Regd Post with A/D

Ref.No.: MGM/P&E/189/20

Date: 28/6/2020

To,
The Additional Director,
Ministry of Environment and Forest & Climate Change,
Eastern Region Office,
A/3, Chandrasekharpur,
Bhubaneswar-751023

Subject: Submission of half-yearly compliance report on the stipulated environmental clearance terms and conditions in respect of Bamebari Iron and Manganese Mine of M/s TATA Steel Ltd., for the period from October'2019 to March'2020.

Reference:
1) MoEF Letter Ref No: J-11015/85/2003-IA. II(M) DATED 17th Nov 2005.
2) MoEF&CC's notification vide S.O-5845 (E), dt. 28th Nov 2018.

Respected Sir,

We are herewith submitting the six-monthly compliance report on the status of the implementation of the conditions stipulated in environmental clearance awarded to us vide MoEF Letter Ref No: - **J-11015/85/2003-IA. II(M) DATED 17.11.2005** in respect of Bamebari Iron and Manganese Mine of M/s TATA Steel Ltd. for the period from October'2019 to March'2020 for your kind perusal.

This is in reference to the MoEF&CC's notification vide S.O-5845, dt. 28th Nov 2018, the six-monthly compliance report is being submitted only in soft copy mode, shared with your good office at e-mail @ roez.bsr-mef@nic.in.

We believe the above submission is in order.

Thanking you,

Yours faithfully,

F: TATA STEEL LTD.

Head
Mine & Production Planning
Manganese Group of Mines
Encl: As above.
Copy To:
1) Zonal Office Kolkata, Central Pollution Control Board, South end Conclave, Block 502, 5th and 6th Floors, 1582 Rajdanga Main Road, Kolkata, West Bengal 700107.
2) The Member Secretary, State Pollution Control Board, A/118, Nilakantha Nagar, Bhubaneswar, Odisha-751012.
3) The Regional Officer, State Pollution Control Board, Baniapat, DD College Road, Keonjhar, Odisha-758001.

TATA STEEL LTD.
Ferro Alloys & Minerals Division, Manganese Group of Mines, At/P.O.: Bichhakundi, Via: Joda,
Dist: Keonjhar Odisha – 758 034 Tel.: 9238101370, e-mail : mnminesadmin@tatasteel.com
Regd.Office : Bombay House, 24 Homi Modi Street, Mumbai – 400 001 Tel 912266658282, Fax 912266657724
Corporate Identity Number L27100MH1907PLC000260 website : www.tatasteel.com

Half-Yearly Compliance Report

On

Environmental Clearance Conditions

(MoEF Letter Ref No: - J-11015/85/2003-IA. II(M) DATED 17.11.2005)

Period: October'2019 – March'2020

Submitted By:

Bamebari Iron & Manganese Mine

M/s. Tata Steel Limited

At/Po: Bamebari, Via-Joda

District- Keonjhar, Odisha -758034

Table of Contents

S.No.	Title/Chapter	Page No.
1.	Compliance Status to EC……	3-13 (of 34)
2.	Annexure-I-Environmental Monitoring ……	14-34 (of 34)

Compliance to the Environment Clearance Letter No: -11015/85/2003-IA. II(M) DATED 17.11.2005 in respect of Expansion of Bamebari Manganese Mines of M/s Tata Steel Limited for the enhancement of production capacity to a capacity of 0.83LTPA, in villages Bamebari, Boneikala and Joribar, Tehsil Barbil, District-Keonjhar, Odisha

Table. A. Specific Condition:

Sl. No	Specific Condition	Compliance Status (Oct'19 to March'20)
(i)	Mining shall not be undertaken in areas of forestland within the lease without the necessary approvals / forestry clearance.	We have obtained Forest Clearance vide MoEF's letter No 8-72/2004-FC dt 25.01.2007 over an area of 145.329 ha of forest land for Bamebari Iron & Mn. Mines. Further, in the year 2015, MoEF notified the legal status of Sabik Kisam of Forest land as on 25.10.1980) as forest land, vide Circular No. F.No.8-78/1996-FC, dated.10.03.2015, due to which applicability of forest clearance over an area of 66.126 ha. of prevailing non-forest land becomes a legal requirement. Accordingly, forest diversion proposal over an area of 303.066 ha (Sabik forest & Balance forest) has been applied on 19.06.2016, the same is under process. Portion of the land (non-forest prior to the circular of 2015) were already broken up as per the prevailing statute. The mining operation and allied activities are confined within the approved diverted area only.
(ii)	Topsoil should be stacked properly with proper slope at earmarked site(s) with adequate measures and should be used for reclamation and rehabilitation of mined out area.	**Complied.** No top soil generated during the period October'19 to March' 20. Top Soil recovered during mining operation is concurrently being used for the development of plantation activities.
(iii)	OB and other wastes should be stacked at earmarked sites only and should not be kept active for long periods of time. Plantation should be taken up for soil stabilization along the slopes of the dump and terraced after every 5-6 m of height and overall slope angle shall be maintained not exceeding 28°. Sedimentation pits shall be constructed at the corners of the garland drains. Retention/toe walls shall be provided at the base of the dumps.	**Agreed & Complied.** OB and other wastes are being dumped as per Scheme of Mining approved by Indian Bureau of Mines. The dump is terraced at every 10m and overall slope is maintained well within 28° as per approved Scheme of Mining. Dump stabilization is carried out by means of Vertiber Plantation followed by plantation of native forestry species saplings. During Oct'19 to March'20, Plantation of around 3000 Nos of saplings have been completed. Total plantation for FY 2019-20 for the dump and other available fonts is 10150Nos. Local forest species planted are Gambhari, Neem, Mahaneem, Sisam, Karanj, Sal, etc. The retaining wall and garland drain with sedimentation pit have been provided along the periphery of all the dumps. De-

Sl. No	Specific Condition	Compliance Status (Oct'19 to March'20)
		silting of the drains and sedimentation pits are ensured every year before the onset of monsoon.
(iv)	Minerals rejects shall be stacked separately at earmarked site/dump only.	**Complied** The mineral rejects generated during manual processing of manganese ore (i.e. sorting, dressing and sizing) has been stacked separately at earmarked site.
(v)	Catch drains and siltation ponds of appropriate size should be constructed to arrest silt and sediment flows from soil, OB and mineral dumps. The drains should be regularly desilted and maintained properly. Garland drains (size, gradient & length) and sump capacity should be designed keeping 50% safety margin over and above the peak sudden rainfall and maximum discharge in the area adjoining the mine site. Sump capacity should also provide adequate retention period to allow proper settling of silt material. Storm water return system should be provided. Storm water should not be allowed to go to the effluent treatment plant during high rainfall/super cyclone period. A separate storm water sump for this purpose should be created.	**Complied.** Existing catch drains and garland drains are covering the entire dump slope at low lying part. Size, gradient and length of the drains are adequate to take care of the peak flow. A series of check dams and settling pits have been provided for proper settlement of suspended solid in surface runoff. The garland drain, catch drains and sedimentation pits are periodically de-silted and maintained properly every year before the onset of monsoon.
(vi)	Dimension of retaining wall at the toe of OB dumps and benches within the mine to check run-off and siltation should be based on the rainfall data.	**Complied** Retaining wall and garland drain with the dimension as specified below, are provided to prevent the siltation and check the run-off. Dimension of the Retaining Wall: Height – 1 to 1.2 mtr. Width – 1 mtr. Dimension of the Garland Drain: Depth – 1.20 to 1.5 mtr. Width – 1 to 1.2 mtr.
(vii)	Trace Metals such as Ni, Co, As and Hg should be analyzed in dust fall and soil samples for at least one year during summer, monsoon and winter seasons. If concentrations of these metals are found below the standards then with prior approval of MOEF this specific monitoring could be discontinued.	**Complied.** Dust Fall Analysis of soil samples for the prescribed parameters are being varied out on periodic manner. Please Refer to **Annexure-I** (Environmental Monitoring Report for Oct'19 to Mar'20).
(viii)	Mineral and OB transportation shall be in trucks/dumpers covered with tarpaulins. Vehicular emissions should be kept under control and regularly monitored. Suitable measures should be taken to check fugitive emissions from haulage	**Complied.** The trucks are being covered with tarpaulin during dispatch of manganese ore from mine to Ferro Alloys Plant and Railway Siding at Joda. OB is being transported by shovel – dumper combination from mine face to dump yard, and since the movement is restricted within the mining area and frequent in nature thus covering by means of

