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Ref.No.: MGM/P&E/190/20

Date:

28/6/2020

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

Subject: Submission of half-yearly compliance report on the stipulated environmental clearance terms and conditions in respect of Joda West 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-11015/86/2004-IA. II(M) DATED 13th Sep 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-11015/86/2004-IA. II(M) DATED 13th Sep 2005** in respect of Joda West 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
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Corporate Identity Number L27100MH1907PLC000260 website : www.tatasteel.com



Half-Yearly Compliance Report

On

Environmental Clearance Conditions

(MoEF Letter Ref No: - J-11015/86/2004-IA. II(M) DATED 13.09.2005)

Period: October'2019 – March'2020

Submitted By:

Joda West Iron & Manganese Mine

M/s. Tata Steel Limited

At/Po: Joda, Via-Joda

District- Keonjhar, Odisha -758034

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Compliance to the Environment Clearance Letter No: -11015/86/2004-IA. II(M) DATED

13.09.2005 in respect of Expansion of the Joda West Manganese Mine of M/s Tata Steel Limited

for the enhancement of production capacity from 0.45LTPA to 1.80 LTPA, in villages Joda,

Bichhakundi, Kamarjoda, Banspani and Bhuyan Roida, Tehsil-Barbil, District-Keonjhar, Odisha.

Table. A. Specific Condition:

Sl. No	Specific Conditions	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.	<p style="text-align: center;"><u>Complied.</u></p> <p>We have obtained the Forest Clearance vide MoEF's letter no. F.No.8-89/2004-FC, dt.10.08.2007 over an area of 436.678 ha of forest land within Joda West Iron and Mn. Mine. Diversion Proposal for 809.874 ha of forest land has been applied is under process.</p> <p>Presently, the mining operation and allied activities are confined within the approved diverted area only.</p>
(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.	<p style="text-align: center;"><u>Complied.</u></p> <p>Topsoil generated during the mining operation is subsequently used for the greenbelt development and maintenance activities.</p>
(iii)	<p>OB and other wastes should be stacked at earmarked sites only and should not be kept active for long periods of time.</p> <p>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.</p> <p>Retention/toe walls shall be provided at the base of the dumps.</p>	<p style="text-align: center;"><u>Complied.</u></p> <p>Overburden dumps are maintained as per the mining scheme/plan approved by Indian Bureau of Mines.</p> <p>The dump is terraced at every 10m and overall slope is maintained well within 28° as per approved Scheme of Mining.</p> <p>The dumps are stabilised by means of biological reclamation with the plantation of Vertiber grass on the slopes and native varieties of forestry saplings. During FY 2019-20, 11717 saplings have been planted and fetching us survival of 11284 saplings. (96.3% survival rate).</p> <p>The retaining wall and garland drain with sedimentation pit at corners near toe at low lying area and uplift portion of OB dump has been constructed.</p>
(iv)	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)	<p style="text-align: center;"><u>Complied.</u></p> <p>Existing catch drains and garland drains are covering the entire dump slope at bottom part. The run off from garland drains are collected in settling/sedimentation pits. The catch drains and sedimentation pits are periodically de-silted and maintained properly.</p>

Sl. No	Specific Conditions	Compliance Status (Oct'19 to March'20)
	<p>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.</p> <p>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.</p>	<p>Size, gradient and length of the drains are adequate to take care of the peak flow.</p> <p>A series of check dams and settling pits have been provided for arresting the silt in the runoff sludge.</p>
(v)	<p>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.</p>	<p><u>Complied.</u></p> <p>To prevent the siltation and check the run-off, retaining wall and garland drain are provided with the dimension as follows: <u>Dimension of the Retaining Wall:</u> Height – 1 to 1.2 mtr. Width – 1 mtr. <u>Dimension of the Garland Drain:</u> Depth – 1.20 to 1.5 mtr. Width – 1 to 1.2 mtr.</p> <p>Multi-stage check dams have been constructed in series at H' Quarry to arrest sedimentation/silt prior to its confluence with Kundra Nallah.</p>
(vi)	<p>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.</p>	<p><u>Complied.</u></p> <p>Dust fall analysis have been conducted for all the stipulated parameters. Monitoring results for the period from Oct'19 to March'20 is enclosed in the Annexure-I.</p>
(vii)	<p>Mineral and OB transportation shall be done in trucks/dumpers covered with tarpaulins.</p> <p>Vehicular emissions should be kept under control and regularly monitored.</p> <p>Suitable measures should be taken to check fugitive emissions from haulage roads & transfer points, etc.</p>	<p><u>Complied.</u></p> <p>The trucks are being covered with tarpaulin during dispatch of manganese ore from mine to Ferro Alloys Plant and Railway Siding located at Joda. OB is being transported by shovel – dumper combination from mine face to dumps located near the quarry itself within 1.5 Km. So, it is not in practice to cover the OB transportation trucks with tarpaulin.</p> <p>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. The emissions are under control.</p> <p>Apart from the regular water sprinkling by mobile water tanker, permanent/fixed type water sprinklers have been installed along the haul roads in D-Quarry.</p>

Six Monthly EC Compliance Report-Joda West Iron & Manganese Mine, M/s Tata Steel Ltd. for Oct'19 – Mar'20

Sl. No	Specific Conditions	Compliance Status (Oct'19 to March'20)
		The results of Fugitive Emission Monitoring done during the period Oct'19 to March'20 is enclosed as Annexure-I.
(viii)	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 / Agriculture Department. The density of the trees should be not less than 2500 plants per ha.	<p style="text-align: center;"><u>Complied.</u></p> <p>Mine reclamation and rehabilitation work is carried out by biodiversity management plan (BMP) of the unit, emphasizing on the plantation of native varieties of forestry species. We have planted around 11.54 lakh nos. of trees over an area around 225.9 ha till 2019-20. at safety zone, OB dump and as avenue plantation. The tree density is maintained at the rate of more than 2500 saplings per ha.</p> <p>During FY 2019-20, 11717 saplings have been planted and fetching us survival of 11284 saplings. (96.3% survival rate). Apart from this, dump slope stabilisation have been carried out by 1,22,300 nos. of vetiver slips/grass slips.</p>
(ix)	Groundwater shall not be used for mine operations. Prior approval of CGWA shall be obtained for using groundwater.	<p style="text-align: center;"><u>Complied.</u></p> <p>We have obtained NOC from CGWA vide NOC No. CGWA/NOC/MIN/ORIG/2018/3888, Dated 09.08.2018 for a quantity of 146 cum/day.</p>
(x)	Mining will not intersect groundwater. Prior permission of the MOEF and CGWA shall be taken to mine below water table.	<p style="text-align: center;"><u>Complied.</u></p> <p>Mining is not intersecting the ground water as the Ground water table being at lower level in comparison to prevailing pit depth; However, seepage of very low potential is getting evidenced at one point of the D-Quarry. It shall be assessed and regularised in the renewal of NOC from CGWA.</p>
(xi)	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.	<p style="text-align: center;"><u>Complied.</u></p> <p>Ground water level & quality at existing wells (open dug wells/borewells/piezometers) is monitored from time to time.</p> <p>The monitoring result of ground water (quality & level) is enclosed as Annexure-I.</p>
(xii)	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	<p style="text-align: center;"><u>Complied.</u></p> <p>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 monitored on regular basis. The parameters analysed for testing the potability as per drinking water Standards, IS 10500:2012.</p>

