



Dr. Amit Ranjan Chakraborty
Chief Environment Management

EMD/C-41/337/19
May 26, 2020

Additional Principal Chief Conservator of Forests
(Eastern-Central) Regional Office (ECZ)
Ministry of Environment, Forests & Climate Change
Bungalow No. A-2, Shyamali Colony
RANCHI - 834 002

Subject: Submission of Six Monthly (October 2019 to March 2020) EC Compliance and monitoring reports of expansion of Steel plant (4 MTPA to 5 MTPA Crude Steel Production), (5 MTPA to 6.8 MTPA Crude Steel Production), (6.8 MTPA to 9.7 MTPA Crude Steel Production) and (9.7 MTPA to 11 MTPA Crude Steel Production)

Reference:

1. MoEF EC letter no. J-11011/221/2003-IA.II (I) dated May 24, 2005
2. MoEF EC letter no. J-11011/317/2006-IA.II (I) dated April 16, 2007
3. MoEF EC letter no. J-11011/691/2007-IA.II (I) dated May 11, 2010
4. MoEFCC EC letter no. J-11011/691/2007-IA.II (I) dated March 1, 2016

Dear Sir,

This has reference to the captioned subject and cited references. It is to inform that we are herewith submitting six monthly Compliance reports for the conditions stipulated in the Environment Clearance of expansion of Steel plant (4 MTPA to 5 MTPA Crude Steel Production), (5 MTPA to 6.8 MTPA Crude Steel Production), (6.8 MTPA to 9.7 MTPA Crude Steel Production) and (9.7 MTPA to 11 MTPA Crude Steel Production) for the period from **October 2019 to March 2020** along with monitoring data report for your kind consideration.

TATA STEEL LIMITED

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Dr. Amit Ranjan Chakraborty
Chief Environment Management

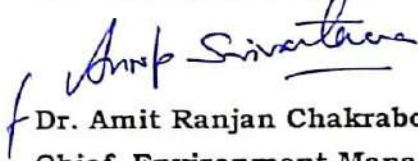
The copy of above compliance report is also being sent in soft format through email (ro.ranchi-mef@gov.in) for your kind perusal. Also copy of 11 MTPA EC Compliance has been uploaded on MoEFCC website on portal <http://environmentclearance.nic.in/>.

Hope the above are in line with the statutory requirements.

Thanking you

Yours Faithfully

For Tata Steel Limited



Dr. Amit Ranjan Chakraborty
Chief, Environment Management

Encl:

1. Six Monthly Compliance Status report of Environmental Clearance from expansion of 4 to 5 MTPA Crude Steel Production
2. Six Monthly Compliance Status report of Environmental Clearance from expansion of 5 to 6.8 MTPA Crude Steel Production
3. Six Monthly Compliance Status report of Environmental Clearance from expansion of 6.8 to 9.7 MTPA Crude Steel Production
4. Six Monthly Compliance Status report of Environmental Clearance from expansion of 9.7 to 11 MTPA Crude Steel Production
5. Monitoring and analysis reports for April 2019 to September 2019

Copy to:

1. Zonal Officer, Central Pollution Control Board, Southern Conclave, Block 502, 5th and 6th Floors, 1582 Rajdanga Main Road, Kolkata - 700 107
2. Member Secretary, Jharkhand State Pollution Control Board, T.A. Division Building, HEC Campus, Dhurwa, Ranchi - 834004
3. Regional Officer, Jharkhand State Pollution Control Board, Jamshedpur

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ENVIRONMENTAL CLEARANCE COMPLIANCE STATUS REPORT

October 2019 to March 2020

**Tata Steel Limited, Jamshedpur
(MAIN WORKS & TOWN)**

**Six Monthly Compliance Status report of Environmental
Clearance from expansion of 4 to 5 MTPA Crude Steel
Production**

**ENVIRONMENTAL MANAGEMENT DEPARTMENT
TATA STEEL LIMITED
JAMSHEDPUR**

Compliance to Conditions stipulated in Environment Clearance for Expansion of steel manufacturing capacity at Jamshedpur Steel works from 4.0 MTPA to 5.0 MTPA, No. J-11011/221/2003 - IA II (I) dated 24.05.2005

SN	Condition	Compliance Status
Specific Conditions:		
i.	The gaseous emissions from various process units should conform to the load/mass based standards notified by this Ministry on 19 th May 1993 and standards prescribed from time to time. The State Board may specify more stringent standards for the relevant parameters keeping in view the nature of the industry and its size and location. At no time, the emission level should go beyond the prescribed standards. In the event of failure of any pollution control system adopted by the unit, the respective unit should not be restarted until the control measures are rectified to achieve the desired efficiency.	<p>All the existing and new units are provided with adequate pollution control equipment (PCEs) to ensure the emission levels within specific legal requirement.</p> <p>Please refer Annexure - I for monitoring reports for April 2019 to March 2020.</p>
ii.	As reflected in the EIA/EMP report, the waste water generation shall not exceed from the existing level from various units namely, Sponge iron plant, steel melting shop, rolling mill, rotary hearth furnace. The company shall undertake closed circuit system for the wastewater treatment and the sludge recycled to the sinter plant. The recovery and recycling of Susangharia nalla water shall be carried to recycle 800m ³ /hr water. The Jugsalai and Ram Mandir nalla shall be made zero discharge. However, 31300 m ³ /d of treated effluent after confirming to the prescribed standards shall be discharge into Subarnarekha river. The treated waste water to be discharged into the Kharkai river should remain at the existing level of 1364m ³ /d. The domestic waste water after treatment in STP should be used for green belt development	<ul style="list-style-type: none"> • Waste water treatment plants have been provided in all the operating units. The treated water is recycled and reused for various processes within the plant. • The discharge quantity from the works drain is kept within the prescribed standard. • Waste water recovery system has been provided at all the process drains. • Discharges to Subarnarekha River & Kharkai River are confirming to prescribe standards. <p>Please refer Annexure - I Monitoring reports for April 2019 to March 2020.</p>
iii.	In plant control measures for checking fugitive emission from spillage/ raw materials handling should be provided. Further specific measures like provision of dust extraction system at sinter plant, stock house fume extraction system at cast house of blast furnace shall be installed. Particulate emissions shall not exceed 100mg/Nm ³ . Further de-dusting facilities at new lime kiln, sinter plant and wet suppression system at raw material bedding and blending plant shall be provided.	<p>To check the fugitive emission in raw material handling, dry-fog dust suppression systems are effectively operating. Spillage on the road, along the conveyors, if any, is collected and recycled. ESP and Bag Houses are installed in Sinter Plants. Cast Houses of Blast furnaces are having Fume Extraction System. Lime Kilns have been provided with Bag House. The emissions from the stacks are within specified limits.</p> <p>Please refer Annexure - I Monitoring reports for April 2019 to March 2020.</p>
iv.	The company shall phase out steam coal burning by using by-products fuel gas and replace existing wet quenching facility of coke oven battery No.5,6 and 7 by dry	<ul style="list-style-type: none"> • The conversion of all the coal-fired boilers to gas firing in PH # 3, PH#4 & PH # 5 has been completed.