Sl. No	Specific Condition	Compliance Status (Oct'19 to March'20)
	roads & transfer points, etc.	tarpaulins is not practiced and feasible from safety point of view. All the trucks meant for transportation of mineral from mine to our captive plant & Railway Siding at Joda is bearing the "Pollution under Control' certificate. Haul road and other areas having potential for producing air borne dust are sprinkled regularly with help of mobile sprinklers. Beside this fixed sprinkler has also been provided in main haul road in Joribar block of Bamebari Iron and Manganese Mine.
(ix)	A green belt of adequate width should be raised by planting the native species around ML area. Plantation should also be carried out along roads, OB dump sites etc. in consultation with the local DFO *I* Agriculture Department. The density of the trees should be not less than 2500 plants per ha.	**Complied.** Plantation is an integral part of the progressive mine closure plan approved by Indian Bureau of Mines. Greenbelt development is practiced in line with the Safety Zone norms of the Forest statute. As per the approved Reclamation and Rehabilitation plan, plantation of around 4.42 lakh nos. of saplings over an area of around 73.37 ha has been completed as on 31st March 2020. • We have planted about 10150 numbers of saplings and 16000 vetiver slips in the fiscal year 2019-20 ensuring density above 2500 plants per ha. • The plantation includes the local species forest species like Gambhari, Sal, Neem, Mahaneem, Sisam, Karanj, etc.
(x)	Groundwater shall not be used for mine operations. Prior approval of CGWA shall be obtained for using groundwater.	**Complied** NOC from Central Ground Water Authority has been obtained vide NOC No. CGWA/NOC/MlN/ORIG/2018/3899, dt. 09.08.2018 for the drawl of 130cum/day and not exceeding 47450 cum in a year of ground water.
(xi)	Mining will not intersect groundwater. Prior permission of the MOEF and CGWA shall be taken to mine below water table.	**Complied** Presently, Mining has not intersected the ground water table as the Ground water being at lower level in comparison to prevailing maximum quarry depth, However in Joribar block seepage of very minimal potential was evidenced in the past. During the renewal of NOC, it shall be regularised as per the applicability of ground water seepage.
(xii)	Regular monitoring of ground water level and quality should be carried out by establishing a network of existing wells and constructing new piezometers. The monitoring should be done for quantity four times a year in pre-monsoon (April / May), monsoon (August). Post-monsoon (November) and winter (January) seasons and for quality in May. Data thus collected should be submitted to the MoEF & CGWA quarterly.	**Complied** Ground water table is much below the existing mine workings because of mining operations are confined at hilly topography only. However, ground water level & quality at existing well at nearby villages are being monitored. One Piezometer has been fitted with telemetric system for real-time surveillance of ground water level and the user ID & Password has been shared with CGWA. Ground Water Level is enclosed in the

Sl. No	Specific Condition	Compliance Status (Oct'19 to March'20)
		Environmental Monitoring Report, enclosed as **Annexure-I.**
(xiii)	Regular monitoring of ground water level and quality should be carried out by establishing a network of existing wells and constructing new piezometers. The monitoring should be done for quantity four times a year in pre-monsoon (April / May), monsoon (August). Post-monsoon (November) and winter (January) seasons and for quality in May. Data thus collected should be submitted to the MoEF & CGWA quarterly.	**Complied** Ground water level & quality at existing well at nearby villages are being monitored. For real-time monitoring of ground water level one telemetric system has also been established. User ID and Password for the telemetric system has been shared with CGWA. Please Refer to Environmental Monitoring Report enclosed as **Annexure-I.**
(xiv)	Trace metals such as Fe, Cr+6, Cu, Se, As, Cd, Hg, Pb, Zn and Mn at specific locations for both surface water downstream and in ground water at lower elevations from mine area, shall be periodically monitored in consultation with the OSPCB and State Ground Water Board. Suitable treatment measures shall be undertaken in case levels are found to be higher than permissible limits.	**Complied**. Trace metals such as Fe, Cr^{6+}, Cu, Se, As, Cd, Hg, Pb, Zn and Mn at specific locations for both surface water (downstream & upstream) and ground water at lower elevation is being periodically monitored by engaging an NABL Accredited Lab. The details of analysis are enclosed as **Annexure – I.**
(xv)	"Consent to Operate" should be obtained from SPCB before expanding mining activities.	**Complied.** Consent to operate has been obtained from Odisha State Pollution Control Board vide Consent No. 117 vide letter no. 8917/ IND-I-CON-189 dated 29.08.2019, valid up to 31.03.2021.
(xvi)	A Conservation Plan for conservation of endangered fauna including the Indian Elephant found in and around the mine area shall be prepared and implemented in consultation with identified agencies/institutions and with the State Forest Department. The Plan should be dovetailed with that prepared / under implementation / proposed for the endangered fauna found in the Reserve Forest in the buffer zone of the project site. The costs for the specific activities/taslcs should be earmarked in the Conservation Plan and shall not be diverted for any other purpose. Year.wise status of the implementation of the Plan and the expenditure thereon should be reported to the Ministry of Environment & forests, RO, Bhubaneshwar.	**Complied.** A regional wild life conservation plan has been prepared by the state forest department for Bonai & Keonjhar divisions. Towards the implementation cost, we have deposited the fund as assessed by the divisional forest officer. Details is as follows: 1. Rs. 45,05,554/- on 14.12.2005 2. Rs. 47,74,446/- on 27.03.2013 3. Rs. 10672000/- on 24.02.2015 Apart from this, we have also deposited an amount of Rs. 4,69,81,000/- on 15.02.2018 for the implementation of site Specific wildlife management plan, prepared by state forest department.
(xvii)	A Final Mine Closure Plan along with details of Corpus Fund should be submitted to the Ministry of Environment & Forests 5 years in advance of final mine closure for approval.	**Complied.** Progressive Mine Closure Plan for the period 2018-19 to 2019-20 has been approved by Indian Bureau of Mines.

Sl. No	Specific Condition	Compliance Status (Oct'19 to March'20)
		The final mine closure plan along with details of Corpus fund will be submitted to the Ministry of Environment & Forests 5 years in advance of final mine closure for approval.

Table. B General Conditions

Sl. No	General Condition	Compliance Status (Oct'19 to March'20)
i.	No change in mining technology and scope of working should be made without prior approval of the Ministry of Environment & Forests.	**Complied.** No change in mining technology and scope of working has been made at the mine. If any changes proposed in technology and scope of workings, prior approval shall be sought from Ministry of Environment & Forests.
ii.	No change in the calendar plan including excavation, quantum of manganese ore and waste should be made.	**Complied.** Calendar plan as approved in the mining scheme by Indian Bureau of Mines is complied. **Plan Vs. Actual (2019-20)** (2019-20) | Plan | Actual Production (MT) | 83,200 | 92223.00
iii.	Four ambient air quality-monitoring stations should be established in the core zone as well as in the buffer zone for RPM. SPM, SO2, NOx. monitoring. Location of the stations should be decided based on the meteorological data, topographical features, and environmentally and ecologically sensitive targets in consultation with the State Pollution Control Board. Data on ambient air quality (RPM, SPM, SO2 & NOx.) should be regularly submitted to the Ministry including its Regional office at Bhubaneshwar and the State Pollution Control Board *I* Central Pollution Control Board once in six. Months.	**Complied.** Six ambient air quality monitoring stations have been established out of which 3 nos. are located within the core zone comprising mine pit area, weigh bridge and camp area. Such stations have also been established in three different neighbouring villages like Jagannathpur, Bandhuabeda and Raikera. Frequency of monitoring at core zone is twice per week and in buffer zone stations are monitored on quarterly basis. All parameters monitored is as per NAAQS-2009 standards. It was observed that the environmental monitoring parameters are within the prescribed limits. Ambient air quality monitoring report is being submitted to State Pollution Control Board on monthly basis. Abstract of the monitoring result is enclosed as **Annexure-I**.
iv.	Drills should be wet operated or with dust extractors and controlled blasting should be practiced.	**Complied.** Wet drilling is followed. Controlled blasting technique with NONEL is in practice. Ground vibration for the Peak Particle Velocity is also monitored for major blasts.
v.	Fugitive dust emissions from all the sources should be controlled regularly monitored and data recorded properly. Water spraying arrangements on haul	**Complied.** Effective water sprinkling by mobile water tanker is carried out for haul roads. Fixed sprinkler based

Sl. No	General Condition	Compliance Status (Oct'19 to March'20)
	roads, wagon loading, dumpers/ trucks, loading & unloading points should be provided and properly maintained.	dust suppression system is also in place for Joribar block. The Fugitive dust emissions monitoring result is enclosed as **Annexure-I.**
vi.	Adequate measures should be taken for control of noise levels below 85 dBA in the work environment. Workers engaged in blasting and drilling operations, operations of HEMM should be provided with ear plugs/ muffs.	**Complied.** Ear plugs & Ear muffs are provided to the workers working in drilling operations & DG operations. Rests of operations are below the noise levels of 85 dB(A). The details of noise monitoring carried out during October'19 to March'20 is enclosed as **Annexure-I.**
vii.	Industrial waste water (workshop and waste water from the mine) should be properly collected, treated so as to conform to the standards prescribed under GSR 422 (E) dated 19th May, 1993 and 31 st December 1993 or as amended from time to time. Oil and grease trap should be installed before discharge of workshop effluents.	**Complied.** Oil-Water separation system has been provided at workshop and working effectively. Samples both before treatment and after treatment are collected and analysed on monthly basis. The details of wastewater analysis report for the period Oct'19 to March'20 are enclosed as **Annexure-I.**
viii.	Environmental laboratory should be established with adequate number and type of pollution monitoring and analysis equipment in consultation with the State Pollution Control Board.	**Complied.** To ensure an independent environmental monitoring, sampling analysis and reporting of the environmental quality parameters have been outsourced to a third-party agency having NABL Accredited lab. During Oct'19 to March'20, M/s Visiontek Consultancy Service Pvt. Ltd. a Bhubaneswar based agency recognized as "A" category consultant as by State Pollution Control Board, Odisha has conducted monitoring, following applicable guidelines.
ix.	Personnel working in dusty areas should wear protective respiratory devices and they should also be provided with adequate training and information on safety and health aspects. Occupational health surveillance program of the workers should be undertaken periodically to observe any contractions due to exposure to dust and take corrective measures, if needed.	**Complied.** Use of dust masks is mandatorily followed for all the workers engaged in dusty areas. Employees are undergoing Periodical Medical Examination such as lungs related tests and audiometry. Significant emphasis is also provided on the safety and awareness of the personnel and ensured by means of daily safety talk, pre-start talk, implementation of Safe Operating Procedure, assessment of Hazards and safety visit cum line walk based initiatives. The initial and periodical examination includes blood hematology, blood pressure, detailed cardiovascular assessment, neurological examination etc. Total 73 contractual employees and 10 departmental employees have undergone PME during Oct'19 to March'20. There are no such cases of any occupational disease among the workers have ever been evidenced.