Six Monthly EC Compliance Report-Joda West Iron & Manganese Mine, M/s Tata Steel Ltd. for Oct'19 – Mar'20

Sl. No	Specific Conditions	Compliance Status (Oct'19 to March'20)
	permissible limits.	The monitoring results are summarised in the Annexure-I.
(xiii)	"Consent to Operate" should be obtained from SPCB before expanding mining activities.	<u>Complied.</u> Consent to operate has been granted by Odisha State Pollution Control Board, vide letter no. 5095/IND-I-CON-186 dated 25.05.2019 and Consent order no. 67 valid 31.03.2021.
(xiv)	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/tasks 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.	<u>Complied.</u> Site Specific Wildlife Management Plan has been approved vide memo no. 7726/1WL-SSP-93/2015 dated 31 st Aug 2015. 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. 56,30,000/- dt. 05.07.2006 2. Rs. 2,31,24,380/- dt. 07.09.2011 3. Rs 3,30,67,537- dt. 19.05.2015 Apart from this we have also deposited an amount of Rs. 9,79,48,000/- on 12.12.2017 towards implementation of Site Specific Wild Life Conservation Plan (SSWLCP) prepared and approved by the State Forest Department.
(xv)	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.	<u>Complied.</u> A progressive mine closure plan for the period 2013-14 to 2017-18 has been approved by IBM along with the Scheme of Mining. Further, Progressive mine closure plan for the period of 2018-19 to 2022-23 has been submitted under the Rule No. 23, MCDR 2017. The final mine closure plan along with details of Corpus fund will be submitted to the Ministry of Environment & Forests 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.	<u>Complied.</u> So far, Mining is carried out as proposed. Any changes in terms of mining technology and scope of working when envisaged, prior approval shall be obtained.						
ii.	No change in the calendar plan including excavation, quantum of manganese ore and waste should be made.	<u>Complied.</u> Production and excavation quantum is regulated by the Mine Plan approved by Indian bureau of Mines (IBM). Plan Vs. Actual (2019-20) <table border="1"> <thead> <tr> <th>(2019-20)</th> <th>Plan</th> <th>Actual</th> </tr> </thead> <tbody> <tr> <td>Production (MT)</td> <td>95998</td> <td>93605.000</td> </tr> </tbody> </table>	(2019-20)	Plan	Actual	Production (MT)	95998	93605.000
(2019-20)	Plan	Actual						
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iii.	Four ambient air quality-monitoring stations should be established in the core zone as well as in the buffer zone for RPM. SPM, SO ₂ , NO _x . 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, SO ₂ & NO _x) should be regularly submitted to the Ministry including its Regional office at Bhubaneswar and the State Pollution Control Board / Central Pollution Control Board once in six months.	<u>Complied.</u> Five ambient air quality monitoring stations (02 in Core Zone & 3 in buffer zone) have been established. Samples are monitored as per NAAQS-2009 and the reports are submitted to OSPCB every month. It is observed that the environmental parameters are within the prescribed limit. Abstract of the monthly monitoring data on ambient air quality is enclosed as Annexure -I.						
iv.	Drills should be wet operated or with dust extractors and controlled blasting should be practiced.	<u>Complied.</u> Wet drilling concept is already in place. Controlled blasting technique with NONEL is in practice.						
v.	Fugitive dust emissions from all the sources should be controlled regularly monitored and data recorded properly. Water spraying arrangements on haul roads, wagon loading, dumpers/ trucks, loading & unloading points should be provided and properly maintained.	<u>Complied.</u> All the dust prone areas are adequately sprinkled by mobile sprinklers. Additionally, we have also installed fixed-type water sprinklers along haul road at D-Quarry. Environmental 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, etc should be provided with ear plugs/ muffs.	<u>Complied.</u> Ear plugs & Ear muffs are provided to the workers working in mining operation & DG operations. Rests of operations are below the noise levels of 80 dBA. The noise monitoring result for the period Oct'19 to March'20 is enclosed as Annexure-I.						
vii.	Industrial waste water (workshop and	<u>Complied.</u>						

Sl. No	General Condition	Compliance Status (Oct'19 to March'20)
	waste water from the mine) should be properly collected, treated so as to conform to the standards prescribed under GSR 422 (E) dated 19 th 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.	The oil separation system has been provided at workshop and working effectively. The details of Waste Water analysis for the period Oct'19 to March'20 is 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.	<u>Complied.</u> Environmental Laboratory has not been established; however entire monitoring services are carried out by engaging a third party recognised by MoEF&CC and/or SPCB and having NABL Accredited Lab. During Oct'19 to March'20, Visiontek Consultancy had been engaged for the environmental monitoring services.
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.	<u>Complied.</u> Personnel Protective Equipment's (PPEs) are being mandatorily used by all the workers as per applicability. It is regularly ensured at the entry points. Safe Operating Procedure based training is imparted to all the workers apart from the initial VT training. Periodical Medical Examination of employees (departmental & contractual) are conducted as per prescribed norms of Mines Rule, 1955. The initial and periodical examination includes blood haematology, blood pressure, detailed cardiovascular assessment, neurological examination etc. All chest radiographs are being classified for detection of pneumoconiosis, diagnosis and documentation made in accordance to ILO classifications. Total 556 contractual employees and 19 departmental employees have undergone PME during Period.
x.	A separate environmental management cell with suitable qualified personnel should be set up under the control of a Senior Executive, who will report directly to the Head of the Organization.	<u>Complied.</u> A central environmental management cell has been established, wherein an environmental manager ensures the implementation of environmental management plans/protection measures at the mining site(s) or the units and reports to the chief environment, who directly reports to the Head of the Organisation.