Compliance to Conditions stipulated in Environment Clearance for Expansion of steel manufacturing capacity at Jamshedpur Steel works from 4.0 MTPA to 5.0 MTPA, No. J-11011/221/2003 - IA II (I) dated 24.05.2005

	quenching to recover energy and reduce CO2 greenhouse gas emission.	<ul style="list-style-type: none"> • Coke dry quenching facility has been commissioned at battery no. 5, 6 & 7.
v.	As per the solid waste management plan submitted to the Ministry, about 7268 TPD of solid waste shall be generated. There shall be no generation of boiler ash as BF gas would be used instead of coal. The company shall recycle the BF and LD slag for cement manufacturing, road embankment, construction and filling up of low-lying areas. As per the plan submitted to the Ministry the company shall reuse 100% of BF and LD slag by December 2007.	<ul style="list-style-type: none"> • Tata Steel has been successful in achieving almost complete utilization of most of the solid wastes except LD Slag. Tata Steel has taken a number of initiatives to find increasing usage of LD Slag in construction, road making, soil conditioning and cement making. The initiatives include among others: <ul style="list-style-type: none"> ○ Approvals from BIS for use of LD slag in cement making. ○ Commercial trials for use of LD slag as soil conditioner. ○ Please refer Annexure-I Monitoring and Analysis report for LD Slag Chemical Analysis report. <p>Three of four power houses within the Steel Works do not have even provision for firing coal. Only one boiler located at Power House 4 has provision for coal firing in addition to by-product gas firing. Normally this boiler also runs on by-product gas. Only in case of emergency conditions and shortage by-product gas due to disturbance in plant operations, coal firing is done as per the need. The quantity of fly ash generated has reduced drastically which is handled appropriately.</p>
vi.	<p>a. The chrome sludge (251kg/d) generated from the colour coating shall be disposed off in the lined pit within the plant premises and oily sludge (25TPD) shall be incinerated.</p> <p>b. The company shall undertake ground water quality monitoring around the chrome sludge disposal site and data submitted to the Ministry.</p>	<ul style="list-style-type: none"> • Chrome sludge is being disposed off in land filling facility in steel works. • The analysis of ground water is done for chromium content; the values are within prescribed limits. <p>Please refer Annexure – I Monitoring reports for April 2019 to March 2020.</p>
vii.	A green belt adequate width and density should be developed in an area of 7.0 ha of plant area in addition to the 75 ha of area already afforested within and around the plant premises as per the CPCB guidelines.	<p>We have planted 1,01,095 Nos. saplings during April 2019 to March 2020 inside the works, Jugsalai Muck Dump area and in Township in the same period. Every year plantation done in available space.</p> <p>The following plant species are being planted:</p> <ul style="list-style-type: none"> • <i>Ficus, karanj, Cicilipinia, Palm, Ashoka, Mahogany, Caesalpinia Arjun, Sita Ashok, Bakul, Spathodia, Kanchan, Jural, Tabulia,</i>

Compliance to Conditions stipulated in Environment Clearance for Expansion of steel manufacturing capacity at Jamshedpur Steel works from 4.0 MTPA to 5.0 MTPA, No. J-11011/221/2003 - IA II (I) dated 24.05.2005

		<i>Sissam, Termanelia Sp., Arica palm, foxtail palm, Tecoma, Kannel, Tababia, Ghandhraj, calendra, Tagar, Hemelia, Kamani, Karbi, Calendra etc.</i>
viii.	The company shall undertake rainwater-harvesting measures to harvest the rainwater for utilisation in the lean season as well as to recharge the ground water table.	<ul style="list-style-type: none"> • Rainwater collected from various facilities within the Steel Plant is channelled through surface drains into Cooling Pond. The rainwater thus collected is recycled in the plant. • Rainwater harvesting has been planned and being implemented at suitable locations within the plant.
ix.	Occupational Health Surveillance of the workers shall be done on a regular basis and records maintained as per Factories Act.	The health surveillance is being done as per Factory Act. Records are maintained at the Occupational Health Services. Health check-up for contractor's persons are conducted regularly.
x.	Recommendations made in the CREP shall be implemented.	Tata Steel has implemented the recommendations of CREP. CREP report is enclosed as Annexure-II of Monitoring and Analysis report.
xi	The company shall carry out life cycle assessment for monitoring to assess the overall environmental improvement of the plant with respect to consumption norms of natural resources and energy and specific norms for waste generation.	Tata Steel had participated in the life cycle assessment conducted with the government agencies.
B. General Conditions		
i.	The project authorities must adhere to the stipulations made by the Jharkhand Environment Conservation Board and the State Government.	All the relevant stipulations made by JSPCB and State Government are being complied.
ii.	No further expansion or modifications in the plant should be carried out without prior approval of the Ministry of Environment and Forests.	<p>Environmental Clearance for the expansion from 6.8 MTPA to 9.7 MTPA Steel Plant was granted vide MoEF letter no. J-11011/691/2007-IA. (II) dated May 11, 2010.</p> <p>Environmental Clearance for the expansion from 9.7 MTPA to 11 MTPA Steel Plant was granted vide MoEF letter no. J-11011/691/2007-IA. (II) dated March 1, 2016.</p> <p>Necessary Environment Clearance will be taken before any further expansion or modification.</p>
iii.	At least four ambient air quality-monitoring stations should be established in the downward direction as well as where	Four Ambient Air Quality Monitoring Stations have been installed. Monitoring data on

Compliance to Conditions stipulated in Environment Clearance for Expansion of steel manufacturing capacity at Jamshedpur Steel works from 4.0 MTPA to 5.0 MTPA, No. J-11011/221/2003 - IA II (I) dated 24.05.2005

	<p>maximum ground level concentration of SPM, SO₂ and NO_x are anticipated in consultation with the state pollution Control Board. Data on ambient air quality and stack emission should be regularly submitted to this Ministry including its Regional office at Bhubaneswar and State Pollution Control Board/Central Pollution Control Board once in six months.</p>	<p>ambient air quality and stack emission is being submitted regularly to JSPCB.</p> <p>Please refer Annexure – I Monitoring reports for April 2019 to March 2020.</p>
iv.	<p>Industrial wastewater should be properly collected, treated so as to conform to the standards prescribed under GSR 422(E) dated 19th May, 1993 and 31st December 1993 or as amended from time to time. The treated wastewater should be utilized be for plantation purpose.</p>	<ul style="list-style-type: none"> All wastewater discharges from Steel Works are let out after treating them suitably. The discharge water quality is monitored at all the discharge points
v.	<p>The overall noise level in and around the plant area should be kept well within the standards (85 dBA) by providing noise control measures including acoustic hoods, Silencers, enclosures etc. on all sources of noise generation. The ambient noise levels should conform to the standards prescribed under EPA Rules, 1989 viz. 75 dBA (daytime) and 70 dBA (night time).</p>	<ul style="list-style-type: none"> The noise control measures such as; silencers, enclosures, hoods, rubber pads, have been provided at the required places in the existing plant. The work areas where noise levels are high, earplugs and earmuffs have been provided to the people to minimize noise exposure. The high noise area within the plant have been identified and demarcated. Adequate caution boards are displayed and anyone who enters the area is required to wear ear-plugs/ear-muffs. The noise monitoring is done regularly. Please refer Annexure-I for Monitoring reports of April 2019 to March 2020.
vi.	<p>The project proponent shall also comply with all the environmental protection measures and safeguards recommended in the EIA / EMP report. Further, the company must undertake socio-economic development programmes, educational programmes, drinking water supply and health care etc.</p>	<p>Socio economic development activities are regularly undertaken in and around Jamshedpur through the two agencies namely, Tata Steel Rural Development Society and Tata Steel Community Development & Welfare Services Centres. The development activities undertaken in the surrounding community are need based and are in the field of health care, education, mid-day meals in schools, sports and culture, self-employment, drinking water, rural electrification, etc. Tata Steel also facilitate the Institutes like R D Tata Technical Institute, Tata Football Academy, Tata Archery Foundation, etc. which encourages the local talent to develop themselves and participate at National and International levels.</p>
vii.	<p>The project authorities shall provide an amount of Rs 286 crores (question no. xix part b) funds both recurring and non-recurring to implement the conditions stipulated by the Ministry of Environment</p>	<p>The funds for capital investment on pollution control equipment were not diverted. The 5 MTPA project has been completed. All the pollution control equipment have been</p>