<table>
<tr><th>Sl. No</th><th>General Condition</th><th>Compliance Status (Oct'19 to March'20)</th></tr>
<tr><td>x.</td><td>A separate environmental management cell with suitable qualified personnel should be set up under the control of a Senior Executive, who will report directly to the Head of the Organization.</td><td><u>Complied</u>
A central environmental management cell has been established, wherein an environmental manager ensures the implementation of environmental management plan at the mining sites and reports to the chief environment, who in turn reports to the Head of the Organisation.</td></tr>
<tr><td>xi.</td><td>The funds earmarked for environmental protection measures should be kept in separate account and should not be diverted for other purpose. Year wise expenditure should be reported to the Ministry and its Regional Office located at Bhubaneshwar.</td><td><u>Complied</u>
Funds allocated for environmental management are earmarked in separate cost center maintained for the purpose. The details of Proposed Expenditure for FY 2019-20 as per below:
<table><tr><th rowspan="2">S.No.</th><th rowspan="2">Activity</th><th colspan="2">Expenditure (Lacs-INR)</th></tr><tr><th>Proposed</th><th>Actual</th></tr><tr><td>1</td><td>Afforestation on Dump slopes</td><td>1.825</td><td>3.0</td></tr><tr><td>2</td><td>Construction of retaining wall</td><td>0.0936</td><td>1.20</td></tr><tr><td>3</td><td>Construction of Garland drain, settling pits with check dam</td><td>0.0312</td><td>0.40</td></tr><tr><td>4</td><td>Env. Awarenss</td><td>03.0</td><td>4.0</td></tr><tr><td>5</td><td>Environmental monitoring</td><td>15.0</td><td>15.5</td></tr><tr><td></td><td>Total</td><td>21.073</td><td>24.1</td></tr></table></td></tr>
<tr><td>xii.</td><td>The Regional Office of this Ministry located at Bhubaneshwar shall monitor compliance of the stipulated conditions. The project authorities should extend full cooperation to the officer (s) of the Regional Office by furnishing the requisite data/information/monitoring reports</td><td><u>Complied.</u>
We are extending full co-operation to the officers of the Regional Office by furnishing the requisite data / information / monitoring reports.</td></tr>
<tr><td>xiii.</td><td>A copy of clearance letter will be marked to the concerned Panchayat/local NGO, if any, from whom suggestion/ representation has been received while processing the proposal.</td><td><u>Complied.</u>
Copy of the clearance letter marked to Sarpanch, Gram Panchayat, Palasa on 12.01.2006.</td></tr>
<tr><td>xiv.</td><td>The State Pollution Control Board should display a copy of the clearance letter at the Regional Office, District Industry Centre and Collector's Office/Tehsildar's Office for 30 days.</td><td>Applicable for the State Pollution Control Board, Odisha.</td></tr>
<tr><td>xv.</td><td>The project authorities should advertise at least in two local newspapers widely circulated around the project, one of which shall be in the vernacular of the locality concerned within seven days of the issue of</td><td><u>Complied.</u>
A copy of Environmental Clearance has been advertised in two local newspapers such as Anupam Bharat & Aam Khabar, dt.10.01.2006.</td></tr>
</table>

Sl. No	General Condition	Compliance Status (Oct'19 to March'20)
	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 Web Site of the Ministry of Environment & Forests at http://envfor.nic.in. and a copy of the same should be forwarded to the Regional Office of this Ministry located at Bhubaneswar.	
xvi.	The Ministry or any other competent authority may stipulate any further condition for environmental protection.	**Noted.**
xvii.	Failure to comply with any of the conditions mentioned above may result in withdrawal of this clearance.	**Noted**
xviii.	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, 1991 along with their amendments and rules.	**Noted**

A. Additional Conditions as per MoEFCC Letter No. 106-9/11/EPE dt. 02.12.2014 issued to all Non-Coal Mining Projects.

Sl. No.	Stipulated Condition	Compliance Status (Oct'19 to March'20)
i.	The project authority shall adopt best mining practices for given conditions in the mining area, adequate number of check dam, retaining wall/ structure, garland drains and settling ponds should be provided to arrest the wash off with rain water in catchment area.	**Complied & Ongoing.** The mine is operated by opencast mining method using shovel-dumper combination. Due care is taken during all the aspects of mining operations (starting from excavation till dispatch of the minerals) to ensure sustainable practices are adopted such as: 1. Wet drilling (Drills with inbuilt features of wet drilling) for preventing fugitive dust generation at the working face. 2. Controlled blasting by means of pre-split blasts using both NONEL & SME for arresting fly rocks and improved fragmentation with minimal ground vibration is practiced. 3. Pre-wetting is also carried out prior to blasting to minimize dust generating potential of blasts. 4. Stationary water sprinklers and mobile water tankers are operated main/permanent haul roads. 5. Garland drains all along the periphery of dumps supported with toe walls/gabion walls and 10nos of settling pits (1.5mX1.5mX2m) for guiding effluents/surface runoff up to ETP.

Sl. No.	Stipulated Condition	Compliance Status (Oct'19 to March'20)
ii.	The natural water bodies and or stream which are flowing in and around the village should not be disturbed. The water table should be nurtured so as not to go down below the pre-mining period. In case of any water scarcity in the area, the project authority has to provide water to the villagers for their use. A provision for regular monitoring of water table in open dug well	**Complied.** Agreed. No water bodies disturbed due to mining activities. The ground water table is being monitored regularly from the open well and tube well of nearby villages. Drinking water is provided to the villagers.
iii.	The illumination and sound at night at project sites disturb the village in respect of both human and animal population. Consequent sleeping disorder and stress may affect the health in the village located close to mining operation. Habitations have a right to darkness and minimal noise level at night. The Project Proponents must ensure that the biological clock of the village is not disturbed by orienting the floodlights mask way from the village and keeping the noise levels well within prescribed limits for day/ night hours.	**Complied.** The operation of the mine is restricted to the day hours only. Hence, there is no disturbance to the habitats located close to the mining operation. The biological clock of the village is not disturbed.
iv.	The project Authority shall make necessary alternative arrangement, where required, in consultation with state Government to provided alternated areas for livestock grazing. In this case context, the Project Authority should implement the direction of Hon'ble Supreme Court with regard to acquiring grazing land. The sparse tress on such grazing ground, which provides mid-day shelter from the scorching sun, should be scrupulously guarded felling lest the cattle abandon the grazing ground or return home by noon.	**Not Applicable**. No such grazing land have been acquired by the company.
v.	Where ever blasting is undertaken as part of mining activity, the Project Authority shall carry out vibration studies well before approaching any such habitats or other building to evaluate the zone of influence and impact of blasting on neighbourhood. Within 500 meters of such sites vulnerable to blasting vibration, avoidance of use of explosives and adoption of alternative means of mineral extraction such as ripper/dozer combination/ rock breakers/ surface mineral etc should be seriously considered and practiced wherever practicable. A provision for monitoring of each blast should be made so that impact of blasting on nearby habitation and dwelling unit could be ascertained. The covenant of lease deed under	**Complied.** Deep hole drilling and controlled blasting technique is adopted in the mine. Vibration study has been conducted by CIMFR. Each blast is monitored for the Peak Particle Velocity which is well within the DGMS prescribed limits. Rock breakers are used to avoid secondary blasting.