Sl. No	General Condition	Compliance Status (Oct'19 to March'20)																															
xi.	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 Bhubaneswar.	<p>Funds allocated for environmental management are earmarked in separate Cost center maintained for the purpose.</p> <p>The details of Proposed Expenditure for FY 2019-20 as per below:</p> <table border="1"> <thead> <tr> <th>S. No</th> <th>Activity</th> <th>Expenditure (P) FY20- Lacs INR</th> <th>Expenditure (A) FY20-I Lacs NR</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Construction of retaining wall at toe of dumps</td> <td>5.47</td> <td>6.20</td> </tr> <tr> <td>2</td> <td>Construction of check dams</td> <td>1.1</td> <td>1.5</td> </tr> <tr> <td>3</td> <td>Construction of settling ponds (Garland drains etc.).</td> <td>0.08</td> <td>1.10</td> </tr> <tr> <td>4</td> <td>Environmental monitoring</td> <td>10.0</td> <td>11.5</td> </tr> <tr> <td>5.</td> <td>Afforestation</td> <td>11.3</td> <td>12.5</td> </tr> <tr> <td></td> <td>Total</td> <td>27.95</td> <td>32.8</td> </tr> </tbody> </table> <p>(P)-Proposed, (A)-Actual</p>				S. No	Activity	Expenditure (P) FY20- Lacs INR	Expenditure (A) FY20-I Lacs NR	1	Construction of retaining wall at toe of dumps	5.47	6.20	2	Construction of check dams	1.1	1.5	3	Construction of settling ponds (Garland drains etc.).	0.08	1.10	4	Environmental monitoring	10.0	11.5	5.	Afforestation	11.3	12.5		Total	27.95	32.8
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xii.	The Regional Office of this Ministry located at Bhubaneswar 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	<p align="center"><u>Complied.</u></p> <p>All necessary cooperation is extended to all the Govt officials/authorities during their inspection at our sites.</p>																															
xiii.	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.	<p align="center"><u>Complied.</u></p> <p>Copy of the clearance letter marked to Chairman, Municipal Council, Joda on 12.01.2006.</p>																															
xiv.	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.	<p>This is applicable for the Odisha State Pollution Control Board.</p>																															
xv.	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 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	<p align="center"><u>Complied.</u></p> <p>A detail of Environmental Clearance with regard to Joda West Manganese Mine was published in Oriya News Papers Dharitri & Sambad 17.10.2005.</p>																															

Sl. No	General Condition	Compliance Status (Oct'19 to March'20)
	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.	<u>Complied.</u> The best scientific method of mining is in practice at Joda West Iron and Manganese Mine. Garland drain and Retaining wall are provided at the toe of the overburden dumps. Settling ponds are done at intervals along the garland drain. A five-stage check dam has been provided at H Quarry of the mine to arrest the surface run off with rain water.
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.	<u>Complied</u> The natural water bodies which are flowing around the nearby villages are not disturbed by mining activity. 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 through pipe line and overhead tanks.
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	<u>Complied.</u> The operation of the mine is restricted to the day light hours only. Hence, there is no disturbance to the habitats located close to the mining operation.

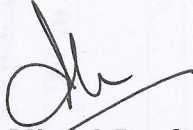
Six Monthly EC Compliance Report-Joda West Iron & Manganese Mine, M/s Tata Steel Ltd. for Oct'19 – Mar'20

Sl. No.	Stipulated Condition	Compliance Status (Oct'19 to March'20)
	the village and keeping the noise levels well within prescribed limits for day/ night hours.	
iv.	The project Authority shall make necessary alternative arrangement, where required, in consultation with state Government to provide alternative 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 since there is no grazing land within the M.L. area.
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 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.	<u>Complied.</u> Deep hole drilling and controlled blasting technique has been adopted in the mine. Vibration study has been done with the help of CIMFR and vibration limit (ppv) found within the limit prescribed by DGMS.
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 conveyer fully covered to avoid air borne dust.	<u>Complied.</u> The main haulage road, mineral stacking area overburden dumping areas are regularly sprinkled with water by using water tankers. A part of the D-Quarry has been covered under the permanent/fixed water sprinkling arrangement.
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	<u>Complied.</u> Not Applicable since there is no crop land affected within the Mine Lease (ML) area or in vicinity to the ML Area.

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Sl. No.	Stipulated Condition	Compliance Status (Oct'19 to March'20)
	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.	
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	There is no transportation road passing through any village.
x.	Likewise, alteration or re-routing of foot paths, pagdandies, cart road and village 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.	Not Applicable
xi.	The CSR activates by companies including mining establishment has become mandatory up to 2% their financial turn over, socio Economic Development of neighborhood. 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	<p style="text-align: center;"><u>Complied on ongoing basis.</u></p> <p>Tata Steel has taken up many social initiatives for the upliftment of the education, health and other socio-economic development of the neighbouring villages. TSRDS (Tata Steel Rural Development Society) has been pioneering the initiatives through CSR activities.</p>

Sl. No.	Stipulated Condition	Compliance Status (Oct'19 to March'20)
	<p>required under TOR. "R&R Plan// compensation details for Project Affected People (PAP) should be furnished. While preparing the R&R plan, the relevant State/ national Rehabilitation & Resettlement Policy should be kept in view. In respect of SCs and STs and weaker section of society in study, a need based sample survey, family-wise, should be undertaken to assess their requirement, and action programmes prepared and submitted accordingly, integrating the sectoral programmes 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.</p>	<p>R&R policy has not been applicable for the Project Proponent (PP) till now.</p>



Head, Mine & Production Planning
 Ferro Alloys Mineral Division
 (Joda West 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: Kundra Nallah Entering H. Quarry**

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	5.8	6.2	6.1	6.6	6.2	6.4
BOD (3) days at 270C (max)	mg/l	3	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8
Total Coli form	MPN/	5000	210	180	220	210	220	210
pH Value	--	6.0-9.0	7.48	7.51	7.54	7.51	7.55	7.56
Colour (max)	Hazen	300	CL	CL	CL	CL	CL	CL
Total Dissolved Solids	mg/l	1500	160	182	188	182	188	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	0.38	0.32	0.42	0.38	0.42	0.38
Chloride (max)	mg/l	600	46.2	48.8	51.8	50.6	52.6	50.6
Sulphates (SO4) (max)	mg/l	400	5.2	5.6	5.4	5.2	5.6	5.2
Nitrate as NO3 (max)	mg/l	50	3.2	3.1	3.6	3.2	3.6	3.8
Fluoride as F (max)	mg/l	1.5	0.021	0.018	0.018	0.016	0.018	0.016
Phenolic Compounds as C6H5OH (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: Kundra Nallah leaving H-Quarry