Compliance to Conditions stipulated in Environment Clearance for Expansion of steel manufacturing capacity at Jamshedpur Steel works from 4.0 MTPA to 5.0 MTPA, No. J-11011/221/2003 - IA II (I) dated 24.05.2005

	and Forests as well as the State Government along with the implementation schedule for all the conditions stipulated herein. The funds so provided should not be diverted for any other purposes.	commissioned and are being operated and maintained regularly.
vii.	The Regional Office of this Ministry at Bhubaneswar/ Central Pollution Control Board/State Pollution Control Board will monitor the stipulated conditions. A six-monthly compliance report and the monitored data along with statistical interpretation should be submitted to them regularly.	Six monthly compliance reports and the monitored data are being submitted regularly. Please refer Annexure - I for monitoring reports of April 2019 to March 2020 .
ix.	The Project Proponent should inform the public that the project has been accorded environmental clearance by the Ministry and copies of the clearance letter are available with the State Pollution Control Board/ Committee and may also be seen at Website of the Ministry of Environment and Forests at http://envfor.nic.in . This should be advertised within seven days from the date of issue of the clearance letter, at least in two local newspapers that are widely circulated in the region of which one shall be in the vernacular language of the locality concerned and a copy of the same should be forwarded to the regional office.	The Notice has been advertised in two local newspapers viz. Chamkta Aaina (Hindi) and The Avenue Mail (English) on June 04, 2005 and communication to this effect was also sent to the MoEF.
x.	The Project Authorities should inform the Regional Office as well as the Ministry, the date of financial closure and final approval of the project by the concerned authorities and the date of commencing the land development work.	It has been complied as the project has already been completed and Consent to Operate has been issued by Jharkhand State Pollution Control Board.

ENVIRONMENTAL CLEARANCE COMPLIANCE STATUS REPORT

October 2019 to March 2020

**Tata Steel Limited, Jamshedpur
(MAIN WORKS & TOWN)**

**Six Monthly Compliance Status report of Environmental
Clearance from expansion of 5 to 6.8 MTPA Crude Steel
Production**

**ENVIRONMENTAL MANAGEMENT DEPARTMENT
TATA STEEL LIMITED
JAMSHEDPUR**

Compliance Status of Environmental Clearance of Expansion of Crude Steel Plant (5.0 MTPA to 6.8 MTPA) at Tata Steel Works, Jamshedpur, District East Shinghbhum, Jharkhand vide MoEF Letter no J-11011/317/2006.IA.II (I) dated April 16, 2007

SN	Condition	Compliance Status
Specific Conditions		
i.	The gaseous emissions from various process units shall conform to the load/mass based standards notified by this Ministry on 11 th May, 1993 and standards prescribed from time to time. The state Board may specify more stringent standards for the relevant parameters keeping in view the nature of the industry and its size and location. At no time, the emission level shall go beyond the prescribed standards. Interlocking facilities shall be provided so that process can be automatically stopped in case emission level exceeds the limit.	All the existing and new units are provided with adequate pollution control equipment (PCEs) to ensure the emission levels within specific legal requirement. Please refer Annexure – I for monitoring reports of April 2019 to March 2020 . Alarms and interlocking wherever possible have been provided in the units to indicate emission level.
ii.	Efforts shall be made to reduce RSPM levels in the ambient air and a time bound action plan shall be submitted. On-line stack monitoring facilities for all the stacks including new sinter plant and power house and sufficient air pollution control devices shall be provided to keep the emission levels below 50 mg/Nm ³ and reports submitted to the Jharkhand SPCB and CPCB.	<ul style="list-style-type: none"> • We have submitted Action Plan and status update on reduction of RSPM Level in Ambient Air vide our letter no. EMD/C-33/124/13 dated June 22, 2013. • Online stacks monitoring systems in the major stacks have been installed. • All the new Air Pollution Control devices have been commissioned with design emission levels of below 50 mg/Nm³ of particulate matter from stacks within Works. • Monitoring reports are being submitted regularly.
iii.	In-plant control measures for checking fugitive emissions from all the vulnerable sources shall be provided. Dust extraction system and dry fogging system will be provided to control air emissions at material transfer and sizing plants. ESP and bag filters shall be provided wherever required to keep the emission levels below 50 mg/Nm ³ particularly in 'H'-BF stock house, BF cast houses and Sinter stock house. Low NO burners will be installed to control NO emissions. Gas cleaning plant shall be provided to BF. Further, specific measures like water sprinkling shall be carried out and fugitive emissions shall be controlled, regularly monitored and records maintained.	The status of control measures in the units are as follows. <ul style="list-style-type: none"> • Installed ESPs and Bag Houses in the "H" Blast Furnace, Sinter Plant#4. • Dust control systems, dry fog system and water spraying have been provided at the material handling systems. • Low NOx burners have been installed. The following control measures are in place to check the fugitive emissions. <ul style="list-style-type: none"> • Bag Houses, water-spraying arrangements are provided at all potential dust generating points. • The boilers at Power House#3 have been converted to gas firing from coal. This has contributed significantly in the reduction of the fugitive emissions. • Regular cleaning of shop floor area with the help of mechanical dust collector, road sweepers, is being done. • Monitoring of fugitive emission is being done at the regular intervals and records kept. Please refer Annexure – I for monitoring reports of April 2019 to March 2020 .

Compliance Status of Environmental Clearance of Expansion of Crude Steel Plant (5.0 MTPA to 6.8 MTPA) at Tata Steel Works, Jamshedpur, District East Shinghbhum, Jharkhand vide MoEF Letter no J-11011/317/2006.IA.II (I) dated April 16, 2007

iv.	Gaseous emission levels including secondary fugitive emissions shall be controlled within the latest permissible limits issued by the Ministry and regularly monitored. Guidelines / Code of Practice issued by the CPCB in this regard shall be followed.	All the Steel Melting Shops (LD#1, LD#2 and LD#3) have been provided with Electrostatic Precipitators (ESP) as secondary emission control system.
v.	Total water requirement from River Subarnarekha shall not exceed 3,91,800 m ³ /day as per the permission accorded by the State Govt. No ground water shall be used. GCP wastewater treatment plants for 'H'-BF and Billet Caster no. 3 shall be provided. The treated process effluent shall be recycled and re-used in cooling tower as well as for green belt development. Cooling tower blow down shall be used for granulation, coke quenching, dust suppression and other non-product uses. Treated effluent discharge into the streams/river shall not exceed 37,000 m ³ /day. Domestic effluent shall be treated in Sewage Treatment Plant (STP).	<ul style="list-style-type: none"> • Water taken from Subarnarekha River for steelmaking as make-up water is within the recommended capacity by State Government. • Installations of closed loop system for the new units have been commissioned. The treated water is recycled for various processes within the plant. • The discharge quantity from the works drain is kept within the prescribed standard. • Sewage from the Jamshedpur Town is treated in Sewage Treatment Plants (2 nos.). BOD and Suspended Solids are within the prescribed limits.
vi.	Continuous monitoring of Total Organic Compounds (TOC) shall be done at the outlet of ETP (BOD plant).	Online TOC analyzer has been installed for continuous monitoring at BOD Plant Outlet.
vii.	Ground water monitoring around the solid waste disposal site / secured landfill (SLF) shall be carried out regularly and report submitted to the Ministry's Regional Office at Bhubaneswar, CPCB and OPCB.	We are regularly conducting the ground water monitoring around the waste disposal site at five locations. Analysis report submitted to JSPCB indicates that concentration of heavy metals is well within the prescribed limits. Please refer Annexure - I for monitoring reports of April 2019 to March 2020 .
viii.	Solid wastes shall be reused in the cement plant, road construction and railway ballast. BF slag shall be granulated in cast house and used for cement making. LD slag shall be processed in Waste Recycling Plant and subsequently recycled in the BF LD sludge and sinter plants. Remaining slag shall be used for road construction and filling the low-lying areas. The Chrome sludge in the form of Cr ⁺³ shall be dumped only in the secured landfill located within the plant premises and proper disposal of Chrome sludge shall be ensured. Oily waste shall be burnt in the incinerator.	<ul style="list-style-type: none"> • BF slag from H Blast Furnace is granulated in cast house and is used for cement making. • LD slag is processed at the modernized Waste Recycling Plant to recover the metallic portion and reuse at Sinter Plants. • The chrome sludge from CRM Plant is stored in secured land fill within the Works. • Oily sludge is burnt in the Incinerator.
ix.	Fly ash shall be used in cement plants. Bottom ash shall be disposed off in a suitably designed landfill as per CPCB	All boilers at Tata Steel are capable to fire gas. This has resulted in considerable reduction in generation of fly ash.