Sl. No.	Stipulated Condition	Compliance Status (Oct'19 to March'20)
	rule 31 of MCR 1960 provided that no mining operation shall be carried out within 50 meters of public works such as public roads and building or inhabited sites except with prior permission from the competent Authority.	
vi.	Main haulage road in the mines should be provided with permanent water sprinkler and other road should be regularly wetted water tanker fitted with sprinkler. Crusher and material transfer points should be invariably be provided with bag filter and or dry fogging system. Belt conveyor fully covered to avoid air borne dust.	**Complied.** Mobile water based dust suppression is regularly carried out over the main haul road, mineral stacking area overburden dumping areas and permanent portions are operated with fixed sprinklers.
vii.	The project Authority shall ensure that productivity of agriculture crops is not affected due to the mining operation. Crop Liability Insurance Policy has to be taken by PP as a precaution to compensate for the crop loss. The impact zone shall be 5 Km from the boundary of mine lease area for insurance policy. In case, several mines are located in cluster mines, formed inter – alia, to sub serve such and objective shall be responsibility for securing such Crop Liability Policy.	**Not Applicable.** There is no crop land nearby the M.L. area.
viii.	In case any village is located within the mining leasehold which is not likely to be affected due to mining activities during the life of mine, the Expert Appraisal Committee (EAC) should consider the proposal of Environmental Clearance (EC) for reduced mining area. The mining lease may be executed for the area for which EC is accorded. The mining plan also accordingly revised and required stipulation under the MMDR Act 1957 and MCR 1969 met.	**Not Applicable.**
ix.	Transportation of minerals by road passing through the village shall not be allowed. A "bypass" road should be constructed (say leaving a gap of at least 200 m) for the purpose of transportation of minerals so that the impact of sound, dust and accidents could be mitigated. The PP shall bear the cost towards the widening and strengthening of existing public road network in case same is proposed to be used for the project. No road movement should be allowed on existing village road network without appropriately increasing carrying capacity of such road	**Complied.** There is no transportation road passing through any village.
x.	Likewise, alteration or re-routing of foot paths, pagdandies, cart road and village	**Not Applicable.**

Sl. No.	Stipulated Condition	Compliance Status (Oct'19 to March'20)
	infrastructure/ public utilities or roads (for purpose of land acquisition for mining) shall be avoided to extent possible and in such case acquisition is inevitable, alternative arrangements shall be made first and the only the area can be acquired. In these types of cases Inspection reports by site visit by expert may be insisted upon which should be done through reputed Institutes.	Entire lease area of 406.0ha is govt. land (404.669ha of forest land and 1.331ha of non-forest land thus this project was not subjected to land acquisition.
xi.	The CSR activates by companies including mining establishment has become mandatory up to 2% their financial turn over, socio Economic Development of neighbourhood. Habitats could also be planned and executed by the PPs more systemically based on need based door to door survey by established Social Institute/ Workers on the lines as required under TOR. " R&R Plan// compensation details for Project Affected People (PAP) should be furnished. While preparing the R&R plant, the relevant State/ national Rehabillitation & Resettlement Policy should be kept in view. In respect of SCs and STs and weaker section of society in study, a need bashed sample survey, family-wise, should be undertaken to assess their requirement, and action programmes prepared and submitted accordingly, integrating the sectoral programs of line department of State Government. It may be clearly brought out whether the village including their R&R and socio-economics aspect should be discussed in EIA report.	**Complied.** Tata Steel has taken up many social initiatives for the improvement of quality of life of the surrounding community by means of education, health and other socio-economic aspects. TSRDS (Tata Steel Rural Development Society) has been pioneering the initiatives through CSR activities. R&R policy is not applicable for the PP till now.

Head, Mine & Production Planning
Ferro Alloys Mineral Division
(Bamebari Iron and Mn.Mine)
M/s Tata Steel Limited

Date: 28/6/2020

ENVIRONMENTAL MONITORING RESULTS (OCT'19 to MARCH'20)

Table. 1. SURFACE WATER QUALITY ANALYSIS REPORT

SW1: Confluence Point at Kassia Nallah

Parameters	Unit	Standard	Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20
			1st Report	1st Report	1st Report	1st Report	1st Report	1st Report
Dissolved Oxygen (minimum)	mg/l	**4**	5.6	5.2	5.6	6.6	6.2	6.2
BOD (3) days at 27^{0}C (max)	mg/l	**3**	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8
Total Coli form	MPN/	**5000**	110	100	110	180	210	110
pH Value	--	**6.0-9.0**	7.56	7.64	7.48	7.66	7.68	7.6
Colour (max)	Hazen	**300**	CL	CL	CL	CL	CL	CL
Total Dissolved Solids	mg/l	**1500**	162	168	160	188	192	180
Copper as Cu (max)	mg/l	**1.5**	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Iron as Fe (max)	mg/l	**0.5**	0.36	0.38	0.44	0.41	0.44	0.32
Chloride (max)	mg/l	**600**	66.8	71.4	71.2	78	80	70
Sulphates (SO_4) (max)	mg/l	**400**	3.9	4.2	5.8	5.2	5.6	4.2
Nitrate as NO_3 (max)	mg/l	**50**	2.6	3.2	3.2	3.2	3.8	3.2
Fluoride as F (max)	mg/l	**1.5**	0.019	0.018	0.051	0.026	0.022	0.026
Phenolic Compounds as C_6H_5OH (max)	mg/l	**0.005**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium as Cd (max)	mg/l	**0.01**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Selenium as Se (max)	mg/l	**0.05**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic as As	mg/l	**0.2**	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Cyanide as CN (max)	mg/l	**0.05**	ND	ND	ND	ND	ND	ND
Lead as Pb(max)	mg/l	**0.1**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc as Zn(max)	mg/l	**15**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Hexa Chromium as Cr^{+6}	mg/l	**0.05**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Anionic Detergents (max)	mg/l	**1**	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2

Table.2. SW2: Intake Point at Tindharia

Parameters	Unit	Standards	Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20
			1st Report	1st Report	1st Report	1st Report	1st Report	1st Report
Dissolved Oxygen (minimum)	mg/l	**4**	6.6	6.1	6.5	6.8	6.4	6.4
BOD (3) days at 27^{0}C (max)	mg/l	**3**	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8

ENVIRONMENTAL MONITORING RESULTS (OCT'19 to MARCH'20)

Parameters	Unit	Standards	Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20
			1st Report	1st Report	1st Report	1st Report	1st Report	1st Report
Total Coli form	MPN/	**5000**	170	120	220	210	240	180
pH Value	--	**6.0-9.0**	7.64	7.72	7.71	7.74	7.82	7.69
Colour (max)	Hazen	**300**	CL	CL	CL	CL	CL	CL
Total Dissolved Solids	mg/l	**1500**	174	174	194	192	210	192
Copper as Cu (max)	mg/l	**1.5**	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Iron as Fe (max)	mg/l	**0.5**	0.38	0.44	0.42	0.44	0.46	0.38
Chloride (max)	mg/l	**600**	64.6	74.8	76	82	84	74
Sulphates (SO_4) (max)	mg/l	**400**	3.2	4.6	4.8	5.6	6.2	5.1
Nitrate as NO_3 (max)	mg/l	**50**	2.1	3.6	3.6	3.8	4.2	3.8
Fluoride as F (max)	mg/l	**1.5**	0.012	0.021	0.019	0.021	0.026	0.022
Phenolic Compounds as C_6H_5OH (max)	mg/l	**0.005**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium as Cd (max)	mg/l	**0.01**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Selenium as Se (max)	mg/l	**0.05**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic as As	mg/l	**0.2**	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Cyanide as CN (max)	mg/l	**0.05**	ND	ND	ND	ND	ND	ND
Lead as Pb(max)	mg/l	**0.1**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc as Zn(max)	mg/l	**15**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Hexa Chromium as Cr^{+6}	mg/l	**0.05**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Anionic Detergents (max)	mg/l	**1.0**	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2

Table.3. DRINKING WATER

DW1: Near Canteen

Sl.No	Parameters	Unit	IS10500:2012 Norms		Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20	Oct-19
			Desirable Limit	Acceptable Limit in the absence of alternate source							
1.	Total Coli form	MPN/ 100 ml	**Shall not be detectable in**	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1

ENVIRONMENTAL MONITORING RESULTS (OCT'19 to MARCH'20)

Sl.No	Parameters	Unit	IS10500:2012 Norms		Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20	Oct-19
			Desirable Limit	Acceptable Limit in the absence of alternate source							
	Organism MPN/100ml		**any 100ml sample**								
2.	Fecal Coli forms	MPN/ 100 ml	**---**	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1
3.	E. Coli	MPN/ 100 ml	**Shall not be detectable in any 100ml sample**	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
4.	Colour (Unit)	Hazen	**5**	**25**	CL	CL	CL	CL	CL	CL	**5**
5.	Odour	--	**Unobjectionable**	**--**	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	**Unobjectionable**
6.	Taste	--	**Agreeable**	**--**	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	**Agreeable**
7.	pH value (25^0C)		**6.5 - 8.5**	**No Relaxation**	7.48	7.52	7.61	7.66	7.68	7.56	**6.5 - 8.5**
8.	Turbidity	NTU	**5**	**10**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**5**
9.	Total Dissolved Solids	mg/l	**500**	**2000**	112.2	118.6	112	118	128	108	**500**
10.	Aluminium (as Al)	mg/l	0.03	0.2	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.03
11.	Anionic Detergents (as MBAS)	mg/l	0.2	1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.2
12.	Boron (as B)	mg/l	1	5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	1
13.	Calcium (as Ca)	mg/l	75	200	52	56	51.2	50.8	52.6	50.6	75
14.	Chloride (as Cl)	mg/l	250	1000	46	52	48.2	51.2	56.8	46	250
15.	Copper (asCu)	mg/l	0.05	1.5	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.05
16.	Fluoride (as F)	mg/l	1	1.5	0.016	0.018	<0.01	<0.01	<0.01	<0.01	1
17.	Residual Free Chlorine	mg/l	0.2(Min.)	---	ND	ND	ND	ND	ND	ND	0.2(Min.)

