



Letter No.: HIL/JH/DUM/478

Dated: 31.05.2021

To,
The Additional PCCF,
Ministry of Environment, Forest and Climate Change, Regional Office (ECZ),
Bungalow No. – A-2, Shyamali Colony,
Ranchi- 834002,
Tel- 0651-2410007, 2410002, Email id: ro.ranchi-mef@gov.in

Sub: Submission of Half Yearly Compliance Report of Environmental Clearance for 1 MTPA opencast Dumri Coal Mine Project located in Dist. Hazaribag, Jharkhand for the period of October, 2020 to March, 2021

Ref.:

1. Environmental Clearance vide letter no. J-11015/239/2008-IA.II (M) dated 23rd December, 2010
2. Transfer of EC vide letter no. J-11015/239/2008-IA-II (M) Pt. dated 28th October, 2016
3. Revoke the abeyance on Transfer of EC vide letter no. J-11015/239/2008-IA-II (M) Pt. dated 6th November, 2019

Dear Sir,

With reference to the above, please find the enclosed "Half Yearly Compliance Report" of Environmental Clearance for the period October, 2020 to March, 2021 for your kind perusal.

Thanking you,
Yours Sincerely,

Mainak Chakraborty
VP & Head
Dumri Coal Mine
Hindalco Industries Ltd.

Encl:

1. Annexure-I: Compliance Report of EC
2. Annexure-II: Environmental Monitoring Report
3. Annexure-III: Revoke the abeyance on transfer of EC
4. Annexure-IV: Copy of Transfer of Environmental Clearance
5. Annexure-V: Copy of Environmental Clearance
6. Annexure-VI: Environment Management Cell

CC to:

1. The Regional Officer, JSPCB, Qtr. No.- E-1, C.T.I. Colony, HEC, Sector-III, Durwa, Ranchi- 834004
2. The Member Secretary, JSPCB, T.A. Building, Ground Floor, HEC Complex, Durwa, Ranchi- 834004
3. The Member Secretary, CPCB, Parivesh Bhawan, Delhi- 110032
4. The Director, MoEF, A/3 Chandrasekharpur, Bhubaneswar- 751023

**Annexure-I:
Compliance Report of EC**

HALF YEARLY COMPLIANCE REPORT

October'2020 to March'2021

Compliance Report on conditions of Environment Clearance for Dumri Coal Mine Project Transfer by Ministry of Environment, Forest & Climate Change vide letter no. J-11015/239/2008-IA-II (M) Pt., dated 6th November, 2019 for open cast mining with production capacity of 1.0 MTPA

Sl. No.	Conditions	Compliance
1.	The safety distance of at least 15 m shall be maintained all along the forest boundary.	The condition is noted and will be complied as applicable. Presently there is no mining activity within the ML area as all the statutory approvals has not yet received.
2.	The project proponent shall develop greenbelt all along the mine boundary with broad leaved, native tree species.	The condition is noted and will be complied as applicable. Presently there is no mining activity within the ML area as all the statutory approvals has not yet received.
3.	Control blasting techniques using NONEL and down the hole initiation shall be adopted while working near the forest boundary and habitations.	The condition is noted and will be complied as applicable. Presently there is no mining activity within the ML area as all the statutory approvals has not yet received.
4.	The project proponent shall adhere to the approved mining plan for the ML area of 259.64 ha	Noted and will follow the approved mining plan for the ML area of 259.64 ha.
5.	The fund allocation for the CER shall be made as per the guidelines issued by the Ministry vide OM dated 1 st May, 2018.	The condition is noted and will be complied as applicable.

Compliance Report on conditions of Environment Clearance for Dumri Coal Mine Project Transfer by Ministry of Environment, Forest & Climate Change vide letter no. J-11015/239/2008-IA-II (M) Pt., dated 28th October, 2016 for open cast mining with production capacity of 1.0 MTPA

Sl. No.	Conditions	Compliance
1.	Any change in scope of work will attract the provisions of Environmental (Protection) Act, 1986 and the Environmental Impact Assessment Notification, 2006 in conjunction with the subsequent amendments/circulars.	The condition is noted and will be complied as applicable.
2.	All conditions stipulated in the EC letter No.J-11015/239/2008-IA.II (M) dated 23 rd December, 2010 shall remain unchanged.	The condition is noted and will be complied as applicable.
3.	The successful bidder shall be liable, if any, for any act of violation of the said Act and the EIA Notification 2006/ subsequent amendments and circulars which it has inherited during the transfer.	The condition is noted.
4.	Successful bidder shall be liable for compliance of all court directions, if any.	The condition is noted and shall be liable for compliance of all court directions, if any.
5.	Mining shall be carried out in the forest area of 158.64 ha for which stage-FC has been obtained, out of the total forest land of 183 ha in the total mine lease area of 279 ha. No mining shall be done in the remaining 19.36 ha of forest area (excluding 5 ha for safety zone), committed to be surrendered. Also, mining lease shall be executed for the total mine lease area excluding the forest land of 19.36 ha, and shall be submitted to this Ministry.	The condition is noted. 19.36 ha of forest land had been already surrendered. Revised Mining Plan with ML area of 259.64 ha had been also submitted and subsequently approved by the ministry.

Compliance Report on conditions of Environment Clearance for Dumri Coal Mine Project given by Ministry of Environment, Forest & Climate Change vide letter no. J-11015/239/2008-IA.II (M), dated 23rd December, 2010 for open cast mining with production capacity of 1.0 MTPA

Sl. No.	Conditions	Compliance
Specific Conditions		
1.	The maximum production of coal shall not exceed 1 MTPA.	The condition is noted and there is no production of coal during October 2020 to March 2021. Presently there is no mining activity within the ML area as all the statutory approvals has not yet received.
2.	No mining shall be carried out in the 183 ha of forestland until prior forestry clearance is obtained under FC Act 1980. No OB shall be dumped on forest land.	The condition is noted and will be complied as applicable. Presently there is no mining activity within the ML area as all the statutory approvals has not yet received. Based on approved mining plan (Revision-I) for the ML area of 259.64 ha, presently the forest land is 163.64 ha.
3.	The stretch of nala flowing in the west-central part of the ML shall not be disturbed. Prior approval of the Flood and Irrigation Department of the State Government shall be obtained for the proposed diversion of 2km stretch of Baldeori nala and realignment of the diverted nala along the fault lines and for design of the embankment. A minimum safe distance of 60m distance shall be maintained between the realigned nala and the mine. The embankment of 2km along the diverted stretch of the nala shall be a minimum 3m higher than the HFL of the nala and 30m wide at the bottom. The slope of the embankment shall at least 2:1 towards the ML, compacted and stone pitching shall be done towards the river and the embankment shall be stabilised with Plantation. Materials such as OB shall be tested for strength before using for construction of embankment.	The condition is noted and will be complied as applicable.

4.	Top soil shall be stored in the earmarked site and shall be used within a year of its generation for green belt development and for plantation/reclamation.	The condition is noted and will be complied as applicable. Presently there is no mining activity within the ML area as all the statutory approvals has not yet received.
5.	OB shall be temporarily stored on mineralised area and rehandled by 7th year of mining operations. Monitoring and management of existing reclaimed dumpsites including slope stability shall continue until the vegetation becomes self-sustaining. Compliance status shall be submitted to the Ministry of Environment & Forests and its Regional office located at Bhubaneshwar on yearly basis.	The condition is noted and will be complied as applicable. Presently there is no mining activity within the ML area as all the statutory approvals has not yet received.
6.	Garland drains (size, gradient and length) around the safety areas and low lying areas and sump capacity shall be designed keeping 50% safety margin over and above the peak sudden rainfall and maximum discharge in the area adjoining the mine sites. Sump capacity shall also be provided adequate retention period to allow proper settling of silt material.	The condition is noted and will be complied as applicable. Presently there is no mining activity within the ML area as all the statutory approvals has not yet received.
7.	Catch drains and siltation ponds of appropriate size shall be constructed to arrest silt and sediment flows from soil, OB and mineral dumps. The water so collected shall be utilized for watering the mine area, roads, green belt development, etc. The drains shall be regularly desilted and maintained properly. Garland drains (size, gradient and length) and sump capacity shall be designed keeping 50% safety margin over and above the peak sudden rainfall and maximum discharge in the area adjoining the mine site. Sump capacity shall also provide adequate retention period to allow proper settling of silt material.	The condition is noted and will be complied as applicable. Presently there is no mining activity within the ML area as all the statutory approvals has not yet received.
8.	Dimension of the retaining wall at the toe of the dumps and OB benches within the mine to check run-off and siltation shall be based on the rainfall data.	The condition is noted and will be complied as applicable. Presently there is no mining activity within the ML area as all the statutory approvals has not

		yet received.
9.	Crushers at the CHP shall be operated with high efficiency bag filters/water sprinkling system shall be provided to check fugitive emissions from crushing operations, conveyor system which shall be closed, haulage roads, transfer points, etc.	The condition is noted and will be complied as applicable. Presently there is no mining activity within the ML area as all the statutory approvals has not yet received.
10.	Drills shall be wet operated only.	The condition is noted and will be complied as applicable. Presently there is no mining activity within the ML area as all the statutory approvals has not yet received.
11.	Controlled blasting shall be practiced with use of delay detonators and only during daytime. The mitigative measures for control of ground vibrations and to arrest the fly rocks and boulders shall be implemented.	The condition is noted and will be complied as applicable. Presently there is no mining activity within the ML area as all the statutory approvals has not yet received.
12.	The main Approach road of 10km shall be black topped and developed with 3-tier avenue plantation using a mix of species suitable for controlling fugitive dust emissions.	The condition is noted and will be complied as applicable. Presently there is no mining activity within the ML area as all the statutory approvals has not yet received.
13.	Coal transportation to proposed Tori Railway siding by trucks covering a distance of 8 km shall be until the 8th year of mine operations only and thereafter coal transportation shall be by rail from the proposed Railway siding on the proposed Tori-Shibpur-Hazaribagh railway line. The rail link and route for coal evacuation from the mine shall form a part of an integrated plan for the entire North Karanpura Coalfields. Until the railway siding and the rail link is established of the, coal transport is permitted by road using a minimum 20-T trucks (160 trips/day) to Churi Railway siding at a distance of 42 km.	The condition is noted and will be complied as applicable. Presently there is no mining activity within the ML area as all the statutory approvals has not yet received.
14.	A Plan for afforestation of not less than 196 ha of the mine lease shall be implemented, which includes backfilled quarries (178 ha), ext. OB dump (7.5 ha), mineral storage area (6.5 ha), along ML boundary, along	Presently there is no mining activity within the ML area as all the statutory approvals has not yet received. The condition is noted and will be complied as applicable.

	roads, infrastructure (4 ha), safety zone, embankment, colony including R&R colony outside the ML and the 32 ha area falling between the forest land left out of the ML and between the embankment shall be thickly vegetated by planting native species in consultation with the local DFO/Agriculture Department. The density of the trees shall be around 2500 plants per ha.	As per direction of MoEF&CC vide letter no. J-11015/239/2008-IA-II(M) Pt. dated 6 th November, 2019 project proponent shall adhere to the approved mining plan for the ML area of 259.64 ha. Therefore, based on approved mining plan for the ML area of 259.64 ha, proposed land-use pattern will be implemented.
15.	Of the total quarry area of 208 ha, an area of 178 ha shall be backfilled and reclaimed with plantation and the balance 30 ha of the decoaled void being converted into a water reservoir not exceeding 30m depth at the post mining stage shall be gently sloped along the higher benches and stabilised by plantation/afforestation by planting native plant species in consultation with the local DFO/Agriculture Department. The density of the trees shall be around 2500 plants per ha.	Presently there is no mining activity within the ML area as all the statutory approvals has not yet received. The condition is noted and will be complied as applicable. As per direction of MoEF&CC vide letter no. J-11015/239/2008-IA-II(M) Pt. dated 6 th November, 2019 project proponent shall adhere to the approved mining plan for the ML area of 259.64 ha. Based on approved mining plan for the ML area of 259.64 ha, total proposed quarry area is 212.52 ha. Technically reclaimed area within the mining lease at post mine closure stage is 240.78 ha.
16.	Project specific Conservation Plan for endangered Schedule- I and II faunal species reported in the study area shall be prepared and implemented in consultation with the State Forest and Wildlife Departments. The Plan shall include conservation of fauna found in the core and buffer zone in conjunction with the neighbouring mines which come up in the area to allow movement of these fauna passing through the project area into the buffer zone. The project authorities shall also participate in a Regional Conservation Plan as and when prepared in the future for the conservation of flora-fauna found in the region as a whole including a budgetary support over the life of the project. The status of budgetary	The condition is noted. Conservation plan for eco-restoration and maintenance of the area has been submitted to DFO, Hazaribag.

	<p>provision of capital and revenue expenditure on the various activities under the Project specific and Regional WL Conservation Plan and the status of the Plans shall be regularly reported to the MOEF RO and also uploaded on the company website.</p>	
17.	<p>No groundwater shall be used except during the initial phase of mine operations until mining intersects the water table and thereafter only mine pit water shall be used. Any additional water requirement shall be met from mine water and from rainwater harvesting systems.</p>	<p>Presently there is no mining activity within the ML area as all the statutory approvals has not yet received. The condition is noted and included in planning. To obtain NOC for groundwater withdrawal during the initial phase of mine operations, application has been made to CGWB. Any additional water requirement shall be met from mine water and from rainwater harvesting systems.</p>
18.	<p>Regular monitoring of groundwater level and quality shall be carried out by establishing a network of existing wells and construction of new peizometers. The monitoring for quantity shall 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 shall be submitted to the Ministry of Environment & Forests and to the Central Pollution Control Board quarterly within one month of monitoring.</p>	<p>Presently there is no mining activity within the ML area as all the statutory approvals has not yet received. The condition is noted and included in planning. Quality of groundwater is monitored by CSIR-CIMFR, Dhanbad (Govt. agency appointed for the purpose). The report for the post-monsoon and winter season is enclosed.</p>
19.	<p>The Company shall put up artificial groundwater recharge measures for augmentation of groundwater resource in case monitoring of groundwater levels indicate decline of water table. Any additional water requirement for mining operation shall be met from rainwater/recycling of water only. The project authorities shall meet water requirement of nearby village(s) in case the village wells go dry due to dewatering of mine.</p>	<p>The condition is noted and will be complied as applicable. Presently there is no mining activity within the ML area as all the statutory approvals has not yet received.</p>

20.	ETP shall also be provided for treatment of effluents from workshop, CHP and an STP shall be provided for treating wastewater from the township and the treated effluents shall be used for green belt development. Waste water generated from the mine shall be treated and recycled for mine operations to the extent possible and the balance shall be treated to prescribed standards before discharge into the surface waters/agricultural use.	The condition is noted and will be complied as applicable. Presently there is no mining activity within the ML area as all the statutory approvals has not yet received.
21.	Besides carrying out regular periodic health check up of their workers, 10% of the workers identified from work force 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, Ahmadabad within a period of one year and the results reported to this Ministry and to DGMS.	The condition is noted and will be complied as applicable. Presently there is no mining activity within the ML area as all the statutory approvals has not yet received.
22.	For monitoring land use pattern and for post mining land use, a time series of land use maps, based on satellite imagery (on a scale of 1: 5000) of the core zone and buffer zone, from the start of the project until end of mine life shall be prepared once in 3 years (for any one particular season which is consistent in the time series), and the report submitted to MOEF and its Regional office at Bhubaneshwar.	The condition is noted and included in planning. Presently there is no mining activity within the ML area as all the statutory approvals has not yet received.
23.	A detailed project specific R&R Plan prepared for the villages Pagar, Balia, Tunda, Pandu, Chatti-Bariatu comprising about 1737 PAP & 534 PAFs and land & house losers shall be implemented within an agreed time frame. R&R Plan for a cost of Rs 297.30 lakhs shall be implemented initially in consultation with the stakeholders of the villages- Pagar and Balia to be shifted in Phase- I. R&R shall be based on norms laid down/approval by the State Government and shall not be inferior than that in the National R&R Policy and shall be completed within a	The condition is noted and will be complied as applicable. R&R plan is prepared and submitted to the concerned authority. Presently there is no mining activity within the ML area as all the statutory approvals has not yet received.

	<p>specified timeframe. R&R shall include specific income generation schemes. A Corpus Fund of Rs 2 crores shall be created for maintenance of the R&R colony. Annuities of not less than Rs 1500/month shall be provided for persons of vulnerable sections of the displaced population. Alternate livelihood schemes shall be implemented for the persons not being absorbed for employment. The daily wages persons/labourers who are regularly used by the company on a long term basis may also be provided housing and other amenities as regular employees. In addition, 1% of the profits will be disbursed to the displaced population as per the State Govt. R&R Policy.</p>	
24.	<p>A minimum provision of Rs 1 core shall be earmarked as capital expenditure and Rs 5/tonne of coal towards recurring expenditure. Initially, activities under CSR would be undertaken for the adjoining villages such as Dumri, Manatu and Gopda in stage- I and extending to other villages in Stage-II. Monitoring of the socio-economic status of the local communities living in the villages near the project area shall be based on a scientific methodology such as the UNDP Human Development Index. Report of the monitoring of the impacts of project on the socio-economic and human development of the local communities shall be regularly reflected in the Annual Report of the company and also furnished as part of the Monitoring Report submitted to MOEF.</p>	<p>The condition is noted and will be complied as applicable. Presently CSR activities are undertaken within the project area (such as Pandu, Pagar, Balia) and immediate adjacent villages (such as Chatti-Bariyatu, Baleduari, Kabed, Tarhesa). A Socio-economic study report has been prepared and submitted to DC, Hazaribag office.</p>
25.	<p>A Final Mine Closure Plan along with details of Corpus Fund shall be submitted to the Ministry of Environment & Forests three years before completion of this project. Habitat Restoration Plan of the mine area shall be carried out using a mix of native species found in the original ecosystem.</p>	<p>The condition is noted and will be complied as applicable.</p>

	General conditions	
1.	No change in technology and scope of working shall be made without prior approval of the Ministry of Environment and Forests.	The condition is noted and will be complied as applicable. Presently there is no mining activity within the ML area as all the statutory approvals has not yet received.
2.	No change in the calendar plan including quantum of mineral coal and waste being produced shall be made.	The condition is noted and coal production will be restricted within EC limit. Presently there is no mining activity within the ML area as all the statutory approvals has not yet received.
3.	Four ambient air quality monitoring stations shall be established in the core zone as well as in the buffer zone for monitoring PM10, PM2.5, SOx and NOx. 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. Monitoring of heavy metals such as Hg, As, Ni, Cd, Cr, in particulates shall be carried out at least once in six months.	Four ambient air quality monitoring stations have been established and regular monitoring is being carried out. Copy of the monitoring report of the post-monsoon and winter season is enclosed.
4.	Data on ambient air quality (PM10, PM2.5, SOx and NOx and heavy metals such as Hg, As, Ni, Cr, etc) and other monitoring data shall be regularly submitted to the Ministry including its Regional Office at Bhubaneshwar and to the State Pollution Control Board and the Central Pollution Control Board once in six months. Random verification of samples through analysis from independent laboratories recognised under the EP Rules, 1986 shall be furnished as part of the compliance report.	Ambient air quality data is being monitored by CSIR-CIMFR, Dhanbad (Govt. agency) and the report thereof is being submitted to JSPCB and to the regional office of MoEF&CC and CPCB in every six months by email.
5.	Adequate measures shall be taken for control of noise levels below 85 dBA in the work environment. Workers engaged in blasting and drilling operations, operation of HEMM, etc shall be provided with ear plugs/muffs.	The condition is noted and will be complied as applicable. Presently there is no mining activity within the ML area as all the statutory approvals has not yet received.

6.	Industrial waste water (workshop and wastewater from the mine) shall be properly collected, and treated so as to conform to the standards including for heavy metals before discharge prescribed under GSR 422 (E) dated 19th May 1993 and 31st December 1993 or as amended from time to time. Oil and grease trap shall be installed before discharge of workshop effluents.	The condition is noted and will be complied as applicable. Presently there is no mining activity within the ML area as all the statutory approvals has not yet received.
7.	Vehicular emissions shall be kept under control and regularly monitored. Vehicles used for transportation of the mineral shall be covered with tarpaulins and optimally loaded.	The condition is noted and will be complied as applicable. Presently there is no mining activity within the ML area as all the statutory approvals has not yet received.
8.	Monitoring of environmental quality parameters shall be carried out through establishment of adequate number and type of pollution monitoring and analysis equipment in consultation with the State Pollution Control Board and data got analysed through a laboratory recognised under EP Rules, 1986.	Presently there is no mining activity within the ML area as all the statutory approvals has not yet received. Monitoring of environmental quality parameters has done by CSIR-CIMFR, Dhanbad (Govt. agency).
9.	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.	Presently there is no mining activity within the ML area as all the statutory approvals has not yet received. Dust masks will be issued to all employees working in dusty environment. The condition is noted and will be complied as applicable.
10.	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.	A separate environmental management cell has been set up. The department is functioning under the direct control of the unit head. Copy of the management cell is enclosed.
11.	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 the Ministry and its Regional Office at Bhubaneswar.	The condition is noted and will be complied as applicable. Presently there is no mining activity within the ML area as all the statutory approvals has not yet received.

12.	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 .	Compliance completed for publication in newspapers.
13.	A copy of the environmental clearance letter shall be marked to concerned Panchayat/Zila Parishad, Municipal Corporation or Urban Local Body and local NGO, if any, from whom any suggestion/representation has been received while processing the proposal. A copy of the clearance letter shall also be displayed on the company's website.	Copy of clearance letter has been shared with local Panchayat and was discussed along with good suggestions. Copy of the clearance letter is available in the company website. The link is below- http://www.hindalco.com/sustainability/regulatory-compliances
14.	A copy of the clearance letter shall be displayed on the website of the concerned State Pollution Control Board. The EC letter shall also be displayed at the Regional Office, District Industry Centre and Collector's Office/Tehsildar's Office for 30 days.	Duty of the concerned authority.
15.	The clearance letter shall be uploaded on the company's website. The compliance status of the stipulated EC conditions shall also be uploaded by the project authorities on their website and updated at least once every six months so as to bring the same in the public domain. The monitoring data of environmental quality parameters (air, water, noise and soil) and critical pollutants such as PM10, PM2.5, SO ₂ and NO _x (ambient) and critical sectoral parameters shall also be displayed at the entrance of the project premises and mines office and incorporate office and on the company's website.	Clearance letter has been already uploaded in the company website. The compliance report and monitoring data of environmental quality parameters (air, water, noise and soil) and critical pollutants such as PM10, PM2.5, SO ₂ and NO _x (ambient) environmental quality data are being shared in the company website in a regular basis.