Compliance Status of Environmental Clearance of Expansion of Crude Steel Plant (5.0 MTPA to 6.8 MTPA) at Tata Steel Works, Jamshedpur, District East Shinghbhum, Jharkhand vide MoEF Letter no J-11011/317/2006.IA.II (I) dated April 16, 2007

	guidelines to prevent leaching to the sub-soil and underground aquifer.	
x.	Practice of disposal of solid wastes along the river shall be immediately stopped and efforts shall be made to remove the solid waste from the banks of the river.	No disposal of solid waste along the river bank from Tata Steel.
xi.	A time bound action plan should be submitted to reduce solid waste, its proper utilization and disposal. Action plan for the reclamation of Jugsalai Muck disposal site submitted to the Ministry shall be implemented in a time bound manner.	<p>An action plan for Solid waste management has been submitted to JSPCB vides our letter no. EMD/C-02/460/11 dated December 16, 2011.</p> <p>We have also submitted road map regarding future generation and the disposal of solid waste vide our letter no. EMD/C-33/124/13 dated June 22, 2013.</p> <p>Tata Steel has taken a number of steps to improve the solid waste utilization. For the period during April 2019 to March 2020, the solid waste utilization was 102% excluding storage of LD slag at Galudih for processing. Various actions have been already planned to improve the solid waste utilization further.</p> <p>The reclamation of JMD has been completed. A rainwater harvesting facility has been constructed at the top of the JMD which is being utilized for development of greenery. Besides this, there is a provision to pump surface drainage carry out from the plant to JMD area for development of greenery.</p>
xii.	The company shall develop surface as well as ground water harvesting structures to harvest the rainwater for utilization in the lean season besides recharging the ground water table.	<ul style="list-style-type: none"> • Rainwater is collected from the new facilities through surface drain into Cooling Pond. The rainwater thus collected is recycled in the plant for reuse. • The rainwater harvesting structures at four buildings within and outside the plant have been completed.
xiii.	Green belt shall be developed in 1157.7 ha (33 %) out of total 4391.85 ha. within and around the plant premises as per the CPCB guidelines in consultation with DFO.	<p>We have planted 1,01,095 nos. saplings during April 2019 to March 2020 inside the works, Jugsalai Muck Dump area and in Township in the same period. Every year plantation done in available space.</p> <p>The following plant species are being planted:</p> <ul style="list-style-type: none"> • <i>Ficus, karanj, Cicilipinia, Palm, Ashoka, Mahogany, Caesalpinia Arjun, Sita Ashok, Bakul, Spathodia, Kanchan, Jural, Tabulia, Sissam, Termanelia Sp., Arica palm, foxtail palm, Tecoma, Kannel, Tababia, Ghandhraj, calendra,</i>

Compliance Status of Environmental Clearance of Expansion of Crude Steel Plant (5.0 MTPA to 6.8 MTPA) at Tata Steel Works, Jamshedpur, District East Shinghbhum, Jharkhand vide MoEF Letter no J-11011/317/2006.IA.II (I) dated April 16, 2007

		<i>Tagar, Hemelia, Kamani, Karbi, Calendra etc.</i>
xiv.	Occupational Health Surveillance of the workers shall be done on a regular basis and records maintained as per the Factories Act.	The health surveillance is being done as per Factory Act. Records are maintained at the Occupational Health Services. Regular health surveillance is being conducted i.e. 2 times in a year to all the workers who have already attended more than 40 years of age. The workers having age less than 40 years are under gone occupational health surveillance program once in a year.
xv.	Recommendations made in the Corporate Responsibility for Environment Conservation (CREP) issued for the steel plants shall be implemented.	CREP recommendations have been implemented. CREP report is enclosed as Annexure-II of Monitoring and Analysis report.
General Conditions		
i.	The project authorities must strictly adhere to the stipulations made by the Jharkhand Pollution Control Board (Jharkhand SPCB) and the State Government	All the relevant stipulations made by JSPCB and State Government are being complied.
ii.	No further expansion or modifications in the plant should be carried out without prior approval of the Ministry of Environment and Forests.	<ul style="list-style-type: none"> • Environmental Clearance for the expansion from 6.8 MTPA to 9.7 MTPA Steel Plant was granted vide MoEF letter no. J-11011/691/2007-IA. (II) dated May 11, 2010. • Environmental Clearance for the expansion from 9.7 MTPA to 11 MTPA Steel Plant was granted vide MoEF letter no. J-11011/691/2007-IA. (II) dated March 1, 2016. • Necessary Environment Clearance will be taken before any further expansion or modification.
iii.	At least four ambient air quality monitoring stations shall be established in the downward direction as well as where maximum ground level concentration of SPM, SO ₂ and NO _x are anticipated in consultation with the Jharkhand SPCB. Data on ambient air quality and stack emission should be regularly submitted to this Ministry including its Regional Office at Bhopal and the Jharkhand SPCB/CPCB once in six months.	Four Ambient Air Quality Monitoring Stations have been installed. We submit monitoring data on ambient air quality and stack emission regularly to JSPCB/MoEF/CPCB. Please refer Annexure - I for monitoring reports of April 2019 to March 2020 .
iv.	Industrial wastewater shall be properly collected, treated so as to conform to the standards prescribed under GSR 422 (E) dated 11 th May, 1993 and 31 st December,	Wastewater is being treated in the Effluent treatment plants of respective units for meeting the standards. Treated wastewater is used for plantations and road dust

Compliance Status of Environmental Clearance of Expansion of Crude Steel Plant (5.0 MTPA to 6.8 MTPA) at Tata Steel Works, Jamshedpur, District East Shinghbhum, Jharkhand vide MoEF Letter no J-11011/317/2006.IA.II (I) dated April 16, 2007

