Mining Project NTPC (PBCMP) and its surrounding for year 2019 and 2022 with are shown in Figure 12 and 13 respectively. LULC maps showing 10 Km buffer area around the ML falls within the boundaries of 85°03'56"' E to 85°21' 23" E and latitudes of 23°45' 21" N to 24°01'12" N covering a total radial buffer area of 622.855 sq. km, depicting distinct spatial pattern of different major LULC categories such as built-up, agriculture, forest, wasteland and water bodies etc., are listed in Table - 4.

Table 4 - LULC units within 10 Km Buffer zone and their Spatial Extent

S. No.	LULC Categories	Year 2019		Year 2022		Difference % (2019-2022)
		Area (sq. km)	Area %	Area (sq. km)	Area %	
1	Crop	31.340	5.03	32.679	5.25	0.22
2	Fallow	200.329	32.16	202.220	32.47	0.31
3	Trees / Plantation	1.442	0.23	4.719	0.76	0.53
4	Dense Mixed Forest	133.023	21.36	102.110	16.39	- 4.97
5	Sparse Mixed Forest	50.524	8.11	42.577	6.84	- 1.27
6	Open Mixed Forest	152.341	24.46	139.710	22.43	- 2.03
7	Degraded Forest	6.763	1.09	19.666	3.16	2.07
8	Forest Blank	0.135	0.02	2.121	0.34	0.32
9	Land with Scrub	9.814	1.58	15.373	2.47	0.89
10	Barren / Rocky/ Stony Area	3.847	0.62	4.506	0.72	0.1
11	Mining Area	1.629	0.26	6.986	1.12	0.86
12	Dump Area	0.849	0.14	4.432	0.71	0.57
13	Processing Area	0.152	0.02	1.973	0.32	0.3
14	Village	16.446	2.64	16.131	2.59	- 0.05
15	Industrial Area	0.720	0.12	31.384	5.10	4.98
16	Infrastructure Building	1.115	0.18	1.965	0.32	0.14
17	Waterbodies	2.294	0.37	4.017	0.64	0.27
18	Stream / River	7.427	1.19	7.501	1.20	0.01
19	Canal	0.117	0.02	2.962	0.48	0.46
20	Dam	0.508	0.08	1.499	0.24	0.16
21	Highways	1.109	0.18	2.610	0.42	0.24
22	Kacha Road	0.374	0.06	0.953	0.15	0.09
23	Railway Line	0.322	0.05	1.871	0.30	0.25
24	Ore Carrier Belt	0.235	0.04	2.361	0.38	0.34
	Total	**622.855**	**100.00**	**622.855**	**100.00**	**Nil**

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From the spatial extent of LULC as shown in Table - 4, it could be observed that "forest cover" is the predominant category covering 308.782 sq. km representing 49.57% of the buffer area followed by agricultural activity covering an area of 234.899 sq. km representing 37.71% of the buffer area. Together these two LULC categories occupy 87.28% of the buffer area.

LULC pattern within 2 km radial buffer around the ML

A similar approach is undertaken to study changes in spatial pattern of LULC around 2 km radial buffer of the ML area, which is estimated to be 106.703 sq. km., was interpreted and mapped using satellite data acquired on April of 2022, which is shown in Figure - 14.

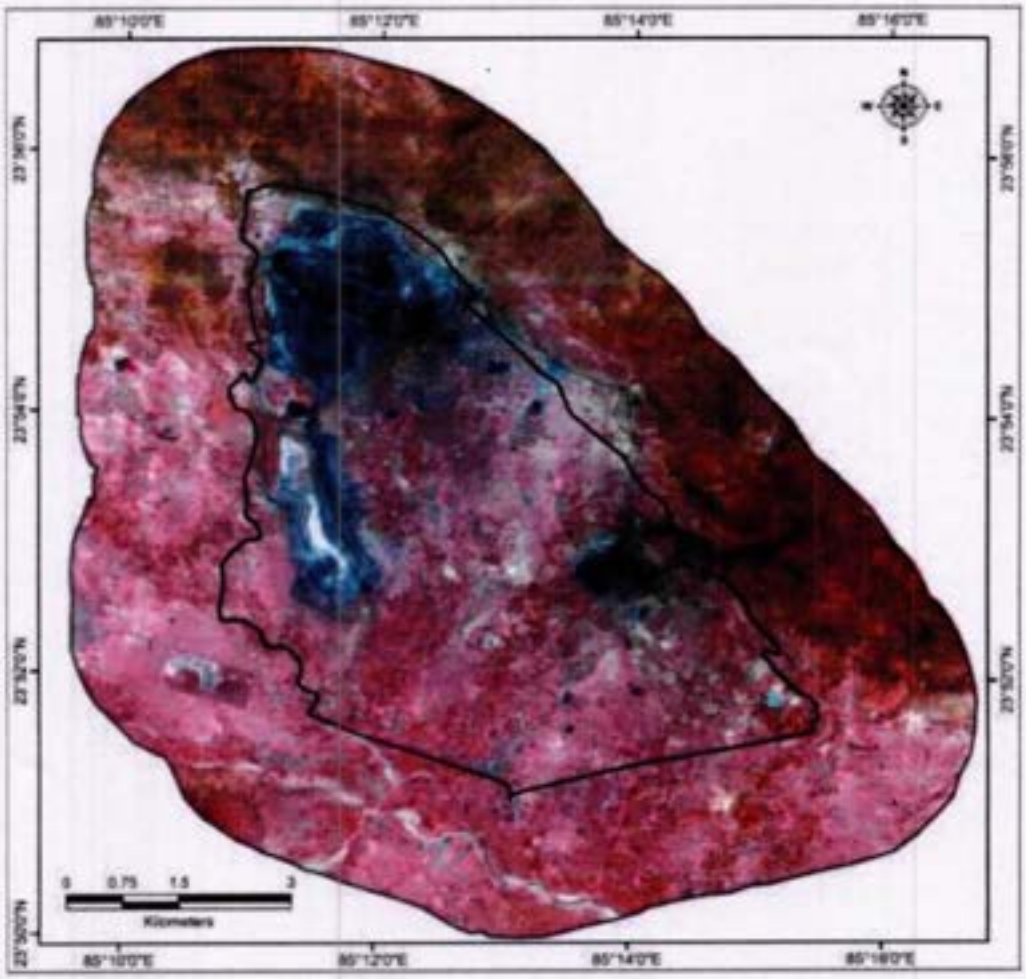

Figure 14 - LISS IV data of 2 Km Buffer area around the ML– April 2022

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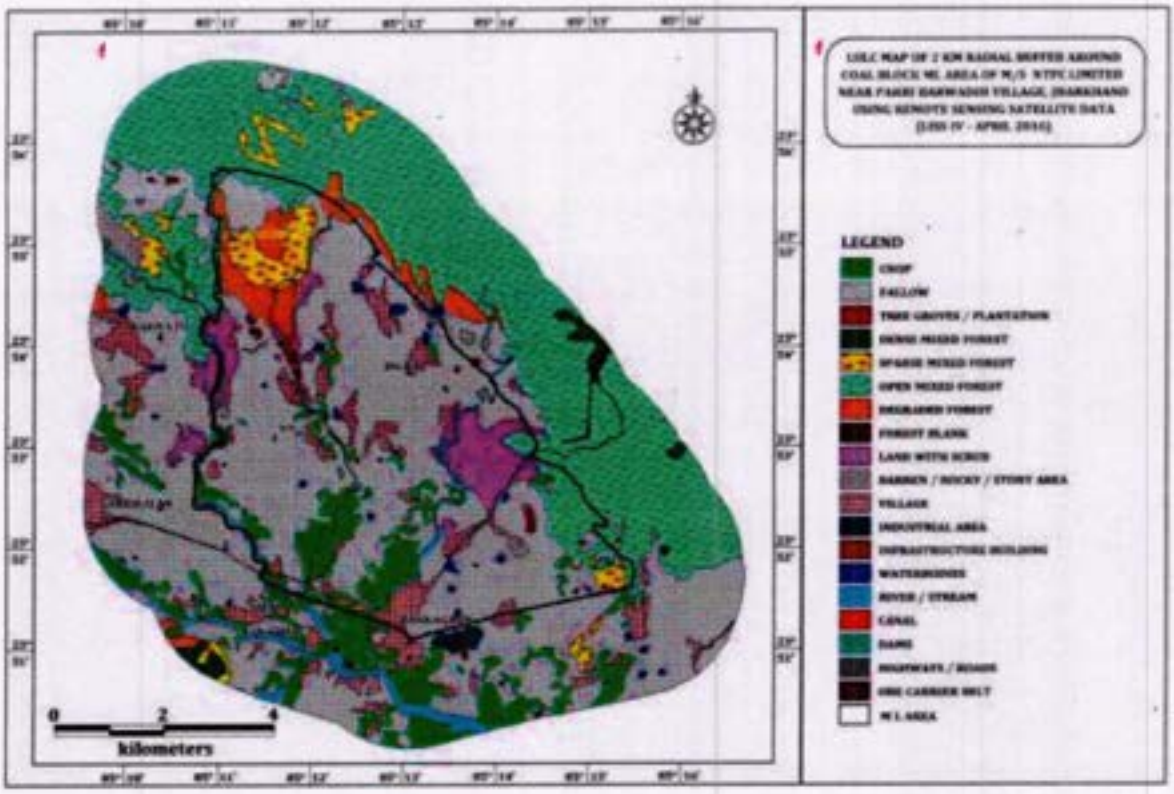

Figure 15 - LULC Map of 2 Km Buffer area around the ML– April 2019
(Source: LULC map from 2019 report by Geosensing Information Pvt. Ltd., Chennai)

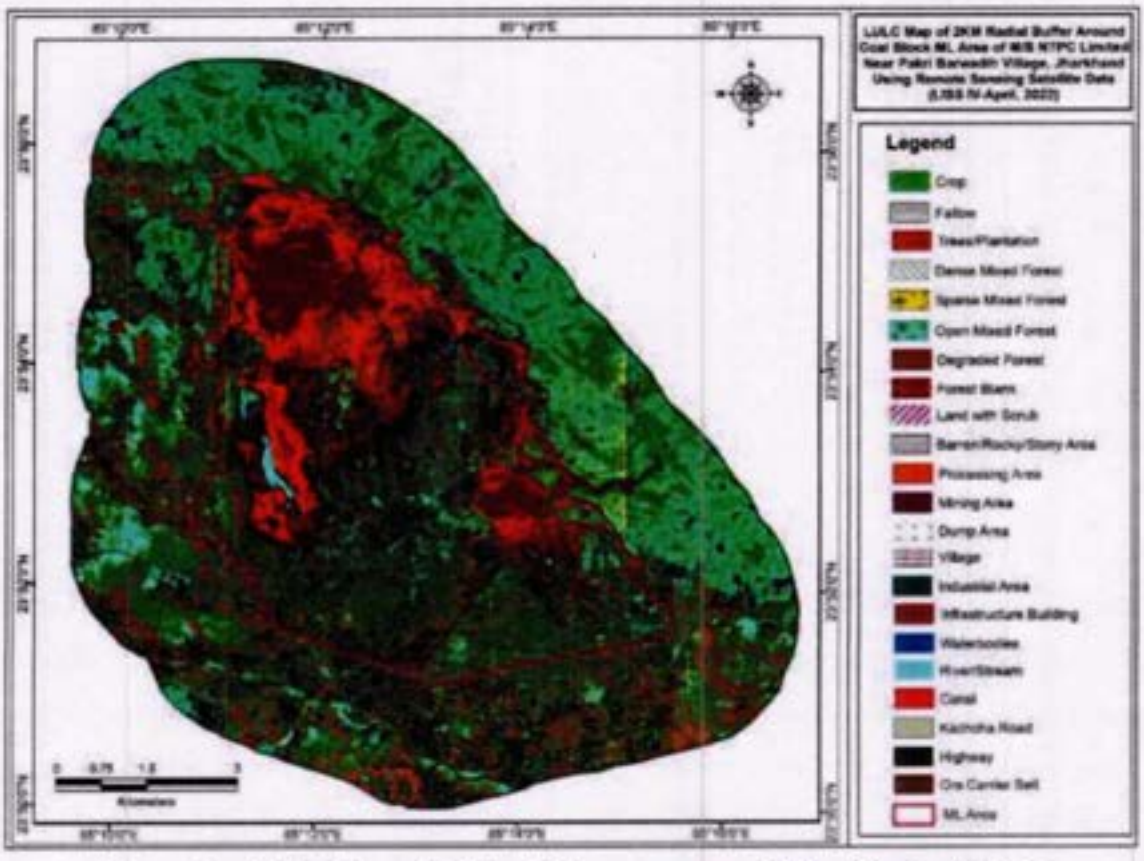

Figure 16 - LULC Map of 2 Km Buffer area around the ML– April 2022

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For change detection in LULC categories, spatial pattern delineated using historical LULC data of 2019 (Figure - 15) is compared with recent LULC data of 2022 (Figure -16), which is discussed in the Table 5.

Table 5 - LULC units within 2 Km Buffer zone and their Spatial Extent

S. No.	LULC Categories	Year 2019		Year 2022		Difference % (2019-2022)
		Area (sq. km)	Area %	Area (sq. km)	Area %	
1	Crop	8.216	7.70	5.611	5.26	-2.44
2	Fallow	47.603	44.61	39.913	37.41	-7.20
3	Trees / Plantation	0.278	0.26	2.561	2.40	2.14
4	Dense Mixed Forest	0.728	0.68	1.103	1.03	0.35
5	Sparse Mixed Forest	2.778	2.60	3.812	3.57	0.97
6	Open Mixed Forest	27.392	25.67	22.921	21.48	-4.19
7	Degraded Forest	2.344	2.20	3.701	3.47	1.27
8	Forest Blank	0.019	0.02	0.461	0.43	0.41
9	Land with Scrub	2.007	1.88	3.460	3.24	1.36
10	Barren / Rocky/ Stony Area	1.925	1.80	2.859	2.68	0.88
11	Mining Area	1.629	1.53	2.212	2.07	0.54
12	Dump Area	0.849	0.80	1.799	1.69	0.89
13	Processing Area	0.152	0.14	1.942	1.82	1.68
14	Village	5.711	5.35	4.133	3.87	-1.48
15	Industrial Area	0.423	0.40	1.837	1.72	1.32
16	Infrastructure Building	0.969	0.91	1.725	1.62	0.71
17	Waterbodies	0.484	0.45	0.572	0.54	0.09
18	Stream / River	2.194	2.06	2.715	2.54	0.49
19	Canal	0.030	0.03	0.127	0.12	0.09
20	Highways	0.573	0.54	0.964	0.90	0.36
21	Kacha Road	0.329	0.31	0.853	0.80	0.49
22	Ore Carrier Belt	0.070	0.07	1.421	1.33	1.26
	Total	**106.703**	**100.00**	**106.703**	**100.00**	**NIL**

From the LULC map, it could be seen that major portion of the buffer area is covered by fallow land and monopolizes throughout the buffer area with intermittent presence of land parcels delineated as crop land. On the other hand, the northern and eastern periphery of the buffer area is observed with open mixed forest with a small patch of dense forest cover at the eastern periphery. Scrub land is observed as small and scattered land parcels among the fallow land and at the foothills in the eastern part of the buffer area. Similarly, degraded forest cover is seen in the

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northern part and in the north-eastern part of ML boundary along with a small patch of sparse forest cover. General condition of LULC implies that the buffer area is endowed with agricultural land followed by forest cover.

From the map, majority of the buffer area could be observed with "fallow" land and seen with large tract of crop land in the southern part growing towards the central part of the buffer area. The crop land is seen closely affined to a minor stream that is flowing from north and joining with a major stream, River Ghagra, in the southern part of the buffer area. Spatial extent of "agriculture" category – fallow and crop land – is estimated as 45.52 sq.km representing 42.67% of the buffer area.

In similar fashion, "forest cover" is seen in the northern and eastern parts of the buffer area, mostly open mixed forest. Presence of a small patch of dense forest cover is seen in the eastern periphery and small area of sparse forest cover is seen in the western part. There are also mining activities and few land parcels of infrastructure buildings observed in the buffer area. Presence of ore carrier belt starting from the mining area in the lower part of the buffer area is also delineated. Spatial extents of these categories such as forest cover (34.55 sq. km) and mining and dump area 4.011 sq. km) are estimated from the LULC map. Forest cover represents 32.37% of the buffer area. Agriculture and forest cover are the predominant LULC covering 75.04% of the area.

No evidence of mining operation is interpreted in the buffer area during this period. Because of the nature of distribution of LULC, care must be taken to see minimal influence on these LULC while undertaking any industrial and allied activities including "mining" activities in the buffer area.

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LULC pattern within the Mining lease (ML) area

The satellite image of Mining lease (ML) area of Pakri Barwadi Coal Mining Project NTPC (PBCMP) is shown in Figure 17.

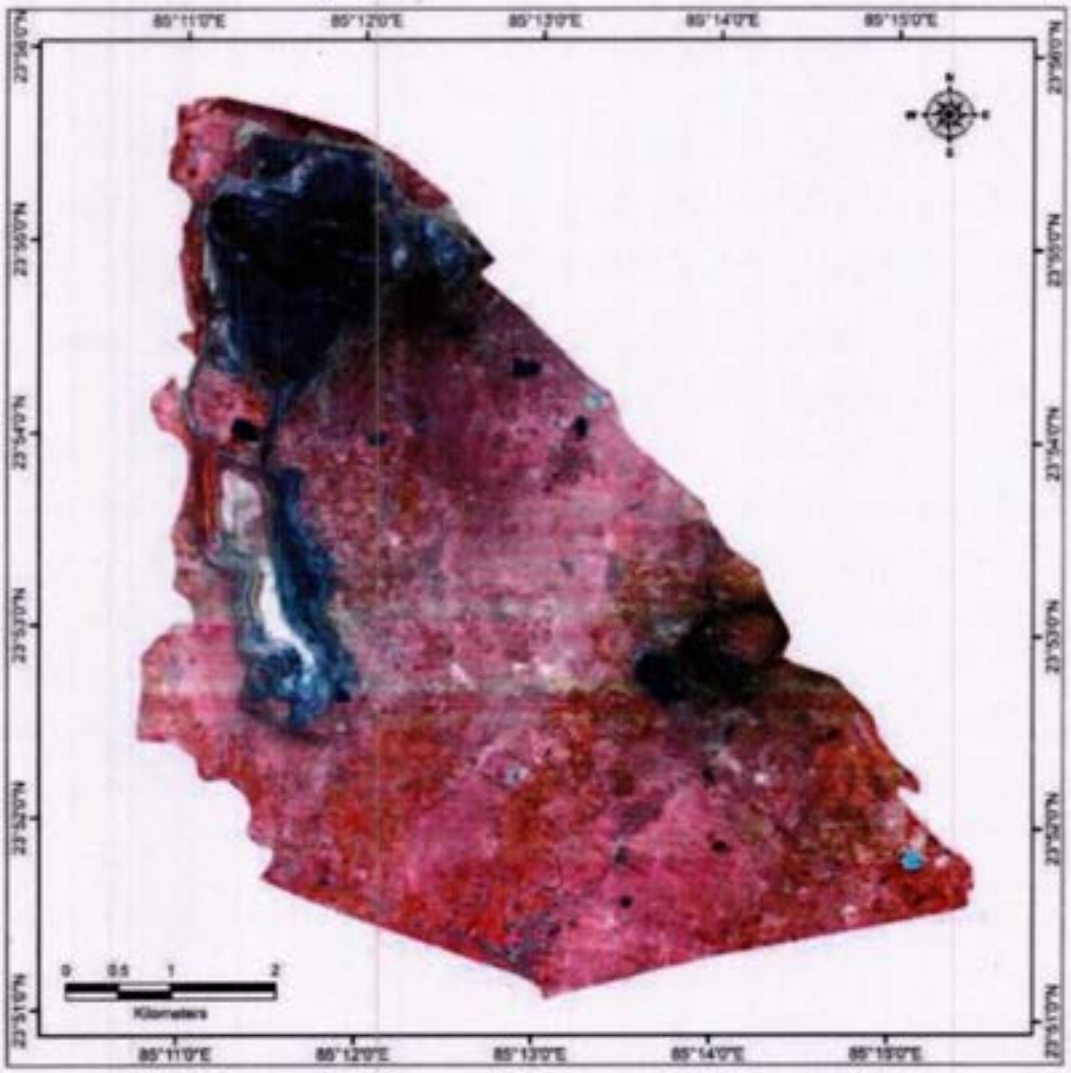

Figure 17 - LISS IV data of the Mining Lease area - April 2022

For change detection in LULC categories, spatial pattern delineated using historical LULC data of 2019 (Figure - 18) is compared with recent LULC data (Figure -19), which is discussed in the Table 6.