ENVIRONMENTAL MONITORING RESULTS (OCT'19 to MARCH'20)

Sl.No	Parameters	Unit	IS10500:2012 Norms		Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20	Oct-19
			Desirable Limit	Acceptable Limit in the absence of alternate source							
18.	Iron (as Fe)	mg/l	0.3	1	0.18	0.22	0.29	0.26	0.34	0.26	0.3
19.	Magnesium (as Mg)	mg/l	**30**	**100**	18.6	21.4	24.6	28.8	30.6	22.8	**30**
20.	Manganese (as Mn)	Hazen	**0.1**	**0.3**	<0.05	<0.05	<0.005	<0.005	<0.005	<0.005	**0.1**
21.	Mineral Oil	--	**0.01**	**0.03**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	**0.01**
22.	Nitrate (as NO_3)	--	**45**	**100**	1.36	1.42	2.4	2.6	3.2	2.8	**45**
23.	Phenolic Compounds (as C_6H_5OH)		**0.001**	**0.002**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**0.001**
24.	Selenium (as Se)	NTU	**0.01**	**No Relaxation**	5.6	6.1	<0.001	<0.001	<0.001	5.2	**0.01**
25.	Sulphate (as SO_4)	mg/l	**200**	**400**	5.4	6.6	5.6	5.8	6.2	5.4	**200**
26.	Alkalinity (as CaCO3)	mg/l	**200**	**600**	62	70	64.8	66.2	70.8	60.8	**200**
27.	Total Hardness(as $CaCO_3$)	mg/l	**300**	**600**	78	80	78	72	80	72	**300**
28.	Cadmium (as Cd)	mg/l	**0.01**	**No Relaxation**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**0.01**
29.	Cyanide (as CN)	mg/l	**0.05**	**No Relaxation**	ND	ND	ND	ND	ND	ND	**0.05**
30.	Lead (as Pb)	mg/l	**0.05**	**No Relaxation**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	**0.05**
31.	Mercury (as Hg)	mg/l	**0.001**	**No Relaxation**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**0.001**
32.	Arsenic (as As)	mg/l	**0.05**	**No Relaxation**	<0.01	<0.01	<0.001	<0.001	<0.001	<0.001	**0.05**
33.	Zinc (as Zn)	mg/l	**5**	**15**	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	**5**

ENVIRONMENTAL MONITORING RESULTS (OCT'19 to MARCH'20)

Sl.No	Parameters	Unit	IS10500:2012 Norms		Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20	Oct-19
			Desirable Limit	Acceptable Limit in the absence of alternate source							
34.	Chromium (as Cr^{+6})	mg/l	**0.05**	**No Relaxation**	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	**0.05**
35.	Poly Aromatic Hydrocarbon as PAH	mg/l	**<0.0001**	**--**	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	**<0.0001**
36.	Pesticide	µg/l	**Absent**	**0.001**	Absent	Absent	Absent	Absent	Absent	Absent	**Absent**

Table.4. GROUND WATER

Ground Water Quality (Biffer Zone)

Sl. No	Parameter	Unit	Standards as per IS: 10500:2012 Amended on 2015 & 2018		Analysis Result Joribar Pump House		Analysis Result Nimera Village	
			Acceptable Limit	Permissible Limit	Nov-19	Mar-20	Nov-19	Mar-20
Essential Characteristics								
1	Colour	Hazen	**5**	**15**	CL	CL	CL	CL
2	Odour	--	**Agreeable**	**Agreeable**	Agreeable	Agreeable	Agreeable	Agreeable
3	Taste	--	**Agreeable**	**Agreeable**	Agreeable	Agreeable	Agreeable	Agreeable
4	Turbidity	NTU	**1**	**5**	1.3	1.4	1.8	1.5
5	pH Value	--	**6.5-8.5**	**No Relaxation**	7.51	7.1	7.2	7.46
6	Total Hardness (as $CaCO_3$)	mg/l	**200**	**600**	110.0	113.0	124.0	128.0
7	Iron (as Fe)	mg/l	**1.0**	**No Relaxation**	0.22	0.24	0.22	0.25
8	Chloride (as Cl)	mg/l	**250**	**1000**	43.2	43.4	49.0	54.0
9	Residual, free Chlorine	mg/l	**0.2**	**1**	ND	ND	ND	ND

ENVIRONMENTAL MONITORING RESULTS (OCT'19 to MARCH'20)

Sl. No	Parameter	Unit	Standards as per IS: 10500:2012 Amended on 2015 & 2018		Analysis Result Joribar Pump House		Analysis Result Nimera Village	
			Acceptable Limit	Permissible Limit	Nov-19	Mar-20	Nov-19	Mar-20
Desirable Characteristics								
10	Dissolved Solids	mg/l	**500**	**2000**	196.0	196.0	216.0	224.0
11	Calcium (as Ca)	mg/l	**75**	**200**	44.8	44.2	51.0	52.2
12	Magnesium (as Mg)	mg/l	**30**	**100**	22.8	22.6	22.6	24.2
13	Copper (as Cu)	mg/l	**0.05**	**1.5**	<0.02	<0.02	<0.02	<0.02
14	Manganese (as Mn)	mg/l	**0.1**	**0.3**	0.021	0.021	0.016	0.016
15	Sulphate (as SO_4)	mg/l	**200**	**400**	5.5	5.1	6.4	6.2
16	Nitrate (as NO_3)	mg/l	**45**	**No Relaxation**	3.8	3.2	3.3	3.1
17	Fluoride (as F)	mg/l	**1.0**	**1.5**	0.018	0.018	0.028	0.028
18	Phenolic Compounds (as C_6H_5OH)	mg/l	**0.001**	**0.002**	<0.001	<0.001	<0.001	<0.001
19	Mercury (as Hg)	mg/l	**0.001**	**No Relaxation**	<0.002	<0.002	<0.002	<0.002
20	Cadmium (as Cd)	mg/l	**0.003**	**No Relaxation**	<0.01	<0.01	<0.01	<0.01
21	Selenium (as Se)	mg/l	**0.01**	**No Relaxation**	<0.001	<0.001	<0.001	<0.001
22	Arsenic (as As)	mg/l	**0.01**	**No Relaxation**	<0.004	<0.004	<0.004	<0.004
23	Cyanide (as CN)	mg/l	**0.05**	**No Relaxation**	<0.01	<0.01	<0.01	<0.01
24	Lead (as Pb)	mg/l	**0.01**	**No Relaxation**	<0.01	<0.01	<0.01	<0.01
25	Zinc (as Zn)	mg/l	**5**	**15**	3.4	2.1	3.2	3.6

ENVIRONMENTAL MONITORING RESULTS (OCT'19 to MARCH'20)

Sl. No	Parameter	Unit	Standards as per IS: 10500:2012 Amended on 2015 & 2018		Analysis Result Joribar Pump House		Analysis Result Nimera Village	
			Acceptable Limit	Permissible Limit	Nov-19	Mar-20	Nov-19	Mar-20
26	Anionic Detergents (as MBAS)	mg/l	--	--	<0.2	<0.2	<0.2	<0.2
27	Chromium (as Cr^{+6})	mg/l	**0.5**	**No Relaxation**	<0.01	<0.01	<0.01	<0.01
28	Mineral Oil	mg/l	**200**	**600**	<0.01	<0.01	<0.01	<0.01
29	Alkalinity	mg/l	**0.03**	**0.2**	78.0	78.0	90.0	90.0
30	Aluminium as(Al)	mg/l	**0.5**	**2.4**	<1.0	<1.0	<1.0	<1.0
31	Boron (as B)	mg/l	--	--	<0.1	<0.1	<0.1	<0.1
32	Poly Aromatic Hydrocarbon as PAH	mg/l	**<0.0001**	--	<0.0001	<0.0001	<0.0001	<0.0001
33	Pesticide	µg/l	**Absent**		Absent	Absent	Absent	Absent

Table.5 WASTE WATER (Oct'19 to Dec'19)

Sl. No	Parameter	Unit	Discharge Standards In land Surface water-IS2296(Class C)	Oct-19		Nov-19		Dec-19	
				STP (Inlet)	STP (Outlet)	STP (Inlet)	STP (Outlet)	STP (Inlet)	STP (Outlet)
1	Colour & Odour	Hazen	**Colorless/Odorless as far as practicable**	02 & pungent smell	CL & U/O	<5 & pungent smell	CL & U/O	02 & pungent smell	CL & U/O
2	Suspended Solids	mg/l	**100**	76	30	70	26	96	52
3	Particulate size of SS		**Shall pass 850 micron IS Sieve**	< 850	< 850	< 850	< 850	< 850	< 850
4	pH Value	--	**5.5-9.0**	6.86	7.26	6.94	7.18	6.87	7.19

ENVIRONMENTAL MONITORING RESULTS (OCT'19 to MARCH'20)