16.	The project proponent shall submit six monthly reports on the status of compliance of the stipulated environmental clearance conditions (both in hard copy and in e-mail) to the respective Regional Office of the MOEF, the respective Zonal offices of CPCB and the SPCB.	Noted and six-monthly reports on the status of compliance of the stipulated environmental clearance conditions are being submitted.
17.	The Regional Office of this Ministry located at Bhubaneswar shall monitor compliance of the stipulated conditions. The Project authorities shall extend full cooperation to the office(s) of the Regional Office by furnishing the requisite data/information/monitoring reports.	The condition is noted and will extend full co-operation.
18.	The environmental statement for each financial year ending 31 st March in Form-V is mandated to be submitted by the project proponent to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently, shall also be uploaded on the company's website along with the status of compliance of EC conditions and shall be sent to the respective Regional Offices of the MOEF by E-mail.	The condition is noted and the required report will submit time to time. Presently there is no mining activity within the ML area as all the statutory approvals has not yet received.

Annexure-II:
Environmental Monitoring Report

***ENVIRONMENTAL STUDY REPORT FOR DUMRI COAL
MINE, HAZARIBAG, JHARKHAND***

**(POST-MONSOON SEASON)
(OCTOBER, 2020 TO DECEMBER, 2020)**

Prepared

For



**M/s HINDALCO INDUSTRIES LIMITED
Hazaribag - 825311
Jharkhand**

Prepared

by



**HYDRLOGY & GEOCHEMISTRY DIVISION
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**CSIR-CENTRAL INSTITUTE OF MINING & FUEL RESEARCH
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Report


On

Environmental Study Report for Dumri Coal Mine, Hazaribag, Jharkhand


**(POST-MONSOON SEASON)
(OCTOBER, 2020 TO DECEMBER, 2020)**

Project No.: SSP/474/2020-21


1. This report is meant for the internal use of your organisation only and it should not be published in full or part by your organisation or staff. It should not be communicated/circulated to outside parties except the concerned government department.
 2. CSIR-Central Institute of Mining and Fuel Research, Dhanbad reserves the right to publish the results of research for the benefit of the industry.
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03/05/2021

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Principal Scientist/Project Leader
CSIR-CIMFR, Dhanbad**


03/05/21

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Sr. Principal Scientist & HOS
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Mr. A. S. Kumar

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1.0 INTRODUCTION

Mining is the extraction of valuable minerals or other geological materials from the Earth. It is a site specific and ecologically sensitive industry. For sustaining national development, mining of coal and minerals is of paramount importance for developed as well as developing countries. To meet the energy requirements of the country, increased coal production has been possible due to large-scale surface mining activities. Mining operations usually create a negative environmental impact, both during the mining activity and after the mine has closed. Surface mining causes environmental disturbance in the form of land degradation, removal of OB material which stress on air and water regime and finally interferes in the balance of the ecosystem. To meet these problems, sound environmental management system for pre-mining, active mining and post mining stages in the form of Environmental Impact Assessment, Environmental Management Practice for concurrent mining and Environmental Audit has been made necessary by the regulating state and central authorities. Regular monitoring of the different components of environment is made necessary for evaluating the requirements of environmental management system and its impact in the society. This report presents the study conducted by CSIR-Central Institute of Mining and Fuel Research (CSIR-CIMFR), Dhanbad for proposed Dumri Coal Mine belonging to M/s Hindalco Industries Ltd, Hazaribag, Jharkhand.

1.1 HISTORY OF DUMRI COAL MINE

“Dumri Block” in North Karanpura Coalfield situated in the District Hazaribag, State of Jharkhand, was previously allotted by Ministry of Coal and Mines vide their letter dated 13.01.2006, jointly to M/s Nilachal Iron and Power Ltd. as leader and M/s Bajrang Ispat (P) Ltd. as associate.

Honourable Supreme Court of India vide Judgement dated 25th August, 2014 and Order dated 24th Sept. 2014 cancelled the allocation of 204 coal blocks, which include Dumri coal block also.

Later the Office of Nominated Authority constituted under section 6 of the Coal Mines (Special Provision) Act, 2015, issued Vesting order under clause (b) of sub-rule 7 and sub-rule (1) of rule, Order no. 104/24/2015/NA dt. 22nd April, 2015 for Dumri Coal Mine in favour of M/s Hindalco Industries Ltd.

Further, vide Corrigendum No. 1, dated 30th January, 2018, the MOC issued the revised boundary Co-ordinates. As per approved Mining Plan (Revision-I) of Dumri Coal Mine of M/s Hindalco Industries Ltd., revised area of the mining lease is 259.64 ha.

Based on recommendation of EAC; Ministry of Environment, Forest and Climate Change revoke the abeyance on transfer of Environmental Clearance for Dumri Coal Mine project from M/s Nilachal Iron and Power Limited to M/s Hindalco Industries Limited for a production capacity of 1 MTPA in the ML area of 259.64 ha. The environmental clearance finally granted for opening of Dumri Coal Mine Project of M/s Hindalco Industries Ltd. vide letter no. J-11015/239/2008-IA-II (M) Pt., dated 6th November, 2019.

1.2 LOCATION

The lease area of Dumri coal mine covers land in villages: Pagar, Balia, Tunda and Pandu of Keredari Block of district Hazaribag (Jharkhand). The nearest township is Hazaribag located at a distance of about 40 KM from Dumri Coal Mine (DCM). The Hazaribag-Khelari State Highway-07 is about 3KM on the south of the coal block. The nearest railhead is "RAY" at about 40 KM on the Gomoh-Barkakana-Dehri-on-Sone loop line of South-Eastern railway. A new railway line connecting Hazaribag via mandu has been commissioned and block is at a distance of about 40 KM from the nearest offtake station which is Nawada/Khapariaon. The nearest airport of Ranchi is at distance of 120 KM. The project area is situated between the latitude 23^o 53' 31.998" N and 23^o 54' 30.848" N and longitude 85^o 03' 11.539" E & 85^o 05' 37.103" E. The site is well connected by road and about 8 KM away from Keredari Block Office. It is a barren area and coal mine has not yet operational.

1.3 SCOPE OF WORK

M/s Hindalco Industries Ltd, Hazaribag, approached CSIR-Central Institute of Mining and Fuel Research (CSIR-CIMFR), Dhanbad for conducting the environmental study for one year i.e. 2020-2021 having following objectives:

- Environmental study of Air, Water, Noise and Soil of the core and buffer zone.
- The Environmental monitoring will be conducted on seasonal basis.
- Advice into the adoption of necessary control measures.
- Land use pattern study will be done once in a year and report will be submitted separately.
- Preparation of Environmental Statement.

The detailed studies with respect to air, water and noise will be carried on seasonal basis in the year 2020-21 while soil samples, for the adjoining mining area, will be collected once in a year and analyzed in the CSIR-CIMFR laboratory.

2.0 REGIONAL GEOLOGY

The North Karanpura Coalfield forms a prominent east-west trending valley between Hazaribag plateau in the north and Ranchi plateau in the south. The Aswa pahar in the south-east separates in North and South Karanpura Coalfields by east west elongated metamorphic patch. However, they are interconnected near Bachra and Hindegir village by a narrow tongue of Talchir outcrops. On the eastern side, North Karanpura Coalfield is separated from the West Bokaro Coalfield by a narrow stretch of metamorphic rocks having several outliers of Talchir Formation. In the west, it is separated by a stretch of about 20kms wide metamorphic belt from Auranga Coalfield.

Out of 1230 Sq. Km area of North Karanpura Coalfield, the coal bearing Formations viz. Karharbari, Barakar and Raniganj crop-out over an area of about 500 Sq. Km. The Karharbari formation is well developed in the south-central and eastern part of the coalfield. It contains only one seam, which occurs often in two to three sections. It comprises of very coarse grained, gritty sandstone, and at times, has silicified sandstones. The Barakar formation contains a number of coal seams and contributes the major bulk reserves of this coalfield. Five persistent coal seams have been established in the coalfield. The total coal column is more or less around 35-40 m in major part of the coalfield. Raniganj formation contains three to four coal seams which are generally shaly in nature and often impersistent.

2.1 LOCAL GEOLOGY

The Dumri block is the up-dip extension of Chatti-Bariatu block and is located in the northern part of the North Karanpura Coalfield. It is contiguous to Chatti-Bariatu block in the south. Keredari 'A' block in the east, Pachra block on the west. The northern boundary of the block is defined by hilly terrain and dense forest cover which is a part of the inaccessible Dumri area.

The Dumri block comprises Talchir, Karharbari, Barakar and Barren measures Formations belonging to Damuda sub-group of lower Gondwana Group. The Talchir formation overlies metamorphic rocks with an unconformity. The Karharbari and Barakar are the main coal bearing formations contain four major coal seams i.e. Seam-I, II, III and IV in ascending order. Besides these, six more thin coal horizons are also developed in the block. The Karharbari Formation is essentially composed of conglomerates and coarse to gritty arkosic sandstone varying in thickness from 7 to 139m. The strata are very hard and compact at places on account of localized silicification. The thickness of this formation generally varies from 7m to 136m with coaly horizons. Among them, the topmost horizon (K5) is more persistent than the other horizons. The Barakar Formation lies comfortably over the Karharbari Formation. This is the main coal bearing formation in the block and contains four major coal seams i.e. Seam-I to IV and four thin coal seams i.e. IVA, IVB, IVC, IVD in ascending order and two local seams L1 between Seam III Top & III Bottom and L2 below seam I Bottom. This formation is composed of gritty to conglomeratic sandstone (basal part), medium to coarse grained sandstone with siltstone, shale and carbonaceous shale. Among the four coal seams, seam-I Middle, II Bottom & IV Top are the thickest. The maximum thickness of Barakar Formation as intersected in boreholes is 129m. The Barren Measure Formation lie conformably over the Barakar Formation and is characterized by fine grained sandstone, shale and sandy shale. As per borehole records its thickness varies from 15m to 20m.

A dolerite dyke trending almost E-W and having roughly 4km length and a width of approximately 12-25m passes through the Dumri block. The presence of this dyke has also been reported in Pachra block lying west of Dumri block. Stratigraphic sequence of Dumri block is given below in **Table 1**.

**Table 1: Stratigraphic Sequence of Dumri Block
(As per Borehole Intersection)**

Period	Group	Sub-group	Formation	Thickness Range (m)	Lithology
Recent	Lower Gondwana	Damuda	Alluvium	3.50-14	Detrital and Alluvial soil and subsoil
			Barren Measures	15-20	Dark shale, sandy shale and Interbanded shale, sandstone
			Barakar	18-129	Fine to coarse grained sandstone, shale, conglomerate, carbonaceous shale and coal seams
			Karharbari	7-136	Medium to coarse grained sandstone shale, silicified quartzitic rock and thin coal seams.
			Talchir	10	Green coloured shale, Boulder and conglomerate
			Metamorphics		Granite, gneisses and Quartzite

2.2 MINING SCENARIO

The Dumri Block is the up-dip extension of Chatti-Bariatu Block and opencast mining method has been adopted for extraction of coal within the mining lease area. The mining plan for proposed Dumri Coal Mine was approved for two pit opencast working. The main part of the reserves lies in the eastern part of the mining lease and it was named as Quarry-2. Meager coal reserves are available in the western part in form of three small pits named Quarry-1A, Quarry-1B and Quarry-1C. In approved revised mining plan, the sequence of operation was suggested to work Quarry-2 first followed by Quarry-1 (comprising of 3 small pits). The anticipated life of the mine with peak production rate of 1.0 MTPA will be 46 years. Prior to the advancing of 1st OB bench, land will be cleared with dozers/graders and topsoil removed in line with the Environmental Management Plan. Coal is extracted by shovel dumper combination after blasting off the coal faces. Excavators with 2.5 cum bucket capacity are planned to be used for coal mining which

will load into 35T coal dumpers. The over burden will be transported by 35T dumpers to surface dumps over the coal bearing area within mining lease and later used for backfilling. The coal will be transported by 35T coal trucks to the proposed coal stockyard at the pit head and later coal will be transported through weigh-bridge to the nearest railhead.

Total extractable reserve of Dumri Coal Mine is 45.22 MT with an average grade of G11. The open cast mine worked by Shovel-Dumper combination with an average stripping ratio of 2.36 Cum/Te.

3.0 ENVIRONMENTAL SCENARIO IN THE MINING AREA

3.1 AIR ENVIRONMENT

Air pollution includes one or more contaminants (pollutants), in the outdoor atmosphere in such quantities and of such duration that may be injurious to human, plant or animal life. Once these contaminants enter in the atmosphere, either in gaseous form or as particulate matter, these cannot escape and keep circulating and deteriorating the air quality. Air pollution effects encompass those that are health related as well as those associated with damage to property or which cause decrease in atmospheric aesthetic feature. Dispersion of air pollutants from the source depends on micro-meteorological parameters of the area.

3.1.1 SOURCES OF AIR POLLUTION

Coal transportation, OB removal, drilling, blasting, haul road and movements of mining equipments will be the major sources of air pollution in the proposed mining area. Generally, dust generation will be of major concern during mining operation. NO₂ will be liberated in the time of blasting and during the movement of mining machineries. This coal contains very less sulphur (<0.72%) and as such the concentration of SO₂. In Indian coal, it is low, except Assam where sulphur content is high.

3.1.2 METHODOLOGY AND INSTRUMENTS USED

The methodology and instruments used for air quality monitoring and analysis are given in **Table 2** as below:

Table 2: Methodology and Instrument Used for Air Quality Analysis

Parameters	Method	Instrument
PM _{2.5}	IS-5182 (Part 23):2006 Gravimetric Method	Fine Particulate Sampler
PM ₁₀	IS-5182 (Part 23):2006 Gravimetric Method	Fine Particulate Sampler
SO ₂	IS-5182 (Part 2):2001 (Improved West & Gaeke Method)	Fine Particulate Sampler with gaseous attachment
NO _x	IS-5182 (Part 6):2006 (Jacob & Hochheiser modified Method)	Fine Particulate Sampler with gaseous attachment

3.1.3 AIR QUALITY

Air quality monitoring in core and buffer zone of the Dumri coal mine has been carried out in post-monsoon season for the year 2020-21 to assess the impact of mining activities on the ambient air quality. During the study, two sampling locations for ambient air quality had been fixed in buffer zone and two sampling locations in core zone area of the proposed mine on the basis of wind direction and other meteorological parameters. Details of sampling stations along with the source of air pollution are given in **Table 3** and shown in **Fig. 1**. The air quality at these locations is presented in **Tables 4 & 5**. The results show that the ambient air quality of the villages, in and around the mining site, is least affected as the mine is not initiated during the study period.

Table 3: Details of Air monitoring Locations

Station Code	Location	Source of Air Pollution
CORE ZONE		
CA-1	Within Mining lease area	Kachha road and natural activity.
CA-2	Balia Village	Household coal burning and vehicular movement, etc.
BUFFER ZONE		
BA-1	Chatti-Bariatu Village	Household coal burning and vehicular movement, etc.
BA-2	Tunda Village	Household coal burning and vehicular movement, etc.

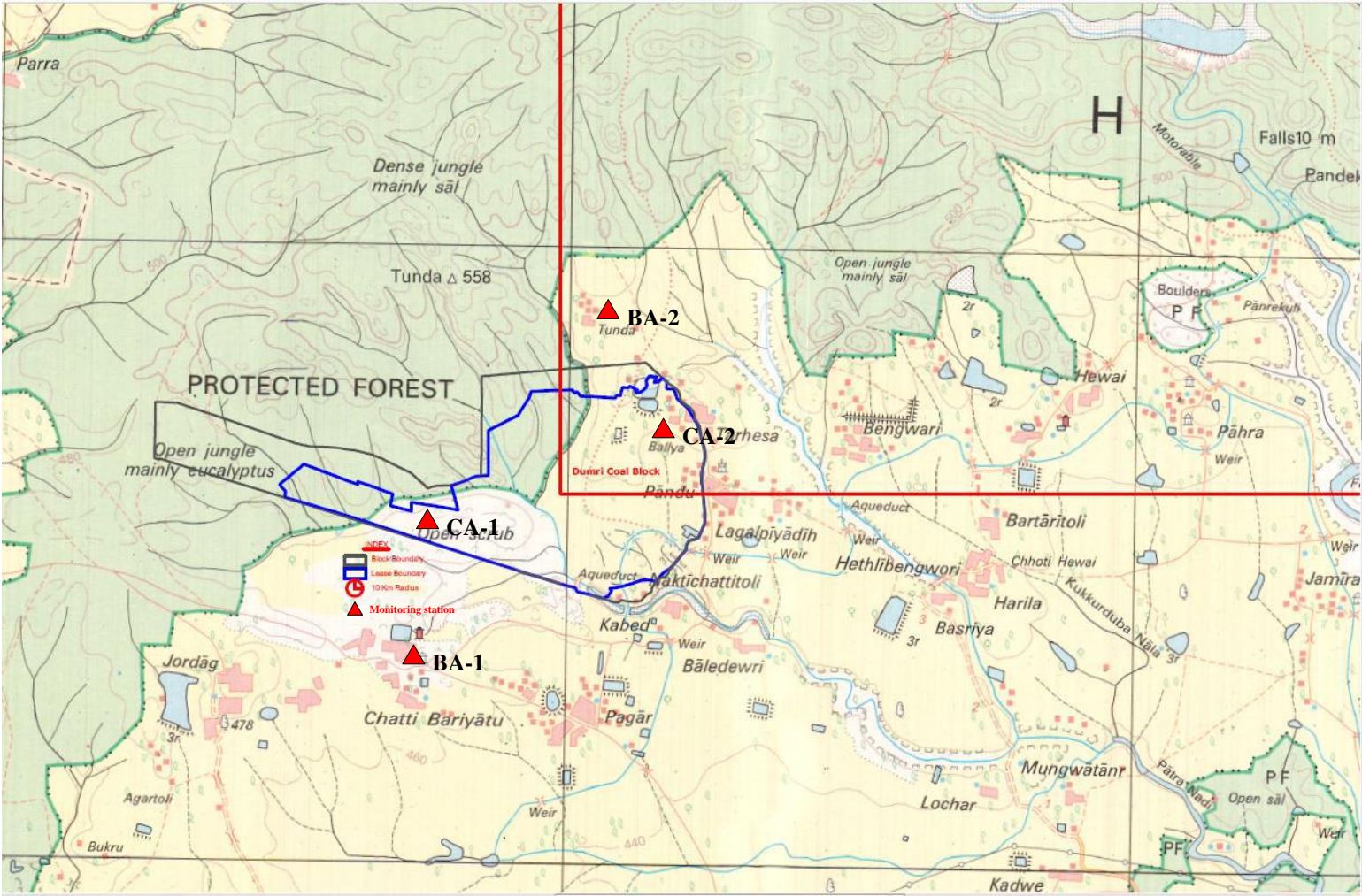


Fig. 1: Location of Air Monitoring Station in Core and Buffer Zone of Dumri Coal Mine

Table 4: Ambient Air Quality Report for Core Zone of Dumri Coal Mine

Sampling Code	Sampling Location	Season	Date of Sampling	Parameters ($\mu\text{g}/\text{m}^3$)				Remarks
				PM _{2.5}	PM ₁₀	SO ₂	NO ₂	
CA-1	Within Mining lease area	Post-monsoon	23/12/2020	35.3	49.7	14.4	15.2	
			24/12/2020	40.8	47.3	14.2	16.0	
CA-2	Balua Village	Post-monsoon	25/12/2020	43.5	60.3	18.0	19.0	
			26/12/2020	51.7	65.2	16.7	19.5	
Standards as per NAAQS-2009				60	100	80	80	

Table 5: Ambient Air Quality Report for Buffer Zone of Dumri Coal Mine

Sampling Code	Sampling Location	Season	Date of Sampling	Parameters ($\mu\text{g}/\text{m}^3$)				Remarks
				PM _{2.5}	PM ₁₀	SO ₂	NO ₂	
BA-1	Chatti-Bariatu Village	Post-monsoon	21/12/2020	43.8	72.2	18.7	22.2	
			22/12/2020	48.0	66.3	19.6	23.9	
BA-2	Tunda Village	Post-monsoon	27/12/2020	47.4	61.5	16.1	17.5	
			28/12/2020	43.0	59.1	17.3	18.8	
Standards as per NAAQS-2009				60	100	80	80	

3.1.4 RESULTS AND DISCUSSIONS

During post-monsoon season (December, 2020), PM_{2.5} concentration level at near proposed mine infrastructure area within core zone was found from 35.3 $\mu\text{g}/\text{m}^3$ to 40.8 $\mu\text{g}/\text{m}^3$ and concentration of PM₁₀ was found from 47.3 $\mu\text{g}/\text{m}^3$ to 49.7 $\mu\text{g}/\text{m}^3$. At Balua Village, the PM_{2.5} concentration was found from 43.5 $\mu\text{g}/\text{m}^3$ to 51.7 $\mu\text{g}/\text{m}^3$ and the concentration of PM₁₀ was found from 60.3 $\mu\text{g}/\text{m}^3$ to 65.2 $\mu\text{g}/\text{m}^3$. In the core zone, all the PM_{2.5} and PM₁₀ values are within the threshold value i.e. 60 $\mu\text{g}/\text{m}^3$ for PM_{2.5} and 100 $\mu\text{g}/\text{m}^3$ for PM₁₀ as per the guideline of National Ambient Air Quality Standard (NAAQS), 2009 around the entire sampling sites. Concentration of SO₂ and NO₂ are also found

within the limit of $80 \mu\text{g}/\text{m}^3$ as per the guideline of NAAQS, 2009 in the sampling sites of core zone of the proposed mine.

During post-monsoon season (December, 2020), the $\text{PM}_{2.5}$ concentration at Chatti-Bariatu Village in buffer zone was found from $43.8 \mu\text{g}/\text{m}^3$ to $48.0 \mu\text{g}/\text{m}^3$ and the concentration of PM_{10} was found from $66.3 \mu\text{g}/\text{m}^3$ to $72.2 \mu\text{g}/\text{m}^3$. At Tunda Village, the $\text{PM}_{2.5}$ concentration was found from $43.0 \mu\text{g}/\text{m}^3$ to $47.4 \mu\text{g}/\text{m}^3$ and the concentration of PM_{10} was found from $59.1 \mu\text{g}/\text{m}^3$ to $61.5 \mu\text{g}/\text{m}^3$. In the buffer zone both the concentration levels are within the threshold value i.e. $60 \mu\text{g}/\text{m}^3$ for $\text{PM}_{2.5}$ & $100 \mu\text{g}/\text{m}^3$ for PM_{10} as per the guideline of NAAQS, 2009. Concentration of SO_2 and NO_2 are also found within the limit $80 \mu\text{g}/\text{m}^3$ as per the guideline of NAAQS, 2009 in all the sampling sites of buffer zone of the proposed mine.

3.2 WATER ENVIRONMENT

Water is one of the most essential natural resources for sustaining life and it is likely to become critically scarce in the coming decades, due to continuous increase in its demands, rapid increase in population and expanding economy of the country. Variation in climatic characteristics both in space and time are responsible for uneven distribution of precipitation in India.

The diversity of climates, ecosystems, land uses and topographies greatly influences the design of environmental monitoring programs. Social factors have also become important elements in environmental management. Best practice for each site is therefore governed by these regional physical and social factors.