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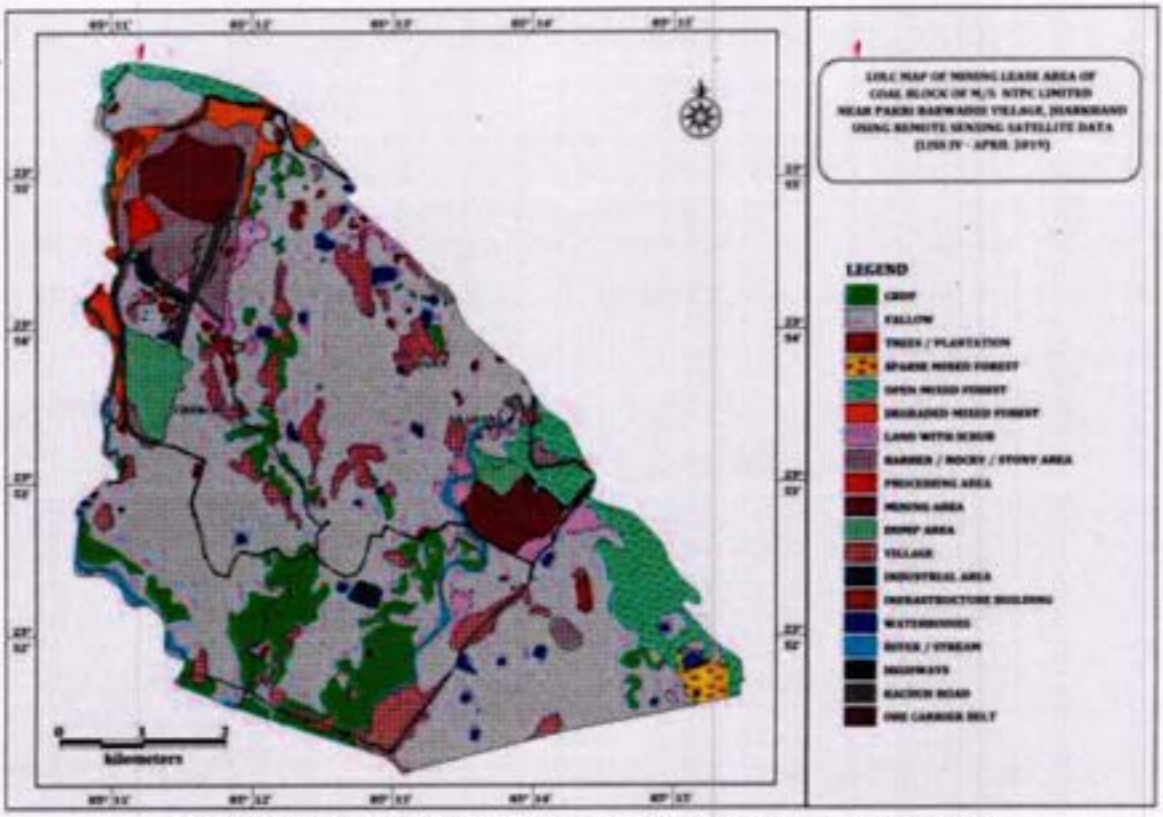

Figure 18 - LULC Map of the Mining Lease area –April 2019
(Source: LULC map from 2019 report by Geosensing Information Pvt. Ltd., Chennai)

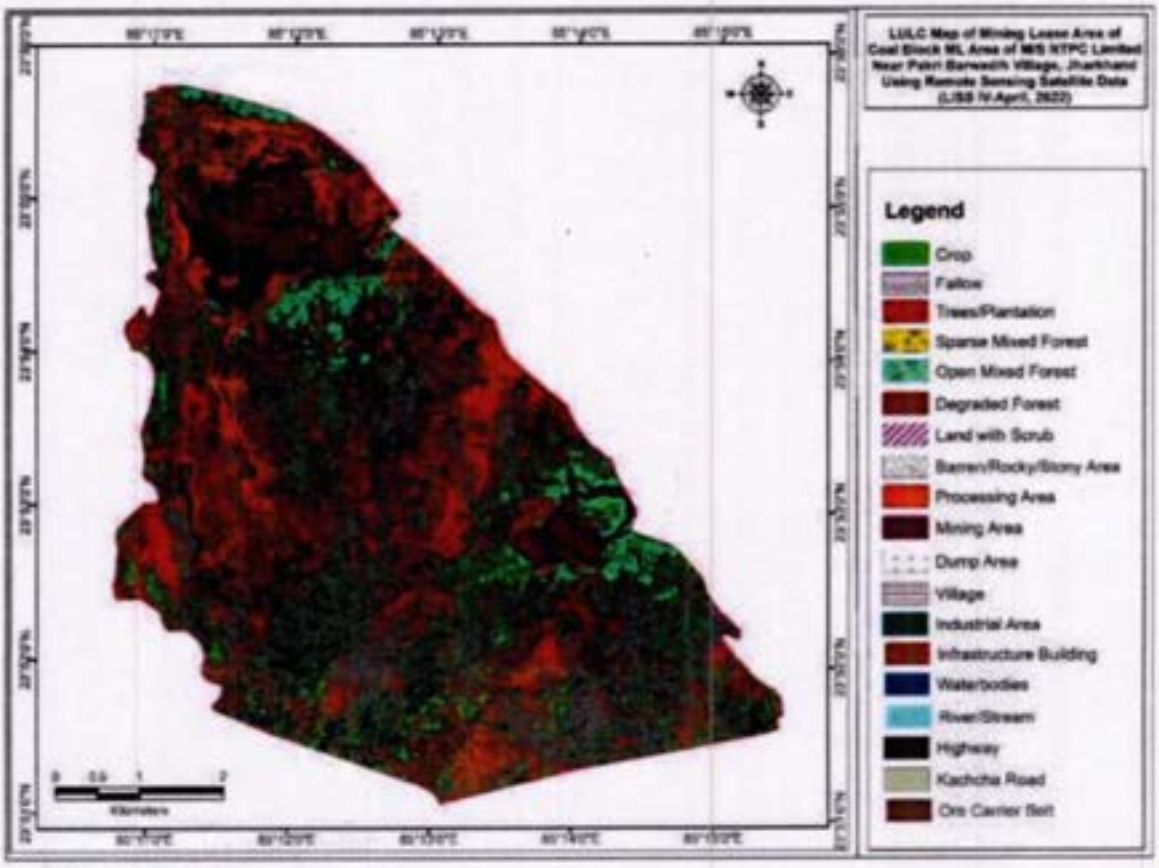

Figure 19 - LULC Map of the Mining Lease area –April 2022

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The LULC maps showing spatial pattern of LULC categories (Figure - 19) reiterated the similarity in their presence with that of LULC map of previous period – 2019 (Figure - 18). Significance of the LULC of the current period (2022) is the presence of mining activity in two parts of the ML – one in the northern part and the other on eastern part. This has certainly caused changes in the LULC but has not shown much influence on the nearby land parcels that are in the ML. Parts of degraded forest and open mixed forest in the northern part of the ML is delineated as mining area and similarly, degraded forest cover in the eastern part. Some fallow land near the mining area has changed and left as "barren".

The majority of the land use within ML is delineated as "fallow" and "crop" land representing 38.13% of the total 39.512 sq. km (Table - 6).

Table 6 - LULC units within ML area and their Spatial Extent

S. No.	LULC Categories	Year 2019		Year 2022		Difference % (2019-2022)
		Area (sq. km)	Area %	Area (sq. km)	Area %	
01	Crop	3.060	7.74	2.461	6.23	-1.51
02	Fallow	22.694	57.44	12.607	31.91	-25.53
03	Trees / Plantation	0.287	0.73	1.128	2.85	2.12
04	Sparse Mixed Forest	0.248	0.63	1.544	3.91	3.28
05	Open Mixed Forest	2.382	6.03	1.914	4.84	-1.19
06	Degraded Forest	0.851	2.15	1.811	4.58	2.43
07	Land with Scrub	0.901	2.28	2.362	5.98	3.70
08	Barren / Rocky/ Stony Area	1.806	4.57	2.374	6.01	1.44
09	Mining Area	1.660	4.20	2.104	5.33	1.13
10	Dump Area	0.823	2.08	1.721	4.36	2.28
11	Processing Area	0.152	0.38	1.642	4.16	3.78
12	Village	2.698	6.83	1.726	4.37	-2.46
13	Industrial Area	0.086	0.22	1.721	4.36	4.14
14	Infrastructure Building	0.269	0.68	0.825	2.09	1.41
15	Waterbodies	0.328	0.83	0.419	1.06	0.23
16	Stream / River	0.608	1.54	0.645	1.63	0.09
17	Highways	0.335	0.85	0.619	1.57	0.72
18	Kacha Road	0.314	0.79	0.766	1.94	1.15
19	Ore Carrier Belt	0.010	0.03	1.123	2.84	2.81
	Total	**39.512**	**100.00**	**39.512**	**100.00**	**NIL**

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एनटीपीसी लिमिटेड/ NTPC Limited
कोयला खनन परियोजनाएँ/ COAL MINING PROJECTS

Such changes may be well understood by comparing the spatial extent of "agriculture" and "forest cover" existed during previous period with the recent period. Agriculture area cumulatively showed 38.14% of the ML area showing 27.04% decreases during 2022, which is nearly 10.68 sq. km. Likewise "forest cover" showed 2.62 sq. km increase in area during 2022 when compared the cumulative area of forest cover during 2019. At the same time, mining and dump area covers an area of 3.825 sq. km during 2022, which is about 2.483 sq. km during 2019. Mining and dump area covers 3.335 sq. km representing nearly 9.68% of the ML area. Barren area near the mines, which is used for transport and other allied purposes, is around 1.84 Sq.km in excess of the previous period. The recent satellite data has shown presence of mining area and relative increase in barren area in the stating phase of degraded forest and parts of open forest along with few parcels of fallow land within the ML. Such time series comparison would highlight not only the quantum of such changes in LULC but also assist in environmental impact assessment and feasible mitigation measures in the ML and its environment.

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हजारीबाग / Hazaribag

Conclusion & Recommendations

Conclusion

In the present study, land use/ vegetation cover mapping has been carried out based on IRS-R2 L4FMX satellite data of year, 2022 in order to generate the database on land use/ land cover in Pakri Barwadi Coal-field for monitoring the impact of coal mining on land environment. The land use/cover data will help in assessing the land restoration status as well as for formulating the mitigation measures required, if any.

Study reveals that the total area in 10 km buffer zone of settlements which includes rural, infrastructure building and industrial settlements in the Pakri Barwadi Coal Mining Project NTPC (PBCMP) covers an area of 49.48 sq. km (7.94%). Vegetation cover, which includes dense mixed forests, sparse mixed forest, open mixed forests, degraded forest, trees/plantation and forest blank, covers an area of 308.782 sq. km (49.57%). The analysis further indicates that total agricultural land which includes both crop and fallow land covers an area of 234.899 sq. km (37.71%). The mining area which includes coal quarry, advance quarry site, barren OB dump and coal dump covers 11.418 sq. km (1.83%). Surface water bodies, canals, dam and stream/rivers covered an area of 15.979 sq. km (2.56%).

As the mining activities are progressing at a faster rate, the process of reclamation and restoration of the mined out areas need to be enhanced for geo-environmental protection and social benefits.

Recommendations

Keeping in view the sustainable development together with coal mining in the area, it is recommended that similar study should be carried out regularly at an interval of two-three years to assess the impact of coal mining on land use pattern, vegetation cover and biodiversity assessment in the coalfield to formulate the remedial measures, if any, required for mitigating the adverse impact of coal mining on land environment. Such regional study will also be helpful in assessing the environmental degradation/ upgradation carried out by different industries operating in the coalfield area.

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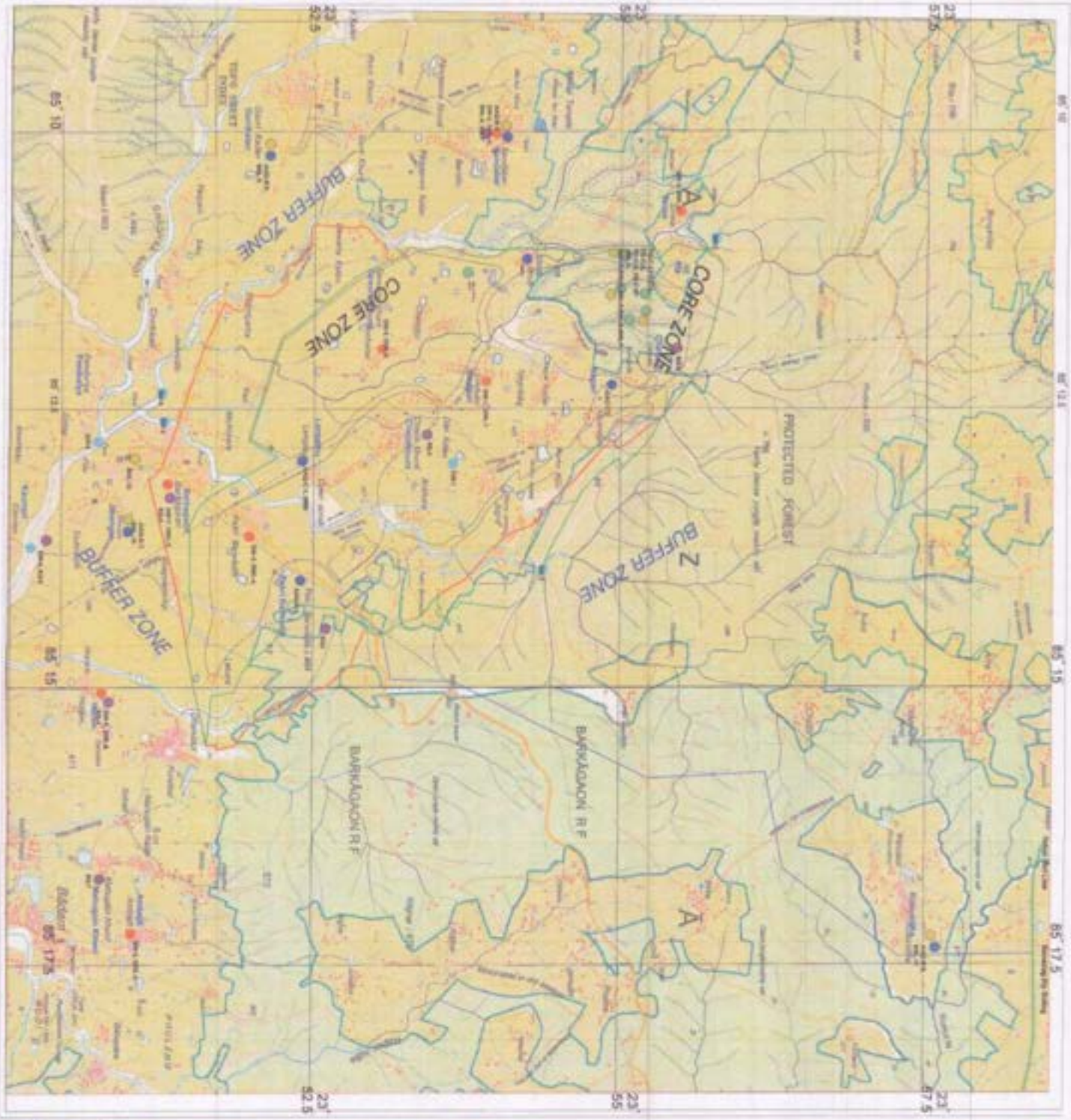
नवीन कुमार / NAVIN KUMAR
उप महाप्रबंधक (भंडारण प्रबंधन) / DGM (STORE MGMT.)
एनटीपीसी लिमिटेड/ NTPC Limited
कोयला खनन परियोजनाएँ/ COAL MINING PROJECTS
हजारीबाग / Hazaribag



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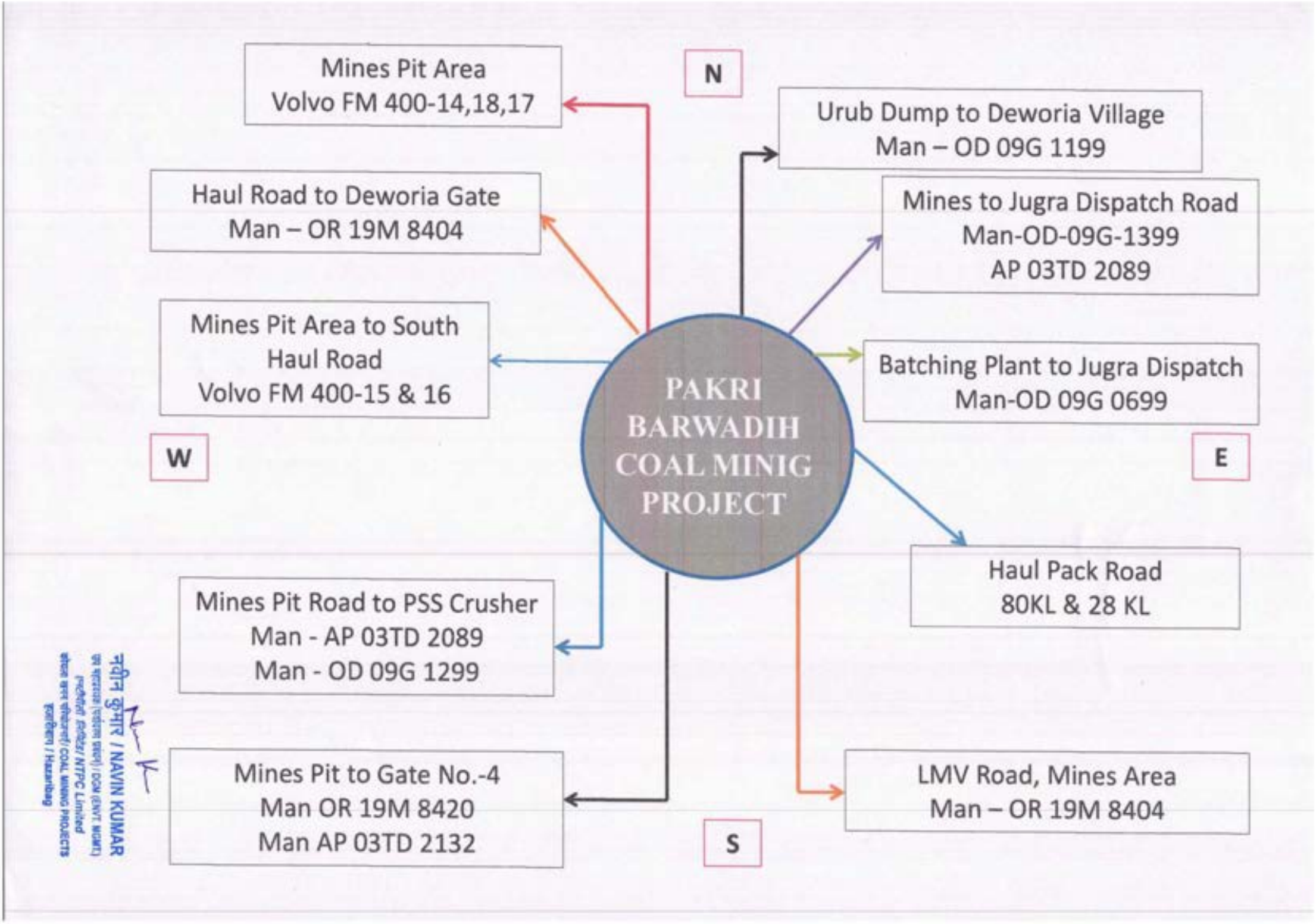

नवीन कुमार / NAVIN KUMAR

Pakri Barwadih Coal Mining Project, NTPC LTD.