	1993 or as amended form time to time. The treated wastewater shall be utilized for plantation purpose.	suppression. Most of treated wastewater is recycled back to the system.
v.	The overall noise levels in and around the plant area shall be kept well within the standards (85 dBA) by providing noise control measures including acoustic hoods, silencers, enclosures etc. on all sources of noise generation. The ambient noise levels should conform to the standards prescribed under EPA Rules, 1989 viz. 75 dBA (daytime) and 70 dBA (nighttime).	The control measures such as silencers, enclosures, hoods, rubber pads, have been provided at the appropriate places on all sources of noise generation in the plant. The ambient noise level is being monitored. Please refer Annexure – I for monitoring reports of April 2019 to March 2020 .
vi.	The project proponent shall also comply with all the environmental protection measures and safeguards recommended in the EIA and EMP report. Further, the company must undertake socio-economic development activities in the surrounding villages like community development programs, educational programs, drinking water supply and health care etc.	<ul style="list-style-type: none"> • Implementation of protection measures as indicated in the EIA for 6.8 MTPA plant units have been complied which includes ESPs, bag filters, on-line slag granulation system for blast furnaces and waste water treatment plants etc. • Socio economic development activities are regularly undertaken in and around Jamshedpur through the two agencies namely, Tata Steel Rural Development Society and Tata Steel Community Development and Welfare Services Centers. The development activities undertaken in the surrounding community are need based and are in the field of health care, education, mid-day meal at schools, sports and culture, self-employment, drinking water, rural electrification, etc. Tata Steel also facilitate the Institutes like R D Tata Technical Institute, Tata Football Academy, Tata Archery Foundation, etc. which encourages the local talent to develop themselves and participate at National and International levels.
vii.	As mentioned in the EIA and EMP, ₹ 259.00 Crores and ₹18.5 Crores earmarked towards the capital cost and recurring cost/annum for environmental pollution control measures shall be judiciously utilized to implement the conditions stipulated by the Ministry of Environment and Forests as well as the State Government. The funds so provided shall not be diverted for any other purpose.	The funds for capital investment on pollution control equipment were not diverted. The 6.8 MTPA project has been completed. All the pollution control equipment have been commissioned and are being operated and maintained regularly. In FY 20 total capital expenditure for environment is 358.6 Crore. The funds for capital investment on pollution control equipment are not diverted.
viii.	The Regional Office of this Ministry at Bhubaneswar/ CPCB/Jharkhand SPCB will monitor the stipulated conditions. A six-monthly compliance report and the monitored data along with statistical	Six monthly compliance reports and the monitored data are being submitted regularly. Please refer Annexure – I for monitoring reports of April 2019 to March 2020 .

Compliance Status of Environmental Clearance of Expansion of Crude Steel Plant (5.0 MTPA to 6.8 MTPA) at Tata Steel Works, Jamshedpur, District East Shinghbhum, Jharkhand vide MoEF Letter no J-11011/317/2006.IA.II (I) dated April 16, 2007

	interpretation shall be submitted to them regularly.	
ix.	The Project Proponent shall inform the public that the project has been accorded environmental clearance by the Ministry and copies of the clearance letter are available with the OSPCB/Committee and may also be seen at Website of the Ministry of Environment and Forests at http://envfor.nic.in . This shall be advertised within seven days from the date of issue of the clearance letter, at least in two local newspapers that are widely circulated in the region of which one shall be in the vernacular language of the locality concerned and a copy of the same shall be forwarded to the Regional office.	The Notice has been advertised in two local newspapers viz. Uditvani (Hindi) and Avenue Mail (English) on April 21, 2007 and communication to this effect was also sent to the MoEF vide our letter no. EMD/C-32/2118/07 dated August 18, 2007.
x.	Project authorities should inform the Regional Office as well as the Ministry, the date of financial closure and final approval of the project by the concerned authorities and the date of commencing the land development work.	It has been complied as the project has already been completed and Consent to Operate has been issued by Jharkhand State Pollution Control Board.

ENVIRONMENTAL CLEARANCE COMPLIANCE STATUS REPORT

October 2019 to March 2020

**Tata Steel Limited, Jamshedpur
(MAIN WORKS & TOWN)**

**Six Monthly Compliance Status report of Environmental
Clearance from expansion of 6.8 to 9.7 MTPA Crude Steel
Production**

**ENVIRONMENTAL MANAGEMENT DEPARTMENT
TATA STEEL LIMITED
JAMSHEDPUR**

Compliance Status of Environmental Clearance of Expansion of Steel Plant (6.8 MTPA to 9.7 MTPA, Crude Steel Production) at Tata Steel Works, Jamshedpur, District East Singhbhum, Jharkhand vide MoEF Letter no J-11011/691/2007-IA. II (I) dated May 11, 2010

SN	Conditions	Compliance Status																						
Specific Conditions:																								
i.	Compliance to all the specific and general conditions stipulated for the existing plant by the Central/State Govt. shall be ensured and regular reports submitted to the Ministry and its Regional Office at Bhubaneswar.	<p>The six-monthly compliance reports are being submitted to the regional office regularly. The report for last 5 years submitted to Regional office at Ranchi/Bhubaneswar is as follows:</p> <table border="1"> <thead> <tr> <th>Six Monthly Report</th> <th>Submitted on</th> </tr> </thead> <tbody> <tr> <td>December 2019</td> <td>November 27, 2019 vide letter no. EMD/C-41/238/19</td> </tr> <tr> <td>June 2019</td> <td>May 25, 2019 vide letter no. EMD/C-41/148/19.</td> </tr> <tr> <td>December 2018</td> <td>November 28, 2018 vide letter no. EMD/C-41/429/18.</td> </tr> <tr> <td>June 2018</td> <td>May 28, 2018 vide letter no. EMD/C-41/280/18.</td> </tr> <tr> <td>December 2017</td> <td>November 28, 2017 vide letter no. EMD/C41/178/17</td> </tr> <tr> <td>June 2017</td> <td>May 25, 2017 vide letter no. EMD/C41/77/17</td> </tr> <tr> <td>December 2016</td> <td>November 25, 2016 vide letter no. EMD/C41/183/16</td> </tr> <tr> <td>June 2016</td> <td>June 01, 2016 vide letter no. EMD/C-41/78/16</td> </tr> <tr> <td>December 2015</td> <td>December 05, 2015 vide letter no. EMD/C-33/215/15</td> </tr> <tr> <td>June 2015</td> <td>May 19, 2015 vide letter no. EMD/C-33/58/15</td> </tr> </tbody> </table> <p>The six monthly compliance reports along the monitored data is also uploaded in the website(https://www.tatasteel.com/corporate/our-organisation/environment/environment-compliance-reports/)</p>	Six Monthly Report	Submitted on	December 2019	November 27, 2019 vide letter no. EMD/C-41/238/19	June 2019	May 25, 2019 vide letter no. EMD/C-41/148/19.	December 2018	November 28, 2018 vide letter no. EMD/C-41/429/18.	June 2018	May 28, 2018 vide letter no. EMD/C-41/280/18.	December 2017	November 28, 2017 vide letter no. EMD/C41/178/17	June 2017	May 25, 2017 vide letter no. EMD/C41/77/17	December 2016	November 25, 2016 vide letter no. EMD/C41/183/16	June 2016	June 01, 2016 vide letter no. EMD/C-41/78/16	December 2015	December 05, 2015 vide letter no. EMD/C-33/215/15	June 2015	May 19, 2015 vide letter no. EMD/C-33/58/15
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ii.	Efforts shall be made to reduce RSPM levels in the ambient air and a time bound action plan shall be submitted. On-line ambient air quality monitoring and continuous stack monitoring facilities for all the stacks shall be provided and sufficient air pollution control devices viz. Electrostatic precipitator (ESP), bag house, gas cleaning plant, bag filters etc. shall be provided to keep the emission levels below 50 mg/Nm ³ by installing energy efficient technology. Low NOx burners shall be installed to control NOx emissions. At no time, the emission level shall go beyond the prescribed standards. Interlocking facilities shall be provided so that process can be automatically stopped in case emission level exceeds the limit.	<ul style="list-style-type: none"> 4 online AAQMS have been commissioned to monitor PM₁₀, PM_{2.5}, SO₂, NO₂, CO, NH₃ continuously. ESPs are being upgraded of all relevant production units. Among these 6 ESPs of Sinter Plant have already been upgraded. Several projects have been taken to monitor gaseous emissions from ESPs. The agreed emission for their upgraded emission has been guaranteed to be 50 mg/Nm³. Low NOx burners have been provided in all the new units. Similarly, in almost all the units alert facility have been provided in case of units exceed any prescribed emission level as the interlocking is technically not feasible in all the production units. Please find enclosed the updated status of implementation of action plan to reduce dust emission level in each of production unit and raw material storage area as Annexure II. 																						