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	6.1	6.6	6.6	6.8	6.8	6.6
BOD (3) days at 27°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	220	210	260	240	260	240
pH Value	--	6.0-9.0	7.54	7.56	7.68	7.56	7.61	7.62
Colour (max)	Hazen	300	CL	CL	CL	CL	CL	CL
Total Dissolved Solids	mg/l	1500	182.8	160	196	192	196	192
Copper as Cu (max)	mg/l	1.5	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05
Iron as Fe (max)	mg/l	0.5	0.42	0.41	0.46	0.48	0.49	0.42
Chloride (max)	mg/l	600	51.2	54.8	54.6	52.8	54.8	52.8
Sulphates (SO ₄) (max)	mg/l	400	6.1	6.6	6.2	5.8	6.4	6.1
Nitrate as NO ₃ (max)	mg/l	50	3.8	4.2	3.9	4.1	4.8	4.2
Fluoride as F (max)	mg/l	1.5	0.028	0.031	0.022	0.018	0.021	0.02
Phenolic Compounds as C ₆ H ₅ OH (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/	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	100 ml	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	CL
5.	Odour	--	Unobjectionable	--	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
6.	Taste	--	Agreeable	--	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
7.	pH value (25°C)		6.5 - 8.5	No Relaxation	7.64	7.71	7.72	7.81	7.88	7.78	7.64
8.	Turbidity	NTU	5	10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
9.	Total Dissolved Solids	mg/l	500	2000	76	84	92	88	92	88	76
10.	Aluminium (as Al)	mg/l	0.03	0.2	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
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	<0.01
13.	Calcium (as Ca)	mg/l	75	200	31.2	32.6	32.6	28.2	30.6	36	31.2
14.	Chloride (as Cl)	mg/l	250	1000	42.6	44.8	51.2	53.2	56.8	50.8	42.6
15.	Copper (asCu)	mg/l	0.05	1.5	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02
16.	Fluoride (as F)	mg/l	1	1.5	0.018	0.021	<0.01	<0.01	<0.01	<0.01	0.018

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							
17.	Residual Free Chlorine	mg/l	0.2(Min.)	---	ND	ND	ND	ND	ND	ND	ND
18.	Iron (as Fe)	mg/l	0.3	1	0.22	0.24	0.26	0.28	0.22	0.28	0.22
19.	Magnesium (as Mg)	mg/l	30	100	11.6	18.2	18.4	19.2	20.8	19.6	11.6
20.	Manganese (as Mn)	Hazen	0.1	0.3	<0.05	<0.05	<0.005	<0.005	<0.005	<0.005	<0.05
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	0.61	0.66	0.78	0.79	0.88	0.82	0.61
23.	Phenolic Compounds (as C ₆ H ₅ OH)		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	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
25.	Sulphate (as SO ₄)	mg/l	200	400	4.6	5.2	5.6	5.2	5.6	5.8	4.6
26.	Alkalinity (as CaCO ₃)	mg/l	200	600	52	56	48.6	42.8	44.6	50.6	52
27.	Total Hardness(as CaCO ₃)	mg/l	300	600	64	70	60.8	51.6	50.8	61.2	64
28.	Cadmium (as Cd)	mg/l	0.01	No Relaxation	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
29.	Cyanide (as CN)	mg/l	0.05	No Relaxation	ND	ND	ND	ND	ND	ND	ND
30.	Lead (as Pb)	mg/l	0.05	No Relaxation	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
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	<0.01

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							
33.	Zinc (as Zn)	mg/l	5	15	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.01
34.	Chromium (as Cr ⁺⁶)	mg/l	0.05	No Relaxation	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.01
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 (Buffer Zone)

Sl. No	Parameter	Unit	Standards as per IS: 10500:2012 Amended on 2015 & 2018		Premabasti		Kamar Joda	
			Acceptable Limit	Permissible Limit	Nov-19	Mar-20	Nov-19	Mar-20
<i>Essential Characteristics</i>								
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	1.8	1.4	1.1	1.5
5	pH Value	--	6.5-8.5	No Relaxation	7.52	7.1	7.48	7.45
6	Total Hardness (as CaCO ₃)	mg/l	200	600	116	113.0	124	124.0
7	Iron (as Fe)	mg/l	1.0	No Relaxation	0.24	0.24	0.28	0.24
8	Chloride (as Cl)	mg/l	250	1000	48.2	43.4	36.0	39.0
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		Premabasti		Kamar Joda	
			Acceptable Limit	Permissible Limit	Nov-19	Mar-20	Nov-19	Mar-20
Desirable Characteristics								
10	Dissolved Solids	mg/l	500	2000	156	176.0	144	148.0
11	Calcium (as Ca)	mg/l	75	200	34.8	42.2	31.6	35.2
12	Magnesium (as Mg)	mg/l	30	100	14.8	21.6	12.6	14.6
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	0.016	0.022	0.021	0.016
15	Sulphate (as SO ₄)	mg/l	200	400	6.4	5.4	4.8	6.2
16	Nitrate (as NO ₃)	mg/l	45	No Relaxation	3.4	3.4	3.8	3.2
17	Fluoride (as F)	mg/l	1.0	1.5	0.026	0.016	0.039	0.028
18	Phenolic Compounds (as C ₆ H ₅ OH)	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	2.8	2.4	2.6	3.6
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	<0.05	<0.01	<0.01	<0.01
29	Alkalinity	mg/l	0.03	0.2	64.0	78.0	68.2	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