3.2.1. SOURCES OF WATER POLLUTION

Mine Water

The mine water is to be a probable source of water pollution during the active mining operation. The mine water, which will be mainly rain water and ground water seepage, will be used for industrial purposes like dust suppression by water tankers in haul roads, approach roads, stockyards and watering of plants in the overburden dumps & office premises.

Domestic Effluents/Sewage

There are minimum housing facilities within the mining lease (ML) area for essential services. The domestic wastes from these houses are led to septic tanks. As the domestic waste water is minimum, the possibility of pollution is remote/insignificant. However, proper care has been taken up in the shelters area of inhabitants for sewage discharge.

Surface water

The surface water quality is likely to be affected with higher load of suspended solids as wash off from active dumps, soil erosion from soil and roads, and pumping out mine water to water channels.

Ground water

Ground water pollution can take place only if dumps and stock piles contain harmful chemical substances, which may get leached by precipitation of water and percolate to the ground water table, thus causing pollution. The chemical analysis of active OB soil and their proper management will restrict the water pollution by the management.

3.2.2 INSTRUMENTS USED

- a) pH and Conductivity meter (Thermo)
- b) Ion Meter (Thermo),
- c) COD Analyser (Hach),
- d) BOD Analyser (WTW),
- e) Water Analysis Kit, (HACH, DR - 2000)
- f) Microwave Digestion (Anton-Paar)
- g) UV-VIS Spectrophotometer (Simazdo)
- h) Atomic Absorption Spectrophotometer (Varian)
- i) Ion Chromatograph (Dionex/Metrohm)
- j) Flame Photometer
- k) ICP-MS (Perkin Elmer)

3.2.3 WATER QUALITY OF THE AREA

To assess the water quality of the proposed mine area ground water and surface water in the core and buffer zone were collected and analysed. There is no mine water effluent in the core zone as it is a proposed mine and mining operation is not started. To assess the water quality of the area water samples from nine locations were collected during post-monsoon season (December, 2020). Details of sampling locations for water quality monitoring in and around proposed Dumri coal mine are given in **Table 6** and shown in **Fig. 2**.

Table 6: Sampling locations for water quality study

Sample Code	Sample Type	Description	Sampling Site	Remarks
GW-1	Ground water	Drinking water	Within mining lease	Core Zone
GW-2	Ground water	Drinking water	Chatti-Bariatu Village	Buffer Zone
GW-3	Ground water	Drinking water	Balia Village	Core Zone
GW-4	Ground water	Drinking water	Pandu Village	Buffer Zone
GW-5	Ground water	Drinking water	Pagar Village	Buffer Zone
GW-6	Ground water	Drinking water	Tunda Village	Buffer Zone
SW-1	Surface water	Baldeori Nala	Upstream of mine	Core Zone
SW-2	Surface water	Nala-A	Mine site	Core Zone
SW-3	Surface water	Baldeori Nala	Downstream of mine	Buffer Zone

The water samples were collected in one-liter narrow-mouthed pre-washed polyethylene bottles. For heavy metal analysis, 100 ml of samples were acidified with HNO₃ and preserved separately. Temperature, electrical conductivity (EC), pH and DO values were measured in the field using a portable conductivity and pH meter. The other parameters are measured in the geochemical laboratory at CSIR-CIMFR, Dhanbad following the standard methods prescribed in APHA (2017). The turbidity has been determined in pre-filtered sample by turbidity meter. In the laboratory, the water samples were filtered through 0.45 µm Millipore membrane filters to separate suspended particles. Acid titration method was used to determine the concentration of bicarbonate (APHA 2017). Major

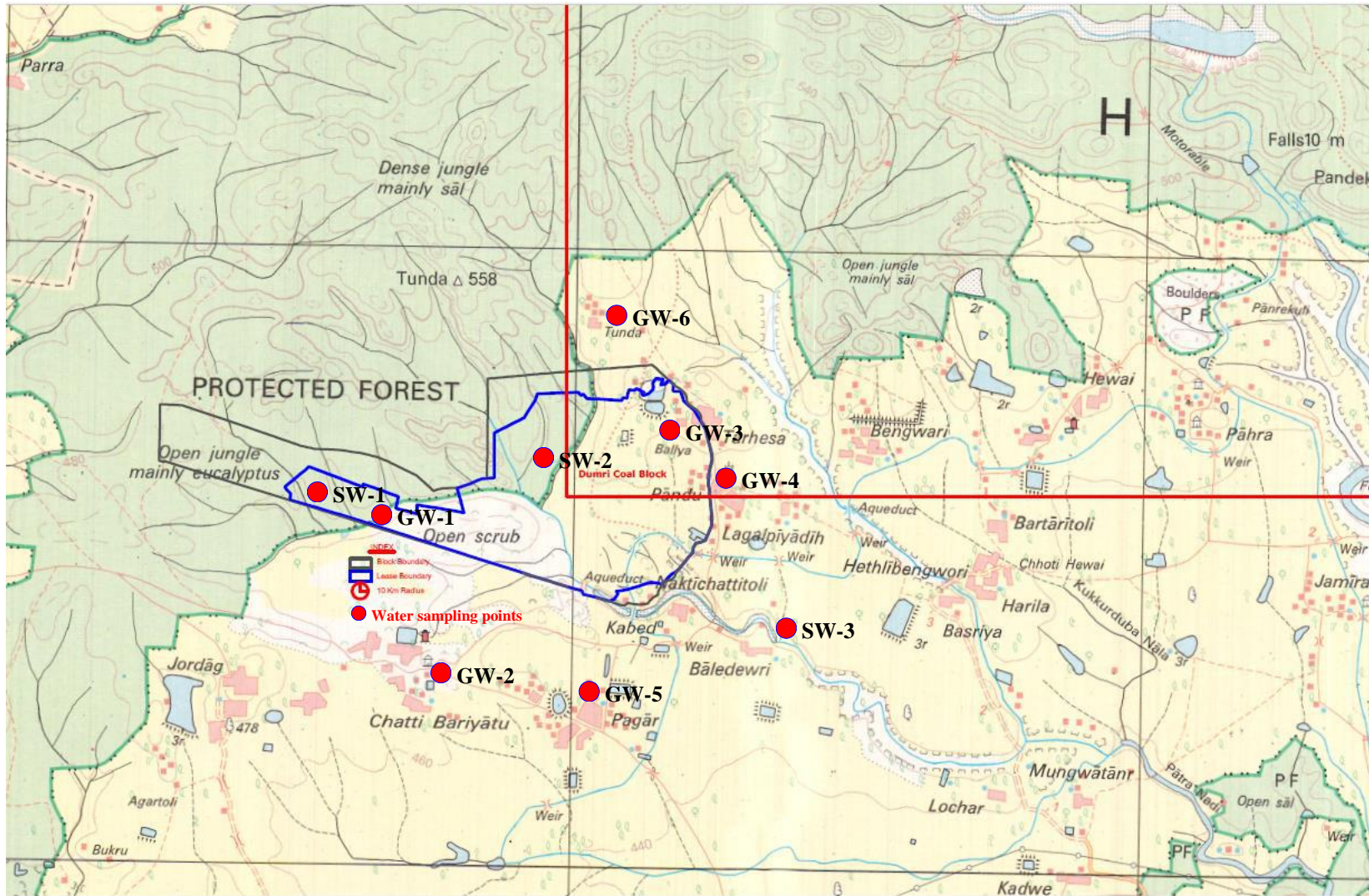


Fig. 2: Location of Water Sampling Points in Core and Buffer Zone of Dumri Coal Mine

anions (F, NO₃ and SO₄.) were analysed on UV-VIS spectrophotometer. Major cations (Ca and Mg) were measured by titrametric method and Na and K by flame photometer. The trace metals were analysed on ICP-AES.

3.2.4 RESULTS AND DISCUSSIONS

The physico-chemical characteristics of the analysed drinking and surface water is presented in **Table 7 to 10** along with the prescribed standards. The water quality of the area is discussed in the following paragraphs:

Drinking Water Quality Assessment:

To assess the status of drinking water quality of Dumri coal mine area, six ground water samples were collected from hand pump as well as dug well in December, 2020 and analysed for parameters as per the drinking water standards. The hydro-chemical parameters of the groundwater of the study area were compared with the prescribed limit of Indian Standard for drinking water (BIS 2012) to assess the suitability for drinking and public health purposes (**Table 7 to 9**). The analytical results show that most of the analysed parameters are well within desirable limits and water is potable for drinking uses. pH of the analysed groundwater are found well within the safe limit of 6.5-8.5, prescribed for drinking water by BIS (2012). The turbidity is one of the important physical parameters for water quality defining the presence of suspended solids in water, which causes the muddy or turbid appearance of water body. The consumption of high turbid water may cause a health risk as excessive turbidity can protect pathogenic microorganisms from effects of disinfectants and also stimulate the growth of bacteria during storage. In the study area the turbidity in the groundwater are found below the recommended value of 5 NTU. The total dissolve solids (TDS) value in all the samples (Except GW-1, GW-2 and GW-6) is slightly higher than the acceptable limit of 500mg/l while lower than the permissible limit in the absence of alternate sources of 2000mg/l. The Total hardness (TH) value in all the samples (Except GW-1, GW-2 and GW-6) is slightly higher than acceptable limit of 200mg/l but lower than the permissible limit in the absence of alternate sources i.e 600mg/l. In all of the samples, the concentration of Ca, Mg, SO₄ and F are also found well within the permissible limit for drinking uses (Except Ca in GW-5). Heavy metal analysis in the groundwater samples indicated that all the analyzed

heavy metals like As, Cd, Cr, Pb, Zn, Mn and Fe are found either below the detection limit or less than the acceptable limit for drinking water.

Surface Water Quality:

The analytical results of physico-chemical analysis of surface water samples collected from Nala-A within the mine site as well as upstream and downstream of Baldeori Nala has been given in **Table 10**. To assess the quality of the surface water resource the results has been compared with the prescribed surface water standards IS-2296 for Class 'C' water (tolerance limit for stream water used drinking water sources with conventional treatment followed by disinfection). It can be seen that pH of the water is slightly alkaline in nature and found well within the prescribed limit of 8.5. In general, the total dissolved values and other analysed parameters are found well within the threshold values. Concentration of sulphate varies between 10.3 and 14.2 mg L⁻¹ and is well below the prescribed value of 400 mg L⁻¹ (IS-2296). The level of TSS, TDS and DO in the river water were found within threshold limit in comparison to IS:2296, surface waters Class-C. The concentrations of the analysed heavy metals in the surface water resource are also found within the prescribed limits. It shows that the surface water of the area is fit for its designated use as a drinking water source with conventional treatment followed by disinfection.

The calculated value of sodium adsorption ration (SAR) shows that the water is low saline and low alkali water (0.51 - 0.69) and can be used for irrigation in most soils and crops with little danger of the development of harmful levels of exchangeable sodium. The percent sodium (%Na) is varying from 18.13 to 24.42 and also found below the 60% recommended limit for irrigation uses.

Table 7: Ground Water Quality Data of Dumri Coal Mine

Area: Core Zone/Buffer Zone	Season: Post-monsoon
Project: Dumri Coal Mine	Date of Sampling: 22.12.2020
Name of the Sampling Station:	
GW-1: Ground Water, Mine site	GW-2: Ground Water, Chatti Bariatu Village

Sl. No.	Parameters	Station Code		IS-10500: 2012	
		GW-1	GW-2	Acceptable Limit	Permissible Limit in the Absence of Alternate
1.	Colour, Hazen units, Max	<5	<5	5	15
2.	Odour	Agreeable	Agreeable	Agreeable	Agreeable
3.	pH	7.22	6.60	6.5-8.5	No relaxation
4.	Taste	Agreeable	Agreeable	Agreeable	Agreeable
5.	Turbidity, NTU, Max	0.01	4.28	1.0	5.0
6.	Total Dissolved Solid, mg/l, Max	476	179	500	2000
7.	Total Hardness (as CaCO ₃)	244	96	200	600
8.	Chloride (as Cl), mg/l, Max	24	12	250	1000
9.	Calcium (as Ca), mg/l, Max	77.4	25.2	75	200
10.	Magnesium (as Mg), mg/l, Max	12.3	8.0	30	100
11.	Sodium (as Na), mg/l, Max	26.4	7.4	NS	NS
12.	Potassium (as K), mg/l, Max	0.5	5.2	NS	NS
13.	Sulphates (as SO ₄), mg/l, Max	21.2	10.3	200	400
14.	Nitrate (as NO ₃), mg/l, Max	13.9	0.59	45	No relaxation
15.	Fluorides (as F), mg/l, Max	0.86	3.21	1.0	1.5
16.	Total Alkalinity, mg/l, Max	347	296	200	600
17.	Mineral Oil, mg/l, Max	<0.001	<0.001	0.5	No relaxation
18.	Iron (as Fe), mg/l, Max	0.005	0.015	0.3	No relaxation
19.	Manganese (as Mn), mg/l, Max	0.004	0.009	0.10	0.30
20.	Arsenic (as AS), mg/l, Max	<0.001	<0.001	0.01	0.05
21.	Cadmium (as Cd), mg/l, Max	<0.001	<0.001	0.003	No relaxation
22.	Lead (as Pb), mg/l, Max	0.003	0.004	0.01	No relaxation
23.	Copper (as Cu), mg/l, Max	0.005	0.009	0.05	1.5
24.	Hexavalent Chromium (as Cr ⁶⁺), mg/l, Max	0.001	0.001	0.05	No relaxation
25.	Selenium (as Se), mg/l, Max	<0.001	<0.001	0.01	No relaxation
26.	Silver (as Ag), mg/l, Max	<0.001	<0.001	-	-
27.	Zinc (as Zn), mg/l, Max	0.256	0.302	5	15
28.	Nickel (as Ni), mg/l, Max	0.002	0.004	0.02	No relaxation

NS: Not Specified,

Table 8: Ground Water Quality Data of Dumri Coal Mine

Area: Core Zone/Buffer Zone	Season: Post-monsoon
Project: Dumri Coal Mine	Date of Sampling: 22.12.2020
Name of the Sampling Station:	
GW-3: Ground Water, Balia Village	GW-4: Ground Water, Pandu Village

Sl. No.	Parameters	Station Code		IS-10500: 2012	
		GW-3	GW-4	Acceptable Limit	Permissible Limit in the Absence of Alternate
1.	Colour, Hazen units, Max	<5	<5	5	15
2.	Odour	Agreeable	Agreeable	Agreeable	Agreeable
3.	pH	6.98	6.83	6.5-8.5	No relaxation
4.	Taste	Agreeable	Agreeable	Agreeable	Agreeable
5.	Turbidity, NTU, Max	0.79	0.44	1.0	5.0
6.	Total Dissolved Solid, mg/l, Max	568	530	500	2000
7.	Total Hardness (as CaCO ₃)	232	232	200	600
8.	Chloride (as Cl), mg/l, Max	58	116	250	1000
9.	Calcium (as Ca), mg/l, Max	52.2	72.4	75	200
10.	Magnesium (as Mg), mg/l, Max	24.8	12.5	30	100
11.	Sodium (as Na), mg/l, Max	36.0	87.4	NS	NS
12.	Potassium (as K), mg/l, Max	42.5	3.3	NS	NS
13.	Sulphates (as SO ₄), mg/l, Max	62.1	60.1	200	400
14.	Nitrate (as NO ₃), mg/l, Max	91.5	85.4	45	No relaxation
15.	Fluorides (as F), mg/l, Max	0.62	0.24	1.0	1.5
16.	Total Alkalinity, mg/l, Max	186	218	200	600
17.	Mineral Oil, mg/l, Max	<0.001	<0.001	0.5	No relaxation
18.	Iron (as Fe), mg/l, Max	0.042	0.013	0.3	No relaxation
19.	Manganese (as Mn), mg/l, Max	0.004	0.002	0.10	0.30
20.	Arsenic (as AS), mg/l, Max	<0.001	<0.001	0.01	0.05
21.	Cadmium (as Cd), mg/l, Max	<0.001	<0.001	0.003	No relaxation
22.	Lead (as Pb), mg/l, Max	0.004	0.005	0.01	No relaxation
23.	Copper (as Cu), mg/l, Max	0.007	0.004	0.05	1.5
24.	Hexavalent Chromium (as Cr ⁶⁺), mg/l, Max	0.003	0.004	0.05	No relaxation
25.	Selenium (as Se), mg/l, Max	<0.001	<0.001	0.01	No relaxation
26.	Silver (as Ag), mg/l, Max	<0.001	<0.001	-	-
27.	Zinc (as Zn), mg/l, Max	0.258	0.312	5	15
28.	Nickel (as Ni), mg/l, Max	0.002	0.003	0.02	No relaxation

NS: Not Specified,

Table 9: Ground Water Quality Data of Dumri Coal Mine

Area: Core Zone/Buffer Zone	Season: Post-monsoon
Project: Dumri Coal Mine	Date of Sampling: 22.12.2020
Name of the Sampling Station:	
GW-5: Ground Water, Pagar Village	GW-6: Ground Water, Tunda Village

Sl. No.	Parameters	Station Code		IS-10500: 2012	
		GW-5	GW-6	Acceptable Limit	Permissible Limit in the Absence of Alternate
1.	Colour, Hazen units, Max	<5	<5	5	15
2.	Odour	Agreeable	Agreeable	Agreeable	Agreeable
3.	pH	6.73	6.91	6.5-8.5	No relaxation
4.	Taste	Agreeable	Agreeable	Agreeable	Agreeable
5.	Turbidity, NTU, Max	0.18	0.01	1.0	5.0
6.	Total Dissolved Solid, mg/l, Max	573	329	500	2000
7.	Total Hardness (as CaCO ₃)	288	180	200	600
8.	Chloride (as Cl), mg/l, Max	34	32	250	1000
9.	Calcium (as Ca), mg/l, Max	84.1	48.8	75	200
10.	Magnesium (as Mg), mg/l, Max	19.0	14.2	30	100
11.	Sodium (as Na), mg/l, Max	40.5	13.8	NS	NS
12.	Potassium (as K), mg/l, Max	45.0	1.1	NS	NS
13.	Sulphates (as SO ₄), mg/l, Max	92.5	26.8	200	400
14.	Nitrate (as NO ₃), mg/l, Max	48.5	34.7	45	No relaxation
15.	Fluorides (as F), mg/l, Max	1.45	1.29	1.0	1.5
16.	Total Alkalinity, mg/l, Max	324	218	200	600
17.	Mineral Oil, mg/l, Max	<0.001	<0.001	0.5	No relaxation
18.	Iron (as Fe), mg/l, Max	0.018	0.014	0.3	No relaxation
19.	Manganese (as Mn), mg/l, Max	0.001	0.002	0.10	0.30
20.	Arsenic (as AS), mg/l, Max	<0.001	<0.001	0.01	0.05
21.	Cadmium (as Cd), mg/l, Max	<0.001	<0.001	0.003	No relaxation
22.	Lead (as Pb), mg/l, Max	0.004	0.003	0.01	No relaxation
23.	Copper (as Cu), mg/l, Max	0.005	0.003	0.05	1.5
24.	Hexavalent Chromium (as Cr ⁶⁺), mg/l, Max	0.003	0.002	0.05	No relaxation
25.	Selenium (as Se), mg/l, Max	<0.001	<0.001	0.01	No relaxation
26.	Silver (as Ag), mg/l, Max	<0.001	<0.001	-	-
27.	Zinc (as Zn), mg/l, Max	0.284	0.263	5	15
28.	Nickel (as Ni), mg/l, Max	0.002	0.001	0.02	No relaxation

NS: Not Specified,

Table 10: Surface Water Quality Data of Dumri Coal Mine

Area: Core Zone/Buffer Zone	Season: Post-monsoon
Project: Dumri Coal Mine	Date of Sampling: 22.12.2020
Name of the Sampling Station:	
<i>SW-1 - Surface Water, Baldeori Nala U/S of mine site</i>	
<i>SW-2 - Surface Water, Nala-A of mine site</i>	
<i>SW-3 - Surface Water, Baldeori Nala D/s of mine site</i>	

Sl. No.	Parameters	Station Code			(IS: 2296)* Surface Waters Class "C" Tolerance Limits
		SW-1	SW-2	SW-3	
1.	Colour, Hazen units, Max	<5	<5	<5	300
2.	Odour	#	#	#	#
3.	pH	8.08	7.80	7.27	6.5-8.5
4.	Dissolved Oxygen, mg/l, Min.	7.05	7.95	7.95	4
5.	BOD (3days at 27°C), mg/l, Max	3.05	2.85	2.73	3
6.	Total Dissolved Solid, mg/l, Max	266	291	274	1500
7.	Oil & Grease, mg/l, Max	<0.1	<0.1	<0.1	0.1
8.	Total Hardness (as CaCO ₃), mg/l, Max	140	136	124	NS
9.	Phenolic compounds (as C ₆ H ₅ OH), mg/l, Max	<0.001	<0.001	<0.001	0.005
10.	Chloride (as Cl ⁻), mg/l, Max	12.0	14.0	24.0	600
11.	Sulphates (as SO ₄ ⁻), mg/l, Max	14.2	10.3	13.2	400
12.	Nitrate (as NO ₃), mg/l, Max	5.4	1.2	4.1	50
13.	Fluorides (as F), mg/l, Max	1.95	1.07	0.82	1.5
14.	Calcium (as Ca), mg/l, Max	32.0	37.0	30.3	NS
15.	Magnesium (as Mg), mg/l, Max	14.6	10.6	11.8	NS
16.	Sodium (as Na), mg/l, Max	13.9	15.0	17.6	NS
17.	Potassium (as K), mg/l, Max	0.6	1.7	1.4	NS
18.	Copper (as Cu), mg/l, Max	0.004	0.003	0.005	1.5
19.	Iron (as Fe), mg/l, Max	0.048	0.072	0.066	50
20.	Manganese (as Mn), mg/l, Max	0.003	0.004	0.004	NS
21.	Zinc (as Zn), mg/l, Max	0.314	0.287	0.325	15
22.	Arsenic (as AS), mg/l, Max	<0.001	<0.001	<0.001	0.2
23.	Cadmium (as Cd), mg/l, Max	<0.001	<0.001	<0.001	0.01
24.	Lead (as Pb), mg/l, Max	0.005	0.009	0.006	0.1
25.	Hexavalent Chromium (as Cr ⁶⁺), mg/l, Max	0.003	0.005	0.003	0.05
26.	Selenium (as Se), mg/l, Max	<0.001	<0.001	<0.001	0.05
27.	Percent Sodium (%)	18.13	20.38	24.42	NS
28.	Sodium Absorption Ratio	0.51	0.56	0.69	NS

: Unobjectionable, NS: Not Specified,

* : Class "C"- Drinking water source with conventional treatment followed by disinfection.

3.3 NOISE ENVIRONMENT

Noise is undesirable and unpleasant sound produced by the vibration of bodies or molecules of the medium and propagates as a pressure perturbation. It disturbs people's work, sleep and communication. It damages hearing and evokes other physiological reactions. It also disturbs the habitat of animals and birds in the surroundings. Mining is the third largest industry in terms of employment and the recent trends of mechanization has changed the working environment to noisy environment leading to higher sound levels.