Heavy Metals Test Report

October-22

S.No.	PARAMTERS	NORMS	VILLAGE URUB		VILLAGE NAGARI		VILLAGE LANGATHU		PAKRI BARWADIH		VILLAGE KANDABER		VILLAGE GARIKALAN		VILLAGE DHENGA		VILLAGE KUSUMBHA	
			08.10.2022	19.10.2022	08.10.2022	19.10.2022	08.10.2022	19.10.2022	08.10.2022	19.10.2022	08.10.2022	19.10.2022	08.10.2022	19.10.2022	08.10.2022	19.10.2022	08.10.2022	19.10.2022
1	PM 10	100 ug/m3	47.7	46.2	71.3	73.3	62.4	42.3	40.4	41.7	35.5	36.1	36.4	36.4	33.2	32.8	32.9	33.5
2	PM 2.5	60 ug/m3	26.1	25.2	53.3	50.6	41.8	24	22.6	23.4	19.9	20.5	20.7	20.7	19.4	18.6	18.5	19.2
3	SO2	80 ug/m3	14.6	15.2	29.1	27.7	23.6	12.6	12.5	11.8	9.4	8.9	9.1	9.1	7.2	7.9	7.6	7.3
4	NO2	80 ug/m3	26.2	26.9	16.7	16.4	12.1	20.9	21.4	19.5	15	14	14.9	14.9	10.7	12.3	11.4	10.4
5	CO	4.0 mg/m3	0.36	0.7	30.3	29.1	20.9	0.62	0.52	0.51	0.33	0.53	0.54	0.54	0.78	0.83	0.67	0.76
6	O3	180 ug/m3	20.7	21.3	19.9	20.6	21.8	22.5	25.2	27.4	28.3	29.3	27.2	28.4	29.1	30.2	28.9	29.9
7	NH3	400 ug/m3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
8	Benzo (A) Pyrene	...	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
9	Benzene	...	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
10	Arsenic	...	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
11	Nikel	...	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
12	Mercury	<0.001	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
13	Chromium	<0.02	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
14	Lead	1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

November-22

S.No.	PARAMTERS	NORMS	VILLAGE URUB		VILLAGE NAGARI		VILLAGE LANGATHU		PAKRI BARWADIH		VILLAGE KANDABER		VILLAGE GARIKALAN		VILLAGE DHENGA		VILLAGE KUSUMBHA	
			07.11.2022	22.11.2022	07.11.2022	22.11.2022	07.11.2022	22.11.2022	07.11.2022	22.11.2022	07.11.2022	22.11.2022	07.11.2022	22.11.2022	07.11.2022	22.11.2022	07.11.2022	22.11.2022
1	PM 10	100 ug/m3	70.6	70.1	76.2	78.4	66.6	65.9	64.1	64.3	57.5	58.4	57.4	58.2	54.3	53.5	53.7	52.8
2	PM 2.5	60 ug/m3	38.5	38.7	41.2	41.9	36.3	36.1	35.4	34.8	32.2	32.3	31.6	32.3	30	29.5	30.1	29
3	SO2	80 ug/m3	15.4	14.8	16.7	17.9	12.1	11.3	11.9	12.4	10.2	9.2	9.7	9.6	8.8	9.1	9.6	10.3
4	NO2	80 ug/m3	27	25.4	29.9	31.4	20.2	18.5	19.6	21.1	16.9	14.5	15.7	15.8	14.3	14.4	15.8	16.5
5	CO	4.0 mg/m3	0.66	0.71	0.84	0.83	0.56	0.49	0.46	0.55	0.37	0.41	0.42	0.39	0.34	0.31	0.33	0.37
6	O3	180 ug/m3	22.4	21.8	19.8	20.3	23.6	22.9	24.1	23.8	26.2	27.4	25.3	28.2	29.6	28.9	30.3	29.7
7	NH3	400 ug/m3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
8	Benzo (A) Pyrene	...	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
9	Benzene	...	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
10	Arsenic	...	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
11	Nikel	...	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
12	Mercury	<0.001	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
13	Chromium	<0.02	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
14	Lead	1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

December-22

S.No.	PARAMTERS	NORMS	VILLAGE URUB		VILLAGE NAGARI		VILLAGE LANGATHU		PAKRI BARWADIH		VILLAGE KANDABER		VILLAGE GARIKALAN		VILLAGE DHENGA		VILLAGE KUSUMBHA	
			07.12.2022	19.12.2022	07.12.2022	19.12.2022	07.12.2022	19.12.2022	07.12.2022	19.12.2022	07.12.2022	19.12.2022	07.12.2022	19.12.2022	07.12.2022	19.12.2022	07.12.2022	19.12.2022
1	PM 10	100 ug/m3	67.2	69.7	71.7	72.9	65.8	61.4	62.3	65.6	57.3	59.8	60.6	61.1	53.6	52.3	51.6	52.9
2	PM 2.5	60 ug/m3	37	38.2	39.3	39	36	34.1	34.1	35.7	31.8	33.3	32.9	34.2	29.9	28.6	29.4	29.7
3	SO2	80 ug/m3	13.3	14.1	17.6	16.6	12.6	11.5	12.3	10.1	10.4	9.6	12.1	8.8	9.4	7.9	8.7	10.8
4	NO2	80 ug/m3	23	23.8	32.1	29.1	21	18.5	20.1	16.8	17.5	15.6	21	14.5	15.2	12.4	13.5	17.1
5	CO	4.0 mg/m3	0.62	0.74	0.81	0.85	0.59	0.46	0.48	0.53	0.35	0.43	0.41	0.37	0.37	0.34	0.35	0.39
6	O3	180 ug/m3	23.9	22.7	19.9	20.5	24.6	23.2	25.8	27.2	26.9	28.3	30.2	29.6	31.5	30.9	30.4	32.6
7	NH3	400 ug/m3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
8	Benzo (A) Pyrene	...	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
9	Benzene	...	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
10	Arsenic	...	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
11	Nikel	...	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
12	Mercury	<0.001	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
13	Chromium	<0.02	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
14	Lead	1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

नवीन कुमार / NAVIN KUMAR
उप महाप्रबंधक (पर्यावरण प्रबंधन) / DGM (ENVT. MGMT.)
पाकरी बरवाडीह / PKRI BARWADIH
एनटीपीसी लिमिटेड / NTPC Limited
कोयला खनन परियोजनाएं / COAL MINING PROJECTS
झारखण्ड / Jharkhand

January-23

S.No.	PARAMTERS	NORMS	VILLAGE URUB		VILLAGE NAGARI		VILLAGE LANGATHU		PAKRI BARWADIH		VILLAGE KANDABER		VILLAGE GARIKALAN		VILLAGE DHENGA		VILLAGE KUSUMBHA	
			07.01.2023	27.01.2023	07.01.2023	27.01.2023	07.01.2023	27.01.2023	07.01.2023	27.01.2023	07.01.2023	27.01.2023	07.01.2023	27.01.2023	07.01.2023	27.01.2023	07.01.2023	27.01.2023
1	PM 10	100 ug/m3	63.4	66.8	74.4	74.5	64.2	62.8	62.8	64.4	56.4	61.2	60.6	61.2	52.6	52.6	51.4	51.4
2	PM 2.5	60 ug/m3	34	35.7	39.7	39.85	34.8	33.8	33.8	34.9	30.9	33.2	32.8	33.3	29.1	28.5	27.8	28.2
3	SO2	80 ug/m3	14.1	14.7	16.9	16.9	12.6	12.4	12.1	11.2	9.1	8.4	9.6	9.1	7.9	8.3	8.4	7.8
4	NO2	80 ug/m3	25.2	25.9	30.7	30.1	21.9	20.5	20.6	18.3	14.8	13	15.9	14	12.1	13.1	13	11.4
5	O3	100 ug/m3	21.4	20.9	19.9	20.1	22.3	21.8	24.7	23.6	27.8	28.2	26.8	25.9	30.3	29.7	29.4	30.6
6	NH3	400 ug/m3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
7	CO	2.0 mg/m3	0.39	0.72	0.75	0.81	0.56	0.66	0.58	0.55	0.36	0.51	0.51	0.47	0.77	0.81	0.65	0.72
8	Benzo (A) Pyrene	...	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
9	Benzene	...	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
10	Arsenic	...	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
11	Nikel	...	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
12	Mercury	<0.001	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
13	Chromium	<0.02	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
14	Lead	1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

February-23

S.No.	PARAMTERS	NORMS	VILLAGE URUB		VILLAGE NAGARI		VILLAGE LANGATHU		PAKRI BARWADIH		VILLAGE KANDABER		VILLAGE GARIKALAN		VILLAGE DHENGA		VILLAGE KUSUMBHA	
			06.02.2023	23.02.2023	06.02.2023	23.02.2023	06.02.2023	23.02.2023	06.02.2023	23.02.2023	06.02.2023	23.02.2023	06.02.2023	23.02.2023	06.02.2023	23.02.2023	06.02.2023	23.02.2023
1	PM 10	100 ug/m3	66.4	68.2	72.4	74.2	63.8	61.6	61.2	62.8	55.2	58.6	59.4	55.8	51.8	54.2	54.4	53.4
2	PM 2.5	60 ug/m3	35.5	36.4	38.7	39.6	34.6	33.5	33	33.8	30.3	32	32.2	30.4	28.7	29.9	29.3	28.8
3	SO2	80 ug/m3	14.5	13.6	15.6	16.2	11.2	12.4	11.8	12.7	8.2	9.2	9.1	9.6	8.6	7.2	7.8	8.5
4	NO2	80 ug/m3	26	24.2	28.1	29.3	19.1	21.5	20	21.8	13	15	14.9	15.9	13.5	10.7	11.8	13.2
5	O3	100 ug/m3	21.4	20.9	19.9	20.1	22.3	21.8	24.7	23.6	27.8	28.2	26.8	25.9	30.3	29.7	29.4	30.6
6	NH3	400 ug/m3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
7	CO	2.0 mg/m3	0.41	0.44	0.74	0.71	0.51	0.49	0.61	0.59	0.39	0.41	0.54	0.52	0.74	0.78	0.68	0.64
8	Benzo (A) Pyrene	...	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
9	Benzene	...	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
10	Arsenic	...	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
11	Nikel	...	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
12	Mercury	<0.001	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
13	Chromium	<0.02	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
14	Lead	1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

March-23

S.No.	PARAMTERS	NORMS	VILLAGE URUB		VILLAGE NAGARI		VILLAGE LANGATHU		PAKRI BARWADIH		VILLAGE KANDABER		VILLAGE GARIKALAN		VILLAGE DHENGA		VILLAGE KUSUMBHA	
			06.03.2023	25.03.2023	06.03.2023	25.03.2023	06.03.2023	25.03.2023	06.03.2023	25.03.2023	06.03.2023	25.03.2023	06.03.2023	25.03.2023	06.03.2023	25.03.2023	06.03.2023	25.03.2023
1	PM 10	100 ug/m3	68.7	66.7	73.2	71.3	62.8	62.1	61.7	64.7	57.1	56.1	55.6	59.3	52.2	50.2	54.8	51.9
2	PM 2.5	60 ug/m3	36.7	35.7	39.1	38.2	34.1	33.8	33.25	34.8	51.5	30.8	30.3	32.2	28.9	27.9	29.5	28.1
3	SO2	80 ug/m3	13.4	12.3	14.2	17.1	10.8	12.3	12.4	10.1	8.3	8.1	8.9	9.2	7.1	8.6	8.3	7.2
4	NO2	80 ug/m3	23.8	21.6	25.3	31.1	18.3	21.3	21.2	16.6	13.2	12.8	14.5	15.1	10.5	13.5	12.8	10.6
5	O3	100 ug/m3	20.3	21.4	19.8	20.1	22.6	23.7	22.9	21.8	24.6	25.7	26.2	24.8	29.3	27.1	28.5	28.2
6	NH3	400 ug/m3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
7	CO	2.0 mg/m3	0.44	0.47	0.71	0.74	0.56	0.46	0.62	0.63	0.41	0.39	0.52	0.54	0.73	0.84	0.65	0.68
8	Benzo (A) Pyrene	...	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
9	Benzene	...	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
10	Arsenic	...	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
11	Nikel	...	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
12	Mercury	<0.001	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
13	Chromium	<0.02	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
14	Lead	1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

Note : BDL = Below Detection Limit

नवीन कुमार / NAVIN KUMAR
उप महाप्रबंधक/उपखान प्रबंधक/DGM (ENVT. MGMT.)
पर्यावरण प्रबंधन/ NTPC Limited
कोयला खनन परियोजनाएं/COAL MINING PROJECTS
हजारीबाग / Hazaribag

PAKRI BARWADIH COAL MINES, NTPC Ltd.				
FUGITIVE DUST MONITORING REPORT				
October-22				
Sl. No.	Date	Station	Result	Norms
1	01.10.2022	Excavation Area	343	600 ug/m3
	16.10.2022		377	600 ug/m3
2	05.10.2022	Haul Road	219	600 ug/m3
	17.10.2022		236	600 ug/m3
3	06.10.2022	Waste Dump	248	600 ug/m3
	19.10.2022		229	600 ug/m3
4	08.10.2022	Top Soil Dump	263	600 ug/m3
	20.10.2022		295	600 ug/m3
5	09.10.2022	Work Shop	241	600 ug/m3
	21.10.2022		252	600 ug/m3
6	12.10.2022	Drilling Location	349	600 ug/m3
	22.10.2022		371	600 ug/m3
7	13.10.2022	PSS Area (Village Nagari)	378	600 ug/m3
	26.10.2022		405	600 ug/m3
November-22				
Sl. No.	Date	Station	Result	Norms
1	01.11.2022	Excavation Area	369	600 ug/m3
	15.11.2022		378	600 ug/m3
2	02.11.2022	Haul Road	246	600 ug/m3
	16.11.2022		252	600 ug/m3
3	03.11.2022	Waste Dump	287	600 ug/m3
	17.11.2022		265	600 ug/m3
4	04.11.2022	Top Soil Dump	292	600 ug/m3
	18.11.2022		284	600 ug/m3
5	05.11.2022	Work Shop	243	600 ug/m3
	19.11.2022		256	600 ug/m3
6	06.11.2022	Drilling Location	371	600 ug/m3
	20.11.2022		366	600 ug/m3
7	07.11.2022	PSS Area (Village Nagari)	417	600 ug/m3
	21.11.2022		436	600 ug/m3

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December-22				
Sl. No.	Date	Station	Result	Norms
1	01.12.2022	Excavation Area	352	600 ug/m3
	16.12.2022		349	600 ug/m3
2	02.12.2022	Haul Road	258	600 ug/m3
	17.12.2022		237	600 ug/m3
3	03.12.2022	Waste Dump	241	600 ug/m3
	18.12.2022		229	600 ug/m3
4	04.12.2022	Top Soil Dump	246	600 ug/m3
	19.12.2022		254	600 ug/m3
5	05.12.2022	Work Shop	263	600 ug/m3
	20.12.2022		256	600 ug/m3
6	06.12.2022	Drilling Location	282	600 ug/m3
	21.12.2022		274	600 ug/m3
7	07.12.2022	PSS Area (Village Nagari)	396	600 ug/m3
	22.12.2022		372	600 ug/m3
January-23				
Sl. No.	Date	Station	Result	Norms
1	02.01.2023	Excavation Area	371	600 ug/m3
	16.01.2023		365	600 ug/m3
2	03.01.2023	Haul Road	264	600 ug/m3
	17.01.2023		274	600 ug/m3
3	04.01.2023	Waste Dump	234	600 ug/m3
	18.01.2023		245	600 ug/m3
4	05.01.2023	Top Soil Dump	281	600 ug/m3
	19.01.2023		277	600 ug/m3
5	06.01.2023	Work Shop	254	600 ug/m3
	20.01.2023		238	600 ug/m3
6	07.01.2023	Drilling Location	374	600 ug/m3
	21.01.2023		358	600 ug/m3
7	08.01.2023	PSS Area (Village Nagari)	381	600 ug/m3
	22.01.2023		396	600 ug/m3

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February-23				
Sl. No.	Date	Station	Result	Norms
1	01.02.2023	Excavation Area	383	600 ug/m3
	16.02.2023		377	600 ug/m3
2	02.02.2023	Haul Road	261	600 ug/m3
	17.02.2023		279	600 ug/m3
3	03.02.2023	Waste Dump	257	600 ug/m3
	18.02.2023		273	600 ug/m3
4	04.02.2023	Top Soil Dump	294	600 ug/m3
	19.02.2023		287	600 ug/m3
5	05.02.2023	Work Shop	259	600 ug/m3
	20.02.2023		278	600 ug/m3
6	06.02.2023	Drilling Location	381	600 ug/m3
	21.02.2023		364	600 ug/m3
7	07.02.2023	PSS Area (Village Nagari)	394	600 ug/m3
	22.02.2023		373	600 ug/m3
March-23				
Sl. No.	Date	Station	Result	Norms
1	01.03.2023	Excavation Area	391	600 ug/m3
	16.03.2023		384	600 ug/m3
2	02.03.2023	Haul Road	284	600 ug/m3
	17.03.2023		275	600 ug/m3
3	03.03.2023	Waste Dump	249	600 ug/m3
	18.03.2023		267	600 ug/m3
4	04.03.2023	Top Soil Dump	302	600 ug/m3
	20.03.2023		291	600 ug/m3
5	05.03.2023	Work Shop	287	600 ug/m3
	21.03.2023		266	600 ug/m3
6	06.03.2023	Drilling Location	345	600 ug/m3
	22.03.2023		315	600 ug/m3
7	07.03.2023	PSS Area (Village Nagari)	369	600 ug/m3
	23.03.2023		345	600 ug/m3

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Pakri Barwadih Coal Mining Project

Noise Monitoring Data Month of March-2023

Monitoring Location :- EXCAVATION AREA(WORK ZONE)

Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)	
				Day	Night	Day	Night
1	01.03.2023	ANL-1	Average	69.3	65.4	75/90	70
			Maximum	72.2	68.1		
			Minimum	66.4	62.6		
			Leq db(A)	69.9	65.8		
2	16.03.2023	ANL-1	Average	68.9	63.3	75/90	70
			Maximum	72.6	67.3		
			Minimum	65.2	59.2		
			Leq db(A)	69.4	64.8		

Monitoring Location :- HAUL ROAD (WORK ZONE)

Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)	
				Day	Night	Day	Night
1	02.03.2023	ANL-2	Average	67.0	63.8	75/90	70
			Maximum	70.8	66.3		
			Minimum	63.2	61.3		
			Leq db(A)	67.7	64.4		
2	17.03.2023	ANL-2	Average	68.6	64.5	75/90	70
			Maximum	73.5	68.5		
			Minimum	63.6	60.4		
			Leq db(A)	70.4	66.1		