ENVIRONMENTAL MONITORING RESULTS (OCT'19 to MARCH'20)**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	72	32	66	30	70	42
3	Particulate size of SS		Shall pass 850 micron IS Sieve	< 850	< 850	< 850	< 850	< 850	< 850
4	pH Value	--	5.5-9.0	7.26	7.54	7.38	7.44	7.12	7.42
5	Temperature	°C	Shall not exceed 5°C above the receiving water temperature	26	26	26	26	26	26
6	Oil & Grease(max)	mg/l	10	4.2	ND	4.1	ND	4.2	ND
7	Total Residual Chlorine	mg/l	1	ND	ND	ND	ND	ND	ND
8	Ammonical Nitrogen (as N)	mg/l	50	8.4	1.80	8.8	2.00	8.4	1.46
9	Total Kjeldahl Nitrogen(as TKN)	mg/l	100	11.2	1.94	10.6	3.2	20.6	3.8
10	Free ammonia (as NH ₃)	mg/l	5	ND	ND	ND	ND	ND	ND
11	BOD(3 days at 27°C (max)	mg/l	30	22	4.6	20.8	5.8	25.2	3.6
12	Chemical Oxygen Demand as COD	mg/l	250	132	22	124	20	164	20
13	Arsenic as As	mg/l	0.2	<0.001	<0.001	<0.001	<0.001	<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)	Oct-19		Nov-19		Dec-19	
				STP (Inlet)	STP (Outlet)	STP (Inlet)	STP (Outlet)	STP (Inlet)	STP (Outlet)
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
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	0.86	<0.05	0.94	<0.05	0.74	<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	0.32	0.018	0.36	0.012	0.2	0.078
25	Dissolved Phosphates (P)	mg/l	5	0.44	<0.05	0.48	<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

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)
28	Bio-assay test		90% survival of fish after 96 hours in 100% effluent	94% survival of fishes	88% survival of fishes	942% survival of fishes	88% survival of fishes	92% survival of fishes	96% survival of fishes
29	Manganese (Mn)	mg/l	2	0.046	<0.005	0.051	<0.005	0.046	<0.005
30	Iron as Fe (max)	mg/l	3	1.82	0.58	1.84	0.64	2.8	1.1
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	4.8	2.1	5.1	2.6	3.8	1.2

Table.6 WASTE WATER (Jan'20 to March'20): STP at Vegetable Garden (Bichhakundi)

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	Haze n	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	72	32	66	30	70	42
3	Particulate size of SS		Shall pass 850 micron IS Sieve	< 850	< 850	< 850	< 850	< 850	< 850
4	pH Value	--	5.5-9.0	7.26	7.54	7.38	7.44	7.12	7.42
5	Temperature	°C	Shall not exceed 5°C above the receiving water temperature	26	26	26	26	26	26
6	Oil & Grease(max)	mg/l	10	4.2	ND	4.1	ND	4.2	ND

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)
7	Total Residual Chlorine	mg/l	1	ND	ND	ND	ND	ND	ND
8	Ammonical Nitrogen (as N)	mg/l	50	8.4	1.80	8.8	2.00	8.4	1.46
9	Total Kjeldahl Nitrogen(as TKN)	mg/l	100	11.2	1.94	10.6	3.2	20.6	3.8
10	Free ammonia (as NH ₃)	mg/l	5	ND	ND	ND	ND	ND	ND
11	BOD(3 days at 27°C (max))	mg/l	30	22	4.6	20.8	5.8	25.2	3.6
12	Chemical Oxygen Demand as COD	mg/l	250	132	22	124	20	164	20
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
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	0.86	<0.05	0.94	<0.05	0.74	<0.05

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)
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	0.32	0.018	0.36	0.012	0.2	0.078
25	Dissolved Phosphates (P)	mg/l	5	0.44	<0.05	0.48	<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	94% survival of fishes	88% survival of fishes	942% survival of fishes	88% survival of fishes	92% survival of fishes	96% survival of fishes
29	Manganese (Mn)	mg/l	2	0.046	<0.005	0.051	<0.005	0.046	<0.005
30	Iron as Fe (max)	mg/l	3	1.82	0.58	1.84	0.64	2.8	1.1
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	4.8	2.1	5.1	2.6	3.8	1.2

ENVIRONMENTAL MONITORING RESULTS (OCT'19 to MARCH'20)**Table.7. MINE WATER: D-Quarry**

Sl.No	Parameters	Unit	General Standards for discharge of Environmental Pollutants Part A- Effluents	Analysis Result					
				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	7.64	7.72	7.58	7.64	7.66	7.52
4	Total Dissolved Solids	mg/l	-	142	144	126	138	132.6	122
5	Copper as Cu	mg/l	3.0	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
6	Fluoride as F	mg/l	2.0	0.026	0.031	0.024	0.036	0.041	0.021
7	Total Residual Chlorine	mg/l	1.0	ND	ND	ND	ND	ND	ND
8	Iron as Fe	mg/l	3.0	0.56	0.61	0.66	0.64	0.66	0.62
9	Manganese as Mn	mg/l	2.0	0.044	0.042	0.078	0.081	0.086	0.071
10	Nitrate as NO3	mg/l	10.0	3.26	3.42	3.2	3.6	4.2	2.8
11	Phenolic Compounds as C6H5OH	mg/l	1.0	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
12	Selenium as Se	mg/l	0.05	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
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

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

Sl.No	Parameters	Unit	General Standards for discharge of Environmental Pollutants Part A- Effluents	Analysis Result					
				Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20
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	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
18	Arsenic as As	mg/l	0.2	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
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	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
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	62	68	68	66	68	62
24	Temperature	0C	shall not exceed 5°C above the receiving water temperature	27	26	22	26	28	28
25	Dissolved Oxygen	mg/l	-	6.4	6.8	6.6	6.8	6.9	6.4
26	BOD at 27°C for 3 days	mg/l	30	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8
27	COD	mg/l	250	15.2	16.6	15.2	16.6	17.2	14.8
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 Kjeldahl Nitrogen as N	mg/l	100	2.48	3.26	2.2	2.6	2.8	2.6
31	Sulphide as S	mg/l	2.0	ND	ND	ND	ND	ND	ND

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

Sl.No	Parameters	Unit	General Standards for discharge of Environmental Pollutants Part A- Effluents	Analysis Result					
				Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20
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 850 mm IS Sieve	Passes through 850 mm IS Sieve	Passes through 850 mm IS Sieve	Passes through 850 mm IS Sieve	Passes through 850 mm IS Sieve	Passes through 850 mm IS Sieve
34	Bio-assay	mg/l	90% survival in 100% effluent	Yes	Yes	Yes	Yes	Yes	Yes
35	Dissolved Phosphates as PO ₄	mg/l	5.0	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Table.8. MINE WATER: H- Quarry

Sl.No	Parameters	Unit	General Standards for discharge of Environmental Pollutants Part A- Effluents	Analysis Result					
				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	7.96	7.92	7.88	7.78	7.84	7.82
4	Total Dissolved Solids	mg/l	-	121	118	124	132	136	116
5	Copper as Cu	mg/l	3.0	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
6	Fluoride as F	mg/l	2.0	0.038	0.042	0.048	0.051	0.058	0.052
7	Total Residual Chlorine	mg/l	1.0	ND	ND	ND	ND	ND	ND