3.3.1 SOURCES OF NOISE

Noise will be produced during mining at different levels by different equipments in the open cast mine are summarized in the **Table 11**.

Table 11: Noise Generating Mining Equipments

S. N.	Equipment / Operation	Noise level dB(A)
1.	Feeder breaker	82-100
2.	Dumpers	100-115
3.	Shovels	80-107
4.	Dozers	84-107
5.	Front End loader	83-101
6.	Electric motors, gear drivers, hoppers, drilling & main pump	85-95
7.	Belt conveyer	90-92
8.	Drill	110-115

3.3.2 AMBIENT NOISE MONITORING LOCATIONS

The main objective of noise monitoring in the study area is to assess the present ambient noise levels in proposed project site & buffer zone due to regular activities and vehicular movement. A preliminary reconnaissance survey has been undertaken to identify the major noise generating sources in the proposed mining area.

Ambient noise level study at Dumri Mine was carried out in core as well as buffer zone. Two noise level monitoring location in core zone followed by two noise level monitoring locations in buffer zone were fixed-up as given in **Table 12** and shown in **Fig.3**.

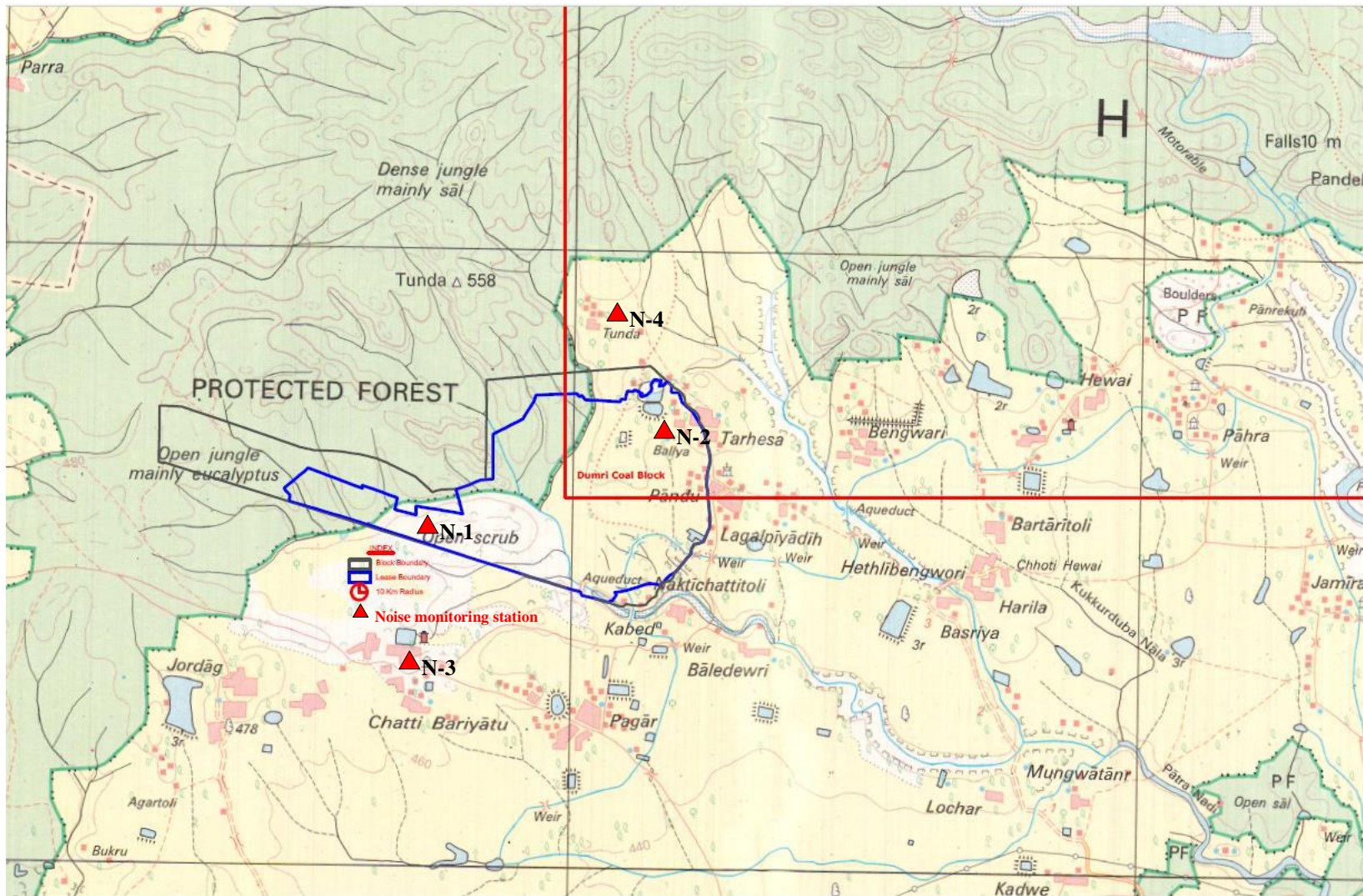


Fig. 3: Location of Noise Monitoring Station in Core and Buffer Zone of Dumri Coal Mine

Table 12: Details of Ambient Noise Monitoring Stations

S. No.	Location Code	Location Name/ Description	Present Land use
Core Zone			
1.	N-1	Within Mining lease area	Barren Land
2.	N-2	Balia Village	Residential Area
Buffer Zone			
3.	N-3	Chatti Bariatu Village	Residential Area
4.	N-4	Tunda Village	Residential Area

3.3.3 INSTRUMENTS USED

Sound level study is carried by using Mip-oy Integrated Sound Level Meter Meeting IEC-179A measuring average peak and Low values in Day and Night time.

3.3.4 RESULTS AND DISCUSSION

Results are shown in **Table 13 and 14** for ambient noise levels of core and buffer zones during post-monsoon season. The average peak values at the nearby villages are found well below the residential areas standard values of 55 & 45 dB (A) for Day & Night respectively. In core zone maximum noise levels and average noise levels are also well within the prescribed limit of 75 & 70 dB (A) for Day & Night respectively.

Table 13: Noise Level in Core Zone of the Study Area

Date of Sampling:		Noise level dB(A) average					
21.12.2020 to 28.12.2020		Day Time (6.00AM to 10.00PM)			Night Time (10.00PM to 6.00AM)		
Stn. Code	Location	Min.	Max.	Average	Min.	Max.	Average
N-1	Within Mining lease area	29.2	54.6	44.2	27.4	42.8	34.3
N-2	Balia Village	31.5	62.2	49.2	28.3	52.6	40.2
Standards as per CPCB		75			70		

Table 14: Noise Level in Buffer Zone of the Study Area

Date of Sampling:		Noise level dB(A) average					
21.12.2020 to 28.12.2020		Day Time (6.00AM to 10.00PM)			Night Time (10.00PM to 6.00AM)		
Stn. Code	Location	Min.	Max.	Average	Min.	Max.	Average
N-3	Chatti Bariatu Village	31.8	65.3	48.7	29.0	54.2	37.6
N-4	Tunda Village	30.1	54.2	45.5	28.1	46.7	36.8
Standards as per CPCB		75			70		

3.4 SOIL ENVIRONMENT

Topsoil is an essential component of land reclamation in mining area. The topsoil is very seriously damaged if is not mined out separately in the beginning with a view to replacement in the area.

During mining huge amount of overburden is being generated and stored as dumps. To know the impact of mining on soils of surrounding area as well as effect of overburden dumping on agricultural field due to run off from soil heaps during rainy season, the soil quality of surrounding area has been evaluated with respect to physico-chemical parameters.

The physical properties of soil, which is important in its utility, are texture, bulk density, specific gravity, moisture content and water holding capacity. The chemical properties, which govern the best use of soil for crops and plants, are pH, N, P, K and organic matter. For assessment of soil quality, five sampling points were fixed which comprise agricultural soil within mining lease area, forest area near Mining lease and agricultural field of nearby villages.

3.4.1 SAMPLING LOCATIONS

The soil sampling points are described below and in **Figure 4**:

S ₁	Agricultural soil near Chatti Bariatu Village
S ₂	Agricultural soil within mining lease area
S ₃	Agricultural soil at Baliya Village
S ₄	Agricultural soil at Tunda Village
S ₅	Agricultural soil at forest area within mining lease

3.4.2 METHODOLOGY

The standard procedure was followed in sampling and all the samples were taken from 0-20 cm depth from all the sites. The sampling was done in the month of December 2020. Standard methods were followed for soil analysis and are appended in **Table 15**. The results reported are average of three replicate analyses.

Table 15: Standard Methods of Soil Analysis

Parameters	Methods
Physical Parameters	
a) Bulk Density	IS: 2720 (Part VII) - 1980
b) Water Holding Capacity	It is determined by the Keen - Raczkowski box experiment using the circular shaped boxes described by Coutts J.R.H. (1930). It is the amount of water taken up by unit weight of dry soil when immersed in water under standardized condition i.e. $\frac{\text{Weight of water held in box}}{\text{Weight of dry soil in box}} \times 100$
c) Specific gravity	It is the ratio of total mass of the soil particles to their total volume excluding pore space .IS 2720 (Part III) - Section 1 & Section 2 -1980
d) Moisture content	IS 2720 (Part II) - 1973, IS 2720 (Part IX) - 1971
e) Texture	IS 1498 - 1970;
Chemical Parameters	
f) pH	It is measured by Systronics Digital pH meter using soil water ratio 1:2.5 IS 2720 (Part XXVI) - 1973
g) Organic carbon	This is measured by Walkleyand Black (1934) rapid titration methods. Organic carbon is oxidized by Potassium dichromate solution i.e. presence of concentrated sulfuric acid. The excess dichromate ion is back titrated and measured. The quality of Organic matter is calculated from the amount of dichromate ion reduced. IS 2720 (Part XXII) - 1972
h) Nitrogen	Micro Kjeldahl method is used for the estimation of total nitrogen (Jackson 1958).
i) Available Phosphorous	Olsen's (1954) methods were followed for the determination of available P in soil.
j) Available Potassium	Ammonium acetate extractable K is determined by Atomic absorption Spectrophotometer.

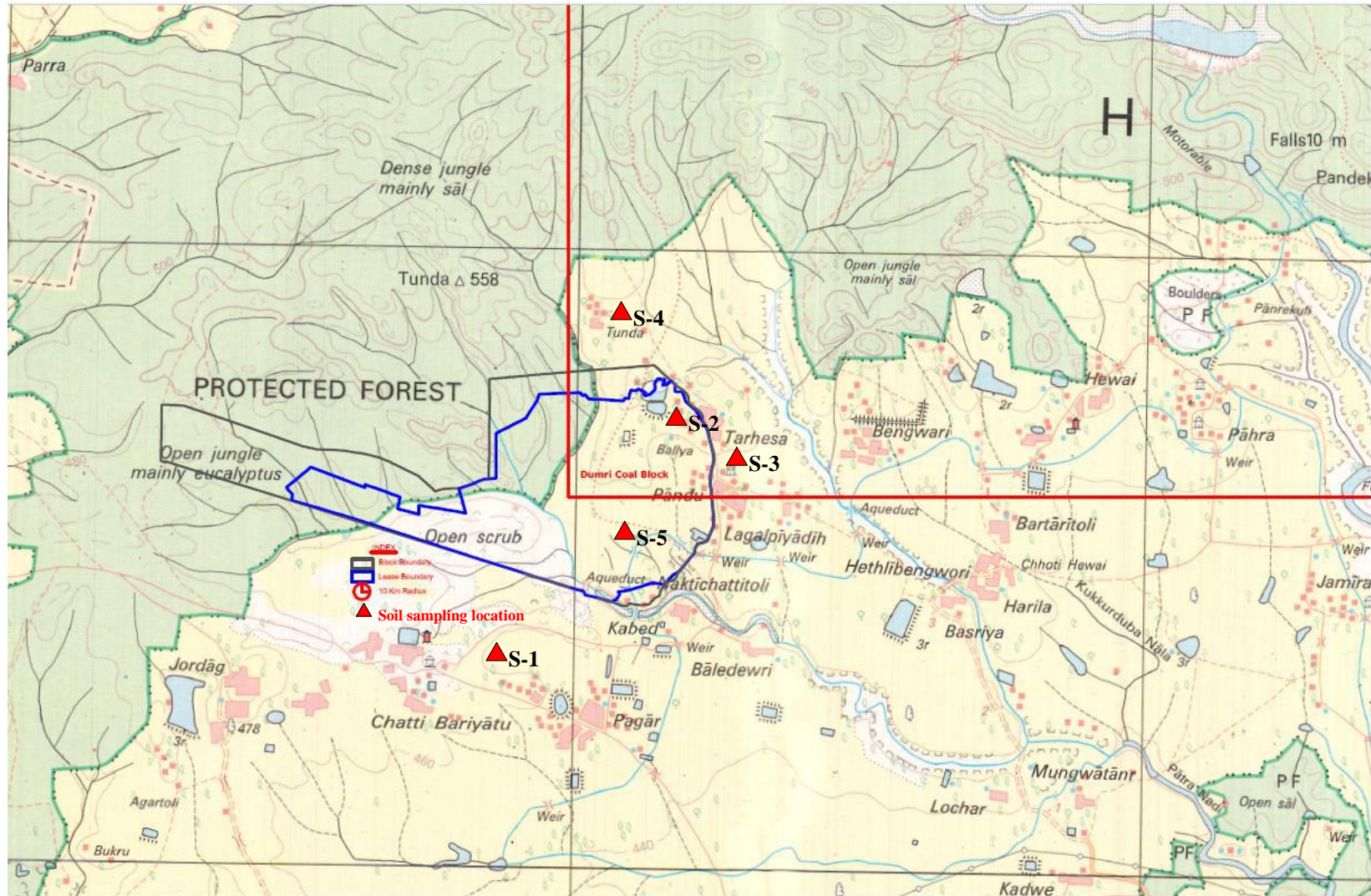


Fig. 4: Location of Soil sampling location in Core and Buffer Zone of Dumri Coal Mine

3.4.3 SOIL QUALITY

Agricultural and forest soil were collected in post-monsoon season (December 2020) and had been analysed for physico-chemical parameters and results are presented in **Table 15**.

3.4.4 RESULTS AND DISCUSSION

3.4.4.1. Physical Properties of Soil Samples

The bulk density of the soil samples varies in the range of 0.85 gm/cm³ to 0.93 gm/cm³, which indicates favorable physical condition. The particle density varies from 1.28 gm/cm³ to 1.43 gm/cm³. The moisture contents are found to vary from 0.76 to 1.95%. The water holding capacity also varies from 38.95% to 45.87% being maximum in the case of agricultural soil, which may be due to its clay content.

3.4.4.2. Chemical Properties

All the soil samples are analysed for the chemical parameters namely pH, organic carbon, available nitrogen, phosphorous, potassium content and the results are presented in **Table 15**.

The pH of the soil samples ranged from 6.07 to 7.43, which clearly indicates that soil samples are slightly acidic to basic in nature. Organic carbon content ranges from 0.29% to 1.29%. The organic matter content ranges from 0.49% to 2.22%. The available Nitrogen, Phosphorous and Potassium content of the soil samples varies from 45 to 145 Kg/ha; 4.4 to 10.8 Kg/ha and 25 to 170 Kg/ha respectively. The values indicate that the soil within mining lease area and forest area near mining lease are deficient in N, P & K that requires addition of farmyard manure, bio fertilizer and other soil amendments to make the top soil suitable for vegetation. The value for agricultural soil of nearby village clearly indicates that the soil is not polluted with respect to chemical constituents.

Table 15: Physico-chemical Properties of Soil of Mine Area

S. N.	Parameters	S ₁	S ₂	S ₃	S ₄	S ₅
1.	Texture	SS	SS	SS	SS	SS
2.	pH	6.90	6.07	6.75	7.43	6.43
3.	EC (µmhos/cm)	95.5	169.5	178.6	478	89.6
4.	Moisture Content (%)	1.22	0.76	1.12	1.95	1.85
5.	Bulk Density (gm/cm ³)	0.85	0.92	0.92	0.88	0.93
6.	Particle density (gm/cm ³)	1.28	1.43	1.39	1.36	1.43
7.	Water Holding Capacity (%)	45.29	41.45	40.76	45.87	38.95
8.	Organic Carbon (%)	0.29	0.60	1.29	0.97	0.83
9.	Organic Matter (%)	0.49	1.03	2.22	1.67	1.43
10.	Avail N (kg/ha)	45	38	92	145	42
11.	Avail P (kg/ha)	4.4	5.1	7.2	10.8	4.6
12.	Avail K (kg/ha)	31	25	88	170	20

Note: SS- Silty Sand

Sampling Sites:

- S₁- Agricultural soil near Chatti Bariatu Village
- S₂- Agricultural soil within Mining lease area
- S₃- Agricultural soil at Baliya Village
- S₄- Agricultural soil at Tunda Village
- S₅- Agricultural soil at Forest area within mining lease

4.0 CONCLUSION

On the basis of the data generated it has been found that the environmental scenario in and around mining area of proposed Dumri Coal Mine with respect to air, water, noise and soil are well within the permissible limits.

5.0 MITIGATIVE MEASURES

Dumri Coal Mine has not commenced its mining operation. Environmental monitoring data of Post-monsoon season, 2020 suggest that all the studied parameters (air, water, noise and soil) are within permissible limits. The mitigative measures to be adopted during mine operation is conferred below.

5.1 AIR POLLUTION CONTROL MEASURES

The mining operations and related activities are anticipated to increase the levels of particulate matter and gaseous pollutants to a limited extent. The proposed air pollution control measures are as follows:

- I. Dust suppression systems (like water spraying) will be adopted where necessary at
 - (a) Faces before and after blasting,
 - (b) Faces while loading
- II. Dust extraction systems will be used in drill machines, crushers/feeder breakers.
- III. Dust suppression systems (like water spraying) would be adopted at roads used for transportation. Sprinklers would be installed along the roads to suppress the dust.
- IV. Suitable dust extraction or suppression systems such as mist sprays with or without chemical will be provided at appropriate places for preventing dust pollution during handling and stockpiling of coal.
- V. Transfer points of coal will be provided with appropriate hoods/chutes to prevent fugitive dust emission.
- VI. To prevent air pollution due to airborne dust, tree belts will be planted around the mine site.
- VII. Dust masks will be provided as safety measure to the workers, engaged at dust generation points like drills, loading/unloading points, crushers etc.
- VIII. To ensure that NO_x level do not increase during mining operation good quality explosives will be used for which the oxygen balance will be checked from time to time. The expired explosives will not be used for which a strict vigil will be kept on the date of manufacture.

5.2 WATER POLLUTION CONTROL MEASURES

Proposed mitigative measures related to water pollution is as below-

- I. Any wash off from the oil/grease handling area of workshop will be treated to remove oil and grease using oil trap. Waste oil/grease will be stored in leak proof containers.
- II. The sewage waste will be treated in properly designed septic tanks and soak pits.
- III. Check dams will be provided to prevent solids from wash off and screen if any from the mine related activities.
- IV. Construction of garland drains around freshly excavated and dumped areas so that flow of water with loose material is prevented.
- V. The coal does not have high sulphur content (<0.72%). It is anticipated that the mine water discharge will have no acid drainage. However, the mine water will be monitored regularly to keep a vigil and will be kept below permissible limits before any discharge.

5.3 NOISE POLLUTION CONTROL MEASURES

The following control measures will be adopted to keep the ambient noise levels below permissible limits 75 dB (A):

- I. Provision and maintenance of thick belts to screen noise.
- II. Avenue plantation within the project area to dampen the noise.
- III. Proper maintenance of noise generating machinery including the transport vehicles will be ensured.
- IV. To protect the workers from exposures to higher noise levels, the following measures will be adopted.
- V. Provision of protective devices like ear muffs/ear plugs to those workers who cannot be isolated from the source of noise.
- VI. Confining the noise by isolating the source of noise.
- VII. Reducing the exposure time of workers to the higher noise levels.

5.4 SOIL POLLUTION CONTROL MEASURES

This is particularly necessary to save topsoil for later use to protect the primary root medium from contamination and erosion, and hence its productivity. The systematic handling and storage practices can protect the physical and chemical characteristics of topsoil while in storage and also after it has been redistributed onto the areas. The following control measures will be adopted:

- I. The topsoil should be kept properly.
- II. Topsoil should be redistributed in a manner that achieves an approximate uniform, stable thickness that is consistent with approved post-mining land use.
- III. Soil should be protected from excess compaction, wind and water erosion.
- IV. An appropriate concurrent and post-mining reclamation strategy can also be determined.

6.0 RECOMMENDATIONS AND FOLLOW-UP ACTION

The study indicates that air quality around the proposed Dumri Coal Mine is found to be within the threshold limit as per the guideline of NAAQS, 2009. However, the mining activity was not in progress during the monitoring period. Water quality of the surrounding water resources are also not found polluted. For the best practice of proposed coal mining in future, Environmental Management System should always be considered with the following key recommendation and follow-up actions:

- ❖ Spraying of water on the haul roads for controlling the dust to its minimum level.
- ❖ Regular maintenance of the heavy earth moving machines.
- ❖ Mine water collection in settling tank before its discharge.
- ❖ Garland drainage should be made around the dumps.
- ❖ Reclamation and revegetation of overburden dumps should be done to control soil erosion, denudation of agricultural land and nearby riverine system, wetlands and to improves the aesthetics of the area.
- ❖ Dumps brought under biological reclamation should not be made active.
- ❖ The mine management would be implementing, these measures to make mining operation eco-friendly in this proposed Dumri coal mine of M/s Hindalco Industries Ltd, Hazaribag, Jharkhand.

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***ENVIRONMENTAL STUDY REPORT FOR DUMRI COAL
MINE, HAZARIBAG, JHARKHAND***

**(WINTER SEASON)
(JANUARY, 2021 TO MARCH, 2021)**

*Prepared
For*



**M/s HINDALCO INDUSTRIES LIMITED
Hazaribag - 825311
Jharkhand**

*Prepared
by*



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Report

On

Environmental Study Report for Dumri Coal Mine, Hazaribag, Jharkhand


(WINTER SEASON)
(JANUARY, 2021 TO MARCH, 2021)

Project No.: SSP/474/2020-21

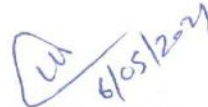
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1.0 INTRODUCTION

Mining is the extraction of valuable minerals or other geological materials from the Earth. It is a site specific and ecologically sensitive industry. For sustaining national development, mining of coal and minerals is of paramount importance for developed as well as developing countries. To meet the energy requirements of the country, increased coal production has been possible due to large-scale surface mining activities. Mining operations usually create a negative environmental impact, both during the mining activity and after the mine has closed. Surface mining causes environmental disturbance in the form of land degradation, removal of OB material which stress on air and water regime and finally interferes in the balance of the ecosystem. To meet these problems, sound environmental management system for pre-mining, active mining and post mining stages in the form of Environmental Impact Assessment, Environmental Management Practice for concurrent mining and Environmental Audit has been made necessary by the regulating state and central authorities. Regular monitoring of the different components of environment is made necessary for evaluating the requirements of environmental management system and its impact in the society. This report presents the study conducted by CSIR-Central Institute of Mining and Fuel Research (CSIR-CIMFR), Dhanbad for proposed Dumri Coal Mine belonging to M/s Hindalco Industries Ltd, Hazaribag, Jharkhand.