Monitoring Location :- WASTE DUMP, (WORK ZONE)

Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)	
				Day	Night	Day	Night
1	03.03.2023	ANL-3	Average	67.9	63.5	75/90	70
			Maximum	71.3	66.6		
			Minimum	64.4	60.4		
			Leq db(A)	68.7	64.2		
2	18.03.2023	ANL-3	Average	69.9	67.7	75/90	70
			Maximum	74.1	69.6		
			Minimum	65.7	65.8		
			Leq db(A)	71.8	67.9		

Monitoring Location :- TOP SOIL DUMP (WORK ZONE)

Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)	
				Day	Night	Day	Night
1	04.03.2023	ANL-4	Average	69.0	65.2	75/90	70
			Maximum	73.2	68.6		
			Minimum	64.8	61.7		
			Leq db(A)	70.4	66.5		
2	20.03.2023	ANL-4	Average	73.2	63.3	75/90	70
			Maximum	74.9	67.3		
			Minimum	71.4	59.2		
			Leq db(A)	72.7	64.8		

Monitoring Location :- WORK SHOP (WORK ZONE)

Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)	
				Day	Night	Day	Night
1	05.03.2023	ANL-5	Average	70	64.0	75/90	70
			Maximum	72.6	67.7		
			Minimum	67.4	60.2		
			Leq db(A)	70.9	65.2		
2	21.03.2023	ANL-5	Average	70.7	64.9	75/90	70
			Maximum	72.9	67.3		
			Minimum	68.5	62.4		
			Leq db(A)	71.2	65.8		

Monitoring Location :- DRILLING LOCATION (WORK ZONE)

Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)	
				Day	Night	Day	Night
1	06.03.2023	ANL-6	Average	70.2	65.7	75/90	70
			Maximum	73.1	68.9		
			Minimum	67.3	62.5		
			Leq db(A)	71.4	66.1		
2	22.03.2023	ANL-6	Average	63.6	60.7	75/90	70
			Maximum	65.8	63.7		
			Minimum	61.4	57.6		
			Leq db(A)	63.9	61.2		

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Monitoring Location :- OPERATOR CABIN (WORK ZONE)								Monitoring Location :- PSS AREA-1 NAGRI (WORK ZONE)							
Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)		Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)	
				Day	Night	Day	Night					Day	Night	Day	Night
1	07.03.2023	ANL-7	Average	64.9	60.1	75/90	70	1	08.03.2023	ANL-8	Average	68.7	62.5	75/90	70
			Maximum	68.2	64.7						Maximum	71.6	66.1		
			Minimum	61.6	55.5						Minimum	65.8	58.8		
			Leq db(A)	65.4	62.2						Leq db(A)	69.2	63.4		
2	23.03.2023	ANL-7	Average	64.5	59	75/90	70	2	24.03.2023	ANL-8	Average	70.6	67.6	75/90	70
			Maximum	66.8	61.8						Maximum	73.5	70.8		
			Minimum	62.1	56.2						Minimum	67.7	64.4		
			Leq db(A)	64.9	59.4						Leq db(A)	71.2	68.9		
Monitoring Location :- PSS AREA-2 NAGARI (WORK ZONE)								Monitoring Location :-VILLAGE KANDABER (AMBIENT ZONE)							
Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)		Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)	
				Day	Night	Day	Night					Day	Night	Day	Night
1	08.03.2023	ANL-9	Average	71.2	67.1	75/90	70	1	09.03.2023	BNL-10	Average	47.7	38.6	55	45
			Maximum	73.9	68.5						Maximum	53.8	44.6		
			Minimum	68.5	65.7						Minimum	41.6	32.5		
			Leq db(A)	71.7	66.2						Leq db(A)	49.8	41.2		
2	24.03.2023	ANL-9	Average	69.9	65.1	75/90	70	2	25.03.2023	BNL-10	Average	47.6	39.6	55	45
			Maximum	72.3	68.8						Maximum	51.5	41.4		
			Minimum	67.5	61.4						Minimum	43.7	37.8		
			Leq db(A)	70.2	66.3						Leq db(A)	49.3	39.9		
Monitoring Location :- VILLAGE GARIKALAN (AMBIENT ZONE)								Monitoring Location :- VILLAGE DHENGA (AMBIENT ZONE)							
Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)		Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)	
				Day	Night	Day	Night					Day	Night	Day	Night
1	10.03.2023	BNL-11	Average	48.2	39.2	55	45	1	11.03.2023	BNL-12	Average	47.1	39.3	55	45
			Maximum	51.5	42.5						Maximum	51.4	42.5		
			Minimum	44.9	35.8						Minimum	42.8	36.1		
			Leq db(A)	49.4	40.1						Leq db(A)	48.9	40.6		
2	26.03.2023	BNL-11	Average	42.4	33.6	55	45	2	27.03.2023	BNL-12	Average	47.0	38.9	55	45
			Maximum	48.6	37.5						Maximum	51.5	42.4		
			Minimum	36.2	29.7						Minimum	42.5	35.3		
			Leq db(A)	44.7	35.1						Leq db(A)	48.2	39.7		

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Monitoring Location :- VILLAGE KUSUMBHA (AMBIENT ZONE)								Monitoring Location :- VILLAGE BLOCK OFFICE AREA BARKAGAON (AMBIENT ZONE)							
Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)		Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)	
				Day	Night	Day	Night					Day	Night	Day	Night
1	12.03.2023	BNL-13	Average	48.6	35.1	55	45	1	13.03.2023	BNL-14	Average	49.2	40.5	55	45
			Maximum	53.6	38.4						Maximum	52.8	41.6		
			Minimum	43.5	31.8						Minimum	45.5	39.4		
			Leq db(A)	49.8	36.5						Leq db(A)	50.4	39.2		
2	28.3.2023	BNL-13	Average	44.6	36.7	55	45	2	29.03.2023	BNL-14	Average	41.5	31.2	55	45
			Maximum	49.4	40.6						Maximum	48.7	38.9		
			Minimum	39.8	32.8						Minimum	34.3	23.5		
			Leq db(A)	46.2	38.1						Leq db(A)	44.2	33.8		

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Pakri Barwadih Coal Mining Project

Noise Monitoring Data Month of February-2023

Monitoring Location :- EXCAVATION AREA(WORK ZONE)

Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)	
				Day	Night	Day	Night
1	01.02.2023	ANL-1	Average	68.6	64.3	75/90	70
			Maximum	71.4	67.2		
			Minimum	65.8	61.4		
			Leq db(A)	69.7	65.1		
2	15.02.2023	ANL-1	Average	70	64.7	75/90	70
			Maximum	72.4	68.1		
			Minimum	67.6	61.2		
			Leq db(A)	70.9	65.9		

Monitoring Location :- HAUL ROAD (WORK ZONE)

Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)	
				Day	Night	Day	Night
1	02.02.2023	ANL-2	Average	67.6	64.9	75/90	70
			Maximum	70.4	67.2		
			Minimum	64.8	62.5		
			Leq db(A)	68.2	65.7		
2	16.02.2023	ANL-2	Average	67.5	64.3	75/90	70
			Maximum	72.8	67.2		
			Minimum	62.1	61.4		
			Leq db(A)	69.2	65.3		

Monitoring Location :- WASTE DUMP,(WORK ZONE)

Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)	
				Day	Night	Day	Night
1	03.02.2023	ANL-3	Average	69.6	64.7	75/90	70
			Maximum	72.8	67.5		
			Minimum	66.4	61.8		
			Leq db(A)	70.4	65.8		
2	17.02.2023	ANL-3	Average	68.2	64.4	75/90	70
			Maximum	71.7	67.8		
			Minimum	64.6	60.9		
			Leq db(A)	69.4	65.7		

Monitoring Location :- TOP SOIL DUMP(WORK ZONE)

Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)	
				Day	Night	Day	Night
1	04.02.2023	ANL-4	Average	68.8	65	75/90	70
			Maximum	71.4	67.7		
			Minimum	66.2	62.2		
			Leq db(A)	69.5	65.9		
2	18.02.2023	ANL-4	Average	69.5	65.2	75/90	70
			Maximum	74.1	67.9		
			Minimum	64.8	62.5		
			Leq db(A)	71.2	65.9		

Monitoring Location :- WORK SHOP(WORK ZONE)

Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)	
				Day	Night	Day	Night
1	05.02.2023	ANL-5	Average	69.9	63.7	75/90	70
			Maximum	73.1	66.1		
			Minimum	66.7	61.2		
			Leq db(A)	70.8	64.5		
2	19.02.2023	ANL-5	Average	69.4	65.8	75/90	70
			Maximum	72.6	69.1		
			Minimum	66.1	62.5		
			Leq db(A)	70.5	66.7		

Monitoring Location :- DRILLING LOCATION(WORK ZONE)

Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)	
				Day	Night	Day	Night
1	06.02.2023	ANL-6	Average	68.9	65.2	75/90	70
			Maximum	72.2	67.1		
			Minimum	65.6	63.2		
			Leq db(A)	69.8	65.9		
2	20.02.2023	ANL-6	Average	70	65.4	75/90	70
			Maximum	72.7	67.6		
			Minimum	67.3	63.2		
			Leq db(A)	70.9	66.7		

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परियोजना / Project/ NTPC Limited
पकरी बरवाडीह कोल माइनिंग प्रोजेक्ट
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हजारीबाग / Hazaribag

Monitoring Location :- OPERATOR CABIN(WORK ZONE)								Monitoring Location :- PSS AREA-1 NAGRI(WORK ZONE)							
Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)		Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)	
				Day	Night	Day	Night					Day	Night	Day	Night
1	07.02.2023	ANL-7	Average	68	65	75/90	70	1	08.02.2023	ANL-8	Average	69.4	64.1	75/90	70
			Maximum	71.8	67.2						Maximum	72.4	66.8		
			Minimum	64.2	62.8						Minimum	66.3	61.4		
			Leq db(A)	69.4	65.9						Leq db(A)	70.5	64.9		
2	21.02.2023	ANL-7	Average	67.7	61.8	75/90	70	2	22.02.2023	ANL-8	Average	68.1	65.7	75/90	70
			Maximum	71.4	64.5						Maximum	72.7	68.7		
			Minimum	63.9	59.1						Minimum	63.4	62.6		
			Leq db(A)	68.7	62.9						Leq db(A)	69.8	66.2		
Monitoring Location :- PSS AREA-2 NAGARI (WORK ZONE)								Monitoring Location :-VILLAGE KANDABER (AMBIENT ZONE)							
Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)		Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)	
				Day	Night	Day	Night					Day	Night	Day	Night
1	08.02.2023	ANL-9	Average	69.1	65.2	75/90	70	1	09.02.2023	BNL-10	Average	50.3	40.8	55	45
			Maximum	73.7	68.4						Maximum	53.4	43.8		
			Minimum	64.5	61.9						Minimum	47.2	37.8		
			Leq db(A)	70.4	66.3						Leq db(A)	51.2	41.4		
2	22.02.2023	ANL-9	Average	68.8	63.1	75/90	70	2	23.02.2023	BNL-10	Average	48.8	37.7	55	45
			Maximum	72.4	66.4						Maximum	52.2	42.3		
			Minimum	65.1	59.8						Minimum	45.3	33.1		
			Leq db(A)	69.9	64.4						Leq db(A)	50.1	39.2		
Monitoring Location :- VILLAGE GARIKALAN (AMBIENT ZONE)								Monitoring Location :- VILLAGE DHENGA (AMBIENT ZONE)							
Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)		Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)	
				Day	Night	Day	Night					Day	Night	Day	Night
1	10.02.2023	BNL-11	Average	47.7	39.8	55	45	1	11.02.2023	BNL-12	Average	47.7	39.7	55	45
			Maximum	52.5	43.8						Maximum	51.8	42.3		
			Minimum	42.9	35.8						Minimum	43.6	37.1		
			Leq db(A)	48.9	41.1						Leq db(A)	48.9	40.5		
2	24.02.2023	BNL-11	Average	49.3	38.7	55	45	2	25.02.2023	BNL-12	Average	49.8	39.2	55	45
			Maximum	52.8	41.8						Maximum	53.2	42.8		
			Minimum	45.8	35.6						Minimum	46.4	35.6		
			Leq db(A)	50.5	39.5						Leq db(A)	50.6	40.9		

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हरिपुरिया / Hariputiya

Monitoring Location :- VILLAGE KUSUMBHA (AMBIENT ZONE)								Monitoring Location :- VILLAGE BLOCK OFFICE AREA BARKAGAON (AMBIENT ZONE)							
Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)		Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)	
				Day	Night	Day	Night					Day	Night	Day	Night
1	12.02.2023	BNL-13	Average	49.6	39.3	55	45	1	13.02.2023	BNL-14	Average	49.3	38.8	55	45
			Maximum	52.7	42.5						Maximum	52.7	42.7		
			Minimum	46.5	36.1						Minimum	45.8	34.8		
			Leq db(A)	50.8	40.2						Leq db(A)	50.4	40.1		
2	26.02.2023	BNL-13	Average	49.4	40	55	45	2	27.02.2023	BNL-14	Average	48.7	38	55	45
			Maximum	53.4	44.4						Maximum	53.1	40.6		
			Minimum	45.3	35.6						Minimum	44.2	35.3		
			Leq db(A)	50.9	41.7						Leq db(A)	50.3	38.4		

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हजारीबाग / Hazaribag

Pakri Barwadih Coal Mining Project

Noise Monitoring Data Month of January-2023

Monitoring Location :- EXCAVATION AREA(WORK ZONE)

Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)	
				Day	Night	Day	Night
1	02.01.2023	ANL-1	Average	69.4	66	75/90	70
			Maximum	72.6	68.5		
			Minimum	66.1	63.4		
			Leq db(A)	70.4	66.7		
2	16.01.2023	ANL-1	Average	70.9	65.4	75/90	70
			Maximum	73.2	68.6		
			Minimum	68.6	62.1		
			Leq db(A)	71.2	65.8		

Monitoring Location :- HAUL ROAD (WORK ZONE)

Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)	
				Day	Night	Day	Night
1	03.01.2023	ANL-2	Average	66.4	64.8	75/90	70
			Maximum	68.6	68.1		
			Minimum	64.2	61.4		
			Leq db(A)	67.1	65.6		
2	17.01.2023	ANL-2	Average	68.4	64	75/90	70
			Maximum	72.6	67.6		
			Minimum	64.2	60.4		
			Leq db(A)	69.4	64.8		

Monitoring Location :- WASTE DUMP,(WORK ZONE)

Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)	
				Day	Night	Day	Night
1	04.01.2023	ANL-3	Average	69.8	63.9	75/90	70
			Maximum	72.4	66.3		
			Minimum	67.2	61.4		
			Leq db(A)	70.7	64.2		
2	18.01.2023	ANL-3	Average	69.4	64.6	75/90	70
			Maximum	72.3	68.6		
			Minimum	66.4	60.6		
			Leq db(A)	70.4	65.9		

Monitoring Location :- TOP SOIL DUMP(WORK ZONE)

Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)	
				Day	Night	Day	Night
1	05.01.2023	ANL-4	Average	69.3	64.5	75/90	70
			Maximum	70.4	66.4		
			Minimum	68.2	62.6		
			Leq db(A)	68.2	64.9		
2	19.01.2023	ANL-4	Average	69.9	65	75/90	70
			Maximum	73.2	67.6		
			Minimum	66.5	62.4		
			Leq db(A)	71.2	65.5		

Monitoring Location :- WORK SHOP(WORK ZONE)

Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)	
				Day	Night	Day	Night
1	06.01.2023	ANL-5	Average	69.3	66.4	75/90	70
			Maximum	72.4	68.6		
			Minimum	66.2	64.2		
			Leq db(A)	70.2	66.8		
2	20.01.2023	ANL-5	Average	71.1	62.3	75/90	70
			Maximum	73.8	66.4		
			Minimum	68.4	58.2		
			Leq db(A)	71.6	63.6		

Monitoring Location :- DRILLING LOCATION(WORK ZONE)

Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)	
				Day	Night	Day	Night
1	07.01.2023	ANL-6	Average	70.8	67.8	75/90	70
			Maximum	72.9	69.4		
			Minimum	68.6	66.2		
			Leq db(A)	71.1	67.9		
2	21.01.2023	ANL-6	Average	70.2	66	75/90	70
			Maximum	72.7	67.6		
			Minimum	67.7	64.4		
			Leq db(A)	70.6	66.3		

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Monitoring Location :- OPERATOR CABIN(WORK ZONE)								Monitoring Location :- PSS AREA-1 NAGRI(WORK ZONE)							
Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)		Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)	
				Day	Night	Day	Night					Day	Night	Day	Night
1	08.01.2023	ANL-7	Average	69.6	66.4	75/90	70	1	09.01.2023	ANL-8	Average	69.8	65.9	75/90	70
			Maximum	72.5	68.3						Maximum	72.3	67.6		
			Minimum	66.7	64.4						Minimum	67.2	64.2		
			Leq db(A)	70.4	65.4						Leq db(A)	68.3	66.3		
2	22.01.2023	ANL-7	Average	68.2	60.4	75/90	70	2	23.01.2023	ANL-8	Average	69.6	66.4	75/90	70
			Maximum	71.4	62.1						Maximum	72.5	68.3		
			Minimum	64.9	58.6						Minimum	66.7	64.4		
			Leq db(A)	68.6	60.6						Leq db(A)	70.4	65.4		

Monitoring Location :- PSS AREA-2 NAGARI (WORK ZONE)								Monitoring Location :-VILLAGE KANDABER (AMBIENT ZONE)							
Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)		Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)	
				Day	Night	Day	Night					Day	Night	Day	Night
1	09.01.2023	ANL-9	Average	69.2	63.1	75/90	70	1	10.01.2023	BNL-10	Average	50.4	40.4	55	45
			Maximum	72.9	67.2						Maximum	52.6	44.1		
			Minimum	65.5	58.9						Minimum	48.2	36.7		
			Leq db(A)	70.3	64.3						Leq db(A)	50.8	40.4		
2	23.01.2023	ANL-9	Average	69.8	63.9	75/90	70	2	24.01.2023	BNL-10	Average	49.7	38.9	55	45
			Maximum	72.4	66.3						Maximum	52.9	42.7		
			Minimum	67.2	61.4						Minimum	46.4	35.1		
			Leq db(A)	70.7	64.2						Leq db(A)	50.7	39.7		

Monitoring Location :- VILLAGE GARIKALAN (AMBIENT ZONE)								Monitoring Location :- VILLAGE DHENGA (AMBIENT ZONE)							
Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)		Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)	
				Day	Night	Day	Night					Day	Night	Day	Night
1	11.01.2023	BNL-11	Average	47.4	38.5	55	45	1	12.01.2023	BNL-12	Average	48.6	39.7	55	45
			Maximum	50.4	43.2						Maximum	52.5	42.3		
			Minimum	44.4	33.8						Minimum	44.6	37.1		
			Leq db(A)	48.1	40.3						Leq db(A)	49.4	40.5		
2	25.01.2023	BNL-11	Average	50.1	38.5	55	45	2	27.01.2023	BNL-12	Average	46.3	39.7	55	45
			Maximum	53.4	43.2						Maximum	51.4	42.9		
			Minimum	46.8	33.8						Minimum	41.2	36.5		
			Leq db(A)	50.8	40.3						Leq db(A)	47.5	40.2		