Sl. No	Parameter	Unit	Discharge Standards In land Surface water-IS2296(Class C)	Oct-19		Nov-19		Dec-19	
				STP (Inlet)	**STP (Outlet)**	**STP (Inlet)**	**STP (Outlet)**	**STP (Inlet)**	**STP (Outlet)**
5	Temperature	^{0}C	**Shall not exceed 5^{0}C above the receiving water temperature**	26	26	26	26	22	22
6	Oil & Grease(max)	mg/l	**10**	4.6	ND	4.2	ND	3.6	ND
7	Total Residual Chlorine	mg/l	**1**	ND	ND	ND	ND	ND	ND
8	Ammonical Nitrogen (as N)	mg/l	**50**	8.1	1.8	7.2	1.6	8.4	1.4
9	Total Kjeldahl Nitrogen(as TKN)	mg/l	**100**	10.2	4.2	11.4	4.6	13.6	5.6
10	Free ammonia (as NH_3)	mg/l	**5**	ND	ND	ND	ND	ND	ND
11	BOD(3 days at 27^{0}C (max)	mg/l	**30**	21.2	6.2	20.8	7.1	32.4	6.4
12	Chemical Oxygen Demand as COD	mg/l	**250**	136	34	142.2	36	196	48
13	Arsenic as As	mg/l	**0.2**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
14	Mercury (Hg)	mg/l	**0.01**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
15	Lead as Pb(max)	mg/l	**0.1**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
16	Cadmium as Cd (max)	mg/l	**2**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
17	Hexavalent Chromium as Cr^{+6}	mg/l	**0.1**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
18	Total Chromium (Cr)	mg/l	**2**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

ENVIRONMENTAL MONITORING RESULTS (OCT'19 to MARCH'20)

Sl. No	Parameter	Unit	Discharge Standards In land Surface water-IS2296(Class C)	Oct-19		Nov-19		Dec-19	
				STP (Inlet)	**STP (Outlet)**	**STP (Inlet)**	**STP (Outlet)**	**STP (Inlet)**	**STP (Outlet)**
19	Copper as Cu (max)	mg/l	**3**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
20	Zinc as Zn(max)	mg/l	**5**	0.64	<0.05	0.66	<0.05	0.62	<0.05
21	Selenium (Se) (max)	mg/l	**0.05**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
22	Nickel (Ni)	mg/l	**3**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
23	Cyanide as CN (max)	mg/l	**0.2**	ND	ND	ND	ND	ND	ND
24	Fluoride as F (max)	mg/l	**2**	0.38	0.026	0.42	0.028	0.36	0.034
25	Dissolved Phosphates (P)	mg/l	**5**	0.44	<0.05	0.48	<0.05	0.52	<0.05
26	Sulphide (S)	mg/l	**2**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
27	Phenolic Compounds as C6H5OH (max)	mg/l	**1**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
28	Bio-assay test		**90% survival of fish after 96 hours in 100% effluent**	98% survival of fishes	92% survival of fishes	92% survival of fishes	90% survival of fishes	94% survival of fishes	98% survival of fishes
29	Manganese (Mn)	mg/l	**2**	0.062	<0.005	0.066	<0.005	0.054	<0.005
30	Iron as Fe (max)	mg/l	**3**	1.86	0.71	1.92	0.77	1.74	0.66
31	Vanadium (V)	mg/l	**0.2**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
32	Nitrate Nitrogen	mg/l	**10**	6.2	0.86	6.6	0.91	5.4	1.11

ENVIRONMENTAL MONITORING RESULTS (OCT'19 to MARCH'20)

Table.6 WASTE WATER (Jan'20 to March'20)

Sl. No	Parameter	Unit	Discharge Standards In land Surface water-IS2296(Class C)	Jan-20		Feb-20		March-20	
				STP (Inlet)	STP (Outlet)	STP (Inlet)	STP (Outlet)	STP (Inlet)	STP (Outlet)
1	Colour & Odour	Hazen	**Colorless/Odorless as far as practicable**	<5 & pungent smell	CL & U/O	<5 & pungent smell	CL & U/O	<5 & pungent smell	<5 & U/O
2	Suspended Solids	mg/l	**100**	94	52	96	56	88	48
3	Particulate size of SS		**Shall pass 850 micron IS Sieve**	< 850	< 850	< 850	< 850	< 850	< 850
4	pH Value	--	**5.5-9.0**	6.94	7.18	7.01	7.24	6.82	7.11
5	Temperature	^{0}C	**Shall not exceed 5^{0}C above the receiving water temperature**	22	22	22	22	28	28
6	Oil & Grease(max)	mg/l	**10**	3.6	ND	4.4	ND	3.2	ND
7	Total Residual Chlorine	mg/l	**1**	ND	ND	ND	ND	ND	ND
8	Ammonical Nitrogen (as N)	mg/l	**50**	9.2	2.6	9.6	3.1	7.8	1.6
9	Total Kjeldahl Nitrogen(as TKN)	mg/l	**100**	14.2	6.2	14.8	6.6	12.8	6
10	Free ammonia (as NH_3)	mg/l	**5**	ND	ND	ND	ND	ND	ND
11	BOD(3 days at 27^{0}C (max)	mg/l	**30**	31.6	7.1	32.8	7.6	30.8	6.2
12	Chemical Oxygen Demand as COD	mg/l	**250**	188	42	192	46	188	42
13	Arsenic as As	mg/l	**0.2**	<0.004	<0.004	<0.004	<0.004	<0.001	<0.001

ENVIRONMENTAL MONITORING RESULTS (OCT'19 to MARCH'20)

Sl. No	Parameter	Unit	Discharge Standards In land Surface water-IS2296(Class C)	Jan-20		Feb-20		March-20	
				STP (Inlet)	**STP (Outlet)**	**STP (Inlet)**	**STP (Outlet)**	**STP (Inlet)**	**STP (Outlet)**
14	Mercury (Hg)	mg/l	**0.01**	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001
15	Lead as Pb(max)	mg/l	**0.1**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
16	Cadmium as Cd (max)	mg/l	**2**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
17	Hexavalent Chromium as Cr^{+6}	mg/l	**0.1**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
18	Total Chromium (Cr)	mg/l	**2**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
19	Copper as Cu (max)	mg/l	**3**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
20	Zinc as Zn(max)	mg/l	**5**	0.66	<0.05	0.68	<0.05	0.58	<0.05
21	Selenium (Se) (max)	mg/l	**0.05**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
22	Nickel (Ni)	mg/l	**3**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
23	Cyanide as CN (max)	mg/l	**0.2**	ND	ND	ND	ND	ND	ND
24	Fluoride as F (max)	mg/l	**2**	0.41	0.028	0.44	0.032	0.32	0.028
25	Dissolved Phosphates (P)	mg/l	**5**	0.56	<0.05	0.66	<0.05	0.48	<0.05
26	Sulphide (S)	mg/l	**2**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
27	Phenolic Compounds as C6H5OH (max)	mg/l	**1**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
28	Bio-assay test		**90% survival of fish after 96 hours in 100% effluent**	92% survival of fishes	96% survival of fishes	94% survival of fishes	98% survival of fishes	96% survival of fishes	98% survival of fishes

ENVIRONMENTAL MONITORING RESULTS (OCT'19 to MARCH'20)

Sl. No	Parameter	Unit	Discharge Standards In land Surface water-IS2296(Class C)	Jan-20		Feb-20		March-20	
				STP (Inlet)	STP (Outlet)	STP (Inlet)	STP (Outlet)	STP (Inlet)	STP (Outlet)
29	Manganese (Mn)	mg/l	**2**	0.056	<0.005	0.061	<0.005	0.044	<0.005
30	Iron as Fe (max)	mg/l	**3**	1.81	0.68	1.92	0.74	1.6	0.61
31	Vanadium (V)	mg/l	**0.2**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
32	Nitrate Nitrogen	mg/l	**10**	5.6	1.26	6.4	1.38	5.2	1.4

Table.7. OIL SEPARATION PIT

W1: Workshop Water

Sl.No	Parameters	Unit	General Standards for discharge of Environmental Pollutants Part A- Effluents	Analysis Report					
				Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20
1	Colour	Hazen	**5**	CL	CL	CL	CL	CL	CL
2	Odour	-	**Unobjectionable**	U/O	U/O	U/O	U/O	U/O	U/O
3	pH at 25 degree C	-	**5.5-9.0**	7.44	7.48	7.46	7.41	7.46	7.52
4	Total Dissolved Solids	mg/l	**-**	148	156	156	148	158	142
5	Copper as Cu	mg/l	**3.0**	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
6	Fluoride as F	mg/l	**2.0**	0.031	0.042	0.038	0.031	0.034	0.03
7	Total Residual Chlorine	mg/l	**1.0**	ND	ND	ND	ND	ND	ND
8	Iron as Fe	mg/l	**3.0**	0.64	0.68	0.68	0.62	0.58	0.56
9	Manganese as Mn	mg/l	**2.0**	1.26	1.32	1.41	1.32	1.38	1.32
10	Nitrate as NO3	mg/l	**10.0**	3.78	4.2	4.42	4.36	4.28	4.18
11	Phenolic Compounds as C6H5OH	mg/l	**1.0**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
12	Selenium as Se	mg/l	**0.05**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

ENVIRONMENTAL MONITORING RESULTS (OCT'19 to MARCH'20)