Compliance Status of Environmental Clearance of Expansion of Steel Plant (6.8 MTPA to 9.7 MTPA, Crude Steel Production) at Tata Steel Works, Jamshedpur, District East Singhbhum, Jharkhand vide MoEF Letter no J-11011/691/2007-IA. II (I) dated May 11, 2010

iii.	<p>Existing electrostatic precipitator (ESP) shall be upgraded and provided to new units to control gaseous emissions within 50 mg/Nm³. ESPs shall be provided to pellet plant, cast house and stock house of blast furnaces and LD#3 shop. Waste gas from the drying and grinding unit of pellet plant shall be cleaned by bag filters. Adequate provisions shall be made to control NOx emissions. Bag house shall be provided to Lime kilns. Data on ambient air quality stack emissions and fugitive emissions shall regularly submit to the Ministry's Regional Office at Bhubaneswar, Jharkhand Pollution Control Board (JPCB) and Central Pollution Control Board (CPCB) once in six months.</p>	<ul style="list-style-type: none"> • ESPs are being upgraded of all relevant production units. Among these 6 ESPs of Sinter Plant have already been upgraded. Several projects have been taken to monitor gaseous emissions from ESPs. The agreed emission for their upgraded emission has been guaranteed to be 50 mg/Nm³. • Bag Filters have been provided in the Cast House and Stock House of all the Blast Furnaces. • 3 nos. of bag filters have been provided in the Pellet Plant to control waste gas from the drying and grinding unit. • 12 nos. of Bag House have been provided in Lime Plant in process and dedusting units. • Low NOx burners have been provided in all the new units to meet the prescribed standards. • The Year till date completion of projects are mentioned in Annexure-II. • Please refer Annexure – I of Monitoring and analysis report for data on ambient air quality, stack emissions and fugitive emissions from April 2019 to March 2020.
iv.	<p>Land based fume extraction system shall be provided to coke oven battery # 10 and 11 to arrest fugitive emissions during charging and pushing operations. The coke oven gas shall be desulphurized by reduction of H₂S content of coke oven gas in the by-product recovery section to below 500 mg/Nm³. On-line charging with high pressure liquor aspiration (HPLA) for extraction of oven gas, leak proof oven doors, hydraulic door and door frame cleaner, water sealed AP caps and charging & pusher side emission extractor device shall be provided for the coke oven batteries to maintain VOC emissions within permissible limit. Land based fume extraction system for pushing emission control from coke ovens shall be provided.</p>	<ul style="list-style-type: none"> • Land based fume extraction, desulphurization facilities, online charging with HPLA, Hydraulic door and door frame clearance, water seal AP caps and charging and pusher side emission extractor device etc were in place in both coke ovens battery 10 & 11 to minimize leaks from doors CAPs, etc and to meet the CREP recommendations. • Coke oven gas is being desulphurised in Battery 10&11. The monitoring reports shows that H₂S content is below 500 mg/Nm³. The report of same is enclosed under Annexure-I of Monitoring and Analysis Report.
v.	<p>All the standards prescribed for the coke oven plants shall be followed as per the latest guidelines. Proper and full utilization of coke oven gases in power plant using heat recovery steam generators shall be ensured and no flue</p>	<ul style="list-style-type: none"> • As per the CREP guidelines, % of PLD, PLL & PLO of all batteries are being monitored thrice in a month. The max % of PLD is found to be 9.26 in Battery#6, max % of PLL found to be 0.88 in Battery#6 and % of maximum PLO is found to be 1.19 in

Compliance Status of Environmental Clearance of Expansion of Steel Plant (6.8 MTPA to 9.7 MTPA, Crude Steel Production) at Tata Steel Works, Jamshedpur, District East Singhbhum, Jharkhand vide MoEF Letter no J-11011/691/2007-IA. II (I) dated May 11, 2010

	gases shall be discharged into the air. Sulphur shall be recovered from the coke oven gases from new product plant.	<p>Battery#10 and maximum charging emission is found to be 62 sec in Battery#6.</p> <ul style="list-style-type: none"> Byproduct gas is recovered and used for power generation captive Power House # 3, 4 & 5 and heating purpose in all the mills. Power is also being generated in TRT at G, H & I Blast Furnace. Sulphur is recovered from coke oven gas and sold to authorized buyers.
vi.	Only dry quenching method in the coke oven in new battery # 10 & 11 shall be adopted.	Coke Dry quenching (CDQ) facility in the new Coke Oven Battery#10 & 11 is completed and commissioned.
vii.	The National Ambient Air Quality Emission Standards issued by the Ministry vide G.S.R. No. 826(E) dated 16 th November, 2009 shall be followed.	<ul style="list-style-type: none"> 4 online AAQMS have been commissioned to monitor PM₁₀, PM_{2.5}, SO₂, NO_x, CO, NH₃ continuously. There is one mobile monitoring facility & about 8 manual AAQMS located both inside the plant and also outside the plant area. All other AAQ parameters being analysed by approved environment laboratory are also found within prescribed limit. Monthly monitoring reports are being submitted to JSPCB and six monthly monitoring reports are being submitted along with EC compliance reports to Ministry's Regional office, CPCB and JSPCB. Please refer Annexure - I for Monitoring reports from April 2019 to March 2020.
viii.	In-plant control measures for checking fugitive emissions from all the vulnerable sources including bag filters and fume extraction system shall be provided. Dry fog dust suppression system / water sprinkling system shall be provided in raw material handling areas to control fugitive dust emissions. Fugitive emissions from different sources shall also be controlled by covered conveyors, water sprinkling in open yards and with dry fogging in the closed zones. Further, specific measures like asphaltting of the roads within premises shall be carried out to control fugitive emissions. Fugitive emissions shall be controlled, regularly monitored and records maintained.	<ul style="list-style-type: none"> Necessary air pollution control measures are provided to control fugitive dust emission. Please find enclosed a list of air pollution control devices for each of production unit as Annexure -I. All the areas of dedusting operation as junction house, transfer tower, conveyors are connected with bag filters and/or dry fog dust suppression system. All these locations are being monitored once in month. A total of 495 nos. of points for dust suppression system (DS) are commissioned at various locations inside Works. A total of 76 nos. Industrial vacuum cleaners (IVC) are commissioned at various locations inside Works. Additional

Compliance Status of Environmental Clearance of Expansion of Steel Plant (6.8 MTPA to 9.7 MTPA, Crude Steel Production) at Tata Steel Works, Jamshedpur, District East Singhbhum, Jharkhand vide MoEF Letter no J-11011/691/2007-IA. II (I) dated May 11, 2010

		Industrial vacuum cleaners (IVC) are being commissioned at various locations inside Works.
ix.	Gaseous emission levels including secondary fugitive emissions from all the sources shall be controlled within the latest permissible limits issued by the Ministry and regularly monitored. Guidelines / Code of Practice issued by the CPCB shall be followed. New standards issued by the Ministry vide G.S.R. 414(E) dated 30 th May, 2008 shall be followed.	<ul style="list-style-type: none"> • Secondary dust emission inside the plant in different critical areas is being monitored in about all 448 locations monthly. • Several Projects have been taken to monitor Gaseous Emission levels including secondary fugitive emissions and are controlled within the permissible limits.
x.	As proposed, traffic decongestion plan shall be implemented in a time bound manner to reduce emissions in the Jamshedpur city and separate budget shall be allocated for implementing the same. Maximum inbound and out bound material movement shall be done by railway wagons only to reduce dust emissions. Measures like covered conveyors for handling of bulk materials, centralized screening of iron ore, rationalization of weighing system, use of higher capacity vehicles etc. shall be adopted to reduce dust emissions. Mechanized vacuum cleaning of arterial roads shall be carried out on regular basis to further reduce dust emissions.	<p>Under the traffic decongestion plan in Jamshedpur city :</p> <ul style="list-style-type: none"> • Strengthening of marine drive (Western corridor) has been implemented • Traffic decongestion plan in other roads have been planned and will be implemented in coordination with Govt. of Jharkhand. <p>Inside the plant:</p> <ul style="list-style-type: none"> • Automatic traffic control system is in place to control the traffic density as well as the safely including secondary emission inside the plant. • All the loaded trucks are ensured to be covered with tarpaulin sheets to avoid dust getting air borne and thus generation of secondary emission. • Sign board have been placed on all the critical areas to keep the speed of the vehicle within 35 kmph to control secondary emission along the internal road (VIP Road) and similarly the vehicle speed is limited to 16 kmph in the units. • All the loaded trucks/dumpers coming inside the plant with their valid PUC. • 4 nos. of mechanized sweepers are deployed within Works for regular cleaning and dust evacuation of roads. • In FY20 approx. 370 tonnes/month of dust from road being collected by these mechanized sweepers which are being reused in sinter making through RMBB.