1.1 HISTORY OF DUMRI COAL MINE

“Dumri Block” in North Karanpura Coalfield situated in the District Hazaribag, State of Jharkhand, was previously allotted by Ministry of Coal and Mines vide their letter dated 13.01.2006, jointly to M/s Nilachal Iron and Power Ltd. as leader and M/s Bajrang Ispat (P) Ltd. as associate.

Honourable Supreme Court of India vide Judgement dated 25th August, 2014 and Order dated 24th Sept. 2014 cancelled the allocation of 204 coal blocks, which include Dumri coal block also.

Later the Office of Nominated Authority constituted under section 6 of the Coal Mines (Special Provision) Act, 2015, issued Vesting order under clause (b) of sub-rule 7 and sub-rule (1) of rule, Order no. 104/24/2015/NA dt. 22nd April, 2015 for Dumri Coal Mine in favour of M/s Hindalco Industries Ltd.

Further, vide Corrigendum No. 1, dated 30th January, 2018, the MOC issued the revised boundary Co-ordinates. As per approved Mining Plan (Revision-I) of Dumri Coal Mine of M/s Hindalco Industries Ltd., revised area of the mining lease is 259.64 ha.

Based on recommendation of EAC; Ministry of Environment, Forest and Climate Change revoke the abeyance on transfer of Environmental Clearance for Dumri Coal Mine project from M/s Nilachal Iron and Power Limited to M/s Hindalco Industries Limited for a production capacity of 1 MTPA in the ML area of 259.64 ha. The environmental clearance finally granted for opening of Dumri Coal Mine Project of M/s Hindalco Industries Ltd. vide letter no. J-11015/239/2008-IA-II (M) Pt., dated 6th November, 2019.

1.2 LOCATION

The lease area of Dumri coal mine covers land in villages: Pagar, Balia, Tunda and Pandu of Keredari Block of district Hazaribag (Jharkhand). The nearest township is Hazaribag located at a distance of about 40 KM from Dumri Coal Mine (DCM). The Hazaribag-Khelari State Highway-07 is about 3KM on the south of the coal block. The nearest railhead is "RAY" at about 40 KM on the Gomoh-Barkakana-Dehri-on-Sone loop line of South-Eastern railway. A new railway line connecting Hazaribag via mandu has been commissioned and block is at a distance of about 40 KM from the nearest offtake station which is Nawada/Khapariaon. The nearest airport of Ranchi is at distance of 120 KM. The project area is situated between the latitude 23^o 53' 31.998" N and 23^o 54' 30.848" N and longitude 85^o 03' 11.539" E & 85^o 05' 37.103" E. The site is well connected by road and about 8 KM away from Keredari Block Office. It is a barren area and coal mine has not yet operational.

1.3 SCOPE OF WORK

M/s Hindalco Industries Ltd, Hazaribag, approached CSIR-Central Institute of Mining and Fuel Research (CSIR-CIMFR), Dhanbad for conducting the environmental study for one year i.e. 2020-2021 having following objectives:

- Environmental study of Air, Water, Noise and Soil of the core and buffer zone.
- The Environmental monitoring will be conducted on seasonal basis.
- Advice into the adoption of necessary control measures.
- Land use pattern study will be done once in a year and report will be submitted separately.
- Preparation of Environmental Statement.

The detailed studies with respect to air, water and noise will be carried on seasonal basis in the year 2020-21 while soil samples, for the adjoining mining area, will be collected once in a year and analyzed in the CSIR-CIMFR laboratory.

2.0 REGIONAL GEOLOGY

The North Karanpura Coalfield forms a prominent east-west trending valley between Hazaribag plateau in the north and Ranchi plateau in the south. The Aswa pahar in the south-east separates in North and South Karanpura Coalfields by east west elongated metamorphic patch. However, they are interconnected near Bachra and Hindegir village by a narrow tongue of Talchir outcrops. On the eastern side, North Karanpura Coalfield is separated from the West Bokaro Coalfield by a narrow stretch of metamorphic rocks having several outliers of Talchir Formation. In the west, it is separated by a stretch of about 20kms wide metamorphic belt from Auranga Coalfield.

Out of 1230 Sq. Km area of North Karanpura Coalfield, the coal bearing Formations viz. Karharbari, Barakar and Raniganj crop-out over an area of about 500 Sq. Km. The Karharbari formation is well developed in the south-central and eastern part of the coalfield. It contains only one seam, which occurs often in two to three sections. It comprises of very coarse grained, gritty sandstone, and at times, has silicified sandstones. The Barakar formation contains a number of coal seams and contributes the major bulk reserves of this coalfield. Five persistent coal seams have been established in the coalfield. The total coal column is more or less around 35-40 m in major part of the coalfield. Raniganj formation contains three to four coal seams which are generally shaly in nature and often impersistent.

2.1 LOCAL GEOLOGY

The Dumri block is the up-dip extension of Chatti-Bariatu block and is located in the northern part of the North Karanpura Coalfield. It is contiguous to Chatti-Bariatu block in the south. Keredari 'A' block in the east, Pachra block on the west. The northern boundary of the block is defined by hilly terrain and dense forest cover which is a part of the inaccessible Dumri area.

The Dumri block comprises Talchir, Karharbari, Barakar and Barren measures Formations belonging to Damuda sub-group of lower Gondwana Group. The Talchir formation overlies metamorphic rocks with an unconformity. The Karharbari and Barakar are the main coal bearing formations contain four major coal seams i.e. Seam-I, II, III and IV in ascending order. Besides these, six more thin coal horizons are also developed in the block. The Karharbari Formation is essentially composed of conglomerates and coarse to gritty arkosic sandstone varying in thickness from 7 to 139m. The strata are very hard and compact at places on account of localized silicification. The thickness of this formation generally varies from 7m to 136m with coaly horizons. Among them, the topmost horizon (K5) is more persistent than the other horizons. The Barakar Formation lies comfortably over the Karharbari Formation. This is the main coal bearing formation in the block and contains four major coal seams i.e. Seam-I to IV and four thin coal seams i.e. IVA, IVB, IVC, IVD in ascending order and two local seams L1 between Seam III Top & III Bottom and L2 below seam I Bottom. This formation is composed of gritty to conglomeratic sandstone (basal part), medium to coarse grained sandstone with siltstone, shale and carbonaceous shale. Among the four coal seams, seam-I Middle, II Bottom & IV Top are the thickest. The maximum thickness of Barakar Formation as intersected in boreholes is 129m. The Barren Measure Formation lie conformably over the Barakar Formation and is characterized by fine grained sandstone, shale and sandy shale. As per borehole records its thickness varies from 15m to 20m.

A dolerite dyke trending almost E-W and having roughly 4km length and a width of approximately 12-25m passes through the Dumri block. The presence of this dyke has also been reported in Pachra block lying west of Dumri block. Stratigraphic sequence of Dumri block is given below in **Table 1**.

**Table 1: Stratigraphic Sequence of Dumri Block
(As per Borehole Intersection)**

Period	Group	Sub-group	Formation	Thickness Range (m)	Lithology
Recent	Lower Gondwana	Damuda	Alluvium	3.50-14	Detrital and Alluvial soil and subsoil
			Barren Measures	15-20	Dark shale, sandy shale and Interbanded shale, sandstone
			Barakar	18-129	Fine to coarse grained sandstone, shale, conglomerate, carbonaceous shale and coal seams
			Karharbari	7-136	Medium to coarse grained sandstone shale, silicified quartzitic rock and thin coal seams.
			Talchir	10	Green coloured shale, Boulder and conglomerate
			Metamorphics		Granite, gneisses and Quartzite

2.2 MINING SCENARIO

The Dumri Block is the up-dip extension of Chatti-Bariatu Block and opencast mining method has been adopted for extraction of coal within the mining lease area. The mining plan for proposed Dumri Coal Mine was approved for two pit opencast working. The main part of the reserves lies in the eastern part of the mining lease and it was named as Quarry-2. Meager coal reserves are available in the western part in form of three small pits named Quarry-1A, Quarry-1B and Quarry-1C. In approved revised mining plan, the sequence of operation was suggested to work Quarry-2 first followed by Quarry-1 (comprising of 3 small pits). The anticipated life of the mine with peak production rate of 1.0 MTPA will be 46 years. Prior to the advancing of 1st OB bench, land will be cleared with dozers/graders and topsoil removed in line with the Environmental Management Plan. Coal is extracted by shovel dumper combination after blasting off the coal faces. Excavators with 2.5 cum bucket capacity are planned to be used for coal mining which

will load into 35T coal dumpers. The over burden will be transported by 35T dumpers to surface dumps over the coal bearing area within mining lease and later used for backfilling. The coal will be transported by 35T coal trucks to the proposed coal stockyard at the pit head and later coal will be transported through weigh-bridge to the nearest railhead.

Total extractable reserve of Dumri Coal Mine is 45.22 MT with an average grade of G11. The open cast mine worked by Shovel-Dumper combination with an average stripping ratio of 2.36 Cum/Te.

3.0 ENVIRONMENTAL SCENARIO IN THE MINING AREA

3.1 AIR ENVIRONMENT

Air pollution includes one or more contaminants (pollutants), in the outdoor atmosphere in such quantities and of such duration that may be injurious to human, plant or animal life. Once these contaminants enter in the atmosphere, either in gaseous form or as particulate matter, these cannot escape and keep circulating and deteriorating the air quality. Air pollution effects encompass those that are health related as well as those associated with damage to property or which cause decrease in atmospheric aesthetic feature. Dispersion of air pollutants from the source depends on micro-meteorological parameters of the area.

3.1.1 SOURCES OF AIR POLLUTION

Coal transportation, OB removal, drilling, blasting, haul road and movements of mining equipments will be the major sources of air pollution in the proposed mining area. Generally, dust generation will be of major concern during mining operation. NO₂ will be liberated in the time of blasting and during the movement of mining machineries. This coal contains very less sulphur (<0.72%) and as such the concentration of SO₂. In Indian coal, it is low, except Assam where sulphur content is high.

3.1.2 METHODOLOGY AND INSTRUMENTS USED

The methodology and instruments used for air quality monitoring and analysis are given in **Table 2** as below:

Table 2: Methodology and Instrument Used for Air Quality Analysis

Parameters	Method	Instrument
PM _{2.5}	IS-5182 (Part 23):2006 Gravimetric Method	Fine Particulate Sampler
PM ₁₀	IS-5182 (Part 23):2006 Gravimetric Method	Fine Particulate Sampler
SO ₂	IS-5182 (Part 2):2001 (Improved West & Gaeke Method)	Fine Particulate Sampler with gaseous attachment
NO _x	IS-5182 (Part 6):2006 (Jacob & Hochheiser modified Method)	Fine Particulate Sampler with gaseous attachment

3.1.3 AIR QUALITY

Air quality monitoring in core and buffer zone of the Dumri coal mine has been carried out in winter season for the year 2020-21 to assess the impact of mining activities on the ambient air quality. During the study, two sampling locations for ambient air quality had been fixed in buffer zone and two sampling locations in core zone area of the proposed mine on the basis of wind direction and other meteorological parameters. Details of sampling stations along with the source of air pollution are given in **Table 3** and shown in **Fig. 1**. The air quality at these locations is presented in **Tables 4 - 6**. The results show that the ambient air quality of the villages, in and around the mining site, is least affected as the mine is not initiated during the study period.

Table 3: Details of Air monitoring Locations

Station Code	Location	Source of Air Pollution
CORE ZONE		
CA-1	Within Mining lease area	Kachha road and natural activity.
CA-2	Balia Village	Household coal burning and vehicular movement, etc.
BUFFER ZONE		
BA-1	Chatti-Bariatu Village	Household coal burning and vehicular movement, etc.
BA-2	Tunda Village	Household coal burning and vehicular movement, etc.

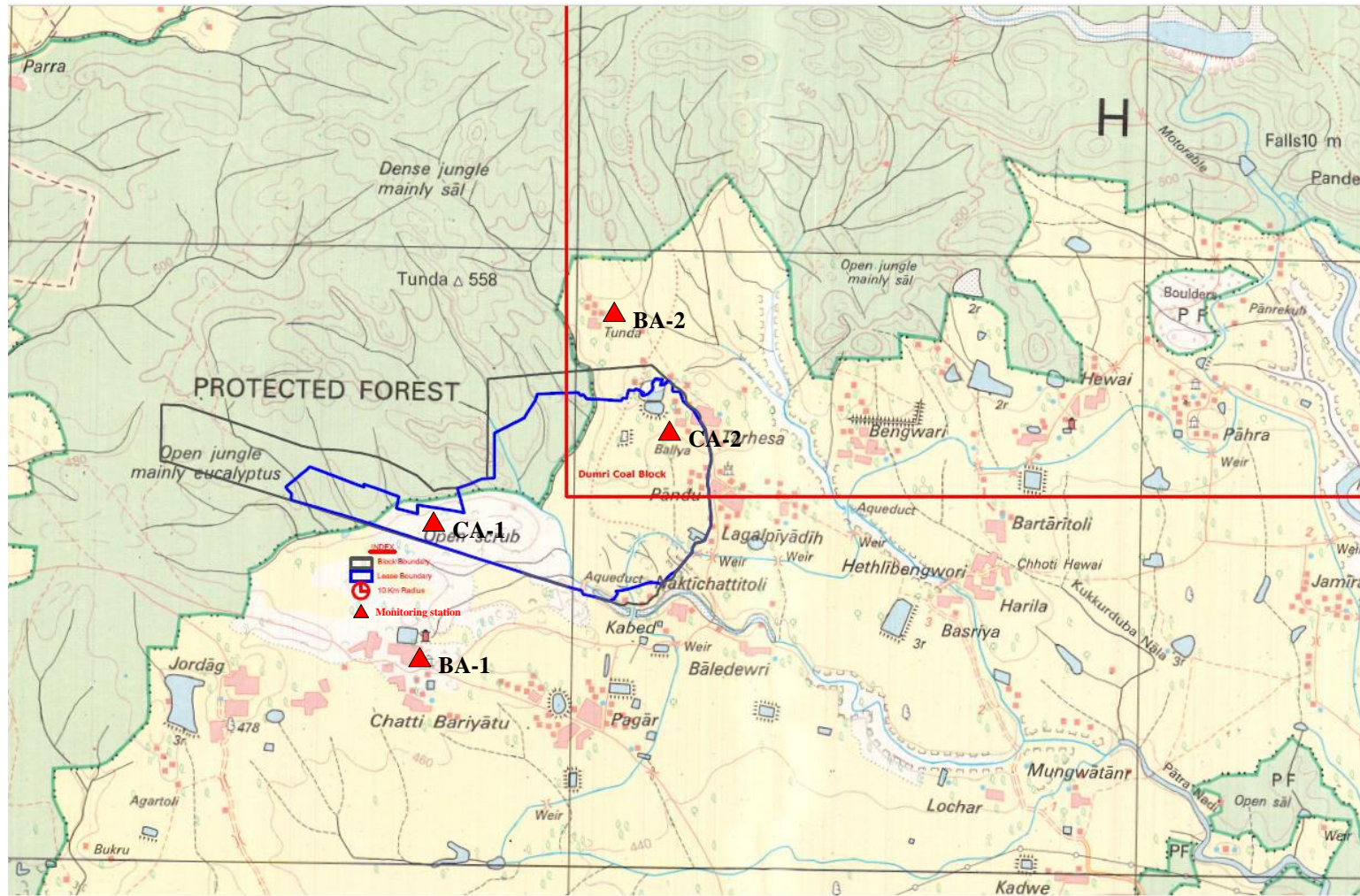


Fig. 1: Location of Air Monitoring Station in Core and Buffer Zone of Dumri Coal Mine

Table 4: Ambient Air Quality Report for Core Zone of Dumri Coal Mine

Sampling Code	Sampling Location	Season	Date of Sampling	Parameters (µg/m ³)				Remarks
				PM _{2.5}	PM ₁₀	SO ₂	NO ₂	
CA-1	Within Mining lease area	Winter	11/03/2021	33.6	58.6	12.5	20.8	
			12/03/2021	41.9	59.9	14.1	19.5	
CA-2	Balua Village	Winter	15/03/2021	53.3	87.7	17.9	22.9	
			16/03/2021	52.9	81.7	20.6	27.6	
Standards as per NAAQS-2009				60	100	80	80	

Table 5: Ambient Air Quality Report for Buffer Zone of Dumri Coal Mine

Sampling Code	Sampling Location	Season	Date of Sampling	Parameters (µg/m ³)				Remarks
				PM _{2.5}	PM ₁₀	SO ₂	NO ₂	
BA-1	Chatti-Bariatu Village	Winter	09/03/2021	50.0	85.2	23.3	28.2	
			10/03/2021	47.0	74.4	22.0	29.2	
BA-2	Tunda Village	Winter	13/03/2021	51.4	67.8	19.7	20.4	
			14/03/2021	40.2	64.9	18.1	21.5	
Standards as per NAAQS-2009				60	100	80	80	

Table 6: Heavy Metal Concentration in PM₁₀

Sampling Code	Station	Pb	As	Ni	Cr	Hg
Core Zone		(µg/m ³)				
CA-1	Within Mining lease area	0.105	0.002	0.011	0.009	BDL
CA-2	Balua Village	0.136	0.003	0.012	0.012	BDL
Buffer Zone						
BA-1	Chatti-Bariatu Village	0.126	0.004	0.018	0.018	BDL
BA-2	Tunda Village	0.118	0.002	0.012	0.015	BDL
Standard		1.000*	0.006**	0.020**	-	-

* 24 hours ** Yearly Average BDL – Below Detection Limit

3.1.4 RESULTS AND DISCUSSIONS

During winter season, PM_{2.5} concentration level at near proposed mine infrastructure area within core zone was found from 33.6 µg/m³ to 41.9 µg/m³ and concentration of PM₁₀ was found from 58.6 µg/m³ to 59.9 µg/m³. At Balia Village, the PM_{2.5} concentration was found from 52.9 µg/m³ to 53.3 µg/m³ and the concentration of PM₁₀ was found from 81.7 µg/m³ to 87.7 µg/m³. In the core zone, all the PM_{2.5} and PM₁₀ values are within the threshold value i.e. 60 µg/m³ for PM_{2.5} and 100 µg/m³ for PM₁₀ as per the guideline of National Ambient Air Quality Standard (NAAQS), 2009 around the entire sampling sites. Concentration of SO₂ and NO₂ are also found within the limit of 80 µg/m³ as per the guideline of NAAQS, 2009 in the sampling sites of core zone of the proposed mine.

During winter season, the PM_{2.5} concentration at Chatti-Bariatu Village in buffer zone was found from 47.0 µg/m³ to 50.0 µg/m³ and the concentration of PM₁₀ was found from 74.4 µg/m³ to 85.2 µg/m³. At Tunda Village, the PM_{2.5} concentration was found from 40.2 µg/m³ to 51.4 µg/m³ and the concentration of PM₁₀ was found from 64.9 µg/m³ to 67.8 µg/m³. In the buffer zone both the concentration levels are within the threshold value i.e. 60 µg/m³ for PM_{2.5} & 100 µg/m³ for PM₁₀ as per the guideline of NAAQS, 2009. Concentration of SO₂ and NO₂ are also found within the limit 80 µg/m³ as per the guideline of NAAQS, 2009 in all the sampling sites of buffer zone of the proposed mine.

The concentration of Lead (Pb), Arsenic (As), Nickel (Ni), Chromium (Cr) and Mercury (Hg) in PM₁₀ are found below the permissible limit in core and buffer zone of the proposed mine.

3.2 WATER ENVIRONMENT

Water is one of the most essential natural resources for sustaining life and it is likely to become critically scarce in the coming decades, due to continuous increase in its demands, rapid increase in population and expanding economy of the country. Variation in climatic characteristics both in space and time are responsible for uneven distribution of precipitation in India.

The diversity of climates, ecosystems, land uses and topographies greatly influences the design of environmental monitoring programs. Social factors have also become important elements in environmental management. Best practice for each site is therefore governed by these regional physical and social factors.

3.2.1. SOURCES OF WATER POLLUTION

Mine Water

The mine water is to be a probable source of water pollution during the active mining operation. The mine water, which will be mainly rain water and ground water seepage, will be used for industrial purposes like dust suppression by water tankers in haul roads, approach roads, stockyards and watering of plants in the overburden dumps & office premises.

Domestic Effluents/Sewage

There are minimum housing facilities within the mining lease (ML) area for essential services. The domestic wastes from these houses are led to septic tanks. As the domestic waste water is minimum, the possibility of pollution is remote/insignificant. However, proper care has been taken up in the shelters area of inhabitants for sewage discharge.

Surface water

The surface water quality is likely to be affected with higher load of suspended solids as wash off from active dumps, soil erosion from soil and roads, and pumping out mine water to water channels.

Ground water

Ground water pollution can take place only if dumps and stock piles contain harmful chemical substances, which may get leached by precipitation of water and percolate to the ground water table, thus causing pollution. The chemical analysis of active OB soil and their proper management will restrict the water pollution by the management.

3.2.2 INSTRUMENTS USED

- a) pH and Conductivity meter (Thermo)
- b) Ion Meter (Thermo),
- c) COD Analyser (Hach),
- d) BOD Analyser (WTW),
- e) Water Analysis Kit, (HACH, DR - 2000)
- f) Microwave Digestion (Anton-Paar)
- g) UV-VIS Spectrophotometer (Simazdo)
- h) Atomic Absorption Spectrophotometer (Varian)
- i) Ion Chromatograph (Dionex/Metrohm)
- j) Flame Photometer
- k) ICP-MS (Perkin Elmer)

3.2.3 WATER QUALITY OF THE AREA

To assess the water quality of the proposed mine area ground water and surface water in the core and buffer zone were collected and analysed. There is no mine water effluent in the core zone as it is a proposed mine and mining operation is not started. To assess the water quality of the area water samples from nine locations were collected during winter season (March, 2021). Details of sampling locations for water quality monitoring in and around proposed Dumri coal mine are given in **Table 6** and shown in **Fig. 2**.