Sl.No	Parameters	Unit	General Standards for discharge of Environmental Pollutants Part A- Effluents	Analysis Report					
				Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20
13	Cadmium as Cd	mg/l	**2.0**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
14	Cyanide as CN	mg/l	**0.2**	ND	ND	ND	ND	ND	ND
15	Lead as Pb	mg/l	**0.1**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
16	Mercury as Hg	mg/l	**0.01**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
17	Nickel as Ni	mg/l	**3.0**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
18	Arsenic as As	mg/l	**0.2**	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
19	Total Chromium as Cr	mg/l	**2.0**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
20	Zinc as Zn	mg/l	**5.0**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
21	Hexavalent Chromium as Cr^{+6}	mg/l	**0.1**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
22	Vanadium as V	mg/l	**0.2**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
23	Total Suspended Solids	mg/l	**100**	48	52	56	52	58	52
24	Temperature	0C	**shall not exceed 5^0C above the receiving water temperature**	26	26	26	25	32	28
25	Dissolved Oxygen	mg/l	**-**	5.6	6.2	6.4	6.6	6.8	6.6
26	BOD at 27^0C for 3 days	mg/l	**30**	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8
27	COD	mg/l	**250**	26	32	32	30	32	34
28	Oil & Grease	mg/l	**10**	ND	ND	ND	ND	ND	ND
29	Ammonical Nitrogen as N	mg/l	**50**	ND	ND	ND	ND	ND	ND
30	Total Kjedahl Nitrogen as N	mg/l	**100**	1.8	2.4	2.4	2.6	3.2	2.6
31	Sulphide as S	mg/l	**2.0**	ND	ND	ND	ND	ND	ND
32	Free Ammonia as NH_3	mg/l	**5.0**	ND	ND	ND	ND	ND	ND
33	Particulate Size of Suspended Solids	mg/l	**850 µm IS Sieve**	Passes through	Passes through	Passes through	Passes through	Passes through	Passes through

ENVIRONMENTAL MONITORING RESULTS (OCT'19 to MARCH'20)

Sl.No	Parameters	Unit	General Standards for discharge of Environmental Pollutants Part A- Effluents	Analysis Report					
				Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20
				850 mm IS Sieve	850 mm IS Sieve	850 mm IS Sieve	850 mm IS Sieve	850 mm IS Sieve	850 mm IS Sieve
34	Bio-assay	mg/l	**90% survival in 100% effluent**	**90% survival in 100% effluent**	90% survival in 100% effluent	94% survival in 100% effluent	96% survival in 100% effluent	98% survival in 100% effluent	92% survival in 100% effluent
35	Dissolved Phosphates as PO4	mg/l	**5.0**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

AAQ MONITORING (CORE ZONE)

Table.8. AAQ1: Bamebari Camp

Monthly Average	PM_{10} (µg/m³)	$PM_{2.5}$ (µg/m³)	SO_2 (µg/m³)	NOx (µg/m³)	O_3 (µg/m³)	CO mg/m³)	NH_3 (µg/m³)	Pb (µg/m³)	Ni (ng/m³)	As (ng/m³)	C_6H_6 (µg/m³)	BaP (ng/m³)	Mn µg/m³)
Oct-19	47.39	22.91	4.39	10.02	5.36	0.22	26.99	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	< 0.001
Nov-19	49.78	29.87	5.73	10.24	6.58	0.28	24.11	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	< 0.001
Dec-19	58.51	35.11	7.10	15.99	8.24	0.44	25.91	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	< 0.001
Jan-20	61.69	37.01	7.12	15.79	8.24	0.53	27.71	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	< 0.001
Feb-20	62.38	37.43	8.18	16.73	8.33	0.56	32.05	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	< 0.001
Mar-20	57.70	34.62	9.86	14.29	7.73	0.37	24.86	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	< 0.001

Table.9. AAQ2: Mines Pit

Monthly Average	PM_{10} (µg/m³)	$PM_{2.5}$ (µg/m³)	SO_2 (µg/m³)	NOx (µg/m³)	O_3 (µg/m³)	CO mg/m³)	NH_3 (µg/m³)	Pb (µg/m³)	Ni (ng/m³)	As (ng/m³)	C_6H_6 (µg/m³)	BaP (ng/m³)	Mn µg/m³)
Oct-19	51.1	25.0	4.4	11.2	8.5	0.3	24.5	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	< 0.001
Nov-19	51.5	30.9	5.1	10.5	9.0	0.3	24.2	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	< 0.001
Dec-19	64.96	38.97	15.16	20.82	7.70	0.71	24.53	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	< 0.001
Jan-20	67.16	40.29	15.98	22.43	8.70	0.69	25.14	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	< 0.001

ENVIRONMENTAL MONITORING RESULTS (OCT'19 to MARCH'20)

Feb-20	67.25	40.35	17.31	22.83	9.49	0.77	26.24	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	< 0.001
Mar-20	62.89	37.73	14.60	19.49	8.34	0.74	25.80	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	< 0.001

Table.10. AAQ3: Weigh Bridge

Monthly Average	PM_{10} (µg/m³)	$PM_{2.5}$ (µg/m³)	SO_2 (µg/m³)	NOx (µg/m³)	O_3 (µg/m³)	CO mg/m³)	NH_3 (µg/m³)	Pb (µg/m³)	Ni (ng/m³)	As (ng/m³)	C_6H_6 (µg/m³)	BaP (ng/m³)	Mn µg/m³)
Oct-19	55.97	28.08	7.43	12.32	6.43	0.30	23.88	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	< 0.001
Nov-19	51.80	31.08	7.53	11.90	6.16	0.32	23.27	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	< 0.001
Dec-19	63.58	38.15	8.01	18.09	7.22	0.62	27.06	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	< 0.001
Jan-20	71.47	42.88	8.73	18.46	7.62	0.66	27.32	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	< 0.001
Feb-20	64.53	38.72	8.75	17.30	7.96	0.70	23.84	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	< 0.001
Mar-20	64.26	38.55	9.80	37.48	7.66	0.60	25.73	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	< 0.001

Table. 11. Buffer Zone -Ambient Air Quality (Jaganathpur)

Parameters	Method of Measurement	NAAQS-2009	OCT-19	NOV-19	DEC-19	JAN-20	FEB-20	MAR-20
PM_{10}	Gravimetric method	**100(µg/m³)**	48.2	54.8	52.8	56.6	60.2	56
$PM_{2.5}$	Gravimetric method	**60 (µg/m³)**	26.992	30.688	31.68	33.96	36.12	33.6
SO_2	Improved West Gaeke method.	**80 (µg/m³)**	5.6	6.2	7.6	8.6	6.8	7.9
NO_x	Jacob & Hochhelser modified (Na-	**80(µg/m³)**	11.1	12.1	11.2	11.2	10.6	12.2
CO	NDIR Spectroscopy method	**4(mg/m³)**	0.54	0.58	0.66	0.71	6.4	0.68
O3	Chemical Method	**100**	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0
NH3	Indo Phenol Blue Method	**400**	<20.0	<20.0	<20.0	<20	25.8	<20
As	AAS Method	**6ng/m³**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ni	AAS Method	**20µg/m³**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Pb	AAS Method	**1µg/m³**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
C6H6	Gas Chromatography	**5µg/m³**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bap	Gas Chromatography	**1ng/m³**	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
HC	GC Method		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

ENVIRONMENTAL MONITORING RESULTS (OCT'19 to MARCH'20)

Table. 12. Bandhubaria Village

Parameters	Method of Measurement	NAAQS-2009	OCT-19	NOV-19	DEC-19	JAN-20	FEB-20	MAR-20
PM_{10}	Gravimetric method	**100(µg/m³)**	50.6	56.6	54.8	60.6	70.2	58
$PM_{2.5}$	Gravimetric method	**60 (µg/m³)**	28.336	31.696	32.88	36.36	42.12	34.8
SO_2	Improved West Gaeke method.	**80 (µg/m³)**	8.4	9.1	8.1	8.6	10.2	8.4
NO_x	Jacob & Hochhelser modified (Na-Arsenite) method	**80(µg/m³)**	11.6	12.4	11.4	13.2	13.8	12.4
CO	NDIR Spectroscopy method	**4(mg/m³)**	0.62	0.66	0.79	0.68	6.6	0.68
O3	Chemical Method	**100 (µg/m3)**	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0
NH3	Indo Phenol Blue Method	**400 (µg/m3)**	<20.0	<20.0	<20.0	<20	26.6	<20
As	AAS Method	**6ng/m³**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ni	AAS Method	**20µg/m³**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Pb	AAS Method	**1µg/m³**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
C6H6	Gas Chromatography	**5µg/m³**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bap	Gas Chromatography	**1ng/m³**	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
HC	GC Method		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

Table.13. Raikara Village

Parameters	Method of Measurement	NAAQS-2009	OCT-19	NOV-19	DEC-19	JAN-20	FEB-20	MAR-20
PM_{10}	Gravimetric method	**100(µg/m³)**	52.2	5808	58.4	60.6	73.2	60.2
$PM_{2.5}$	Gravimetric method	**60 (µg/m³)**	29.232	3252.48	35.04	36.36	43.92	36.12
SO_2	Improved West Gaeke method.	**80 (µg/m³)**	8.8	8.4	9.6	9.8	8.2	9.8
NO_x	Jacob & Hochhelser modified (Na-Arsenite) method	**80(µg/m³)**	11.2	11.6	11.4	12.6	13.8	11.8