Compliance Status of Environmental Clearance of Expansion of Steel Plant (6.8 MTPA to 9.7 MTPA, Crude Steel Production) at Tata Steel Works, Jamshedpur, District East Singhbhum, Jharkhand vide MoEF Letter no J-11011/691/2007-IA. II (I) dated May 11, 2010

		<ul style="list-style-type: none"> • 2 nos. of mechanized sweepers are deployed in Jamshedpur town for regular cleaning and dust evacuation of roads.
xi.	<p>Vehicular pollution due to transportation of raw materials and finished products shall be controlled. Proper arrangements shall also be made to control dust emissions during loading and unloading of the raw material and finished product.</p>	<ul style="list-style-type: none"> • Approx. all the raw material is being transported through railways to reduce the road transport load and vehicular pollution. • Dry fog dust suppression and water sprinklers are provided to control dust emission during loading and unloading activity. • Tyre washing facility has also been provided in 10 strategic locations to keep tyres clean to reduce dust emission on roads and being installed in 3 additional locations.
xii.	<p>As proposed, total water requirement from River Subarnarekha shall not exceed 33.3 MGD although permission for 227 MGD water is obtained vide letter dated 7th January, 1992. Closed circuit cooling system shall be provided to reduce further water consumption. All the wastewater from various units shall be treated in the common effluent treatment plant (CETP) for primary, secondary and tertiary treatment shall be either recycled or used for dust suppression, slag quenching and green belt development etc. within the lease hold area. The phenolic effluent from the by-product recovery section of coke oven battery # 10 and 11 shall be treated in BOD plant. Wastewater containing suspended solids shall be passed through clariflocculation plant to recover and reuse the clarified water for cooling or cleaning. Mill effluent containing oil and suspended solids shall be passed through oil skimmers and filter press. No treated wastewater shall be released out the premises and 'Zero' discharge shall be adopted by recycling all the treated water in the plant itself including from the existing plant.</p>	<ul style="list-style-type: none"> • Due to water recycling facilities, the total water requirement from River Subarnarekha shall not cross 33.3 MGD for Steel Works. • A central effluent treatment plant (CETP) of 4 MGD has been constructed to treat and recycle most of the effluent by tertiary treatment with Reverse Osmosis (RO). • New BOD plant has been commissioned and existing BOD has been upgraded to treat the additional effluent generated from Coke Oven Batteries including Battery 10 & 11. • Closed circuit cooling systems have been installed. Catch pits at all the five designated drains have been constructed to recycle the treated effluent within plant. • All the mills are equipped with respective effluent treatment plants with settling tanks and oil skimming facility. • All the effluent quality (Ammoniacal Nitrogen, COD, BOD, Phenol, Cyanide, TSS, etc) are under discharge norms and the analysis report of same is enclosed under Annexure-I of Monitoring and Analysis Report for FY20.
xiii.	<p>Efforts shall be made to make use of rain water harvested. If needed, capacity of the reservoir shall be enhanced to meet the maximum water requirement. Only balance water requirement shall be met from other sources.</p>	<ul style="list-style-type: none"> • There are two ponds inside Steel works viz. Upper Cooling Pond (UCP) and Lower Cooling Pond (LCP), which stores and harvest most of the surface run off with cooling water of the units. • 38 nos. of rainwater harvesting structures in different office buildings have been provided inside the plant area of which some area has

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		<p>the facility of Ground Water Recharge system.</p> <ul style="list-style-type: none"> RWH structure has been constructed based on the maximum rainfall of last 20 yrs.
xiv.	<p>Continuous monitoring of Total Organic Compounds (TOC) in the wastewater treated in BOD plant from the coke oven plant shall be done at the outlet of ETP (BOD plant). All the treated wastewater shall be monitored for pH, BOD, COD, oil & grease, cyanide, phenolic compounds, Chromium+6 etc. besides other relevant parameters.</p>	<ul style="list-style-type: none"> The BOD plant has facility of continuous monitoring of TOC. Similarly monitoring of other parameters on the outlet of the BOD plant is being done regularly. The monthly monitoring data is being submitted to JSPCB and six-monthly reports are being submitted to regional office of MoEFCC at Ranchi and CPCB. Please refer Annexure - I for monitoring reports from April 2019 to March 2020.
xv.	<p>Regular monitoring of influent and effluent surface, sub-surface and ground water shall be ensured and treated wastewater shall meet the norms prescribed by the State Pollution Control Board or described under the E(P) Act whichever are more stringent. Leachate study for the effluent generated and analysis shall also be regularly carried out and report submitted to the Ministry's Regional Office at Bhubaneswar, Jharkhand SPCB and CPCB.</p>	<ul style="list-style-type: none"> All the effluent viz. catch pits, service water etc are being monitored regularly. The treated effluents such as all ETP outlets and drains are being analyzed regularly. Online effluent monitoring system has been commissioned in all the drains to monitor effluent quality on a real-time basis. Online effluent monitoring data is connected with CPCB/JSPCB. River Water quality of Subarnarekha and kharkai is also being monitored as a part of regular monitoring of surface water quality. There are two cooling water pond whose water quality is also regularly monitored as part of sub surface water quality. Ground water quality is also being monitored at 5 locations both inside and outside plant premises. Please refer Annexure - I for monitoring reports of April 2019 to March 2020. Monthly monitoring data is being submitted to JSPCB and six-monthly reports are being submitted to regional office of MoEFCC at Ranchi and CPCB.
xvi.	<p>'Zero' effluent discharge shall be strictly followed and no additional wastewater shall be discharged outside the premises. Domestic wastewater shall be treated in septic tanks followed by soak pit and used for green belt development.</p>	<p>As per the water balance and plan of zero effluent discharge, all the plant effluent is being recycled in to different process units for various uses. The rain water which is being discharged into the nearby nallah is being collected and in low lying area and settled water is let out</p>

Compliance Status of Environmental Clearance of Expansion of Steel Plant (6.8 MTPA to 9.7 MTPA, Crude Steel Production) at Tata Steel Works, Jamshedpur, District East Singhbhum, Jharkhand vide MoEF Letter no J-11011/691/2007-IA. II (I) dated May 11, 2010