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Monitoring Location :- VILLAGE KUSUMBHA (AMBIENT ZONE)								Monitoring Location :- VILLAGE BLOCK OFFICE AREA BARKAGAON (AMBIENT ZONE)							
Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)		Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)	
				Day	Night	Day	Night					Day	Night	Day	Night
1	13.01.2023	BNL-13	Average	49.7	38.9	55	45	1	14.01.2023	BNL-14	Average	50.1	39.1	55	45
			Maximum	52.9	42.7						Maximum	53.4	42.9		
			Minimum	46.4	35.1						Minimum	46.8	35.2		
			Leq db(A)	50.7	39.7						Leq db(A)	50.8	39.7		
2	28.01.2023	BNL-13	Average	49.9	38.1	55	45	2	29.01.2023	BNL-14	Average	47.4	38.5	55	45
			Maximum	53.4	40.2						Maximum	50.4	41.6		
			Minimum	46.3	35.9						Minimum	44.4	35.4		
			Leq db(A)	50.2	38.3						Leq db(A)	48.1	39.2		

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Pakri Barwadih Coal Mining Project

Noise Monitoring Data Month of December - 2022

Monitoring Location :- EXCAVATION AREA(WORK ZONE)

Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)	
				Day	Night	Day	Night
1	01.12.2022	ANL-1	Average	70.8	67	75/90	70
			Maximum	73.4	68.3		
			Minimum	68.1	65.7		
			Leq db(A)	71.6	66.2		
2	16.12.2022	ANL-1	Average	70.3	65.2	75/90	70
			Maximum	73.2	68.2		
			Minimum	67.4	62.1		
			Leq db(A)	71.3	66.3		

Monitoring Location :- HAUL ROAD (WORK ZONE)

Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)	
				Day	Night	Day	Night
1	02.12.2022	ANL-2	Average	68.8	66.9	75/90	70
			Maximum	71.3	69.2		
			Minimum	66.3	64.6		
			Leq db(A)	69.3	67.1		
2	17.12.2022	ANL-2	Average	70.2	66.8	75/90	70
			Maximum	74.2	69.6		
			Minimum	66.2	63.9		
			Leq db(A)	71.6	67.1		

Monitoring Location :- WASTE DUMP,(WORK ZONE)

Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)	
				Day	Night	Day	Night
1	03.12.2022	ANL-3	Average	70.2	66.1	75/90	70
			Maximum	74.1	68.6		
			Minimum	66.2	63.5		
			Leq db(A)	71.8	66.7		
2	18.12.2022	ANL-3	Average	68.8	63.1	75/90	70
			Maximum	72.4	66.4		
			Minimum	65.1	59.8		
			Leq db(A)	69.9	64.4		

Monitoring Location :- TOP SOIL DUMP(WORK ZONE)

Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)	
				Day	Night	Day	Night
1	04.12.2022	ANL-4	Average	70.5	65.6	75/90	70
			Maximum	73.5	68.7		
			Minimum	67.4	62.4		
			Leq db(A)	71.4	66.3		
2	19.12.2022	ANL-4	Average	70.3	63	75/90	70
			Maximum	73.2	67.3		
			Minimum	67.4	58.6		
			Leq db(A)	71.1	65.6		

Monitoring Location :- WORK SHOP(WORK ZONE)

Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)	
				Day	Night	Day	Night
1	05.12.2022	ANL-5	Average	70	66.1	75/90	70
			Maximum	73.8	68.5		
			Minimum	66.2	63.6		
			Leq db(A)	71.5	65.4		
2	20.12.2022	ANL-5	Average	69.7	63.1	75/90	70
			Maximum	73.1	66.4		
			Minimum	66.2	59.8		
			Leq db(A)	70.9	64.2		

Monitoring Location :- DRILLING LOCATION(WORK ZONE)

Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)	
				Day	Night	Day	Night
1	06.12.2022	ANL-6	Average	70.2	66.2	75/90	70
			Maximum	74.2	69.1		
			Minimum	66.1	63.2		
			Leq db(A)	71.5	67.2		
2	21.12.2022	ANL-6	Average	70.4	64.6	75/90	70
			Maximum	73.1	67.3		
			Minimum	67.6	61.8		
			Leq db(A)	71.3	65.8		

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Monitoring Location :- OPERATOR CABIN(WORK ZONE)								Monitoring Location :- PSS AREA-1 NAGRI(WORK ZONE)							
Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)		Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)	
				Day	Night	Day	Night					Day	Night	Day	Night
1	07.12.2022	ANL-7	Average	70.6	66.1	75/90	70	1	08.12.2022	ANL-8	Average	71.4	65.7	75/90	70
			Maximum	74.3	68.6						Maximum	73.1	68.5		
			Minimum	66.8	63.5						Minimum	69.6	62.8		
			Leq db(A)	72.1	66.9						Leq db(A)	71.5	66.6		
2	22.12.2022	ANL-7	Average	68.9	64.4	75/90	70	2	23.12.2022	ANL-8	Average	68.8	65.2	75/90	70
			Maximum	73.2	67.4						Maximum	72.1	67.7		
			Minimum	64.6	61.3						Minimum	65.5	62.6		
			Leq db(A)	70.2	65.5						Leq db(A)	69.8	65.6		
Monitoring Location :- PSS AREA-2 NAGARI (WORK ZONE)								Monitoring Location :-VILLAGE KANDABER (AMBIENT ZONE)							
Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)		Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)	
				Day	Night	Day	Night					Day	Night	Day	Night
1	09.12.2022	ANL-9	Average	69.1	65.5	75/90	70	1	11.12.2022	BNL-10	Average	50.4	40.3	55	45
			Maximum	73.9	68.6						Maximum	54.2	43.2		
			Minimum	64.3	62.3						Minimum	46.6	37.4		
			Leq db(A)	70.6	66.4						Leq db(A)	51.9	41.1		
2	24.12.2022	ANL-9	Average	69.9	64.9	75/90	70	2	26.12.2022	BNL-10	Average	49.7	39.6	55	45
			Maximum	73.4	67.3						Maximum	53.8	43.7		
			Minimum	66.4	62.4						Minimum	45.6	35.4		
			Leq db(A)	71.2	65.7						Leq db(A)	51.1	40.7		
Monitoring Location :- VILLAGE GARIKALAN (AMBIENT ZONE)								Monitoring Location :- VILLAGE DHENGA (AMBIENT ZONE)							
Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)		Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)	
				Day	Night	Day	Night					Day	Night	Day	Night
1	12.12.2022	BNL-11	Average	49.8	39.2	55	45	1	13.12.2022	BNL-12	Average	48.2	39.1	55	45
			Maximum	53.2	42.8						Maximum	52.8	42.8		
			Minimum	46.4	35.6						Minimum	43.5	35.4		
			Leq db(A)	50.6	40.9						Leq db(A)	49.9	40.4		
2	27.12.2022	BNL-11	Average	49	39.1	55	45	2	28.12.2022	BNL-12	Average	38	48.7	55	45
			Maximum	53.1	42.8						Maximum	40.6	53.1		
			Minimum	44.9	35.3						Minimum	35.3	44.2		
			Leq db(A)	50.9	40.1						Leq db(A)	38.4	50.3		

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हजारीबाग / Hazaribag

Monitoring Location :- VILLAGE KUSUMBHA (AMBIENT ZONE)								Monitoring Location :- VILLAGE BLOCK OFFICE AREA BARKAGAON (AMBIENT ZONE)							
Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)		Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)	
				Day	Night	Day	Night					Day	Night	Day	Night
1	14.12.2022	BNL-13	Average	48.3	39.4	55	45	1	15.12.2022	BNL-14	Average	49.4	40	55	45
			Maximum	52.7	43.6						Maximum	53.4	44.4		
			Minimum	43.8	35.2						Minimum	45.3	35.6		
			Leq db(A)	49.9	40.5						Leq db(A)	50.9	41.7		
2	29.12.2022	BNL-13	Average	48.8	39	55	45	2	30.12.2022	BNL-14	Average	48.7	38.2	55	45
			Maximum	51.2	42.6						Maximum	53.4	42.8		
			Minimum	46.3	35.4						Minimum	43.9	33.5		
			Leq db(A)	49.3	40.1						Leq db(A)	50.4	39.6		

नवीन कुमार / NAVIN KUMAR
उप महाप्रबंधक(पर्यावरण प्रबंधन) / DGM (ENVT. MGMT.)
एनटीपीसी लिमिटेड/ NTPC Limited
कोयला खनन परियोजनाएं/ COAL MINING PROJECTS
हजारीबाग / Hazaribag

Pakri Barwadih Coal Mining Project

Noise Monitoring Data Month of November - 2022

Monitoring Location :- EXCAVATION AREA(WORK ZONE)

Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)	
				Day	Night	Day	Night
1	01.11.2022	ANL-1	Average	70.9	67.2	75/90	70
			Maximum	73.1	67.5		
			Minimum	68.6	66.8		
			Leq db(A)	71.4	65.4		
2	16.11.2022	ANL-1	Average	68.5	63.4	75/90	70
			Maximum	71.9	66.4		
			Minimum	65.1	60.3		
			Leq db(A)	69.1	64.7		

Monitoring Location :- HAUL ROAD (WORK ZONE)

Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)	
				Day	Night	Day	Night
1	02.11.2022	ANL-2	Average	68.6	69.1	75/90	70
			Maximum	70.9	71.4		
			Minimum	66.2	66.8		
			Leq db(A)	68.3	69.1		
2	17.11.2022	ANL-2	Average	65.8	62.2	75/90	70
			Maximum	70.2	63.6		
			Minimum	61.4	60.7		
			Leq db(A)	68.9	61.9		

Monitoring Location :- WASTE DUMP,(WORK ZONE)

Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)	
				Day	Night	Day	Night
1	03.11.2022	ANL-3	Average	69.4	66.1	75/90	70
			Maximum	73.1	68.2		
			Minimum	65.7	63.9		
			Leq db(A)	71.5	66.6		
2	18.11.2022	ANL-3	Average	68.8	62.3	75/90	70
			Maximum	72.2	64.7		
			Minimum	65.3	59.8		
			Leq db(A)	70.5	62.8		

Monitoring Location :- TOP SOIL DUMP(WORK ZONE)

Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)	
				Day	Night	Day	Night
1		ANL-4	Average	70	65.1	75/90	70
			Maximum	71.7	68.4		
			Minimum	68.3	61.7		
			Leq db(A)	69.1	66.2		
2		ANL-4	Average	69.4	63	75/90	70
			Maximum	71.5	67.3		
			Minimum	67.2	58.6		
			Leq db(A)	69.3	65.6		

Monitoring Location :- WORK SHOP(WORK ZONE)

Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)	
				Day	Night	Day	Night
1	05.11.2022	ANL-5	Average	69.5	65	75/90	70
			Maximum	72.4	67.7		
			Minimum	66.6	62.3		
			Leq db(A)	70.7	65.1		
2	20.11.2022	ANL-5	Average	69.3	61.1	75/90	70
			Maximum	73.1	64.5		
			Minimum	65.4	57.7		
			Leq db(A)	71.4	63.1		

Monitoring Location :- DRILLING LOCATION(WORK ZONE)

Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)	
				Day	Night	Day	Night
1	06.11.2022	ANL-6	Average	70.4	64.4	75/90	70
			Maximum	73.3	67.2		
			Minimum	67.4	61.5		
			Leq db(A)	71.6	65.7		
2	21.11.2022	ANL-6	Average	70.1	64	75/90	70
			Maximum	72.5	66.2		
			Minimum	67.6	61.8		
			Leq db(A)	70.9	64.8		

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हजारीबाग / Hazaribag

Monitoring Location :- OPERATOR CABIN(WORK ZONE)								Monitoring Location :- PSS AREA-1 NAGRI(WORK ZONE)							
Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)		Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)	
				Day	Night	Day	Night					Day	Night	Day	Night
1	07.11.2022	ANL-7	Average	71	63.2	75/90	70	1	08.11.2022	ANL-8	Average	70	65.2	75/90	70
			Maximum	74.1	65.5						Maximum	71.6	67.1		
			Minimum	67.8	60.9						Minimum	68.3	63.2		
			Leq db(A)	72.3	63.4						Leq db(A)	69.2	65.5		
2	22.11.2022	ANL-7	Average	67.7	63	75/90	70	2	23.11.2022	ANL-8	Average	68	64.2	75/90	70
			Maximum	71.6	67.1						Maximum	70.9	66.7		
			Minimum	63.8	58.9						Minimum	65.1	61.6		
			Leq db(A)	69.7	65.5						Leq db(A)	68.2	64.3		

Monitoring Location :- PSS AREA -2 NAGARI(WORK ZONE)								Monitoring Location :-VILLAGE KANDABER (AMBIENT ZONE)							
Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)		Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)	
				Day	Night	Day	Night					Day	Night	Day	Night
1	09.11.2022	ANL-9	Average	69.1	63.5	75/90	70	1	11.11.2022	BNL-10	Average	59.5	39.5	55	45
			Maximum	73.7	68.2						Maximum	53.1	42.3		
			Minimum	64.4	58.8						Minimum	45.8	36.7		
			Leq db(A)	71.2	66.2						Leq db(A)	51.5	40.2		
2	24.11.2022	ANL-9	Average	69.9	63.1	75/90	70	2	26.11.2022	BNL-10	Average	48.8	39.1	55	45
			Maximum	73.6	66.5						Maximum	53.2	40.5		
			Minimum	66.2	59.7						Minimum	44.4	37.6		
			Leq db(A)	71.1	64.2						Leq db(A)	51.7	38.6		

Monitoring Location :- VILLAGE GARIKALAN (AMBIENT ZONE)								Monitoring Location :- VILLAGE DHENGA (AMBIENT ZONE)							
Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)		Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)	
				Day	Night	Day	Night					Day	Night	Day	Night
1	12.11.2022	BNL-11	Average	48.9	38.6	55	45	1	13.11.2022	BNL-12	Average	47.6	38.9	55	45
			Maximum	51.5	41.7						Maximum	52.4	43.1		
			Minimum	46.2	35.5						Minimum	42.8	34.6		
			Leq db(A)	48.4	40.6						Leq db(A)	49.7	41.3		
2	27.11.2022	BNL-11	Average	48.5	35.1	55	45	2	28.11.2022	BNL-12	Average	46.5	37.2	55	45
			Maximum	51.1	38.8						Maximum	52.2	40.1		
			Minimum	45.9	31.3						Minimum	40.7	34.2		
			Leq db(A)	49.3	36.1						Leq db(A)	50.4	38.2		

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कोयला खान परियोजनाएं/ COAL MINING PROJECTS
हजारीबाग / Hazaribag

Monitoring Location :- VILLAGE KUSUMBHA (AMBIENT ZONE)								Monitoring Location :- VILLAGE BLOCK OFFICE AREA BARKAGAON (AMBIENT ZONE)							
Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)		Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)	
			Day	Night	Day	Night					Day	Night	Day	Night	Night
14.11.2022	BNL-13	Average	48.2	36.9	55	45	1	15.11.2022	BNL-14	Average	47.3	40.2	55	45	45
		Maximum	51.8	42.4						Maximum	51.5	44.1			
		Minimum	44.5	31.3						Minimum	43.1	36.2			
		Leq db(A)	49.3	40.1						Leq db(A)	46.4	42.2			
29.11.2022	BNL-13	Average	47.9	37.4	55	45	2	30.11.2022	BNL-14	Average	46.9	36.7	55	45	45
		Maximum	50.5	41.4						Maximum	53.6	42.9			
		Minimum	45.3	33.3						Minimum	40.1	30.4			
		Leq db(A)	48.7	39.9						Leq db(A)	51.5	40.8			

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हजारीबाग / Hazaribag

Pakri Barwadih Coal Mining Project

Noise Monitoring Data Month of October-2022

Monitoring Location :- EXCAVATION AREA(WORK ZONE)

Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)	
				Day	Night	Day	Night
1	01.10.2022	ANL-1	Average	69.25	65.95	75/90	70
			Maximum	72.4	68.2		
			Minimum	66.1	63.7		
			Leq db(A)	70.5	66.9		
2	16.10.2022	ANL-1	Average	71.8	62.7	75/90	70
			Maximum	72.2	65.2		
			Minimum	71.3	60.1		
			Leq db(A)	70.6	63.7		

Monitoring Location :- HAUL ROAD (WORK ZONE)

Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)	
				Day	Night	Day	Night
1	05.10.2022	ANL-2	Average	67.2	64.5	75/90	70
			Maximum	68.8	67.3		
			Minimum	65.5	61.6		
			Leq db(A)	66.5	66.4		
2	17.10.2022	ANL-2	Average	65.6	63.2	75/90	70
			Maximum	68.5	64.6		
			Minimum	62.7	61.8		
			Leq db(A)	66.4	62.1		

Monitoring Location :- WASTE DUMP,(WORK ZONE)

Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)	
				Day	Night	Day	Night
1	06.10.2022	ANL-3	Average	69.8	64	75/90	70
			Maximum	72.4	65.9		
			Minimum	67.2	62.1		
			Leq db(A)	70.7	62.5		
2	18.10.2022	ANL-3	Average	68.7	65.1	75/90	70
			Maximum	71.3	69.5		
			Minimum	66.1	60.6		
			Leq db(A)	70.3	68.2		

Monitoring Location :- TOP SOIL DUMP(WORK ZONE)

Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)	
				Day	Night	Day	Night
1	07.10.2022	ANL-4	Average	70.2	64.7	75/90	70
			Maximum	70.6	67.1		
			Minimum	69.7	62.3		
			Leq db(A)	68.8	65.8		
2	19.10.2022	ANL-4	Average	68.4	63.05	75/90	70
			Maximum	70.2	66.6		
			Minimum	66.5	59.5		
			Leq db(A)	68.9	65.5		

Monitoring Location :- WORK SHOP(WORK ZONE)

Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)	
				Day	Night	Day	Night
1	08.10.2022	ANL-5	Average	70.15	67	75/90	70
			Maximum	71.9	68.4		
			Minimum	68.4	65.5		
			Leq db(A)	70.1	67.3		
2	20.10.2022	ANL-5	Average	71.5	60.8	75/90	70
			Maximum	72.8	63.3		
			Minimum	70.1	58.2		
			Leq db(A)	70.5	61.9		

Monitoring Location :- DRILLING LOCATION(WORK ZONE)

Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)	
				Day	Night	Day	Night
1	09.10.2022	ANL-6	Average	72.5	68.4	75/90	70
			Maximum	72.5	69.2		
			Minimum	70.1	67.6		
			Leq db(A)	70.8	67.9		
2	21.10.2022	ANL-6	Average	70.5	66.3	75/90	70
			Maximum	71.3	67.2		
			Minimum	69.7	65.4		
			Leq db(A)	69.2	65.7		

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पाकरीबरवाडीह / Hazaribag

Monitoring Location :- OPERATOR CABIN(WORK ZONE)							
Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)	
				Day	Night	Day	Night
1	10.07.2022	ANL-7	Average	69.9	66.1	75/90	70
			Maximum	73.1	67.7		
			Minimum	66.7	64.4		
			Leq db(A)	71.6	65.7		
2	22.10.2022	ANL-7	Average	67.7	59.9	75/90	70
			Maximum	70.4	62.1		
			Minimum	64.9	57.6		
			Leq db(A)	68.4	60.3		

Monitoring Location :- PSS AREA -1 NAGARI CRUSHER(WORK ZONE)							
Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)	
				Day	Night	Day	Night
1	12.10.2022	ANL-8	Average	70.2	66.8	75/90	70
			Maximum	70.4	68.1		
			Minimum	69.9	65.4		
			Leq db(A)	68.3	66.6		
2	23.10.2022	ANL-8	Average	72.6	67.2	75/90	70
			Maximum	73.9	68.1		
			Minimum	71.3	66.4		
			Leq db(A)	72.1	66.2		

Monitoring Location :- PSS AREA-2 NAGARI(WORK ZONE)							
Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)	
				Day	Night	Day	Night
1	13.10.2022	ANL-9	Average	68.9	61.1	75/90	70
			Maximum	72.7	64.5		
			Minimum	65.1	57.6		
			Leq db(A)	70.5	62.2		
2	23.10.2022	ANL-9	Average	68.6	63.6	75/90	70
			Maximum	71.3	65.4		
			Minimum	65.9	61.7		
			Leq db(A)	68.8	63.6		