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

Sl.No	Parameters	Unit	General Standards for discharge of Environmental Pollutants Part A- Effluents	Analysis Result					
				Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20
8	Iron as Fe	mg/l	3.0	0.66	0.68	0.74	0.78	0.82	0.72
9	Manganese as Mn	mg/l	2.0	1.38	1.42	1.8	2.1	2.6	2.1
10	Nitrate as NO3	mg/l	10.0	1.62	1.66	1.74	1.82	1.99	1.6
11	Phenolic Compounds as C6H5OH	mg/l	1.0	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
12	Selenium as Se	mg/l	0.05	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
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	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
18	Arsenic as As	mg/l	0.2	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
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	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
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	54	56.6	72	60	68	78

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

Sl.No	Parameters	Unit	General Standards for discharge of Environmental Pollutants Part A- Effluents	Analysis Result					
				Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20
24	Temperature	0C	shall not exceed 5°C above the receiving water temperature	26	26	28	28	26	28
25	Dissolved Oxygen	mg/l	-	5.4	5.8	6.8	7.2	7.8	7.4
26	BOD at 27°C for 3 days	mg/l	30	5.2	6.2	<1.8	<1.8	2.6	<1.8
27	COD	mg/l	250	21.2	26	24	28	32	28
28	Oil & Grease	mg/l	10	ND	ND	ND	ND	ND	ND
29	Ammonical Nitrogen as N	mg/l	50	ND	ND	ND	0.81	0.86	ND
30	Total Kjeldahl Nitrogen as N	mg/l	100	0.91	0.84	0.94	1.2	1.6	0.92
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 850 mm IS Sieve	Passes through 850 mm IS Sieve	Passes through 850 mm IS Sieve	Passes through 850 mm IS Sieve	Passes through 850 mm IS Sieve	Passes through 850 mm IS Sieve
34	Bio-assay	mg/l	90% survival in 100% effluent	All fishes survive in 100% effluent after 96 hrs	All fishes survive in 100% effluent after 96 hrs	All fishes survive in 100% effluent after 96 hrs	All fishes survive in 100% effluent after 96 hrs	All fishes survive in 92% effluent after 96 hrs	All fishes survive in 100% effluent after 96 hrs

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

Sl.No	Parameters	Unit	General Standards for discharge of Environmental Pollutants Part A- Effluents	Analysis Result					
				Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20
35	Dissolved Phosphates as PO4	mg/l	5.0	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Table.9. Oil-Water Separation Pit

Sl.No	Parameters	Unit	General Standards for discharge of Environmental Pollutants Part A- Effluents	Analysis Result					
				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	7.15	7.26	7.26	7.34	7.36	7.28
4	Total Dissolved Solids	mg/l	-	142	148	160	168	166	152
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	0.036	0.036	0.041	0.046	0.041
7	Total Residual Chlorine	mg/l	1.0	ND	ND	ND	ND	ND	ND
8	Iron as Fe	mg/l	3.0	0.61	0.66	0.68	0.71	0.64	0.66
9	Manganese as Mn	mg/l	2.0	1.21	1.26	1.36	1.42	1.38	1.28
10	Nitrate as NO3	mg/l	10.0	3.82	4.28	4.2	4.6	4.8	4.6
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 Result					
				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	38	42	44	46	52	48
24	Temperature	0C	shall not exceed 5°C above the receiving water temperature	28	26	26	26	28	28
25	Dissolved Oxygen	mg/l	-	5.6	6.2	6.4	6.6	6.8	6.6
26	BOD at 27°C for 3 days	mg/l	30	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8
27	COD	mg/l	250	16.4	17.8	18.6	21.8	24.2	19.2
28	Oil & Grease	mg/l	10	ND	ND	ND	ND	ND	ND

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

Sl.No	Parameters	Unit	General Standards for discharge of Environmental Pollutants Part A- Effluents	Analysis Result					
				Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20
29	Ammonical Nitrogen as N	mg/l	50	ND	ND	ND	ND	ND	ND
30	Total Kjeldahl Nitrogen as N	mg/l	100	2.6	2.6	3.8	4.2	4.1	4.2
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 850 mm IS Sieve	Passes through 850 mm IS Sieve	Passes through 850 mm IS Sieve	Passes through 850 mm IS Sieve	Passes through 850 mm IS Sieve	Passes through 850 mm IS Sieve
34	Bio-assay	mg/l	90% survival in 100% effluent	90% survival in	90% survival in	90% survival in	90% survival in	90% survival in	90% survival in
35	Dissolved Phosphates as PO ₄	mg/l	5.0	100% effluent	<0.05	<0.05	<0.05	<0.05	<0.05

AAQ MONITORING (CORE ZONE)**Table.10. AAQ1: Time Office**

Monthly Average	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NO _x (µg/m ³)	O ₃ (µg/m ³)	CO mg/m ³	NH ₃ (µg/m ³)	Pb (µg/m ³)	Ni (ng/m ³)	As (ng/m ³)	C ₆ H ₆ (µg/m ³)	BaP (ng/m ³)	Mn µg/m ³
Oct-19	50.01	24.19	4.41	11.10	5.41	0.23	22.72	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	0.014
Nov-19	63.84	38.31	6.70	12.23	7.09	0.34	24.76	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	0.017
Dec-19	59.63	35.81	12.34	16.58	8.53	0.69	25.99	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	0.013
Jan-20	61.10	36.65	11.01	16.21	8.83	0.59	26.71	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	0.013
Feb-20	67.98	40.79	14.00	15.96	8.71	0.56	27.96	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	0.014
Mar-20	57.54	34.53	9.61	13.96	11.46	0.39	22.60	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	< 0.001

ENVIRONMENTAL MONITORING RESULTS (OCT'19 to MARCH'20)**Table.11. AAQ2: H-Quarry**