Table 6: Sampling locations for water quality study

Sample Code	Sample Type	Description	Sampling Site	Remarks
GW-1	Ground water	Drinking water	Within mining lease	Core Zone
GW-2	Ground water	Drinking water	Chatti-Bariatu Village	Buffer Zone
GW-3	Ground water	Drinking water	Balia Village	Core Zone
GW-4	Ground water	Drinking water	Pandu Village	Buffer Zone
GW-5	Ground water	Drinking water	Pagar Village	Buffer Zone
GW-6	Ground water	Drinking water	Tunda Village	Buffer Zone
SW-1	Surface water	Baldeori Nala	Upstream of mine	Core Zone
SW-2	Surface water	Nala-A	Mine site	Core Zone
SW-3	Surface water	Baldeori Nala	Downstream of mine	Buffer Zone

The water samples were collected in one-liter narrow-mouthed pre-washed polyethylene bottles. For heavy metal analysis, 100 ml of samples were acidified with HNO₃ and preserved separately. Temperature, electrical conductivity (EC), pH and DO values were measured in the field using a portable conductivity and pH meter. The other parameters are measured in the geochemical laboratory at CSIR-CIMFR, Dhanbad following the

standard methods prescribed in APHA (2017). The turbidity has been determined in pre-filtered sample by turbidity meter. In the laboratory, the water samples were filtered through 0.45 µm Millipore membrane filters to separate suspended particles. Acid titration method was used to determine the concentration of bicarbonate (APHA 2017). Major anions (F, NO₃ and SO₄) were analysed on UV-VIS spectrophotometer. Major cations (Ca and Mg) were measured by titrametric method and Na and K by flame photometer. The trace metals were analysed on ICP-AES.

3.2.4 RESULTS AND DISCUSSIONS

The physico-chemical characteristics of the analysed drinking and surface water is presented in **Table 7 to 10** along with the prescribed standards. The water quality of the area is discussed in the following paragraphs:

Drinking Water Quality Assessment:

To assess the status of drinking water quality of Dumri coal mine area, six ground water samples were collected from hand pump as well as dug well in March, 2021 and analysed for parameters as per the drinking water standards. The hydro-chemical parameters of the groundwater of the study area were compared with the prescribed limit of Indian Standard for drinking water (BIS 2012) to assess the suitability for drinking and public health purposes (**Table 7 to 9**). The analytical results show that most of the analysed parameters are well within desirable limits and water is potable for drinking uses. pH of the analysed groundwater are found well within the safe limit of 6.5-8.5, prescribed for drinking water by BIS (2012). The turbidity is one of the important physical parameters for water quality defining the presence of suspended solids in water, which causes the muddy or turbid appearance of water body. The consumption of high turbid water may cause a health risk as excessive turbidity can protect pathogenic microorganisms from effects of disinfectants and also stimulate the growth of bacteria during storage. In the study area the turbidity in the groundwater are found below the recommended value of 5 NTU. The total dissolve solids (TDS) value in all the samples is lower than the acceptable limit of 500mg/l and the permissible limit in the absence of alternate sources of 2000mg/l.

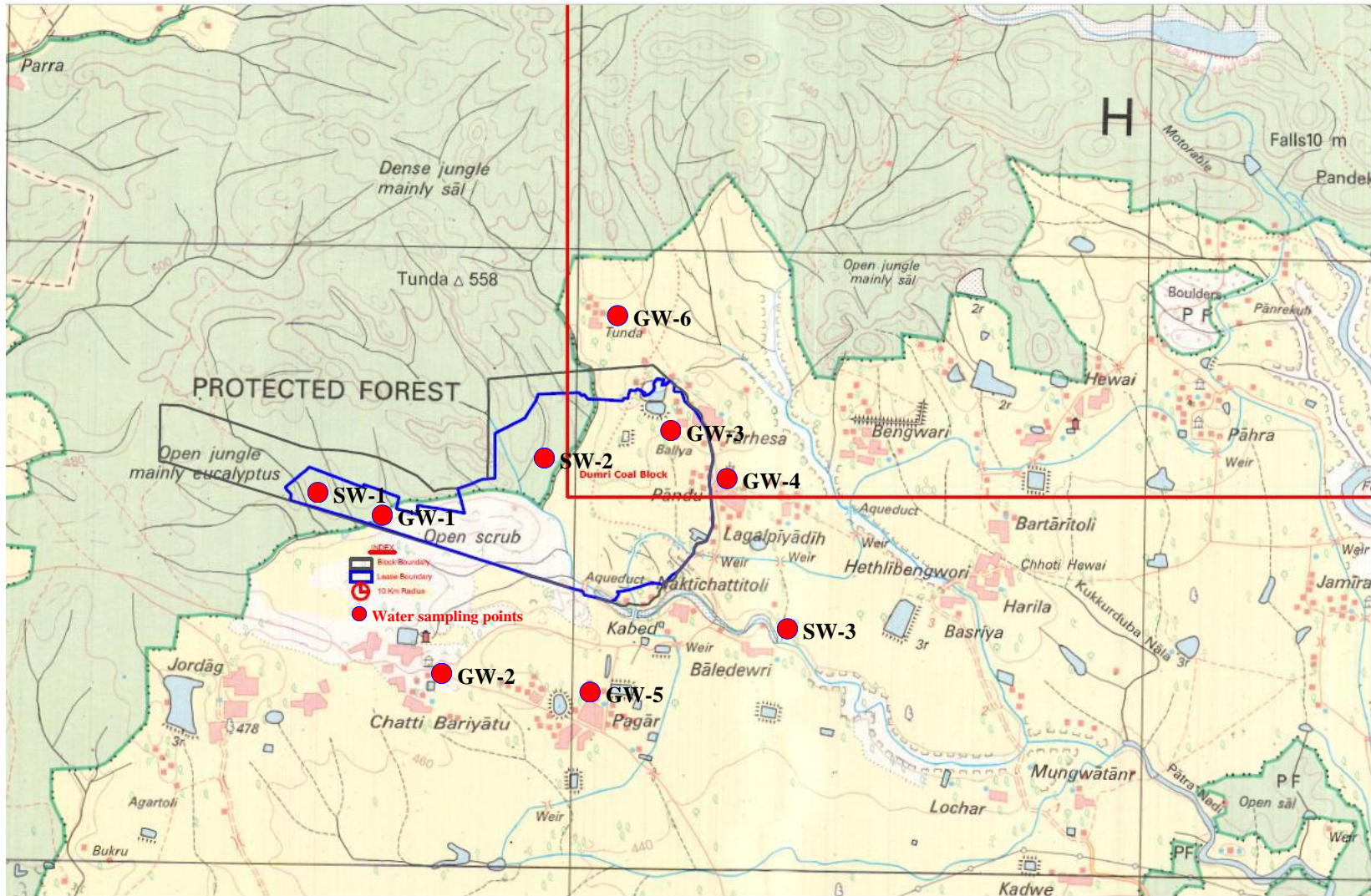


Fig. 2: Location of Water Sampling Points in Core and Buffer Zone of Dumri Coal Mine

The Total hardness (TH) value in all the samples (Except GW-1 and GW-5) is slightly higher than acceptable limit of 200mg/l but lower than the permissible limit in the absence of alternate sources i.e 600mg/l. In all of the samples, the concentration of Ca, Mg, SO₄ and F are also found well within the permissible limit for drinking uses (Except Ca in GW-1). In all of the samples, the concentration of NO₃ are also found well within the permissible limit for drinking uses (Except in GW-3 & GW-5). Heavy metal analysis in the groundwater samples indicated that all the analyzed heavy metals like As, Cd, Cr, Pb, Zn, Mn and Fe are found either below the detection limit or less than the acceptable limit for drinking water.

Surface Water Quality:

The analytical results of physico-chemical analysis of surface water samples collected from Nala-A within the mine site as well as upstream and downstream of Baldeori Nala has been given in **Table 10**. To assess the quality of the surface water resource the results has been compared with the prescribed surface water standards IS-2296 for Class 'C' water (tolerance limit for stream water used drinking water sources with conventional treatment followed by disinfection). It can be seen that pH of the water is slightly alkaline in nature and found well within the prescribed limit of 8.5. In general, the total dissolved solids values and other analysed parameters are found well within the threshold values. Concentration of sulphate varies between 9.0 and 14.3 mg L⁻¹ and is well below the prescribed value of 400 mg L⁻¹ (IS-2296). The level of TSS, TDS and DO in the river water were found within threshold limit in comparison to IS:2296, surface waters Class-C. The concentrations of the analysed heavy metals in the surface water resource are also found within the prescribed limits. It shows that the surface water of the area is fit for its designated use as a drinking water source with conventional treatment followed by disinfection.

The calculated value of sodium adsorption ration (SAR) shows that the water is low saline and low alkali water (0.04 - 0.28) and can be used for irrigation in most soils and crops with little danger of the development of harmful levels of exchangeable sodium. The percent sodium (%Na) is varying from 17.46 to 38.09 and also found below the 60% recommended limit for irrigation uses.

Table 7: Ground Water Quality Data of Dumri Coal Mine

Area: Core Zone/Buffer Zone	Season: Winter
Project: Dumri Coal Mine	Date of Sampling: 16.03.2021
Name of the Sampling Station:	
GW-1: Ground Water, Mine site	GW-2: Ground Water, Chatti Bariatu Village

Sl. No.	Parameters	Station Code		IS-10500: 2012	
		GW-1	GW-2	Acceptable Limit	Permissible Limit in the Absence of Alternate
1.	Colour, Hazen units, Max	<5	<5	5	15
2.	Odour	Agreeable	Agreeable	Agreeable	Agreeable
3.	pH	6.96	6.30	6.5-8.5	No relaxation
4.	Taste	Agreeable	Agreeable	Agreeable	Agreeable
5.	Turbidity, NTU, Max	0.29	7.29	1.0	5.0
6.	Total Dissolved Solid, mg/l, Max	426	280	500	2000
7.	Total Hardness (as CaCO ₃)	216	146	200	600
8.	Chloride (as Cl), mg/l, Max	14	29	250	1000
9.	Calcium (as Ca), mg/l, Max	81.6	40.4	75	200
10.	Magnesium (as Mg), mg/l, Max	3.0	11.0	30	100
11.	Sodium (as Na), mg/l, Max	28.0	19.6	NS	NS
12.	Potassium (as K), mg/l, Max	0.9	10.2	NS	NS
13.	Sulphates (as SO ₄), mg/l, Max	15.5	36.9	200	400
14.	Nitrate (as NO ₃), mg/l, Max	13.6	1.45	45	No relaxation
15.	Fluorides (as F), mg/l, Max	0.56	3.50	1.0	1.5
16.	Total Alkalinity, mg/l, Max	324	276	200	600
17.	Mineral Oil, mg/l, Max	<0.001	<0.001	0.5	No relaxation
18.	Iron (as Fe), mg/l, Max	0.004	0.07	0.3	No relaxation
19.	Manganese (as Mn), mg/l, Max	0.003	0.009	0.10	0.30
20.	Arsenic (as AS), mg/l, Max	<0.001	<0.001	0.01	0.05
21.	Cadmium (as Cd), mg/l, Max	<0.001	0.002	0.003	No relaxation
22.	Lead (as Pb), mg/l, Max	0.005	0.006	0.01	No relaxation
23.	Copper (as Cu), mg/l, Max	0.002	0.005	0.05	1.5
24.	Hexavalent Chromium (as Cr ⁶⁺), mg/l, Max	0.002	0.003	0.05	No relaxation
25.	Selenium (as Se), mg/l, Max	<0.001	0.002	0.01	No relaxation
26.	Silver (as Ag), mg/l, Max	<0.001	<0.001	-	-
27.	Zinc (as Zn), mg/l, Max	0.154	0.207	5	15
28.	Nickel (as Ni), mg/l, Max	<0.001	0.002	0.02	No relaxation

NS: Not Specified,

Table 8: Ground Water Quality Data of Dumri Coal Mine

Area: Core Zone/Buffer Zone	Season: Winter
Project: Dumri Coal Mine	Date of Sampling: 16.03.2021
Name of the Sampling Station:	
GW-3: Ground Water, Balia Village	GW-4: Ground Water, Pandu Village

Sl. No.	Parameters	Station Code		IS-10500: 2012	
		GW-3	GW-4	Acceptable Limit	Permissible Limit in the Absence of Alternate
1.	Colour, Hazen units, Max	<5	<5	5	15
2.	Odour	Agreeable	Agreeable	Agreeable	Agreeable
3.	pH	6.73	6.90	6.5-8.5	No relaxation
4.	Taste	Agreeable	Agreeable	Agreeable	Agreeable
5.	Turbidity, NTU, Max	0.18	4.79	1.0	5.0
6.	Total Dissolved Solid, mg/l, Max	452	346	500	2000
7.	Total Hardness (as CaCO ₃)	194	188	200	600
8.	Chloride (as Cl), mg/l, Max	40	58	250	1000
9.	Calcium (as Ca), mg/l, Max	47.9	62.3	75	200
10.	Magnesium (as Mg), mg/l, Max	18.1	7.9	30	100
11.	Sodium (as Na), mg/l, Max	30.0	21.6	NS	NS
12.	Potassium (as K), mg/l, Max	38.0	6.1	NS	NS
13.	Sulphates (as SO ₄), mg/l, Max	33.2	13.6	200	400
14.	Nitrate (as NO ₃), mg/l, Max	68.5	9.0	45	No relaxation
15.	Fluorides (as F), mg/l, Max	0.17	0.41	1.0	1.5
16.	Total Alkalinity, mg/l, Max	192	204	200	600
17.	Mineral Oil, mg/l, Max	<0.001	<0.001	0.5	No relaxation
18.	Iron (as Fe), mg/l, Max	0.032	0.011	0.3	No relaxation
19.	Manganese (as Mn), mg/l, Max	0.004	0.002	0.10	0.30
20.	Arsenic (as AS), mg/l, Max	<0.001	<0.001	0.01	0.05
21.	Cadmium (as Cd), mg/l, Max	<0.001	<0.001	0.003	No relaxation
22.	Lead (as Pb), mg/l, Max	0.005	0.006	0.01	No relaxation
23.	Copper (as Cu), mg/l, Max	0.006	0.002	0.05	1.5
24.	Hexavalent Chromium (as Cr ⁶⁺), mg/l, Max	<0.001	<0.001	0.05	No relaxation
25.	Selenium (as Se), mg/l, Max	<0.001	<0.001	0.01	No relaxation
26.	Silver (as Ag), mg/l, Max	<0.001	<0.001	-	-
27.	Zinc (as Zn), mg/l, Max	0.232	0.217	5	15
28.	Nickel (as Ni), mg/l, Max	0.003	0.001	0.02	No relaxation

NS: Not Specified,

Table 9: Ground Water Quality Data of Dumri Coal Mine

Area: Core Zone/Buffer Zone	Season: Winter
Project: Dumri Coal Mine	Date of Sampling: 16.03.2021
Name of the Sampling Station:	
GW-5: Ground Water, Pagar Village	GW-6: Ground Water, Tunda Village

Sl. No.	Parameters	Station Code		IS-10500: 2012	
		GW-5	GW-6	Acceptable Limit	Permissible Limit in the Absence of Alternate
1.	Colour, Hazen units, Max	<5	<5	5	15
2.	Odour	Agreeable	Agreeable	Agreeable	Agreeable
3.	pH	6.44	6.45	6.5-8.5	No relaxation
4.	Taste	Agreeable	Agreeable	Agreeable	Agreeable
5.	Turbidity, NTU, Max	0.17	0.01	1.0	5.0
6.	Total Dissolved Solid, mg/l, Max	471	258	500	2000
7.	Total Hardness (as CaCO ₃)	238	138	200	600
8.	Chloride (as Cl), mg/l, Max	88	8	250	1000
9.	Calcium (as Ca), mg/l, Max	71.5	40.4	75	200
10.	Magnesium (as Mg), mg/l, Max	14.5	9.1	30	100
11.	Sodium (as Na), mg/l, Max	37.5	13.9	NS	NS
12.	Potassium (as K), mg/l, Max	28.5	0.7	NS	NS
13.	Sulphates (as SO ₄), mg/l, Max	53.1	18.2	200	400
14.	Nitrate (as NO ₃), mg/l, Max	61.4	21.4	45	No relaxation
15.	Fluorides (as F), mg/l, Max	2.06	1.07	1.0	1.5
16.	Total Alkalinity, mg/l, Max	332	200	200	600
17.	Mineral Oil, mg/l, Max	<0.001	<0.001	0.5	No relaxation
18.	Iron (as Fe), mg/l, Max	0.024	0.012	0.3	No relaxation
19.	Manganese (as Mn), mg/l, Max	0.002	0.003	0.10	0.30
20.	Arsenic (as AS), mg/l, Max	<0.001	<0.001	0.01	0.05
21.	Cadmium (as Cd), mg/l, Max	<0.001	<0.001	0.003	No relaxation
22.	Lead (as Pb), mg/l, Max	0.002	0.003	0.01	No relaxation
23.	Copper (as Cu), mg/l, Max	0.005	0.003	0.05	1.5
24.	Hexavalent Chromium (as Cr ⁶⁺), mg/l, Max	0.004	<0.001	0.05	No relaxation
25.	Selenium (as Se), mg/l, Max	<0.001	<0.001	0.01	No relaxation
26.	Silver (as Ag), mg/l, Max	<0.001	<0.001	-	-
27.	Zinc (as Zn), mg/l, Max	0.252	0.224	5	15
28.	Nickel (as Ni), mg/l, Max	0.002	0.004	0.02	No relaxation

NS: Not Specified,

Table 10: Surface Water Quality Data of Dumri Coal Mine

Area: Core Zone/Buffer Zone	Season: Winter
Project: Dumri Coal Mine	Date of Sampling: 16.03.2021
Name of the Sampling Station:	
<i>SW-1 - Surface Water, Baldeori Nala U/S of mine site</i>	
<i>SW-2 - Surface Water, Nala-A of mine site</i>	
<i>SW-3 - Surface Water, Baldeori Nala D/s of mine site</i>	

Sl. No.	Parameters	Station Code			(IS: 2296)* Surface Waters Class "C" Tolerance Limits
		SW-1	SW-2	SW-3	
1.	Colour, Hazen units, Max	<5	<5	<5	300
2.	Odour	#	#	#	#
3.	pH	7.56	7.44	7.45	6.5-8.5
4.	Dissolved Oxygen, mg/l, Min.	7.65	9.46	8.28	4
5.	BOD (3days at 27°C), mg/l, Max	6.85	0.81	4.62	3
6.	Total Dissolved Solid, mg/l, Max	242	308	318	1500
7.	Oil & Grease, mg/l, Max	<0.1	<0.1	<0.1	0.1
8.	Total Hardness (as CaCO ₃), mg/l, Max	124	126	120	NS
9.	Phenolic compounds (as C ₆ H ₅ OH), mg/l, Max	<0.001	<0.001	<0.001	0.005
10.	Chloride (as Cl ⁻), mg/l, Max	10.0	28.0	32.0	600
11.	Sulphates (as SO ₄ ⁻), mg/l, Max	9.7	9.0	14.3	400
12.	Nitrate (as NO ₃), mg/l, Max	0.9	0.9	1.1	50
13.	Fluorides (as F), mg/l, Max	0.67	1.50	0.87	1.5
14.	Calcium (as Ca), mg/l, Max	32.0	32.0	31.1	NS
15.	Magnesium (as Mg), mg/l, Max	10.8	11.2	10.3	NS
16.	Sodium (as Na), mg/l, Max	18.8	40.1	45.8	NS
17.	Potassium (as K), mg/l, Max	1.0	5.3	7.0	NS
18.	Copper (as Cu), mg/l, Max	0.002	0.003	0.004	1.5
19.	Iron (as Fe), mg/l, Max	0.032	0.035	0.046	50
20.	Manganese (as Mn), mg/l, Max	0.002	0.003	0.003	NS
21.	Zinc (as Zn), mg/l, Max	0.278	0.284	0.294	15
22.	Arsenic (as AS), mg/l, Max	<0.001	<0.001	<0.001	0.2
23.	Cadmium (as Cd), mg/l, Max	<0.001	<0.001	<0.001	0.01
24.	Lead (as Pb), mg/l, Max	0.004	0.007	0.006	0.1
25.	Hexavalent Chromium (as Cr ⁶⁺), mg/l, Max	<0.001	0.003	0.002	0.05
26.	Selenium (as Se), mg/l, Max	<0.001	<0.001	<0.001	0.05
27.	Percent Sodium (%)	17.46	33.27	38.09	NS
28.	Sodium Absorption Ratio	0.04	0.21	0.28	NS

: Unobjectionable, NS: Not Specified,

* : Class "C"- Drinking water source with conventional treatment followed by disinfection.

3.3 NOISE ENVIRONMENT

Noise is undesirable and unpleasant sound produced by the vibration of bodies or molecules of the medium and propagates as a pressure perturbation. It disturbs people's work, sleep and communication. It damages hearing and evokes other physiological reactions. It also disturbs the habitat of animals and birds in the surroundings. Mining is the third largest industry in terms of employment and the recent trends of mechanization has changed the working environment to noisy environment leading to higher sound levels.

3.3.1 SOURCES OF NOISE

Noise will be produced during mining at different levels by different equipments in the open cast mine are summarized in the **Table 11**.

Table 11: Noise Generating Mining Equipments

S. N.	Equipment / Operation	Noise level dB(A)
1.	Feeder breaker	82-100
2.	Dumpers	100-115
3.	Shovels	80-107
4.	Dozers	84-107
5.	Front End loader	83-101
6.	Electric motors, gear drivers, hoppers, drilling & main pump	85-95
7.	Belt conveyer	90-92
8.	Drill	110-115

3.3.2 AMBIENT NOISE MONITORING LOCATIONS

The main objective of noise monitoring in the study area is to assess the present ambient noise levels in proposed project site & buffer zone due to regular activities and vehicular movement. A preliminary reconnaissance survey has been undertaken to identify the major noise generating sources in the proposed mining area.

Ambient noise level study at Dumri Mine was carried out in core as well as buffer zone. Two noise level monitoring location in core zone followed by two noise level monitoring locations in buffer zone were fixed-up as given in **Table 12** and shown in **Fig.3**.