Monitoring Location :-VILLAGE KANDABER (AMBIENT ZONE)							
Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)	
				Day	Night	Day	Night
1	09.10.2022	BNL-10	Average	50.2	39	55	45
			Maximum	52.1	41.3		
			Minimum	48.3	36.7		
			Leq db(A)	50.6	39.9		
2	26.10.2022	BNL-10	Average	47.8	39.9	55	45
			Maximum	52.6	41.2		
			Minimum	42.9	38.6		
			Leq db(A)	50.1	39.7		

Monitoring Location :- VILLAGE GARIKALAN (AMBIENT ZONE)							
Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)	
				Day	Night	Day	Night
1	10.10.2022	BNL-11	Average	49.1	38.2	55	45
			Maximum	50.4	43.1		
			Minimum	47.8	33.3		
			Leq db(A)	48.6	42.2		
2	27.10.2022	BNL-11	Average	48.5	35.9	55	45
			Maximum	50.2	39.6		
			Minimum	46.8	32.1		
			Leq db(A)	48.8	38.1		

Monitoring Location :- VILLAGE DHENGA (AMBIENT ZONE)							
Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)	
				Day	Night	Day	Night
1	12.10.2022	BNL-12	Average	47.6	39.5	55	45
			Maximum	50.5	42.3		
			Minimum	44.6	36.6		
			Leq db(A)	49.1	4.5		
2	28.10.2022	BNL-12	Average	45.6	39.7	55	45
			Maximum	49.9	42.8		
			Minimum	41.2	36.5		
			Leq db(A)	47.4	37.9		

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कोयला खनन परियोजनाएं/ COAL MINING PROJECTS
हजारीबाग / Hazaribag

Monitoring Location :- VILLAGE KUSUMBHA (AMBIENT ZONE)								Monitoring Location :- VILLAGE BLOCK OFFICE AREA BARKAGAON (AMBIENT ZONE)							
Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)		Sl. No.	Date	Monitoring Code	Description noise level db(A)	Result		Standards (CPCB/FACTORIES ACT)	
				Day	Night	Day	Night					Day	Night	Day	Night
1	14.10.2022	BNL-13	Average	49.4	37.4	55	45	1	15.10.2022	BNL-14	Average	47.8	37	55	45
			Maximum	52.6	41.9						Maximum	50.1	38.8		
			Minimum	46.2	32.8						Minimum	45.5	35.1		
			Leq db(A)	50.7	39.6						Leq db(A)	48.6	36.4		
2	29.10.2022	BNL-13	Average	51.4	38.1	55	45	2	30.10.2022	BNL-14	Average	49	37.9	55	45
			Maximum	56.4	40.2						Maximum	52.2	41.6		
			Minimum	46.3	35.9						Minimum	45.7	34.2		
			Leq db(A)	49.5	38.3						Leq db(A)	50.3	39.1		

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कोयला खनन परियोजनाएं / COAL MINING PROJECTS
हजारीबाग / Hazaribag

Form 59

[See rules 115 (2)]

Pollution Under Control Certificate

Authorised By :
Government of Jharkhand

Date	:	**02/01/2023**
Time	:	**14:09:26 PM**
Validity upto	:	**01/07/2023**

Certificate SL. No.	:	JH00400080016673
Registration No.	:	JH02BF1593
Date of Registration	:	30/Sep/2015
Month & Year of Manufacturing	:	May-2015
Valid Mobile Number	:	******5555
Emission Norms	:	BHARAT STAGE III
Fuel	:	DIESEL
PUC Code	:	JH0040008
GSTIN	:	
Fees	:	Rs.300.00 (GST to be paid extra as applicable)
MIL observation	:	No

Vehicle Photo with Registration plate
60 mm x 30 mm

Sr. No.	Pollutant (as applicable)	Units (as applicable)	Emission limits	Measured Value (upto 2 decimal places)
1	2	3	4	5
Idling Emissions	Carbon Monoxide (CO)	percentage (%)		
	Hydrocarbon, (THC/HC)	ppm		
High idling emissions	CO	percentage (%)		
	RPM	RPM	2500 ± 200	
	Lambda	-	1 ± 0.03	
Smoke Density	Light absorption coefficient	1/metre	2.45	2.25

This PUC certificate is system generated through the national register of motor vehicles and does not require any signature.

Note : 1. Vehicle owners to link their mobile numbers to registered vehicle by logging to https://puc.parivahan.gov.in

Authorised Signature with stamp of PUC operator
60mm x 20 mm

नवीन कुमार / NAVIN KUMAR
उप महाप्रबंधक (पर्यावरण प्रबंधन) / DGM (ENVT. MGMT.)
एनटीपीसी लिमिटेड / NTPC Limited
कोयला खनन परियोजनाएं / COAL MINING PROJECTS
हजारीबाग / Hazaribag

Form 59

[See rules 115 (2)]

Pollution Under Control Certificate

Authorised By :
Government of Jharkhand

Date	:	**05/01/2023**
Time	:	**15:59:22 PM**
Validity upto	:	**04/07/2023**

Certificate SL. No.	:	JH00400080016924
Registration No.	:	JH01DH1641
Date of Registration	:	29/Sep/2014
Month & Year of Manufacturing	:	August-2014
Valid Mobile Number	:	******5555
Emission Norms	:	BHARAT STAGE III
Fuel	:	DIESEL
PUC Code	:	JH0040008
GSTIN	:	
Fees	:	Rs.300.00 (GST to be paid extra as applicable)
MIL observation	:	No

Vehicle Photo with Registration plate
60 mm x 30 mm

Sr. No.	Pollutant (as applicable)	Units (as applicable)	Emission limits	Measured Value (upto 2 decimal places)
1	2	3	4	5
Idling Emissions	Carbon Monoxide (CO)	percentage (%)		
	Hydrocarbon, (THC/HC)	ppm		
High idling emissions	CO	percentage (%)		
	RPM	RPM	2500 ± 200	
	Lambda	-	1 ± 0.03	
Smoke Density	Light absorption coefficient	1/metre	2.45	2.28

This PUC certificate is system generated through the national register of motor vehicles and does not require any signature.

Note : 1. Vehicle owners to link their mobile numbers to registered vehicle by logging to https://puc.parivahan.gov.in

Authorised Signature with stamp of PUC operator
60mm x 20 mm

नवीन कुमार / NAVIN KUMAR
उप महाप्रबंधक (पर्यावरण प्रबंधन) / DGM (ENVT. MGMT.)
एनटीपीसी लिमिटेड/ NTPC Limited
कोयला खनन परियोजनाएँ/ COAL MINING PROJECTS
हजारीबाग / Hazaribag

Form 59

[See rules 115 (2)]

Pollution Under Control Certificate

Authorised By :
Government of Jharkhand

Date	:	**05/01/2023**
Time	:	**15:47:35 PM**
Validity upto	:	**04/07/2023**

Certificate SL. No.	:	JH00400080016917
Registration No.	:	JH01DH0880
Date of Registration	:	29/Sep/2014
Month & Year of Manufacturing	:	August-2014
Valid Mobile Number	:	******5555
Emission Norms	:	BHARAT STAGE III
Fuel	:	DIESEL
PUC Code	:	JH0040008
GSTIN	:	
Fees	:	Rs.300.00 (GST to be paid extra as applicable)
MIL observation	:	No

Vehicle Photo with Registration plate
60 mm x 30 mm

Sr. No.	Pollutant (as applicable)	Units (as applicable)	Emission limits	Measured Value (upto 2 decimal places)
1	2	3	4	5
Idling Emissions	Carbon Monoxide (CO)	percentage (%)		
	Hydrocarbon, (THC/HC)	ppm		
High idling emissions	CO	percentage (%)		
	RPM	RPM	2500 ± 200	
	Lambda	-	1 ± 0.03	
Smoke Density	Light absorption coefficient	1/metre	2.45	2.38

This PUC certificate is system generated through the national register of motor vehicles and does not require any signature.

Note : 1. Vehicle owners to link their mobile numbers to registered vehicle by logging to https://puc.parivahan.gov.in

Authorised Signature with stamp of PUC operator
60mm x 20 mm

नवीन कुमार / NAVIN KUMAR
उप महाप्रबंधक (पर्यावरण प्रबंधन) / DGM (ENVT. MGMT.)
एनटीपीसी लिमिटेड/ NTPC Limited
कोयला खनन परियोजनाएँ/ COAL MINING PROJECTS
हजारीबाग / Hazaribag

Form 59

[See rules 115 (2)]

Pollution Under Control Certificate

Authorised By :
Government of Jharkhand

Date	:	**22/12/2022**
Time	:	**13:48:39 PM**
Validity upto	:	**21/06/2023**

Certificate SL. No.	:	JH00400080016184
Registration No.	:	JH01AX0799
Date of Registration	:	04/Jan/2013
Month & Year of Manufacturing	:	November-2012
Valid Mobile Number	:	******5555
Emission Norms	:	BHARAT STAGE III
Fuel	:	DIESEL
PUC Code	:	JH0040008
GSTIN	:	
Fees	:	Rs.120.00 (GST to be paid extra as applicable)
MIL observation	:	No

Vehicle Photo with Registration plate
60 mm x 30 mm

Sr. No.	Pollutant (as applicable)	Units (as applicable)	Emission limits	Measured Value (upto 2 decimal places)
1	2	3	4	5
Idling Emissions	Carbon Monoxide (CO)	percentage (%)		
	Hydrocarbon, (THC/HC)	ppm		
High idling emissions	CO	percentage (%)		
	RPM	RPM	2500 ± 200	
	Lambda	-	1 ± 0.03	
Smoke Density	Light absorption coefficient	1/metre	2.45	2.35

This PUC certificate is system generated through the national register of motor vehicles and does not require any signature.

Note : 1. Vehicle owners to link their mobile numbers to registered vehicle by logging to https://vahan.parivahan.gov.in

Authorised Signature with stamp of PUC operator
60mm x 20 mm

नवीन कुमार / NAVIN KUMAR
DGM (ENVT. MGMT.)
NTPC Limited
COAL MINING PROJECTS
Hazaribag

Form 59

[See rules 115 (2)]

Pollution Under Control Certificate

Authorised By :
Government of Jharkhand

Date	:	**22/12/2022**
Time	:	**13:46:04 PM**
Validity upto	:	**21/06/2023**

Certificate SL. No.	:	JH00400080016183
Registration No.	:	OR05AQ3299
Date of Registration	:	05/Apr/2011
Month & Year of Manufacturing	:	January-2011
Valid Mobile Number	:	******9995
Emission Norms	:	BHARAT STAGE III
Fuel	:	DIESEL
PUC Code	:	JH0040008
GSTIN	:	
Fees	:	Rs.120.00 (GST to be paid extra as applicable)
MIL observation	:	No

Vehicle Photo with Registration plate
60 mm x 30 mm

Sr. No.	Pollutant (as applicable)	Units (as applicable)	Emission limits	Measured Value (upto 2 decimal places)
1	2	3	4	5
Idling Emissions	Carbon Monoxide (CO)	percentage (%)		
	Hydrocarbon, (THC/HC)	ppm		
High idling emissions	CO	percentage (%)		
	RPM	RPM	2500 ± 200	
	Lambda	-	1 ± 0.03	
Smoke Density	Light absorption coefficient	1/metre	2.45	2.37

This PUC certificate is system generated through the national register of motor vehicles and does not require any signature.

Note : 1. Vehicle owners to link their mobile numbers to registered vehicle by logging to https://vahan.parivahan.gov.in

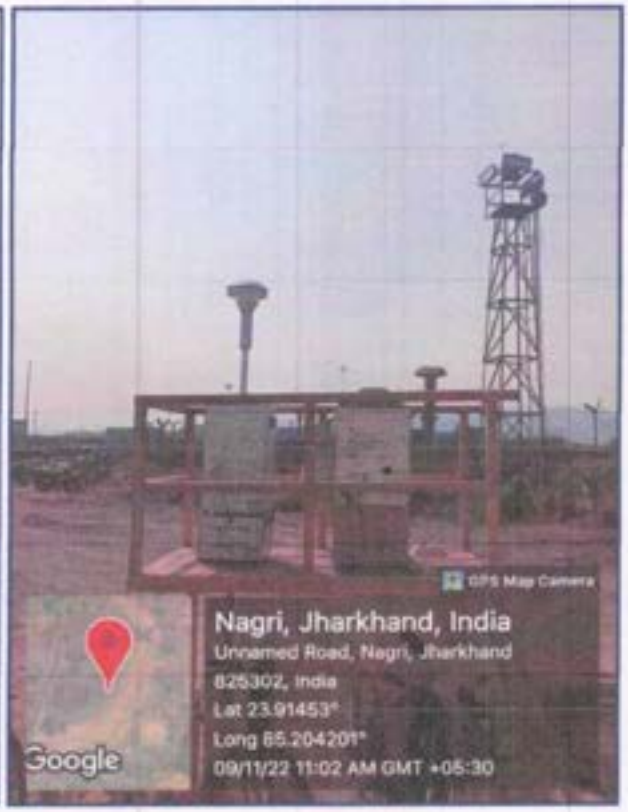
Authorised Signature with stamp of PUC operator
60mm x 20 mm

नवीन कुमार / NAVIN KUMAR
उप महाप्रबंधक (पर्यावरण प्रबंधन) / DGM (ENVT. MGMT.)
एनटीपीसी लिमिटेड/ NTPC Limited
कोयला खनन परियोजनाएं/ COAL MINING PROJECTS
हजारीबाग / Hazaribag

PAKRI BARWADIH COAL MINING PROJECT, NTPC LTD.

ENVIRONMENTAL MONITORING EQUIPEMENTS

Sl. No.	Name of Equipment	No. of Equipments
1.	Respirable dust sampler	5
2.	Fine Dust Sampler	5
3.	High Volume Sampler	1
4.	Continuous AAQ Monitoring Station	1
5.	Continuous AAQM PM_{10} Analyzer	1
6.	Noise Level Meter	1
7.	Telemetry Piezometer	2
8.	Telemetry Ground Water Level Meter	4
9.	Meteorological Station	1
10.	pH, TDS, EC Handy Meter	1



Ambient Air Quality Monitoring

नवीन कुमार / NAVIN KUMAR
उप महाप्रबंधक (पर्यावरण प्रबंधन) / DGM (ENVT. MGMT.)
एनटीपीसी लिमिटेड/ NTPC Limited
कोयला खनन परियोजनाएँ/ COAL MINING PROJECTS
हजारीबाग / Hazaribag

Continue Ambient Air Quality Monitoring Station.

CAAQMS Online Monitoring System installed at Site Office, the monitoring system is monitoring the parameter like PM_{10}, $PM_{2.5}$, SO_2 & NO_x. The real time data is generating continuously and transferring to JSPCB server.

Continuous Ambient Air Quality Monitoring Station

Continuous PM_{10} Analyzer at Banadag Railway Siding

नवीन कुमार / NAVIN KUMAR
उप महाप्रबंधक (पर्यावरण प्रबंधन) / DGM (ENVT. MGMT.)
एनटीपीसी लिमिटेड/ NTPC Limited
कोयला खनन परियोजनाएँ/ COAL MINING PROJECTS
हजारीबाग / Hazaribag

SLM 100 - Noise Monitor

Two (02) nos. Piezometers inside the mine premises with continuous automatic data recorder

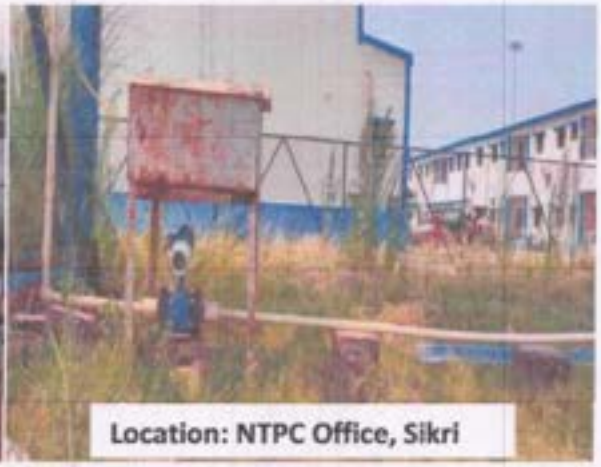
Location: Langatu Office Area

Location: NTPC Office, Sikri

नवीन कुमार / NAVIN KUMAR
उप महाप्रबंधक (पर्यावरण प्रबंधन) / DGM (ENVT MGMT)
एनटीपीसी लिमिटेड/ NTPC Limited
कोयला खनन परियोजनाएँ/ COAL MINING PROJECTS
हजारीबाग / Hazaribag

The project has installed Four (4) nos. water flow recorder in & around the project area with continuous automatic data recorder for monitoring of the ground water consumption.

Location: Langatu Office Area



Location: NTPC Office, Sikri

Location: MDO Canteen, Sikri

Location: MDO Colony, Sikri

Meteorological Station at Langatu Site Office

नवीन कुमार / NAVIN KUMAR
उप महाप्रबंधक (पर्यावरण प्रबंधन) / DGM (ENVT. MGMT.)
एनटीपीसी लिमिटेड/ NTPC Limited
कोयला खनन परियोजनाएं/ COAL MINING PROJECTS
हजारीबाग / Hazaribag

pH, TDS & EC Meter

नवीन कुमार / NAVIN KUMAR
उप महाप्रबंधक (पर्यावरण प्रबंधन) / DGM (ENVT. MGMT.)
एनटीपीसी लिमिटेड/ NTPC Limited
कोयला खनन परियोजनाएँ/ COAL MINING PROJECTS
हजारीबाग / Hazaribag

Occupational health related compliances
Format to be included in Monthly Reports
For the month of March -2023

A: Status of IME/PME :

S. No.	Medical Exam	No. of Persons required to undergo medical examination (Mar.-2023)	Medical Examination Conducted upto last month (Jan'23 to Mar'23)	Medical Examination conducted in the month (March-2023)	Balance Medical Examination to be conducted in the year
1	IME	52	91	52	0
2	PME	809	421	275	388
3	Radiological Tests	61	0	0	61
4	Eye Refraction Test	458	0	0	458

B: Stool Tests and sputum for AFB and chest radiography conducted for canteen workers.

S. No.	No. of Persons employed in canteen	Details of tests conducted during current year	Next due Date/ Remarks
1	87	0	24.12.2023

C: Details of portability test for drinking water : -

1.	**Details of Last test conducted** • Sample location • Date of Sampling • Testing Date • Report results	 PBCMP, Langatu 16. 01.2023 18.01.2023 Portable
2.	Next Due results	15.04.2023

नवीन कुमार / NAVIN KUMAR
उप महाप्रबंधक/पर्यावरण प्रबंधन/ DGM (ENVT. MGMT.)
एनटीपीसी लिमिटेड/ NTPC Limited
कोयला खान परियोजनाएं/ COAL MINING PROJECTS
हजारीबाग / Hazaribag

Occupational health related compliances
Format to be included in Monthly Reports
For the month of February-2023

A: Status of IME/PME :

S. No.	Medical Exam	No. of Persons required to undergo medical examination (Feb-2023)	Medical Examination Conducted upto last month (Jan'23 to Feb'23)	Medical Examination conducted in the month (Feb-2023)	Balance Medical Examination to be conducted in the year
1	IME	26	39	26	0
2	PME	227	146	50	81
3	Radiological Tests	61	0	0	61
4	Eye Refraction Test	458	0	0	458

B: Stool Tests and sputum for AFB and chest radiography conducted for canteen workers.