Monthly Average	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NO _x (µg/m ³)	O ₃ (µg/m ³)	CO mg/m ³)	NH ₃ (µg/m ³)	Pb (µg/m ³)	Ni (ng/m ³)	As (ng/m ³)	C ₆ H ₆ (µg/m ³)	BaP (ng/m ³)	Mn µg/m ³)
Oct-19	58.44	29.47	4.67	12.11	5.88	0.28	23.91	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	0.01
Nov-19	61.00	36.60	5.39	13.12	7.91	0.32	25.87	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	0.010
Dec-19	60.24	35.70	9.31	14.64	7.13	0.61	25.69	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	<0.001
Jan-20	62.49	37.43	9.12	13.70	8.27	0.65	26.49	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	<0.001
Feb-20	70.65	42.39	9.09	14.64	8.25	0.59	26.60	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	<0.001
Mar-20	63.69	38.21	10.43	13.34	8.07	0.52	25.40	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	<0.001

Table. 12. Buffer Zone -Ambient Air Quality (Khondbond)

Parameters	Method of Measurement	NAAQS-2009	OCT-19	NOV-19	DEC-19	JAN-20	FEB-20	MAR-20
PM ₁₀	Gravimetric method	100(µg/m ³)	48	52.2	58.8	60.8	66.2	56
PM _{2.5}	Gravimetric method	60 (µg/m ³)	26.88	29.232	35.28	36.48	39.72	33.6
SO ₂	Improved West Gaeke method.	80 (µg/m ³)	6.4	7.1	6.4	6.8	8.8	7.9
NO _x	Jacob & Hochhelsler modified (Na-Arsenite) method	80(µg/m ³)	10.8	11.21	11.2	12.6	14.2	12.2
CO	NDIR Spectroscopy method	4(mg/m ³)	0.66	0.68	0.74	0.78	0.82	0.68
O ₃	Chemical Method	100	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0
NH ₃	Indo Phenol Blue Method	400	<20.0	<20.0	<20.0	<20.0	26.8	<20.0
As	AAS Method	6ng/m ³	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ni	AAS Method	20µg/m ³	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Pb	AAS Method	1µg/m ³	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
C ₆ H ₆	Gas Chromatography	5µg/m ³	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bap	Gas Chromatography	1ng/m ³	<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. 13. Banspani Village**

Parameters	Method of Measurement	NAAQS-2009	OCT-19	NOV-19	DEC-19	JAN-20	FEB-20	MAR-20
PM₁₀	Gravimetric method	100($\mu\text{g}/\text{m}^3$)	45.2	50.2	60.2	58.8	62.8	58
PM_{2.5}	Gravimetric method	60 ($\mu\text{g}/\text{m}^3$)	25.312	28.112	36.12	35.28	37.68	34.8
SO₂	Improved West Gaeke method.	80 ($\mu\text{g}/\text{m}^3$)	6.2	6.6	6.1	6.1	6.8	8.4
NO_x	Jacob & Hochhelsler modified (Na-Arsenite) method	80($\mu\text{g}/\text{m}^3$)	10.6	11.2	11.6	12.4	11.6	12.4
CO	NDIR Spectroscopy method	4(mg/m^3)	0.6	0.64	0.82	0.88	0.84	0.68
O₃	Chemical Method	100 ($\mu\text{g}/\text{m}^3$)	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0
NH₃	Indo Phenol Blue Method	400 ($\mu\text{g}/\text{m}^3$)	<20.0	<20.0	<20.0	<20.0	25.8	<20.0
As	AAS Method	6ng/m³	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ni	AAS Method	20$\mu\text{g}/\text{m}^3$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Pb	AAS Method	1$\mu\text{g}/\text{m}^3$	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
C₆H₆	Gas Chromatography	5$\mu\text{g}/\text{m}^3$	<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.14. Baneikala Village**

Parameters	Method of Measurement	NAAQS-2009	OCT-19	NOV-19	DEC-19	JAN-20	FEB-20	MAR-20
PM₁₀	Gravimetric method	100($\mu\text{g}/\text{m}^3$)	51.8	52.8	66.4	68.2	56.8	60.2
PM_{2.5}	Gravimetric method	60 ($\mu\text{g}/\text{m}^3$)	29.008	29.568	39.84	40.92	34.08	36.12
SO₂	Improved West Gaeke method.	80 ($\mu\text{g}/\text{m}^3$)	7.2	7.6	7.6	8.1	8.1	9.8
NO_x	Jacob & Hochhelsler modified (Na-Arsenite) method	80($\mu\text{g}/\text{m}^3$)	11	11.2	10.8	10.6	13.2	11.8
CO	NDIR Spectroscopy method	4(mg/m^3)	0.56	0.62	0.78	0.76	0.76	0.82
O₃	Chemical Method	100 ($\mu\text{g}/\text{m}^3$)	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0
NH₃	Indo Phenol Blue Method	400 ($\mu\text{g}/\text{m}^3$)	<20.0	<20.0	<20.0	<20.0	24.9	<20.0
As	AAS Method	6ng/m³	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ni	AAS Method	20$\mu\text{g}/\text{m}^3$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Pb	AAS Method	1$\mu\text{g}/\text{m}^3$	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
C₆H₆	Gas Chromatography	5$\mu\text{g}/\text{m}^3$	<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.14. FUGITIVE EMISSION RESULTS (SPM)**

Location	Parameter	Method of Measurement	unit	Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20
Near Screening Plant (D- Quarry)	SPM	Gravimetric Method	µg/m ³	686.2	432.8	426.8	446.8	542.6	608
Near Stack Yard (D- Quarry)	SPM	Gravimetric Method	µg/m ³	502.6	451.6	442.8	461.2	511.2	518.2
Near Sorting Yard (H-Quarry)	SPM	Gravimetric Method	µg/m ³	446.2	468.8	516.2	526.2	531.6	522.2
Near Sorting Yard (D-Quarry)	SPM	Gravimetric Method	µg/m ³	533.2	514.5	521.6	518.6	524.6	521.2

Table. 15. PERSONAL DUST SAMPLING:

Name of the Person	Personal Number	Oct-2019	Name of the Person	Personal Number	NOV-2019	Name of the Person	Personal Number	DEC-2019
		PM (µg/m ³)			PM (µg/m ³)			PM (µg/m ³)
Asha Munda	TSP/822505/1019	9.6	Dhunu Munda	JW-307	9.6	Radha Naik	TSP/753285/0819	8.5
Muni Munda	TSP/753326/0819	8.4	Durga Aram	JW-303	8.2	Manju Devi	TSP/753281/0819	8.2
Puna Baipai	TSP/814028/0919	7.2	Rebati Munda	JW-85	7.8	Nemabai Sahu	TSP/806073/0919	8.4
Bodhuran Baipai	TSP/823979/0919	8.1	Anita Kerketa	JW-57	8.4	Suresh Naik	TSP/801522/0919	8.6
Raghunath Naik	TSP/753638/0819	8.4	Pintu Soren	JW-75	8.6	Kumari Patra	TSP/801276/0919	9.2
Kanuram Chatombu	TSP/808507/0919	8.2	Jatia Champia	JW-78	8.1	Laxmi Munda	TSP/775944/0819	9.4
Radha Naik	TSP/753285/0819	8.8	Babulal Munda	JW-287	8.2	Rajesh Patra	TSP/785783/0819	9.6
Manju Devi	TSP/753281/0819	9.1	Manju Devi	TSP/753281/0819	8.8	Jena Patra	TSP/775945/0819	9.1