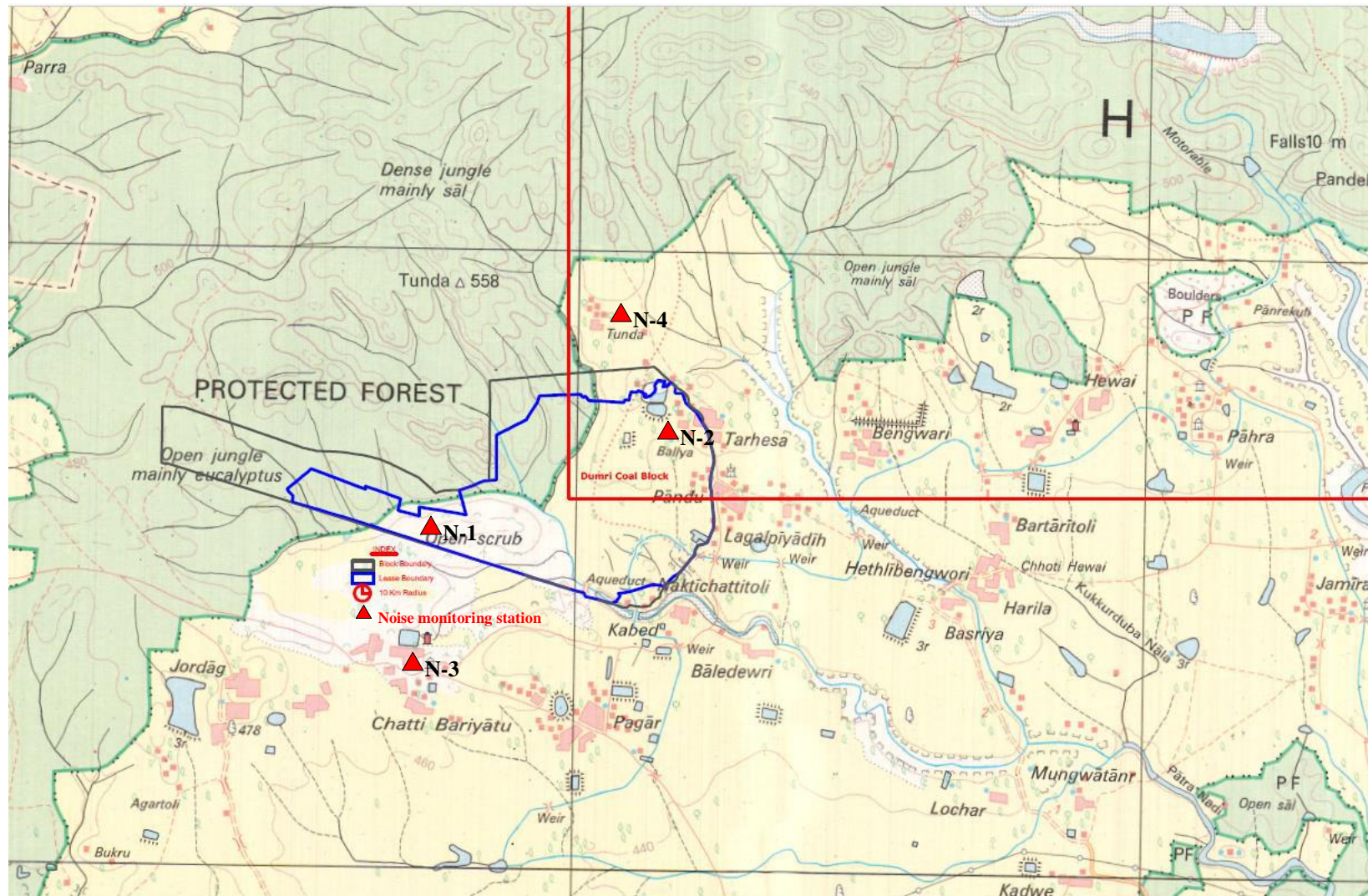


Fig. 3: Location of Noise Monitoring Station in Core and Buffer Zone of Dumri Coal Mine

Table 12: Details of Ambient Noise Monitoring Stations

S. No.	Location Code	Location Name/ Description	Present Land use
Core Zone			
1.	N-1	Within Mining lease area	Barren Land
2.	N-2	Balia Village	Residential Area
Buffer Zone			
3.	N-3	Chatti Bariatu Village	Residential Area
4.	N-4	Tunda Village	Residential Area

3.3.3 INSTRUMENTS USED

Sound level study is carried by using Mip-oy Integrated Sound Level Meter Meeting IEC-179A measuring average peak and Low values in Day and Night time.

3.3.4 RESULTS AND DISCUSSION

Results are shown in **Table 13 and 14** for ambient noise levels of core and buffer zones during winter season. The average peak values at the nearby villages are found well below the residential areas standard values of 55 & 45 dB (A) for Day & Night respectively. In core zone maximum noise levels and average noise levels are also well within the prescribed limit of 75 & 70 dB (A) for Day & Night respectively.

Table 13: Noise Level in Core Zone of the Study Area

Date of Sampling:		Noise level dB(A) average					
09.03.2021 to 15.03.2021		Day Time (6.00AM to 10.00PM)			Night Time (10.00PM to 6.00AM)		
Stn. Code	Location	Min.	Max.	Average	Min.	Max.	Average
N-1	Within Mining lease area	30.5	52.1	43.3	27.8	42.0	34.6
N-2	Balia Village	32.4	65.5	52.6	28.1	50.8	42.1
Standards as per CPCB		75			70		

Table 14: Noise Level in Buffer Zone of the Study Area

Date of Sampling:		Noise level dB(A) average					
09.03.2021 to 15.03.2021		Day Time (6.00AM to 10.00PM)			Night Time (10.00PM to 6.00AM)		
Stn. Code	Location	Min.	Max.	Average	Min.	Max.	Average
N-3	Chatti Bariatu Village	32.7	68.6	50.5	31.2	52.1	38.7
N-4	Tunda Village	30.5	51.6	46.2	28.4	45.2	37.6
Standards as per CPCB		55			45		

4.0 CONCLUSION

On the basis of the data generated it has been found that the environmental scenario in and around mining area of proposed Dumri Coal Mine with respect to air, water and noise are well within the permissible limits.

5.0 MITIGATIVE MEASURES

Dumri Coal Mine has not commence its mining operation. Environmental monitoring data of winter season, suggest that all the studied parameters (air, water and noise) are within permissible limits. The mitigative measures to be adopted during mine operation is conferred below.

5.1 AIR POLLUTION CONTROL MEASURES

The mining operations and related activities are anticipated to increase the levels of particulate matter and gaseous pollutants to a limited extent. The proposed air pollution control measures are as follows:

- I. Dust suppression systems (like water spraying) will be adopted where necessary at
 - (a) Faces before and after blasting,
 - (b) Faces while loading
- II. Dust extraction systems will be used in drill machines, crushers/feeder breakers.
- III. Dust suppression systems (like water spraying) would be adopted at roads used for transportation. Sprinklers would be installed along the roads to suppress the dust.

- IV. Suitable dust extraction or suppression systems such as mist sprays with or without chemical will be provided at appropriate places for preventing dust pollution during handling and stockpiling of coal.
- V. Transfer points of coal will be provided with appropriate hoods/chutes to prevent fugitive dust emission.
- VI. To prevent air pollution due to airborne dust, tree belts will be planted around the mine site.
- VII. Dust masks will be provided as safety measure to the workers, engaged at dust generation points like drills, loading/unloading points, crushers etc.
- VIII. To ensure that NO_x level do not increase during mining operation good quality explosives will be used for which the oxygen balance will be checked from time to time. The expired explosives will not be used for which a strict vigil will be kept on the date of manufacture.

5.2 WATER POLLUTION CONTROL MEASURES

Proposed mitigative measures related to water pollution is as below-

- I. Any wash off from the oil/grease handling area of workshop will be treated to remove oil and grease using oil trap. Waste oil/grease will be stored in leak proof containers.
- II. The sewage waste will be treated in properly designed septic tanks and soak pits.
- III. Check dams will be provided to prevent solids from wash off and screen if any from the mine related activities.
- IV. Construction of garland drains around freshly excavated and dumped areas so that flow of water with loose material is prevented.
- V. The coal does not have high sulphur content (<0.72%). It is anticipated that the mine water discharge will have no acid drainage. However, the mine water will be monitored regularly to keep a vigil and will be kept below permissible limits before any discharge.

5.3 NOISE POLLUTION CONTROL MEASURES

The following control measures will be adopted to keep the ambient noise levels below permissible limits 75 dB (A):

- I. Provision and maintenance of thick belts to screen noise.
- II. Avenue plantation within the project area to dampen the noise.
- III. Proper maintenance of noise generating machinery including the transport vehicles will be ensured.
- IV. To protect the workers from exposures to higher noise levels, the following measures will be adopted.
- V. Provision of protective devices like ear muffs/ear plugs to those workers who cannot be isolated from the source of noise.
- VI. Confining the noise by isolating the source of noise.
- VII. Reducing the exposure time of workers to the higher noise levels.

6.0 RECOMMENDATIONS AND FOLLOW-UP ACTION

The study indicates that air quality around the proposed Dumri Coal Mine is found to be within the threshold limit as per the guideline of NAAQS, 2009. However, the mining activity was not in progress during the monitoring period. Water quality of the surrounding water resources are also not found polluted. For the best practice of proposed coal mining in future, Environmental Management System should always be considered with the following key recommendation and follow-up actions:

- ❖ Spraying of water on the haul roads for controlling the dust to its minimum level.
- ❖ Regular maintenance of the heavy earth moving machines.
- ❖ Mine water collection in settling tank before its discharge.
- ❖ Garland drainage should be made around the dumps.
- ❖ Reclamation and revegetation of overburden dumps should be done to control soil erosion, denudation of agricultural land and nearby riverine system, wetlands and to improves the aesthetics of the area.
- ❖ Dumps brought under biological reclamation should not be made active.
- ❖ The mine management would be implementing, these measures to make mining operation eco-friendly in this proposed Dumri coal mine of M/s Hindalco Industries Ltd, Hazaribag, Jharkhand.

Annexure-III:
Revoke the abeyance on transfer of EC



J-11015/239/2008-IA-II (M) Pt.
Government of India
Ministry of Environment, Forest & Climate Change
Impact Assessment Division

Indira Paryavaran Bhavan,
Vayu Wing, 3rd Floor, Aliganj,
Jor Bagh Road, New Delhi-110 003

Dated: 6th November, 2019

To,

Asst. Vice-President -Corporate-Affairs
M/s Hindalco Industries Limited, Aditya Birla Centre,
3rd Floor, B wing, S.K. Ahire Marg, Worli,
Mumbai - 400030 (Maharashtra) E-mail: vinod.verma@adityabirla.com

Sub: Transfer of Environmental Clearance for Dumri Coal Mine Project of 1 MTPA located in North Karanpura Coalfields, Tehsil Terhesa, District Hazaribagh (Jharkhand) - reg.

The Ministry of Environment, Forest and Climate Change (MoEFCC), in accordance with the Environmental Impact Assessment (EIA) Notification, 2006 and subsequent amendment thereto, had accorded Environmental Clearance (EC) to M/s Nilachal Iron & Power Ltd for Dumri Coal Mine Project of 1 MTPA in ML area of 279 ha located in North Karanpura Coalfields, Tehsil Terhesa, District Hazaribagh (Jharkhand) vide letter No.J-11015/239/2008-IA.II (M) dated 23rd December, 2010 subject to compliance of certain terms and conditions.

2. Whereas, Hon'ble Supreme Court of India vide judgment dated 25th August, 2014 read with the order dated 24th September, 2014 has cancelled the allocation of 204 coal blocks and issued directions with regard to such coal blocks wherein the Central Government in pursuance of the said directions has to take immediate action to implement the said order.

3. Whereas, in pursuance of the judgment and order of the Hon'ble Supreme Court, the nominated authority has, in accordance with provisions of the Coal Mines (Special Provisions) Second Ordinance, 2014 and the Coal Mines (Special Provisions) Rules 2014 conducted the auction of the mines.

4. Whereas, Ministry of Coal (MOC) vide OM No.43020/20/2014-CPAM dated 16th March, 2015 has informed MoEFCC that MOC has approved 23 coal blocks (15 coal blocks from Schedule II and 8 coal blocks from Schedule III of the Ordinance) through bidding to different successful bidders/ companies. MOC has requested this Ministry to facilitate transfer of the Environment Clearance and Forest Clearance of these blocks to the new successful bidders.

5. Whereas, Ministry of Coal vide Vesting Order under clause (b) of sub-rule (2) of rule 7 and sub-rule (1) of rule 13 and Order No.104/24/2015/NA dated 22nd April, 2015 has allocated the Dumri Coal Mine Project of 1 MTPA in ML area of 279 ha located in North Karanpura Coalfields, Tehsil Terhesa, Dist. Hazaribagh (Jharkhand) to M/s Hindalco Industries Limited as the successful bidder.

6. Whereas, vide Gazette Notification S.O.811 (E) Notification dated 23rd March, 2015, MOEFCC has made amendments in paragraph 11 in the Gazette Notification S.O.1533 (E) dated 14th September, 2006. Vide the said amendment; where an allocation of coal block is cancelled in any legal proceeding; or by the Government in accordance with law, the environmental clearance granted in respect of such coal block may be transferred, subject to the same validity period as was initially granted, to any legal person to whom such block is subsequently allocated, and in such case, obtaining of "no objection" from either the holder of environment clearance or from the regulatory authority concerned shall not be necessary and no reference shall be made to the Expert Appraisal Committee or the State Level Expert Appraisal Committee concerned.

7. Whereas, pursuant to the Ministry of Coal vesting Order dated 22nd April, 2015 and MoEFCC Gazette Notification dated 23rd March, 2015, the EC granted vide letter No.J-11015/239/2008-IA.II (M) dated 23rd December, 2010 to M/s Nilachal Iron & Power Ltd for Dumri Coal Mine Project of 1 MTPA in ML area of 279 ha located in North Karanpura Coalfields, Tehsil Terhesa, District Hazaribagh (Jharkhand) was transferred to M/s Hindalco Industries Limited vide letter dated 28th October, 2016 subject to the following conditions:-

(i) Any change in scope of work will attract the provisions of Environment (Protection) Act, 1986 and the Environmental Impact Assessment Notification, 2006 in conjunction with the subsequent amendments/circulars.

(ii) All conditions stipulated in the EC letter No.J-11015/239/2008-IA.II (M) dated 23rd December, 2010 shall remain unchanged.

(iii) The successful bidder shall be liable, if any, for any act of violation of the said Act and the EIA Notification 2006/subsequent amendments and circulars which it has inherited during the transfer.

(iv) Successful bidder shall be liable for compliance of all court directions, if any.

(v) Mining shall be carried out in the forest area of 158.64 ha for which stage-FC has been obtained, out of the total forest land of 183 ha in the total mine lease area of 279 ha. No mining shall be done in the remaining 19.36 ha of forest area (excluding 5 ha for safety zone), committed to be surrendered. Also, mining lease shall be executed for the total mine lease area excluding the forest land of 19.36 ha, and shall be submitted to this Ministry.

8. Whereas, the matter regarding transfer of ECs involving forest areas where stage-I Forest Clearance is yet to be obtained, was deliberated in a meeting held in the Ministry on 12th January, 2017 under the Chairmanship of Secretary (EF&CC). Following decisions were taken during the meeting:-

- Transfer of ECs to the fresh allottees of the coal blocks involving forest area but not having Stage-I FC for the entire pocket of forest land, shall not be considered. The project proponent is required to first submit stage-I FC to take their proposals forward.
- In cases where Stage-I FC is not available for even a part of the total forest land, the project proponent shall be required to revise the mining plan accordingly followed by submitting the fresh proposals to obtain ECs as provided under the EIA Notification, 2006.

9. Whereas, transfer of EC dated 23rd December, 2010 for Dumri Coal Mine Project of 1 MTPA vide letter dated 28th October, 2016 was reviewed in the light of the above decisions, and it was considered that the transfer of EC is not in conformity with the decisions taken Accordingly, transfer of EC dated 28th October, 2016 was kept in abeyance till stage-I FC is available for the total forest land of 24.36 ha.

10. Whereas, M/s HIL has informed that stage-I FC for diversion of further 5 ha of forest land has been obtained on 22nd May, 2019, and the remaining forest land of 19.36 ha is proposed to be surrendered. Mine lease area thus gets reduced from 279 ha to 259.64 ha. The revised mining plan for the reduced mine lease area has the approval of Ministry of Coal vide their letter dated 24th October, 2018.

11. Whereas, the matter regarding Dumri Coal Mine transfer of ECs involving forest areas where forest land of 19.36 ha is proposed to be surrendered and stage-I Forest Clearance is yet to be obtained, was deliberated in a meeting held in the Ministry on 3rd September, 2019, under the Chairmanship of Secretary (EF&CC). During the meeting held between Secretary, Coal and Secretary, EFCC on 3rd September, 2019, It was decided to refer such cases to the sectoral EAC for early consideration on case to case basis based on merits involved. Therefore, the instant proposal was referred to the EAC for examination of impact of reduction of area on the attributes like dumping area, mining sequence, mine closure plan, etc.

12. Whereas, EAC in its meeting held on 3-4 October, 2019, after detailed deliberation, recommend to revoke the abeyance on transfer of EC for Dumri Coal Mine project of 1 MTPA located in North Karanpura Coal Fields, Tehsil Terhesa, District Hazaribagh, Jharkhand from M/s Nilachal Iron and Power Limited to M/s Hindalco Industries limited for a production capacity of 1 MTPA in the ML area of 259.64 Ha subject to the following conditions in addition to the terms and

conditions prescribed in the EC letter dated 23rd December, 2010 and 28th October, 2016 interalia including validity (copy of earlier Environmental Clearance is enclosed).

- The safety distance of at least 15 m shall be maintained all along the forest boundary.
- The project proponent shall develop greenbelt all along the mine boundary with broad leaved, native tree species.
- Control blasting techniques using NONEL and down the hole initiation shall be adopted while working near the forest boundary and habitations.
- The project proponent shall adhere to the approved mining plan for the ML area of 259.64 ha.
- The fund allocation for the CER shall be made as per the guidelines issued by the Ministry vide OM dated 1st May, 2018.

13. Based on recommendation of EAC, Ministry of Environment, Forest and Climate Change hereby revoke the abeyance on transfer of Environmental Clearance for Dumri Coal Mine project of 1 MTPA located in North Karanpura Coal Fields, Tehsil Terhesa, District Hazaribagh, Jharkhand from M/s Nilachal Iron and Power Limited to M/s Hindalco Industries limited for a production capacity of 1 MTPA in the ML area of 259.64 Ha subject to the all the conditions mentioned in para 12 above.

This issues with approval of the competent authority.


(Dr. R.B. Lal)
Additional Director / Scientist 'E'

Copy to:

1. The Secretary, Ministry of Coal, ShastriBhawan, New Delhi
2. The Secretary, Department of Environment & Forests, Government of Jharkhand, Secretariat, Ranchi (Jharkhand).
3. The PCCF (WL), Govt. of Jharkhand in regard to implementation of Wild Life Conservation Plan.
4. The Chief Conservator of Forests, Regional office (ECZ), Ministry of Environment Forest and Climate Change, Bungalow No. A-2, Shyamali Colony, Ranchi (Jharkhand) - 834002
5. The Member-Secretary, Jharkhand State Pollution Control Board, TA Building, HEC Complex, PO Dhurwa, Ranchi.

6. The Member-Secretary, Central Pollution Control Board, CBD-cum-Office Complex, East Arjun Nagar, Delhi 110032.
7. The Member-Secretary, Central Ground Water Authority, Ministry of Water Resources, Curzon Road Barracks, A-2, W-3 Kasturba Gandhi Marg, New Delhi.
8. The District Collector, Hazaribagh, Government of (Jharkhand).
9. Monitoring File 10. Guard File 11. Record File. 12. Notice Board


(Dr. R.B. Lal)
Additional Director / Scientist 'E'

Annexure-IV:
Copy of Transfer of Environmental Clearance

No.J-11015/239/2008-IA-II (M) Pt.
Government of India

Ministry of Environment, Forest & Climate Change
IA-II (Coal Mining) Division

Indira Paryavaran Bhawan
Jor Bagh, New Delhi
Dated: 28th October, 2016

To,

Asst. Vice-President -Corporate-Affairs
M/s Hindalco Industries Limited
Aditya Birla Centre,
3rd Floor, B wing, S.K. Ahire Marg,
Worli, **Mumbai** - 400030 (Maharashtra)

E-mail: vinod.verma@adityabirla.com

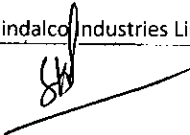
Sub: Transfer of Environmental Clearance for Dumri Coal Mine Project of 1 MTPA located in North Karanpura Coalfields, Tehsil Terhesa, Dist. Hazaribagh (Jharkhand) from M/s Nilachal Iron & Power Ltd to M/s Hindalco Industries Limited– reg

The Ministry of Environment, Forest and Climate Change (MoEFCC), in accordance with the Environmental Impact Assessment (EIA) Notification, 2006 and subsequent amendment thereto had accorded Environmental Clearance (EC) to M/s Nilachal Iron & Power Ltd for Dumri Coal Mine Project of 1 MTPA in ML area of 279 ha located in North Karanpura Coalfields, Tehsil Terhesa, District Hazaribagh (Jharkhand) subject to compliance of terms and conditions stipulated in the EC letter No. J-11015/239/2008-IA.II (M) dated 23rd December, 2010.

WHEREAS the Hon'ble Supreme Court of India vide judgment dated 25th August, 2014 read with its order dated 24th September, 2014 has cancelled the allocation of 204 coal blocks and issued directions with regard to such coal blocks wherein the Central Government in pursuance of the said directions has to take immediate action to implement the said order.

WHEREAS in pursuance of the judgment and order of the Hon'ble Supreme Court, the nominated authority has, in accordance with provisions of the Coal Mines (Special Provisions) Second Ordinance, 2014 and the Coal Mines (Special Provisions) Rules 2014 conducted the auction of the mines.

WHEREAS Ministry of Coal (MOC) vide its OM letter No. 43020/20/2014-CPAM dated 16th March, 2015 has informed MoEFCC that MOC has recently approved 23 coal blocks (15 coal blocks from Schedule II and 8 coal blocks from Schedule III of the Ordinance) through bidding to different successful bidders/companies. MOC has requested this Ministry to facilitate transfer of the Environment Clearance and Forest Clearance of these blocks to the new successful bidders.

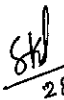


WHEREAS Ministry of Coal vide Vesting Order under clause (b) of sub-rule (2) of rule 7 and sub-rule (1) of rule 13 and Order no. 104/24/2015/NA dated 22nd April, 2015 has allocated the Dumri Coal Mine Project of 1 MTPA in ML area of 279 ha located in North Karanpura Coalfields, Tehsil Terhesa, Dist. Hazaribagh (Jharkhand) to M/s Hindalco Industries Limited as the successful bidder.

WHEREAS vide Gazette Notification S.O. 811 (E) Notification dated 23.03.2015, MOEFCC has made amendments to paragraph 11 in the Gazette Notification S.O.1533 (E) dated 14th September, 2006. Vide the said amendment; where an allocation of coal block is cancelled in any legal proceeding; or by the Government in accordance with law, the environmental clearance granted in respect of such coal block may be transferred, subject to the same validity period as was initially granted, to any legal person to whom such block is subsequently allocated, and in such case, obtaining of "no objection" from either the holder of environment clearance or from the regulatory authority concerned shall not be necessary and no reference shall be made to the Expert Appraisal Committee or the State Level Expert Appraisal Committee concerned.