S. No.	No. of Persons employed in canteen	Details of tests conducted during current year	Next due Date/ Remarks
1	87	0	24.12.2023

C: Details of portability test for drinking water : -

1.	**Details of Last test conducted** • Sample location • Date of Sampling • Testing Date • Report results	 PBCMP, Langatu 16. 01.2023 18.01.2023 Portable
2.	Next Due results	15.04.2023

नवीन कुमार / NAVIN KUMAR
उप महाप्रबंधक (पर्यावरण प्रबंधन) / DGM (ENVT. MGMT.)
एनटीपीसी लिमिटेड/ NTPC Limited
कोयला खनन परियोजनाएं/ COAL MINING PROJECTS
हजारीबाग / Hazaribag

Occupational health related compliances
Format to be included in Monthly Reports
For the month of January-2023

A: Status of IME/PME :

S. No.	Medical Exam	No. of Persons required to undergo medical examination (Jan.-2023)	Medical Examination Conducted upto last month (Jan'23 to Jan'23)	Medical Examination conducted in the month (Jan-2023)	Balance Medical Examination to be conducted in the year
1	IME	13	13	13	0
2	PME	227	96	96	131
3	Radiological Tests	61	0	0	61
4	Eye Refraction Test	458	0	0	458

B: Stool Tests and sputum for AFB and chest radiography conducted for canteen workers.

S. No.	No. of Persons employed in canteen	Details of tests conducted during current year	Next due Date/ Remarks
1	87	0	24.12.2023

C: Details of portability test for drinking water : -

1.	**Details of Last test conducted** • Sample location • Date of Sampling • Testing Date • Report results	 PBCMP, Langatu 16. 01.2023 18.01.2023 Portable
2.	Next Due results	15.04.2023

नवीन कुमार / NAVIN KUMAR
उप महाप्रबंधक (पर्यावरण प्रबंधन) / DGM (ENVT. MGMT.)
एनटीपीसी लिमिटेड/ NTPC Limited
कोयला खनन परियोजनाएं/ COAL MINING PROJECTS
हजारीबाग / Hazaribag

Occupational health related compliances
Format to be included in Monthly Reports
For the month of December -2022

A: Status of IME/PME :

S. No.	Medical Exam	No. of Persons required to undergo medical examination (Dec.-2022)	Medical Examination Conducted upto last month (Jan'22 to Dec'22)	Medical Examination conducted in the month (Dec-2022)	Balance Medical Examination to be conducted in the year
1	IME	11	133	11	0
2	PME	120	243	0	227
3	Radiological Tests	61	0	0	61
4	Eye Refraction Test	382	432	382	458

B: Stool Tests and sputum for AFB and chest radiography conducted for canteen workers.

S. No.	No. of Persons employed in canteen	Details of tests conducted during current year	Next due Date/ Remarks
1	87	87	24.12.2023

C: Details of portability test for drinking water : -

1.	**Details of Last test conducted** • Sample location • Date of Sampling • Testing Date • Report results	 PBCMP, Langatu 16. 10.2022 18.10.2022 Portable
2.	Next Due results	20.01.2023

नवीन कुमार / NAVIN KUMAR
उप महाप्रबंधक (पर्यावरण प्रबंधन) / DGM (ENVT. MGMT.)
एनटीपीसी लिमिटेड/ NTPC Limited
कोयला खनन परियोजनाएं/ COAL MINING PROJECTS
हजारीबाग / Hazaribag

Occupational health related compliances
Format to be included in Monthly Reports
For the month of November -2022

A: Status of IME/PME :

S. No.	Medical Exam	No. of Persons required to undergo medical examination (Nov.-2022)	Medical Examination Conducted upto last month (Jan'22 to Nov'22)	Medical Examination conducted in the month (Nov -2022)	Balance Medical Examination to be conducted in the year
1	IME	13	122	13	0
2	PME	120	243	23	227
3	Radiological Tests	61	0	0	61
4	Eye Refraction Test	0	50	0	840

B: Stool Tests and sputum for AFB and chest radiography conducted for canteen workers.

S. No.	No. of Persons employed in canteen	Details of tests conducted during current year	Next due Date/ Remarks
1	61	61	24.12.2022

C: Details of portability test for drinking water : -

1.	**Details of Last test conducted** • Sample location • Date of Sampling • Testing Date • Report results	 PBCMP, Langatu 16. 10.2022 18.10.2022 Portable
2.	Next Due results	20.01.2023

नवीन कुमार / NAVIN KUMAR
उप महाप्रबंधक(पर्यावरण सेफ्टी) / DGM (ENVT. SAFETY)
एनटीपीसी लिमिटेड / NTPC Limited
कोयला खान परियोजनाएँ / COAL MINING PROJECTS
हजारीबाग / Hazaribag

Occupational health related compliances
Format to be included in Monthly Reports
For the month of October -2022

A: Status of IME/PME :

S. No.	Medical Exam	No. of Persons required to undergo medical examination (Oct-2022)	Medical Examination Conducted upto last month (Jan'22 to Oct'22)	Medical Examination conducted in the month (Oct-2022)	Balance Medical Examination to be conducted in the year
1	IME	8	109	8	0
2	PME	120	220	47	240
3	Radiological Tests	61	0	0	61
4	Eye Refraction Test	0	50	0	840

B: Stool Tests and sputum for AFB and chest radiography conducted for canteen workers.

S. No.	No. of Persons employed in canteen	Details of tests conducted during current year	Next due Date/ Remarks
1	61	61	24.12.2022

C: Details of portability test for drinking water : -

1.	**Details of Last test conducted** • Sample location • Date of Sampling • Testing Date • Report results	 PBCMP, Langatu 16. 10.2022 18.10.2022 Portable
2.	Next Due results	20.01.2023

नवीन कुमार / NAVIN KUMAR
उप महाप्रबंधक (पर्यावरण प्रबंधन) / DGM (ENVT. MGMT.)
एनटीपीसी लिमिटेड/ NTPC Limited
कोयला खनन परियोजनाएं/ COAL MINING PROJECTS
हजारीबाग / Hazaribag

Ref. No: 1040/PBCMP/Min/2017/114 Date: 20.04.2017

OFFICE ORDER No 23A / 2017

Further to the office order regarding the reconstitution of Environment Management Cell for Pakribarwadih Coal Mining Project. the following enclosed structure shall function for the Environment Management with immediate effect for the Pakribarwadih Coal Mining Project.

The cell is responsible for

1. Compliance of statutory conditions given in the Environment , Forest Clearance groundwater clearance etc.
2. Organize the visit of various officials and implementing the suggestions for betterment of the environment.
3. Submit the statutory compliance reports.
4. Organize Environment awareness programs.
5. Implement the innovative measures for the environment protection
6. Documentation etc.

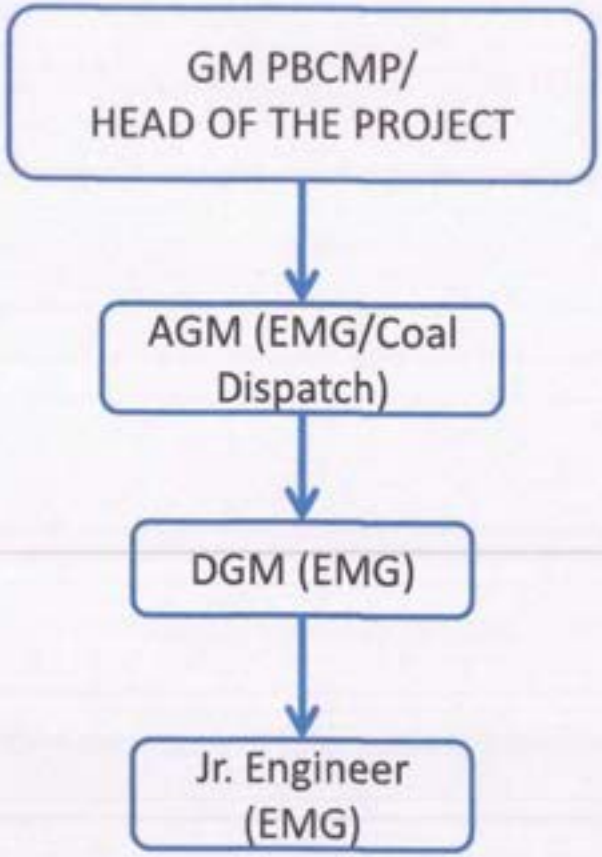
This issues with the approval of the competent authority.

T.Gopalakrishna
Group General Manager,

CC:
All HODs – For Kind information please.
Concerned executives.

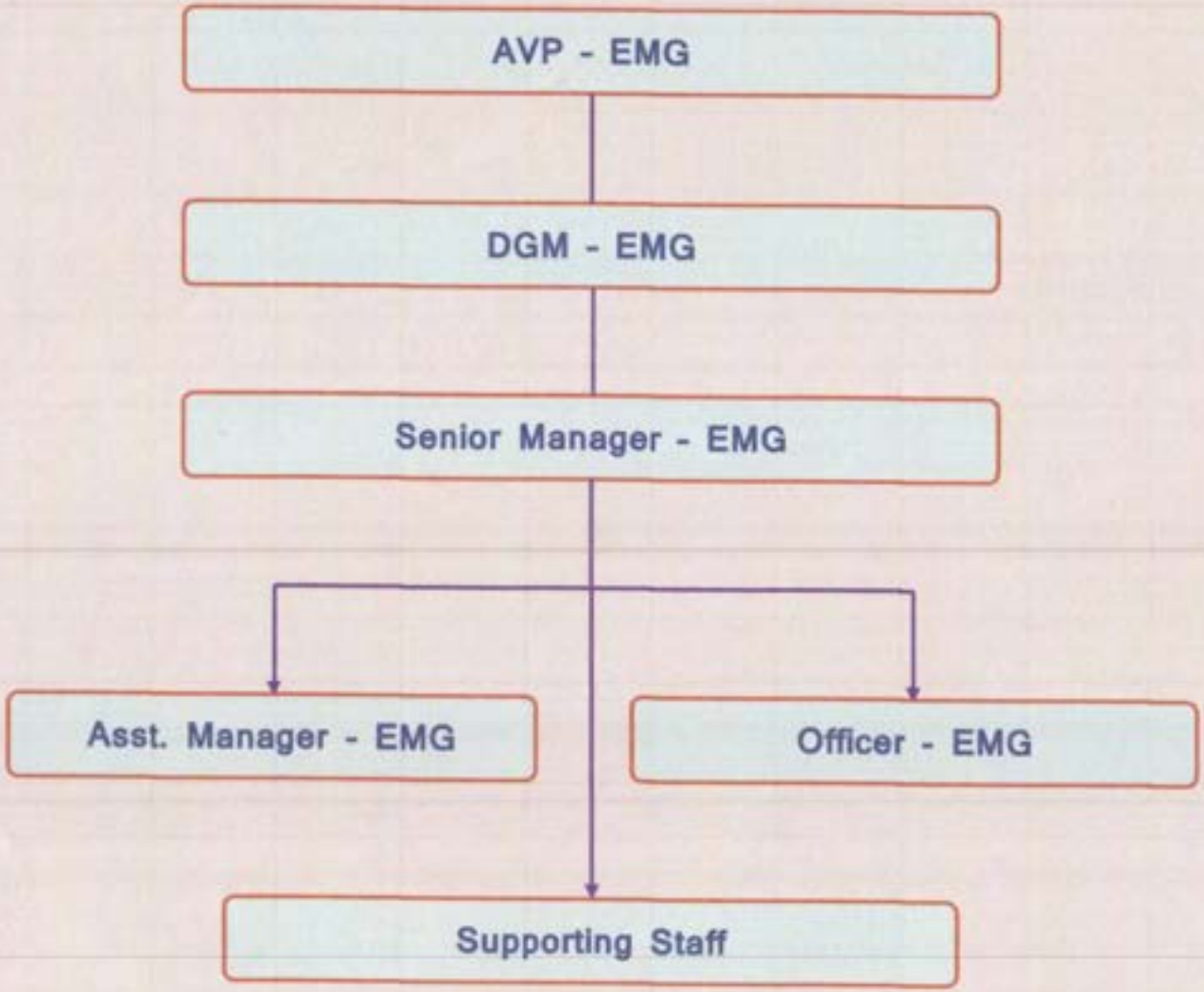
नवीन कुमार / NAVIN KUMAR
उप महाप्रबंधक (पर्यावरण प्रबंधन) / DGM (ENVT. MGMT.)
एनटीपीसी लिमिटेड/ NTPC Limited
कोयला खनन परियोजनाएँ/ COAL MINING PROJECTS
हजारीबाग / Hazaribag

ENVIRONMENT MANAGEMENT CELL AT NTPC - PBCMP



नवीन कुमार / NAVIN KUMAR
उप महाप्रबंधक / पर्यावरण प्रबंधन / DGM (ENVT MGMT)
परियोजना निदेशक/ NTPC Limited
कोयला खनन परियोजनाएं/ COAL MINING PROJECTS
हजारीबाग / Hazaribag

ENVIRONMENT MANAGEMENT CELL
THRIVENI SAINIK MINING PVT. LTD.
PAKRI BARWADIH COAL MINING PROJECT



नवीन कुमार / NAVIN KUMAR
उप महाप्रबंधक (पर्यावरण प्रबंधन) / DGM (ENVT. MGMT.)
एनटीपीसी लिमिटेड/ NTPC Limited
कोयला खनन परियोजनाएं/ COAL MINING PROJECTS
हजारीबाग / Hazaribag

PAKRI BARWADIH COAL MINING PROJECT OF NTPC		
Environmental Expenditure for the FY (October-22 to March-2023)		
Sl NO	**Purpose of Expense**	**Amount (in Rs.)**
(A) For dump slope stabilization		
1	Coir Mating, Gabion Box, Retaining Wall, Garland Drain, Settling Pit and its Maintainance	5687293.45
2	Dozer Operator Salary, HSD Cost and Maintainace charge	
(B) For dust suppression		
1	Permanent Sprinkler	41358982.83
2	Water tanker and its maintenance	
(C) Environmental Monitoring		
1	Annual Maintenance Contract of Instruments	3365670.00
2	Environmental Monitoring (AAQ, Water, Noise etc.)	
(D) Nursery development and plantation		2441932.00
(E) Environment Staff Salary		2742600.00
(F) Water treatment & ETP Maintainace		1069000.00
(G) Scientific Study		0.00
Total Amount		**56665478.28**

नवीन कुमार / NAVIN KUMAR
उप महाप्रबंधक (पर्यावरण प्रबंधन) / DGM (ENVT. MGMT.)
एनटीपीसी लिमिटेड/ NTPC Limited
कोयला खनन परियोजनाएँ/ COAL MINING PROJECTS
हजारीबाग / Hazaribag

PAKRI BARWADIH COAL MINING PROJECT OF NTPC		
Environmental Expenditure for the FY (April to September-2022)		
Sl NO	**Purpose of Expense**	**Amount (in Rs.)**
(A) For dump slope stabilization		
1	Coir Mating, Gabion Box, Retaining Wall, Garland Drain, Settling Pit and its Maintainance	8443390.00
2	Dozer Operator Salary, HSD Cost and Maintainace charge	
(B) For dust suppression		
1	Permanent Sprinkler	33734029.83
2	Water tanker and its maintenance	
(C) Environmental Monitoring		
1	Annual Maintenance Contract of Instruments	3393215.00
2	Environmental Monitoring (AAQ, Water, Noise etc.)	
(D) Nursery development and plantation		2233075.00
(E) Environment Staff Salary		3109200.00
(F) Water treatment & ETP Maintainace		399000.00
(G) Scientific Study		687500.00
Total Amount		**51999409.83**

नवीन कुमार / NAVIN KUMAR
उप महाप्रबंधक (पर्यावरण प्रबंधन) / DGM (ENVT. MGMT.)
एनटीपीसी लिमिटेड/ NTPC Limited
कोयला खनन परियोजनाएँ/ COAL MINING PROJECTS
हजारीबाग / Hazaribag

Pankaj Dhingra & Co.
CHARTERED ACCOUNTANTS

602/24 DLF Colony
Rohtak, Haryana-124001
Email : capdc2010@gmail.com
Ph. No 01262-254634
Mobile : +91-9215380381/82

TO WHOM SO EVER IT MAY CONCERN

Based on our examination of the books of accounts and records, as produced before us for verification, of Thriveni Sainik Mining Private Limited ("the Company") having its registered office at 7th Floor, Corporate Tower, Ambience Mall, NH-8, Gurgaon, Haryana-122001, we hereby certify that the Company has incurred expenditure towards environmental expenditure for its project **NTPC LTD-PAKRI BARWADIH COAL PROJECT, BARKAGON** from April 2021 to March 2022 is Rs 926.43 Lakhs (Rupees Nine Hundered Twenty Six Lakhs and Forty Three Thousand only) as per details given in **Annexure 1**

This certificate has been provided at the request of the Company is not intended for general circulation or publication

The above figures are true and correct as per documents and information provided to us for our verification.

For PANKAJ DHINGRA & Co.
Chartered Accountants
FR No. 023088N

(CA. Nidhi Dhingra)
Partner
MN. No. 510815
UDIN : 22510815AQMITT4220

Place : Rohtak
Date : 25.07.2022

नवीन कुमार / NAVIN KUMAR
उप महाप्रबंधक (पर्यावरण प्रबंधन) / DGM (ENVT. MGMT.)
एनटीपीसी लिमिटेड/ NTPC Limited
कोयला खनन परियोजनाएँ/ COAL MINING PROJECTS
हजारीबाग / Hazaribag

Pankaj Dhingra & Co.
CHARTERED ACCOUNTANTS

602/24 DLF Colony
Rohtak, Haryana-124001
Email : capdc2010@gmail.com
Ph. No 01262-254634
Mobile : +91-9215380381/82

Annexure 1

PAKRI BARWADIH COAL MINING PROJECT OF NTPC		
Environmental Expenditure for the FY (April-2021 to March-2022)		
Sl NO	**Purpose of Expense**	**Amount in INR Lakhs**
(A) For dump slope stabilization		
1	Coir Mating, Gabion Box, Retaining Wall, Garland Drain, Settling Pit and its Maintainance	151.14
2	Dozer Operator Salary, HSD Cost and Maintainace charge	
(B) For dust suppression		
1	Permanent Sprinkler	564.12
2	Water tanker and its maintenance	
(C) Environmental Monitoring		
1	Annual Maintenance Contract of Instruments	70.32
2	Environmental Monitoring (AAQ, Water, Noise etc.)	
(D) Nursery development and plantation		21.77
(E) Environment Staff Salary		30.69
(F) Water treatment & ETP Maintainace		45.71
(G) Certification		0.85
(H) Scientific Study		4.63
(I) Water Recharge Measures		36.71
(J) Miscellaneous Expense		0.48
Total Amount		**926.43**

नवीन कुमार / NAVIN KUMAR
उप महाप्रबंधक (पर्यावरण प्रबंधन) / DGM (ENVT. MGMT.)
एनटीपीसी लिमिटेड/ NTPC Limited
कोयला खनन परियोजनाएँ/ COAL MINING PROJECTS
हजारीबाग / Hazaribag

GAURAV CHOPRA & ASSOCIATES
Chartered Accountants

Ref. No.

Date : 02/07/2021

TO WHOMSOEVER IT MAY CONCERN

I hereby certify that I have examined the related documents for environmental expenses incurred for **TRIVENI SAINIK MINING PRIVATE LIMITED**(PROJECT-**NTPC LTD,PAKRI BARWADIH COAL PROJECT BARKAGON**) from April 2020 to March 2021 which amounting to 9,74,54,170/-(Nine Crore Seventy Four Lacs Fifty Four Thousand and Seventy Rupees Only). These Expenses Consist of following Annexure-A which is attached herewith.