ENVIRONMENTAL MONITORING RESULTS (OCT'19 to MARCH'20)

Parameters	Method of Measurement	NAAQS-2009	OCT-19	NOV-19	DEC-19	JAN-20	FEB-20	MAR-20
CO	NDIR Spectroscopy method	**4(mg/m³)**	0.64	0.66	0.79	0.84	7.4	0.82
O3	Chemical Method	**100 (µg/m3)**	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0
NH3	Indo Phenol Blue Method	**400 (µg/m3)**	<20.0	<20.0	<20.0	<20	27.2	<20
As	AAS Method	**6ng/m³**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ni	AAS Method	**20µg/m³**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Pb	AAS Method	**1µg/m³**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
C6H6	Gas Chromatography	**5µg/m³**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bap	Gas Chromatography	**1ng/m³**	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
HC	GC Method		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

Table.14. FUGITIVE EMISSION RESULTS (SPM

Location	Parameter	Method of Measurement	unit	Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20
Near Sorting Yard (Joribar Block)	**SPM**	Gravimetric Method	µg/m³	686.6	348.8	714.6	708.6	711.6	706.2
Near Stack Yard (Joribar Block)	**SPM**	Gravimetric Method	µg/m³	502.6	392.6	521.2	536.2	544.8	552.2
Near Haul Road (Joribar Block)	**SPM**	Gravimetric Method	µg/m³	446.2	446.8	502.8	518.8	526.6	518.8

ENVIRONMENTAL MONITORING RESULTS (OCT'19 to MARCH'20)

Table. 14. PERSONAL DUST SAMPLING:

Name of the Person	Personal Number	Oct-2019 PM (µg/m³)	Name of the Person	Personal Number	NOV-2019 PM (µg/m³)	Name of the Person	Personal Number	DEC-2019 PM (µg/m³)
Draupadi Lahur	TSP/806096/0919	6.6	Simon Baebandi	TSP/806076/0919	6.6	Lalatendu Lohar	TSP/798688/0919	8.1
Nirakar Patra	TSP/753639/0819	7.1	Balma Munda	TSP/753631/0819	6.8	Santana Munda	TSP/753276/0819	8.4
Anita Patra	BMM-304	7.4	Rajen Munda	BMM-122	8.1	Bigneswari Malakut	BMM-236	8.2
lalatendu Lohar	TSP/798688/0919	7.2	Bhumi Naik	BMM-184	7.8	Johan Hembram	MW0719167159	8.4
Santana Munda	TSP/753276/0819	7.8	Sapani Purti	BMM-414	8.6	Saraswati Tanti	MWO719166977	8.2
Bigneswari Malakut	BMM-236	7.5	Amita Patra	BMM-304	8.1	Shradhanjali Maharana	MWO719167124	8.1
Sibani Soren	TSP/811305/0919	7.4	Bigneswari Malakut	BMM-236	7.8	Bhaina Hembram	MWO719166713	8.2
Simon Bulbandi	TSP/806076/0919	6.9	Simon Bulbandi	TSP/806076/0919	7.4	Parinda Munda	MWO719167743	8.4
Balma Munda	TSP/753631/0819	6.6	Balma Munda	TSP/753631/0819	7.2			
Kamal Patra	TSP/806098/0919	7.4	Kamal Patra	TSP/806098/0919	8.1			

Table. 15. PERSONAL DUST SAMPLING:

Name of the Person	Personal Number	Jan-20 PM (µg/m³)	Name of the Person	Personal Number	Feb-20 PM (µg/m³)	Name of the Person	Personal Number	Mar-20 PM (µg/m³)
lalatendu Lohar	TSP/798688/0919	7.8	lalatendu Lohar	TSP/798688/0919	8.4	lalatendu Lohar	TSP/798688/0919	4.1

ENVIRONMENTAL MONITORING RESULTS (OCT'19 to MARCH'20)

Name of the Person	Personal Number	Jan-20 PM (µg/m³)	Name of the Person	Personal Number	Feb-20 PM (µg/m³)	Name of the Person	Personal Number	Mar-20 PM (µg/m³)
Santana Munda	TSP/753276/0819	7.6	Santana Munda	TSP/753276/0819	8.6	Santana Munda	TSP/753276/0819	4
Bigneswari Malakut	BMM-236	8.1	Bigneswari Malakut	BMM-236	8.6	Bigneswari Malakut	BMM-236	3.9
Johan Hembram	MW0719167159	8.2	Johan Hembram	MW0719167159	8.4	Johan Hembram	MW0719167159	3.6
Saraswati Tanti	MWO719166977	8.4	Saraswati Tanti	MWO719166977	8.2	Saraswati Tanti	MWO719166977	3.2
Shradhanjali Maharana	MWO719167124	8.2	Shradhanjali Maharana	MWO719167124	8.4	Shradhanjali Maharana	MWO719167124	4.2
Bhaina Hembram	MWO719166713	7.8	Bhaina Hembram	MWO719166713	8.6	Bhaina Hembram	MWO719166713	4.4
Parinda Munda	MWO719167743	7.6	Parinda Munda	MWO719167743	7.9	Parinda Munda	MWO719167743	3.8

Table. 16. DG SET EMISSION

Sampling Location: 100 KVA DG SET				Dec-19	Mar-20
SL.No	**Parameters Analyzed**	**Unit**	**CPCB LIMIT**	**Result**	**Result**
1	**Stack Temperature**	^{0}C	**.....**	124	128
2	**Velocity**	m/Sec	**.....**	9.6	10.2
3	**Concentration Of Particulate Matter As PM**	mg/Nm^3	**50**	38	44
4	**Oxides of Nitrogen as Nox**	mg/Nm^3	**400**	62.8	66
5	**Carbon Monoxide as CO**	mg/Nm^3	**150**	38.8	40.8
6	**Non Methyl Hydrocarbon as C**	mg/Nm^3	**....**	7.2	7.6

ENVIRONMENTAL MONITORING RESULTS (OCT'19 to MARCH'20)

Table.17. AMBIENT NOISE LEVEL

Location ID	Location	Day time Equivalent						Standard as per CPCB	Night time Equivalent						Standard as per CPCB
		Noise Level in dB (A) Leq							Noise Level in dB(A) Leq						
		Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20		Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20	
N-1	Town ship	64	70.2	68	67.6	69.6	64.8	**55**	44	48	48	49.2	50.6	51.8	**45**
N-2	Hospital	48	52.6	44.2	48.6	52.8	56	**50**	30	32.8	36.8	39.2	41.2	44.6	**40**
N-3	Mines Area	64	66.2	71.4	70.8	71.2	68.8	**75**	44	42.8	50.6	51.6	42.8	40.8	**70**

Table.18. EQUIPMENT NOISE:

Name of Location	Unit	Result OCT-19	Name of Location	Result NOV-19	Name of Location	Result DEC-19
OR-09K-7335(Volvo Truck)	dB	71.2	MW-Hyua (OR09N9453)	78.8	OD-09K-3107	88.2
HI Tach 200LC(Sovel-1)		78.8	MW-Hyua (OR09N9468)	76.4	OD-09K-3109	83.8
DOOSAN 340LC(Sovel-2)		72.8	Hyua (OD09K 3114)	70.6	OD-09K-3930	80.6
OD-O9A-6541(Truck Tata)		73.6	MW-Hyua (OR09N9470)	71.8	OD-09K-3931	81.8
OD-O9A-6540(Truck Tata)		74.8	Loader Screen Plant (OD09K1796)	75.6	OD-09K-3932	82.6

ENVIRONMENTAL MONITORING RESULTS (OCT'19 to MARCH'20)

Table. 19. Dust Fall Analysis:

Date of Sampling	Total Dust Fall (t/km2/month)	Analysis Result			
		Co (%)	Ni(%)	Hg(%)	As (%)
01.12.2019 TO 31.12.2019	0.66	<0.001	<0.001	<0.001	<0.001
01.03.2020 TO 31.03.2020	0.64	<0.001	<0.001	<0.001	<0.001

Table. 20. SOIL QUALITY ANALYSIS:

	Co (%)	Ni(%)	Hg(%)	As (%)
Dec-2019	0.036	0.062	<0.000002	<0.000002
Mar-20	0.041	0.058	<0.000002	<0.000002

Table. 21. GROUND WATER QUALITY (TRACE METALS)- Panchayat Office Borewell

Parameters	Iron as Fe	Copper as Cu	Manganese as Mn	Hexavalent Chromium as Cr^{6+}	Mercury as Hg	Cadmium as Cd	Selenium as Se	Arsenic as As	Lead as Pb	Zinc as Zn
November-19	0.18	<0.02	<0.05	<0.05	<0.002	<0.01	<0.001	<0.004	<0.01	<0.05

Table. 22 GROUND WATER (LEVEL) ANALYSIS A. GWL1 : Joribahal Pump House B. GWL2 : Nimera Village

Parameters		Unit	Analysis Result
November-19	GWL1	mt/bgl	7.1
	GWL2		2.6