WHEREAS pursuant to the Ministry of Coal vesting Order No. 104/24/2015/NA dated 22nd April, 2015 and MoEFCC Gazette Notification S.O. 811(E) dated 23rd March, 2015, the EC granted vide letter No.J-11015/239/2008-IA.II (M) dated 23rd December, 2010 to M/s Nilachal Iron & Power Ltd for Dumri Coal Mine Project of 1 MTPA in ML area of 279 ha located in North Karanpura Coalfields, Tehsil Terhesa, District Hazaribagh (Jharkhand) is hereby transferred to **M/s Hindalco Industries Limited** subject to the following conditions:


- (i) Any change in scope of work will attract the provisions of Environment (Protection) Act, 1986 and the Environmental Impact Assessment Notification, 2006 in conjunction with the subsequent amendments / circulars.
- (ii) All conditions stipulated in the EC letter No.J-11015/239/2008-IA.II (M) dated 23rd December, 2010 shall remain unchanged.
- (iii) The successful bidder shall be liable, if any, for any act of violation of the said Act and the EIA Notification 2006 /subsequent amendments and circulars which it has inherited during the transfer.
- (iv) Successful bidder shall be liable for compliance of all court directions, if any.
- (v) Mining shall be carried out in the forest area of 158.64 ha for which stage-FC has been obtained, out of the total forest land of 183 ha in the total mine lease area of 279 ha. No mining shall be done in the remaining 19.36 ha of forest area (excluding 5 ha for safety zone), committed to be surrendered. Also, mining lease shall be executed for the total mine lease area excluding the forest land of 19.36 ha, and shall be submitted to this Ministry.


28/10/2016
(S. K. Srivastava)
Scientist E

Copy to :

1. The Secretary, Ministry of Coal, Shastri Bhawan, New Delhi

2. The Secretary, Department of Environment & Forests, Government of Jharkhand, Secretariat, Ranchi (Jharkhand).
3. The PCCF (WL), Govt. of Jharkhand in regard to implementation of Wild Life Conservation Plan.
4. The Chief Conservator of Forests, Regional office (ECZ), Ministry of Environment Forest and Climate Change, Bungalow No. A-2, Shyamali Colony, Ranchi (Jharkhand) - 834002
5. The Member-Secretary, Jharkhand State Pollution Control Board, TA Building, HEC Complex, PO Dhurwa, Ranchi.
6. The Member-Secretary, Central Pollution Control Board, CBD-cum-Office Complex, East Arjun Nagar, Delhi 110032.
7. The Member-Secretary, Central Ground Water Authority, Ministry of Water Resources, Curzon Road Barracks, A-2, W-3 Kasturba Gandhi Marg, New Delhi.
8. The Advisor, Coal India Limited, SCOPE Minar, Core-I, 4th Floor, Vikas Marg, Laxmi Nagar, New Delhi.
9. The District Collector, Hazaribagh, Government of (Jharkhand).
10. Monitoring File 10. Guard File 11. Record File. 12. Notice Board


28/10/2016
(S. K. Srivastava)
Scientist E

Annexure-V:
Copy of Environmental Clearance



Ministry of Environment & Forests (MOEF)

No. J-11015/239/2008-IA.II (M)

Paryavaran Bhawan,
CGO Complex,
New Delhi-110510.

To

Dated: 23rd December 2010

Shri Arun Sinha,
GM, Corporate Affairs,
M/s Nilachal Iron & Power Ltd.,
Jajodia Mansion, 5, Bentinck Street,
KOLKATTA - 700 001.

Sub: Dumri Coal Mine Project (1 MTPA in ML area 279 ha) of M/s Nilachal Iron & Power Ltd., located in North Karanpura Coalfields, Tehsil Terhesa, Dist. Hazaribagh, Jharkhand - Environmental Clearance – reg.

Sir,

This is with reference to letter No. Nil dated 24.4.2008 enclosing an application for Terms of Reference (TOR) and this Ministry's grant of TOR vide letter dated 25.08.2008 and application for environmental clearance dated 30.11.2009 and subsequent letters dated 21.12.2009, 15.03.2010, 11.06.2010, 29.10.2010 and e-mails dated 21.12.2010 and 22.12.2010. The Ministry of Environment & Forests has considered the application. It is noted that the project is for opening a new opencast coalmine - **Dumri Opencast Coal Mine Project of 1 tonnes per annum (MTPA) rated capacity in a total ML area of 279 ha in North Karanpura Coalfields.** The mine is captive to the company's sponge iron plant and for M/s Bajrang Ispat Pvt. Ltd. Of the total ML area, forest land is 183 ha which includes surface water bodies of 8 ha, agricultural land 83 ha, waste land 6 ha, settlements 10 ha. Of the total forestland of 183 ha within the ML consist of medium-dense forest and open forest. Forestry clearance has been applied for. There are no National Parks, Wildlife Sanctuary, Biosphere Reserves found in the 15 km buffer zone. However there are a number of reserved and protected forests in the study area. A number of Schedule-I and II fauna such as the Sloth Bear, Indian Wolf, Spotted Deer, Sambar, Leopard, Indian Monitor Lizard have been reported in the study area as per study done for the projects of other neighbouring coal blocks such as Chhattibaritau, Kerandari, etc. An area of 93 ha of forest along the western side of the ML which is non-mineralised is not proposed to be acquired and this land left unused out of the ML could serve as a corridor/passageway for the movement of wild animals to and from forest areas adjoining the block. A number of seasonal nallahs pass through the block. The Bandori Nala flowing through the ML joins River Hendraj flowing SE to the mine in the buffer zone, which joins River Ghagra and River Haharo, a tributary of River Damodar. It is proposed to modify the natural drainage by diversion of 2km stretch of the Baldeori nala and realign it to its original course at the lease boundary. A 2m high boundary wall of the embankment on the eastern side of the nala would be erected over the 2km stretch of the embankment along the diverted nala to ensure that the animals do not stray into the quarry area.

The project is opencast by mechanised method involving shovel-and-dumper and blasting. Of the total ML area of 279 ha, area to be excavated is 208 ha, area for ext. OB dumps 7.5 ha, area for mineral storage/coal handling 6.5 ha, infrastructure area 5.05 ha, roads 2 ha, nala diversion and embankment 21 ha, sedimentation tank is 1.45 ha, safety zone 4.5 ha, and green belt 23 ha. The rated capacity would be achieved by 4th year of production. The mine is proposed to be mined in two main quarries with a central haul road. Ultimate working depth 160m bgl. Grade of coal is F. CHP is proposed. No mineral beneficiation is proposed. An estimated 125.26 Mm³ of OB would be generated over the life of the mine of which 121.76 Mm³ would be backfilled and the balance 3.50 Mm³ would be stored in one ext. OB dump created within the mineralised area in an area of 7.5 ha and the OB would be rehandled and backfilled from the 7th year of operation. No OB would be dumped on forestland. No underground mining is envisaged. An approach road of 10 km would be constructed. The mineral transportation would be initially by road upto the 5th year and therefore would shift to rail transportation for which a new rail link would require to be established. Alternately, transportation would be by belt conveyor. Water table is in the range of 6.04 -7.10m bgl during pre-monsoon and 2.5-3.5m bgl during post-monsoon. Peak water requirement is 1000 m³/d is to be met from mine pit water except during the initial phase when 120 m³/d of water would be drawn from tubewells or from the nala. Project involves R&R (1737 PAPs and 534 PAFs consisting of land and homestead losers) of 5 villages – Pagar (68 PAPs), Balia (74 PAPs), Tunda, Pandu (1435 PAPs), Chati-Bariatu (160 PAPs), Estimated cost of Phase-I of R&R of villages of Pagar and Balia would be Rs 297.30 lakhs. An amount of Rs 2 crores has been earmarked for maintenance of R&R colony. Anticipated life of mine at the rated capacity of 1 MTPA is 44 years. Public Hearing was held on 07.09.2009. Mining Plan was approved by Ministry of Coal on 09.01.2008. Capital cost of project is **Rs. 170 crores.**

2. The Ministry of Environment & Forests has examined the application in accordance with the EIA Notification 2006 and under the provisions thereof, hereby accords environmental clearance for the above-mentioned **Dumri Opencast Coal Mines of 1 MTPA rated capacity in an ML area of 279 ha of M/s Nilachal Iron & Power Ltd.,** under the provisions of the Environmental Impact Assessment Notification, 2006 and amendments thereto and Circulars issued thereon and subject to the compliance of the terms and conditions mentioned below:

A. Specific Conditions

- (i) The maximum production of coal shall not exceed 1 MTPA.
- (ii) No mining shall be carried out in the 183 ha of forestland until prior forestry clearance is obtained under FC Act 1980. No OB shall be dumped on forestland.
- (iii) The stretch of nala flowing in the west-central part of the ML shall not be disturbed. Prior approval of the Flood and Irrigation Department of the State Government shall be obtained for the proposed diversion of 2km stretch of Baldeori nala and realignment of the diverted nala along the fault lines and for design of the embankment. A minimum safe distance of 60m distance shall be maintained between the realigned nala and the mine. The embankment of 2km along the diverted stretch of the nala shall be a minimum 3m higher than the HFL of the nala and 30m wide at the bottom. The slope of the embankment shall at least 2:1 towards the ML, compacted and stone pitching shall be done towards the river and the embankment shall be stabilised with plantation. Materials such as OB shall be tested for strength before using for construction of embankment.
- (vi) Top soil shall be stored in the earmarked site and shall be used within a year of its generation for green belt development and for plantation/reclamation.
- (vii) OB shall be temporarily stored on mineralised area and rehandled by 7th year of mining operations. Monitoring and management of existing reclaimed dumpsites including slope stability

shall continue until the vegetation becomes self-sustaining. Compliance status shall be submitted to the Ministry of Environment & Forests and its Regional office located at Bhubaneswar on a yearly basis.

- (vii) Garland drains (size, gradient and length) around the safety areas and low lying areas and sump capacity shall be designed keeping 50% safety margin over and above the peak sudden rainfall and maximum discharge in the area adjoining the mine sites. Sump capacity shall also be provided adequate retention period to allow proper settling of silt material.
- (ix) Catch drains and siltation ponds of appropriate size shall be constructed to arrest silt and sediment flows from soil, OB and mineral dumps. The water so collected shall be utilized for watering the mine area, roads, green belt development, etc. The drains shall be regularly desilted and maintained properly.
Garland drains (size, gradient and length) and sump capacity shall be designed keeping 50% safety margin over and above the peak sudden rainfall and maximum discharge in the area adjoining the mine site. Sump capacity shall also provide adequate retention period to allow proper settling of silt material.
- (x) Dimension of the retaining wall at the toe of the dumps and OB benches within the mine to check run-off and siltation shall be based on the rainfall data.
- (xi) Crushers at the CHP shall be operated with high efficiency bag filters/water sprinkling system shall be provided to check fugitive emissions from crushing operations, conveyor system which shall be closed, haulage roads, transfer points, etc.
- (xii) Drills shall be wet operated only.
- (xiii) Controlled blasting shall be practiced with use of delay detonators and only during daytime. The mitigative measures for control of ground vibrations and to arrest the fly rocks and boulders shall be implemented.
- (xiv) The main Approach road of 10km shall be black topped and developed with 3-tier avenue plantation using a mix of species suitable for controlling fugitive dust emissions.
- (xv) Coal transportation to proposed Tori Railway siding by trucks covering a distance of 8 km shall be until the 8th year of mine operations only and thereafter coal transportation shall be by rail from the proposed Railway siding on the proposed Tori-Shibpur-Hazaribagh railway line. The rail link and route for coal evacuation from the mine shall form a part of an integrated plan for the entire North Karanpura Coalfields. Until the railway siding and the rail link is established of the, coal transport is permitted by road using a minimum 20-T trucks (160 trips/day) to Churi Railway siding at a distance of 42 km.
- (xvi) A Plan for afforestation of not less than 196 ha of the mine lease shall be implemented, which includes backfilled quarries (178 ha), ext. OB dump (7.5 ha), mineral storage area (6.5 ha), along ML boundary, along roads, infrastructure (4 ha), safety zone, embankment, colony including R&R colony outside the ML and the 32 ha area falling between the forestland left out of the ML and between the embankment shall be thickly vegetated by planting native species in consultation with the local DFO/Agriculture Department. The density of the trees shall be around 2500 plants per ha.
- (xvii) Of the total quarry area of 208 ha, an area of 178 ha shall be backfilled and reclaimed with plantation and the balance 30 ha of the de-coaled void being converted into a water reservoir not exceeding 30m depth at the post mining stage shall be gently sloped along the higher benches

and stabilised by plantation/afforestation by planting native plant species in consultation with the local DFO/Agriculture Department. The density of the trees shall be around 2500 plants per ha.

- (xxiii) A Project specific Conservation Plan for endangered Schedule-I and II faunal species reported in the study area shall be prepared and implemented in consultation with the State Forest and Wildlife Departments. The Plan shall include conservation of fauna found in the core and buffer zone in conjunction with the neighbouring mines which come up in the area to allow movement of these fauna passing through the project area into the buffer zone. The project authorities shall also participate in a Regional Conservation Plan as and when prepared in the future for the conservation of flora-fauna found in the region as a whole including a budgetary support over the life of the project. The status of budgetary provision of capital and revenue expenditure on the various activities under the Project specific and Regional WL Conservation Plan and the status of the Plans shall be regularly reported to the MOEF RO and also uploaded on the company website.
- (xvii) No groundwater shall be used except during the initial phase of mine operations until mining intersects the water table and thereafter only mine pit water shall be used. Any additional water requirement shall be met from mine water and from rainwater harvesting systems.
- (xvii) Regular monitoring of groundwater level and quality shall be carried out by establishing a network of existing wells and construction of new piezometers. The monitoring for quantity shall be 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 shall be submitted to the Ministry of Environment & Forests and to the Central Pollution Control Board quarterly within one month of monitoring.
- (xviii) The Company shall put up artificial groundwater recharge measures for augmentation of groundwater resource in case monitoring of groundwater levels indicate decline of water table. Any additional water requirement for mining operation shall be met from rainwater/recycling of water only. The project authorities shall meet water requirement of nearby village(s) in case the village wells go dry due to dewatering of mine.
- (xix) ETP shall also be provided for treatment of effluents from workshop, CHP and an STP shall be provided for treating wastewater from the township and the treated effluents shall be used for green belt development. Wastewater generated from the mine shall be treated and recycled for mine operations to the extent possible and the balance shall be treated to prescribed standards before discharge into the surface waters/agricultural use.
- (xx) 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, Ahmadabad within a period of one year and the results reported to this Ministry and to DGMS.
- (xxi) For monitoring land use pattern and for post mining land use, a time series of landuse maps, based on satellite imagery (on a scale of 1: 5000) of the core zone and buffer zone, from the start of the project until end of mine life shall be prepared once in 3 years (for any one particular season which is consistent in the time series), and the report submitted to MOEF and its Regional office at Bhubaneswar.
- (xxii) A detailed project specific R&R Plan prepared for the villages Pagar, Balia, Tunda, Pandu, Chatti-Bariatu comprising about 1737 PAP & 534 PAFs and land & house losers shall be implemented within an agreed time frame. R&R Plan for a cost of Rs 297.30 lakhs shall be implemented initially in consultation with the stakeholders of the villages- Pagar and Balia to be shifted in Phase-I. R&R shall be based on norms laid down/approval by the State Government and shall not be

inferior than that in the National R&R Policy and shall be completed within a specified time-frame. R&R shall include specific income generation schemes. A Corpus Fund of Rs 2 crores shall be created for maintenance of the R&R colony. Annuities of not less than Rs 1500/month shall be provided for persons of vulnerable sections of the displaced population. Alternate livelihood schemes shall be implemented for the persons not being absorbed for employment. The daily wages persons/labourers who are regularly used by the company on a long term basis may also be provided housing and other amenities as regular employees. In addition, 1% of the profits will be disbursed to the displaced population as per the State Govt. R&R Policy.

- (xxiv) A minimum provision of Rs 1 crore shall be earmarked as capital expenditure and Rs 5/tonne of coal towards recurring expenditure. Initially, activities under CSR would be undertaken for the adjoining villages such as Dumri, Manatu and Gopda in stage-I and extending to other villages in Stage-II. Monitoring of the socio-economic status of the local communities living in the villages near the project area shall be based on a scientific methodology such as the UNDP Human Development Index. Report of the monitoring of the impacts of project on the socio-economic and human development of the local communities shall be regularly reflected in the Annual Report of the company and also furnished as part of the Monitoring Report submitted to MOEF.
- (xxv) A Final Mine Closure Plan along with details of Corpus Fund shall be submitted to the Ministry of Environment & Forests three years before completion of this project. Habitat Restoration Plan of the mine area shall be carried out using a mix of native species found in the original ecosystem.

B. General Conditions

- (i) No change in technology and scope of working shall be made without prior approval of the Ministry of Environment and Forests.
- (ii) No change in the calendar plan including quantum of mineral coal and waste being produced shall be made.
- (iii) Four ambient air quality monitoring stations shall be established in the core zone as well as in the buffer zone for monitoring PM_{10} , $PM_{2.5}$, SO_x and NO_x . 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. Monitoring of heavy metals such as Hg, As, Ni, Cd, Cr, in particulates shall be carried out at least once in six months.
- (iv) Data on ambient air quality (PM_{10} , $PM_{2.5}$, SO_x and NO_x and heavy metals such as Hg, As, Ni, Cr, etc) and other monitoring data shall be regularly submitted to the Ministry including its Regional Office at Bhubaneswar and to the State Pollution Control Board and the Central Pollution Control Board once in six months. Random verification of samples through analysis from independent laboratories recognised under the EP Rules, 1986 shall be furnished as part of the compliance report.
- (v) Adequate measures shall be taken for control of noise levels below 85 dBA in the work environment. Workers engaged in blasting and drilling operations, operation of HEMM, etc shall be provided with ear plugs/muffs.
- (vi) Industrial wastewater (workshop and wastewater from the mine) shall be properly collected, and treated so as to conform to the standards including for heavy metals before discharge prescribed under GSR 422 (E) dated 19th May 1993 and 31st December 1993 or as amended from time to time. Oil and grease trap shall be installed before discharge of workshop effluents.


- (vii) Vehicular emissions shall be kept under control and regularly monitored. Vehicles used for transportation of the mineral shall be covered with tarpaulins and optimally loaded.
- (viii) Monitoring of environmental quality parameters shall be carried out through establishment of adequate number and type of pollution monitoring and analysis equipment in consultation with the State Pollution Control Board and data got analysed through a laboratory recognised under EP Rules, 1986.
- (ix) Personnel working in dusty areas shall wear protective respiratory devices and they shall also be provided with adequate training and information on safety and health aspects.
Occupational health surveillance programme of the workers shall be undertaken periodically to observe any contractions due to exposure to dust and to take corrective measures, if needed.
- (x) 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.
- (xi) The funds earmarked for environmental protection measures shall be kept in separate account and shall not be diverted for other purpose. Year-wise expenditure shall be reported to this Ministry and its Regional Office at Bhubaneshwar.
- (xii) The Project authorities shall advertise at least in two local newspapers widely circulated around the project, one of which shall be in the vernacular language of the locality concerned within seven days of the clearance letter informing that the project has been accorded environmental clearance and a copy of the clearance letter is available with the State Pollution control Board and may also be seen at the website of the ministry of Environment & Forests at <http://envyfor.nic.in>
- (xiii) A copy of the environmental clearance letter shall be marked to concerned Panchayat/Zila Parishad, Municipal Corporation or Urban Local Body and local NGO, if any, from whom any suggestion/representation has been received while processing the proposal. A copy of the clearance letter shall also be displayed on the company's website.
- (xiv) A copy of the clearance letter shall be displayed on the website of the concerned State Pollution Control Board. The EC letter shall also be displayed at the Regional Office, District Industry Centre and Collector's Office/Tehsildar's Office for 30 days.
- (xv) The clearance letter shall be uploaded on the company's website. The compliance status of the stipulated EC conditions shall also be uploaded by the project authorities on their website and updated at least once every six months so as to bring the same in the public domain. The monitoring data of environmental quality parameters (air, water, noise and soil) and critical pollutants such as PM10, PM2.5, SO₂ and NO_x (ambient) and critical sectoral parameters shall also be displayed at the entrance of the project premises and mines office and in corporate office and on the company's website.
- (xvi) The project proponent shall submit six monthly reports on the status of compliance of the stipulated environmental clearance conditions (both in hard copy and in e-mail) to the respective Regional Office of the MOEF, the respective Zonal offices of CPCB and the SPCB.
- (xvii) The Regional Office of this Ministry located at Bhubaneshwar shall monitor compliance of the stipulated conditions. The Project authorities shall extend full cooperation to the office(s) of the Regional Office by furnishing the requisite data/ information/monitoring reports.

(xviii) The environmental statement for each financial year ending 31st March in Form-V is mandated to be submitted by the project proponent to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently, shall also be uploaded on the company's website along with the status of compliance of EC conditions and shall be sent to the respective Regional Offices of the MOEF by E-mail.

3. The Ministry or any other competent authority may stipulate any further condition for environmental protection.

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.

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 undertake and 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.


(Dr.T.Chandini)
Director

Copy to:

1. Secretary, Ministry of Coal, Shastri Bhawan, New Delhi.
2. DG (F) and Special Secretary, MOEF, New Delhi.
3. Principal Chief Conservator of Forests, Biodiversity Conservation and Chief Wildlife Warden, Govt. of Jharkhand, Ranchi w.r.t. Special Condition No. (xxiii) and (xxv)
4. Secretary, Department of Environment & Forests, Government of Jharkhand, Secretariat, Ranchi.
5. Chief Conservator of Forests, Regional office (EZ), Ministry of Environment & Forests, A/3 Chandrashekarpur, Bhubaneswar - 751023.
6. Chairman, Jharkhand State Pollution Control Board, TA Building, HEC Complex, PO Dhurwa, Ranchi.
7. Chairman, Central Pollution Control Board, CBD-cum-Office Complex, East Arjun Nagar, New Delhi -110032.
8. Member-Secretary, Central Ground Water Authority, Ministry of Water Resources, Curzon Road Barracks, A-2, W-3 Kasturba Gandhi Marg, New Delhi.
9. District Collector, Hazaribagh, Government of Jharkhand.
10. Monitoring File 11. Guard File 12. Record File.

Annexure-VI:
Environment Management Cell



Dated: 03.05.2021

OFFICE ORDER

A separate Environmental Management Cell with suitable qualified personnel has been set up under the control of Senior Executive, who will report directly to the Head of the unit. The Environmental Management Cell will ensure compliance of various Environmental Acts, Rules and Regulation application to Dumri Coal Mine, Hindalco Industries Ltd., Dist.- Hazaribag, Jharkhand.

The Environmental Management Cell consists of the following personnel:

1. Mr. Mainak Chakraborty, VP & Head, Dumri Coal Mine, CONVENOR

Members:

1. Mr. Manoranjan Kumar Singh, AGM (Mines Operation & Production), Dumri Coal Mine
2. Dr. Rahul Mitra, Asst. Manager (Geology), Dumri Coal Mine
3. Mr. Md. Imran, Asst. Manager (Mines Survey), Dumri Coal Mine
4. Mr. Vishal Kashyap, Deputy Manager (Land), Dumri Coal Mine
5. Mr. Sanjay Singh, Manager (Security & Liaison), Dumri Coal Mine

By Order

Vivek Mishra
Head-Coal Mining (JH & CG)
Hindalco Industries Ltd.

Cc to:

1. All concerned
2. Notice Board