FOR **GAURAV CHOPRA & ASSOCIATES**

GAURAV CHOPRA

(M. NO- 418565)

UDIN: 21418565AAAABO8898

GAURAV CHOPRA CA M. No.418565 CHARTERED ACCOUNTANT

नवीन कुमार / NAVIN KUMAR
उप महाप्रबंधक (पर्यावरण प्रबंधन) / DGM (ENVT. MGMT.)
एनटीपीसी लिमिटेड/ NTPC Limited
कोयला खनन परियोजनाएँ/ COAL MINING PROJECTS
हजारीबाग / Hazaribag

104, AKS Heights 9th & 10th Sardapura C Road, Jodhpur (Raj.)
Contact No. 0291-2641122, 94144-98356
Email : gauravchopraca@gmail.com

PAKRI BARWADIH COAL MINING PROJECT OF NTPC		
Environmental Expenditure for the FY (April-2020 to March-2021)		
SI NO	Purpose of Expense	Amount (in Rs.)
(A) For dump slope stabilization		
1	Coir Mating, Gabion Box, Retaining Wall, Garland Drain, Settling Pit and its Maintainance	28,984,191.42
2	Dozer Operator Salary, HSD Cost and Maintainace charge	
(B) For dust suppression		
1	Permanent Sprinkler	43,973,816.69
2	Water tanker and its maintenance	
(C) Environmental Monitoring		
1	Annual Maintenance Contract of Instruments	7,817,473.30
2	Environmental Monitoring (AAQ, Water, Noise etc.)	
(D) Nursery development and plantation		6,568,550.42
(E) Environment Staff Salary		7,384,800.00
(F) Water treatment & ETP Maintainace		2,118,350.00
(G)Certification		468,900.00
(H) Miscellaneous Expense		138,088.00
Total Amount		**97,454,169.83**

GAURAV CHOPRA CA M. No.418565 CHARTERED ACCOUNTANT

नवीन कुमार / NAVIN KUMAR
उप महाप्रबंधक (पर्यावरण प्रबंधन) / DGM (ENVT. MGMT.)
एनटीपीसी लिमिटेड/ NTPC Limited
कोयला खनन परियोजनाएँ/ COAL MINING PROJECTS
हजारीबाग / Hazaribag

GAURAV CHOPRA & ASSOCIATES
Chartered Accountants

Ref. No.

Date : 26/11/2020

TO WHOMSOEVER IT MAY CONCERN

I hereby certify that I have examined the related documents for environmental expenses incurred for **TRIVENI SAINIK MINING PRIVATE LIMITED**(PROJECT-**NTPC LTD,PAKRI BARWADIH COAL PROJECT BARKAGON**) from April 2019 to March 2020 which amounting to 16,20,82,483/-(Sixteen Crore Twenty Lacs Eighty Two Thousand Four Hundred Eighty Three Only). These Expenses Consist of following Annexure-A which is attached herewith.

FOR **GAURAV CHOPRA & ASSOCIATES**

Gaurav

GAURAV CHOPRA CA M. No.418565 CHARTERED ACCOUNTANT

GAURAV CHOPRA

(M. NO- 418565)

UDIN: 20418565AAAAAT5479

नवीन कुमार / NAVIN KUMAR
उप महाप्रबंधक (पर्यावरण प्रबंधन) / DGM (ENVT. MGMT.)
एनटीपीसी लिमिटेड/ NTPC Limited
कोयला खनन परियोजनाएँ/ COAL MINING PROJECTS
हजारीबाग / Hazaribag

104, AKS Heights 9th & 10th Sardapura C Road, Jodhpur (Raj.)
Contact No. 0291-2641122, 94144-98356
Email : gauravchopraca@gmail.com

PAKRI BARWADIH COAL MINING PROJECT OF NTPC		
Environmental Expenditure for the FY (April 2019 to March 2020)		
Sl NO	**Purpose of Expense**	**Amount (in Rs.)**
(A) For dump slope stabilization		
1	Coir Mating, Gabion Box, Retaining Wall, Garland Drain, Settling Pit and its Maintainance	73,099,492.70
2	Dozer Operator Salary, HSD Cost and Maintainace charge	
(B) For dust suppression		
1	Permanent Sprinkler	60,393,753.17
2	Water tanker and its maintenance	
(C) Environmental Monitoring		
1	Annual Maintenance Contract of Instruments	9,391,214.70
2	Environmental Monitoring (AAQ, Water, Noise etc.)	
(D) Nursery development and plantation		5,466,338.00
(E) Environment Staff Salary		7,741,440.00
(F) Water treatment & ETP Maintainace		3,662,742.00
(G)Surface Runoff Recharge		3,100,000.00
(H)Certification		1,950,799.88
(I) Miscellaneous Expense		376,702.20
Total Amount		**162,082,482.65**

GAURAV CHOPRA
CA
M. No.418565
CHARTERED ACCOUNTANT

नवीन कुमार / NAVIN KUMAR
उप महाप्रबंधक (पर्यावरण प्रबंधन) / DGM (ENVT. MGMT.)
एनटीपीसी लिमिटेड/ NTPC Limited
कोयला खनन परियोजनाएं/ COAL MINING PROJECTS
हजारीबाग / Hazaribag

GAURAV CHOPRA & ASSOCIATES
Chartered Accountants

Ref. No.

Date : 25/09/2019

TO WHOMSOEVER IT MAY CONCERN

I hereby certify that I have examined the related documents for environmental expenses incurred for **TRIVENI SAINIK MINING PRIVATE LIMITED**(PROJECT-**NTPC LTD,PAKRI BARWADIH COAL PROJECT BARKAGON**) from April 2018 to March 2019 which amounting to 11,62,03,315/-(Eleven Crore Sixty Two Lacs Three Thousand Three Hundred Fifteen Only). These Expenses Consist of following Annexure-A which is attached herewith.

FOR **Gaurav Chopra & Associates**

GAURAV CHOPRA

(M. NO- 418565)

UDIN- 19418565AAAAAO4381

नवीन कुमार / NAVIN KUMAR
DGM (ENVT MGMT.)
NTPC Limited
COAL MINING PROJECTS
Hazaribag

104, AKS Heights 9th & 10th Sardapura C Road, Jodhpur (Raj.)
Contact No. 0291-2641122, 94144-98356
Email : gauravchopraca@gmail.com

FAKRI BARWADIH COAL MINING PROJECT OF NTPC		
Environmental Expenditure for the FY (April 2018 to March 2019)		
Sl NO	Purpose of Expense	Amount (In Rs.)
(A) For dump slope stabilization		
1	Coir Mating, Gabion Box, Retaining Wall, Garland Drain, Settling Pit and its Maintainance	4,73,78,336.60
2	Dozer Operator Salary, HSD Cost and Maintainace charge	
(B) For dust suppression		
1	Permanent Sprinkler	4,87,49,865.45
2	Water tanker and its maintenance	
(C) Environmental Monitoring		
1	Annual Maintenance Contract of Instruments	74,18,667.00
2	Environmental Monitoring (AAQ, Water, Noise etc.)	
(D) Nursery development and plantation		17,08,699.00
(E) Environment Staff Salary		66,12,000.00
(F) Water treatment & ETP Maintainace		34,47,729.00
(G)Certification		7,35,076.00
(H) Miscellaneous Expense		1,52,941.72
Total Amount		11,62,03,314.77

नवीन कुमार / NAVIN KUMAR
उप महाप्रबंधक (पर्यावरण प्रबंधन) / DGM (ENVT. MGMT.)
एनटीपीसी लिमिटेड/ NTPC Limited
कोयला खनन परियोजनाएँ/ COAL MINING PROJECTS
हजारीबाग / Hazaribag

A C G C & Associates

Chartered Accountants

104, Aks Heights 9th & 10th Sardarpura, 'C' Road, JODHPUR (Raj.)
Contact No. : 0291-2641122 ,9772591864, 9414498356
E-mail: acgcassociates@gmail.com
Website : www.acgcassociates.icai.org

Ref. No.

Date 18/05/2018

TO WHOMSOEVER IT MAY CONCERN

I hereby certify that I have examined the related documents for environmental expenses incurred for **TRIVENI SAINIK MINING PRIVATE LIMITED(PROJECT-NTPC LTD,PAKRI BARWADIH COAL PROJECT BARKAGON)** from April 2017 to March 2018 which amounting to 10,84,21,227/-(Ten Crore Eighty Four Lacs Twenty One Thousand Two Hundred Twenty Seven Only). These Expenses Consist of following Annexure-A which is attached herewith.

FOR ACGC & ASSOCIATES

GAURAV CHOPRA

(M. NO- 418565)

नवीन कुमार / NAVIN KUMAR
उप महाप्रबंधक (पर्यावरण प्रबंधन) / DGM (ENVT. MGMT.)
एनटीपीसी लिमिटेड/ NTPC Limited
कोयला खनन परियोजनाएँ/ COAL MINING PROJECTS
हजारीबाग / Hazaribag

PAKRI BARWADIH COAL MINING PROJECT OF NTPC		
Environmental Expenditure for the FY (April 2017 to March 2018)		
SI NO	Purpose of Expense	Amount (in Rs.)
(A) For dump slope stabilization		
1	Coir Mating, Gabion Box, Retaining Wall, Garland Drain, Settling Pit and its Maintainance	77,304,660.54
2	Dozer Operator Salary, HSD Cost and Maintainace charge	
(B) For dust suppression		
1	Permanent Sprinkler	22,704,829.36
2	Water tanker and its maintenance	
(C) Environmental Monitoring		
1	Recalibration of Instruments / equipments	4,133,096.00
2	Environmental Monitoring (AAQ, Water, Noise etc.)	
(D) Nursery development and plantation		1,033,287.00
(E) Environment Staff Salary		2,517,864.00
(F) Water treatment & ETP Maintainace		727,490.00
Total Amount		**108,421,226.90**

नवीन कुमार / NAVIN KUMAR
उप महाप्रबंधक (पर्यावरण प्रबंधन) / DGM (ENVT. MGMT.)
एनटीपीसी लिमिटेड/ NTPC Limited
कोल खनन परियोजनाएँ/ COAL MINING PROJECTS
हजारीबाग / Hazaribag

A C G C & Associates

Chartered Accountants

104, Aks Heights 9th & 10th Sardarpura, 'C' Road, **JODHPUR** (Raj.)
Contact No. : 0291-2641122 ,9772591864, 9414498356
E-mail: acgcassociates@gmail.com
Website : www.acgcassociates.icai.org

Ref. No.

Date 23/03/2018

TO WHOMSOEVER IT MAY CONCERN

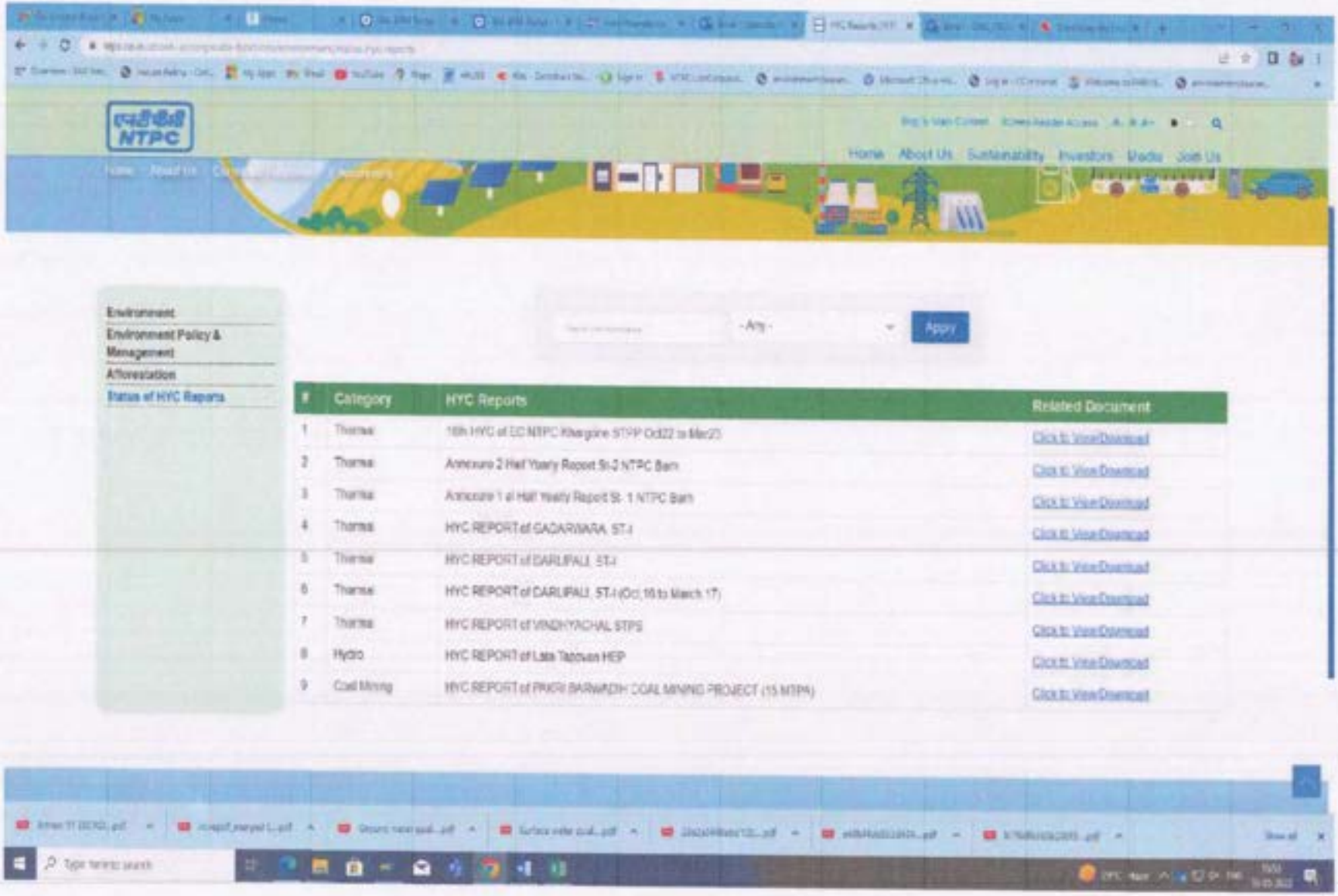
I hereby certify that I have examined the related documents for environmental expenses incurred for **TRIVENI SAINIK MINING PRIVATE LIMITED**(PROJECT-**NTPC LTD,PAKRI BARWADIH COAL PROJECT BARKAGON**) from May 2016 to March 2017 which amounting to 3,47,65,165/-(Three Crore Forty Seven Lacs Sixty Five Thousand One Hundred Sixty Five Only). These Expenses Consist of following Annexure-A which is attached herewith.

FOR A C G C & ASSOCIATES

GAURAV CHOPRA

(M. NO- 418565)

नवीन कुमार / NAVIN KUMAR
उप महाप्रबंधक (पर्यावरण प्रबंधन) / DGM (ENVT. MGMT.)
एनटीपीसी लिमिटेड/ NTPC Limited
कोयला खनन परियोजनाएँ/ COAL MINING PROJECTS
हजारीबाग / Hazaribag



नवीन कुमार / NAVIN KUMAR
उप महाप्रबंधक(पर्यावरण प्रबंधन)/ DGM (ENVT. MGMT.)
एनटीपीसी लिमिटेड/ NTPC Limited
कोयला खनन परियोजनाएं/ COAL MINING PROJECTS
हजारीबाग / Hazaribag

THE TIMES OF INDIA, RANCHI
SATURDAY, MAY 30, 2009

NTPC Limited

(A Govt. of India Enterprise)

PAKRI BARWADIH COAL MINING PROJECT
Hazaribag

NOTICE

Pakri Barwadih Coal Mining Project, Hazaribag, NTPC Limited has been accorded environmental clearance from Ministry of Environment & 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 Environment & Forests at http://envfor.nic.in.

Government of Bihar

P R A N J A L

Bihar State Water and Sanitation Mission

160, Patliputra Colony, Patna - 13

Invitation Proposal for Hiring Accounts Firms

अनुग्रह नारायण मगध मेडीकल कॉलेज अस्पताल, गया

EAST CENTRAL RAILWAY

NOTICE FOR ALL CONCERNED

"SERVING CUSTOMERS WITH A SMILE"

EAST CENTRAL RAILWAY

"SERVING CUSTOMERS WITH A SMILE"

NORTH EASTERN RAILWAY

Open Tender Notice No.

EAST CENTRAL RAILWAY

Corrigendum

EASTERN RAILWAY

WASHING AND DRY CLEANING

नवीन कुमार / NAVIN KUMAR
उप महाप्रबंधक (पर्यावरण प्रबंधन) / DGM (ENVT. MGMT.)
एनटीपीसी लिमिटेड/ NTPC Limited
कोयला खनन परियोजनाएँ/ COAL MINING PROJECTS
हजारीबाग / Hazaribag

एनटीपीसी लिमिटेड

पकरी-बरवाडीह कोल माइनिंग प्रोजेक्ट

इत्तलिया

सूचना

सूचना

दक्षिण पूर्व रेलवे

OFFICE OF THE EXECUTIVE ENGINEER
BUILDING CONSTRUCTION DEPARTMENT
BUILDING DIVISION, GARHWA

SHORT TENDER NOTICE

1. Sealed Tenders on approved bill of quantity to be eventually drawn in PWD from No. F2 will be received from registered contractors of Building Construction Department, Jharkhand of appropriate category up to 3.00 PM on 18.06.2009 by Executive Engineer, B.C.D. Building Construction Division, Garhwa for (A) S/R to Confidential Section of D.C. Office, Boundary Wall, P.C.C. and Campus Development of Confidential Section of D.C. Garhwa Part I & II Estimated Cost of each work is Rs. 5.00 Lacs and (B) Sift of Circuit House, Garhwa E.Cost 5.50 Lacs.
2. The tenders shall be opened by the Executive Engineer, B.C.D., Building Division, Garhwa or Authorised officer on 19.06.09 at 3.30 PM. The tenderers or their authorised agents who so ever desire may remain present at the time of opening the tenders.
3. Tender documents can be purchased from Executive Engineer, B.C.D., Building Division, Garhwa / Superintending Engineer, B.C.D. Circle no. 2, Ranchi / Garhwa on the payment of Rs. 750.00 (Rs. Seven Fifty only.) (Non-refundable) in the shape of A/c payee Bank Draft in favour of Executive Engineer, Building Division, Garhwa payable at State Bank of India, Garhwa Branch up to 1.00 PM on 18.6.2009.
4. The time of completion shall be 3 (three) months from the date of issue of the work order.
5. The tenderers are required to deposit earnest money in the form of N.S.C. VIII Issue / Post Office Saving Bank 3/5 yrs. T.D. only duly pledged in favour of the Executive Engineer, Building Division, Garhwa. The E.M. will be 2% of the amount of the approved BoQ.

Please see terms and Conditions on Notice Board or www.jharkhand.gov.in

Executive Engineer,
B.C.D. Building Division,
Garhwa

तेलंग टाटा मोटर्स के नये प्रबंध निदेशक

काढा तेल 63 डॉलर प्रति बैरल के ऊपर

आम बजट पर विचार-विमर्श जल्द

कार्यालय
जल पथ प्रबंधन
निविदा आमंत्रण

Govt. of J
DIRECTORATE OF ART, CULTU
Notice No
NOTICE INVITIN
Tender for Spo

The Director, National Games Organi
Equipments" in the Mega Sports Com
document has been floated in our webs
The interested bidders can download the
Tenders shall be received in the office of
Dhurwa, Ranchi-834004 before 3.30 P
accepted beyond the specified time.

PR-28250/Education/09-10

नवीन कुमार / NAVIN KUMAR
उप महाप्रबंधक (पर्यावरण प्रबंधन) / DGM (ENVT. MGMT.)
एनटीपीसी लिमिटेड / NTPC Limited
कोयला खनन परियोजनाएं / COAL MINING PROJECTS
हजारीबाग / Hazaribag