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

Name of the Person	Personal Number	Oct-2019	Name of the Person	Personal Number	NOV-2019	Name of the Person	Personal Number	DEC-2019
		PM ($\mu\text{g}/\text{m}^3$)			PM ($\mu\text{g}/\text{m}^3$)			PM ($\mu\text{g}/\text{m}^3$)
Nemabai Sahu	TSP/806073/0919	8.4	Nemabai Sahu	TSP/806073/0919	8.1	Radha Naik	TSP/753285/0819	8.5

Table. 15. PERSONAL DUST SAMPLING:

Name of the Person	Personal Number	Jan-20	Name of the Person	Personal Number	Feb-20	Name of the Person	Personal Number	Mar-20
		PM ($\mu\text{g}/\text{m}^3$)			PM ($\mu\text{g}/\text{m}^3$)			PM ($\mu\text{g}/\text{m}^3$)
Radha Naik	TSP/753285/0819	8.2	Radha Naik	TSP/753285/0819	8.8	Suresh Naik	TSP/801522/0919	4.8
Manju Devi	TSP/753281/0819	7.8	Manju Devi	TSP/753281/0819	8.4	Kumari Patra	TSP/801276/0919	4.1
Nemabai Sahu	TSP/806073/0919	7.6	Nemabai Sahu	TSP/806073/0919	8.2	Laxmi Munda	TSP/775944/0819	4.4
Suresh Naik	TSP/801522/0919	8.1	Suresh Naik	TSP/801522/0919	7.6	Jema Patra	TSP/775945/0819	4.2
Kumari Patra	TSP/801276/0919	8.4	Kumari Patra	TSP/801276/0919	8.1	Rajesh Patra	TSP/785783/0819	3.8
Laxmi Munda	TSP/775944/0819	8.6	Laxmi Munda	TSP/775944/0819	7.8	Sitara Hessa	TSP/770136/0819	4.1
Rajesh Patra	TSP/785783/0819	7.2	Rajesh Patra	TSP/785783/0819	8.2	Ajay Das	TSP/770126/0819	4.2
Jena Patra	TSP/775945/0819	7.8	Jena Patra	TSP/775945/0819	8.4	Sarjen Kulei	TSP/770178/0819	4.4

Table. 16. DG SET EMISSION

Sampling Location: 32 KVA DG SET				Dec-19	Mar-20
SL.No	Parameters Analyzed	Unit	CPCB LIMIT	Result	Result
1	Stack Temperature	$^{\circ}\text{C}$	144	142
2	Velocity	m/Sec	15.8	146
3	Concentration Of Particulate Matter As PM	mg/Nm^3	50	51.2	50.8

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

Sampling Location: 32 KVA DG SET				Dec-19	Mar-20
SL.No	Parameters Analyzed	Unit	CPCB LIMIT	Result	Result
4	Oxides of Nitrogen as Nox	mg/Nm ³	400	81.6	82.2
5	Carbon Monoxide as CO	mg/Nm ³	150	46.6	42
6	Non Methyl Hydrocarbon as C	mg/Nm ³	8.1	7.8

Table.17. AMBIENT NOISE LEVEL

Locat ion 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	62	66	66.8	62.8	66.6	62.8	55	42	44	48	46.6	50.2	52	45
N-2	Hospital	41	46.2	48.87	51.2	58.2	56.0	50	36	38.4	37.4	39.6	46.9	48	40
N-3	Mines Area	60.8	56.2	65.2	63.8	65.2	61.8	75	42	48.6	48	48.2	56.8	58	70
N-4	Railway Sliding	58	57.4	62.8	64.1	64.8	66.0	75	44	42.65	46	47.5	52.6	54	70

Table.18. EQUIPMENT NOISE: Values in dB(A)

Name of Location	Result OCT-19	Name of Location	Result NOV-19	Name of Location	Result DEC-19	Name of Location	Result JAN-20
OD-09A-4693(Truck)	72.2	Loader (OR09N9452)	76.6	OR-09A-5106(Truck)	70.6	OR-09A- 5106(Truck)	71.4
OD-09C-1372(Truck)	56.6	Hyva (OD 09K3113)	64.8	Volvo EC360BLC	71.8	Volvo EC360BLC	72.6
OR-09P-8134(Truck)	61.2	Water Tanker (OR09K6391)	66.6	OD-09G-7805	74.6	OD-09G-7805	73.8
OR-09A-5106(Truck)	66.8	OR-09A-5106(Truck)	70.2	OD-09G-7806	75.2	OD-09G-7806	74.2
Volvo EC360BLC	70.8	Volvo EC360BLC	71.1	OD-09G-7865	75.8	OD-09G-7865	74.8

ENVIRONMENTAL MONITORING RESULTS (OCT'19 to MARCH'20)**Table. 19. Dust Fall Analysis:**

Date of Sampling	Total Dust Fall (t/km ² /month)	Analysis Result			
		Co (%)	Ni (%)	Hg (%)	As (%)
01.12.2019 TO 31.12.2019	0.69	<0.001	<0.001	<0.001	<0.001
01.03.2020 TO 31.03.2020	0.74	<0.001	<0.001	<0.001	<0.001

Table. 20. SOIL QUALITY ANALYSIS:

Date of Sampling	Analysis Result			
	Co (%)	Ni (%)	Hg (%)	As (%)
01.12.2019 TO 31.12.2019	0.026	0.064	<0.000002	<0.000002
01.03.2020 TO 31.03.2020	0.021	0.052	<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	0.26	<0.02	0.018	<0.05	<0.002	<0.01	<0.001	<0.004	<0.01	<0.05

Table. 22 GROUND WATER (LEVEL) RESULT, GWL1 : Kamar Joda Open Well GWL2 : Baneikala Open Well

Parameters	Unit	Analysis Result
November-19	GWL1	6.1
	GWL2	5.4