		thereafter. Maximum effort is being taken to minimize the discharge of rain water.																
xvii.	As proposed, the water consumption shall not exceed 5.7 m ³ /Ton of steel at 9.7 MTPHY stage.	<p>The specific water consumption has been reduced to 2.80 m³/tcs during year 2019-20 as compared to 5.58 m³/tcs for the year 2013-14.</p> <table border="1"> <thead> <tr> <th>Year</th> <th>Specific Water Consumption (m³/tcs)</th> </tr> </thead> <tbody> <tr> <td>FY 14</td> <td>5.58</td> </tr> <tr> <td>FY 15</td> <td>5.54</td> </tr> <tr> <td>FY 16</td> <td>4.39</td> </tr> <tr> <td>FY 17</td> <td>3.83</td> </tr> <tr> <td>FY 18</td> <td>3.68</td> </tr> <tr> <td>FY 19</td> <td>3.27</td> </tr> <tr> <td>FY 20</td> <td>2.80</td> </tr> </tbody> </table>	Year	Specific Water Consumption (m ³ /tcs)	FY 14	5.58	FY 15	5.54	FY 16	4.39	FY 17	3.83	FY 18	3.68	FY 19	3.27	FY 20	2.80
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xviii.	All the blast furnace (BF) slag shall be granulated and provided to cement manufacturers for further utilization in cement making as per the MoUs signed with various companies including M/s Lafarge, M/s Eco-cement & M/s ACC. LD slag after metal recovery shall be used in sinter plant, blast furnaces and LD convertor, aggregates making, road ballast making, soil conditioning etc. All the flue dust generated shall be recycled within the plant to the maximum extent. Mill scales, LD sludge, lime fines and flue dust shall be recycled back to the sinter plant. The BF gas cleaning plant sludge shall be used for manufacturing briquettes.	<ul style="list-style-type: none"> • Online slag granulation facilities have been implemented in the all Blast Furnaces. • All the BF Slag is being granulated and made available to the Cement plants for cement making. • Blast Furnace gas cleaning plant (GCP) sludge is re-utilized in the process as well as being used for manufacturing briquettes. • LD Slag is being used internally in the manufacturing process as well as externally in brick and road making works. "Tata Nirmaan" and "Tata Aggretto" are branded product of LD slag for its external utilization. • Additional initiatives undertaken for improving the utilization of LD Slag: <ul style="list-style-type: none"> ○ Co-processing of LD Slag at Cement Kilns. ○ Open & closed Steam Ageing inside Works ○ Use of LD Slag in Road Making & railway Ballast 																
xix.	As proposed, coal tar sludge and BOD sludge shall be recycled for coke making by mixing with the coal charge and used in the coke ovens. Chromium sludge shall be disposed in a HDPE lined secured landfill as per the CPCB guidelines within the complex. All the other solid waste including broken refractory mass shall be properly disposed off in environment-friendly manner. Oily waste and spent oil	<ul style="list-style-type: none"> • BOD Sludge and Coal Tar sludge generated from By Product Plant is being recycled in coke plant by mixing with raw materials. Quantity data of same is attached in Annexure- II of Monitoring and Analysis Report. • All other kind of process wastes are being reutilized in sinter plant. 																

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	shall be provided to authorized recyclers/reprocessors.	<ul style="list-style-type: none"> In house secured landfill with HDPE liner has been constructed to dispose chrome sludge generated from Cold Rolling Mill.
xx.	All the slag shall be used for land filling inside the plant or used as building material only after passing through Toxic Chemical Leachability Potential (TCLP) test. Toxic Chromium sludge and other hazardous substances recovered from the slag and output waste shall be disposed off in secured landfill as per CPCB guidelines.	<ul style="list-style-type: none"> LD Slag is being used for road making. The TCLP test conducted by external approved agency. Report of same is enclosed under Annexure-I of Monitoring and Analysis Report. Leachate potential of all Heavy metals is negligible. Chrome Sludge is being disposed in the secured landfill inside Works.
xxi.	As proposed, Jugsalai muck dump (JMD) shall be reclaimed in a time bound manner by covering the dump site with geo-netting and vegetation alongwith localized water harvesting.	The reclamation of JMD has been completed. A rainwater harvesting facility has been constructed at the top of the JMD which is being utilized for development of greenery. Besides this, there is a provision to pump surface drainage carry out from the plant to JMD area for development of greenery.
xxii.	A time bound action plan shall be submitted to reduce solid waste, its proper utilization and disposal to the Ministry's Regional Office at Bhubaneswar, Jharkhand SPCB and CPCB.	<p>An action plan for Solid waste management has been submitted to JSPCB vides our letter no. EMD/C-02/460/11 dated December 16, 2011. We had also submitted road map regarding future generation and the disposal of solid waste vide our letter no. EMD/C-33/124/13 dated June 22, 2013.</p> <p>We have taken many steps to improve the solid waste utilization. For the period during April 2019 to March 2020, the solid waste utilization was 102% excluding storage of LD slag at Galudih for processing. Various actions have been already planned to improve the solid waste utilization further.</p>
xxiii.	Proper handling, storage, utilization and disposal of all the solid waste shall be ensured and regular report regarding toxic metal content in the waste material and its composition, end use of solid/hazardous waste shall be submitted to the Ministry's Regional Office at Bhubaneswar, Jharkhand SPCB and CPCB.	<ul style="list-style-type: none"> Most of the solid waste is being reutilized. Information regarding solid waste and hazardous waste is being submitted in Environment Statement to the Board every year. Status of hazardous and other waste generation and utilization from April 2019 to March 2020 is enclosed as Annexure - III.
xxiv.	Proper utilization of fly ash shall be ensured as per Fly Ash Notification, 1999 and subsequent amendment in 2003. All the fly ash shall be provided to cement	<ul style="list-style-type: none"> All the boilers of Captive power plants have been converted from coal fired to gas fired,

Compliance Status of Environmental Clearance of Expansion of Steel Plant (6.8 MTPA to 9.7 MTPA, Crude Steel Production) at Tata Steel Works, Jamshedpur, District East Singhbhum, Jharkhand vide MoEF Letter no J-11011/691/2007-IA. II (I) dated May 11, 2010

	and brick manufacturers for further utilization and 'Memorandum of Understanding' shall be submitted to the Ministry's Regional Office at Bhubaneswar.	thus there is no additional generation of fly ash in the power plant. <ul style="list-style-type: none"> Ash generation from the captive power plants has been stopped due to no coal firing at Power Plants since FY19.
xxv.	A Risk and Disaster Management Plan along with the mitigation measures shall be prepared and a copy submitted to the Ministry's Regional Office at Bhubaneswar, Jharkhand SPCB and CPCB within 3 months of issue of environment clearance letter.	Disaster Management Institute, Bhopal has verified and certified the Risk assessment report and Disaster Management Plan vide their letter no. DMI/IDMU/Con-227/24 dated April 16, 2012. The same has been submitted to JSPCB.
xxvi.	As proposed, green belt shall be developed in more than 33 % area within and around the plant premises as per the CPCB guidelines in consultation with DFO.	We have planted 1,01,095 nos. saplings during April 2019 to March 2020 inside the works, Jugsalai Muck Dump area and in Township in the same period. Every year plantation done in available space. The following plant species are being planted: <i>Ficus, karanj, Cicilipinia, Palm, Ashoka, Mahogany, Caesalpinia Arjun, Sita Ashok, Bakul, Spathodia, Kanchan, Jural, Tabulia, Sissam, Termanelia Sp., Arica palm, foxtail palm, Tecoma, Kannel, Tababia, Ghandhraj, calendra, Tagar, Hemelia, Kamani, Karbi, Calendra etc.</i>
xxvii.	Prior permission from the State Forest Department shall be taken regarding likely impact of the expansion of the proposed steel plant on the reserve forests. Measures shall be taken to prevent impact of particulate emissions / fugitive emissions, if any from the proposed plant on the surrounding reserve forests viz. Jora Pahar PF, Sand Pcha Rahar PF, Deluse RF located within 10 km radius of the project. Further, Conservation Plan for the conservation of wild fauna in consultation with the State Forest Department shall be prepared and implemented.	<ul style="list-style-type: none"> Prior Permission from State Forest Department has been obtained vide their memo. No. 2605 dated October 29, 2010. A revised Wildlife Conservation Plan for Tata Steel has been prepared with the help of approved external agency recommended by State Forest Department and submitted for approval vide our letter no. EMD/C-41/128/16 dated August 22, 2016. Wildlife Conservation Plan has been approved by Principal Chief Conservator of Forests – Wildlife (PCCF-WL) GoJ on Nov 13, 2017. PCCF-WL has informed MoEFCC for the above approval.
xxviii.	All the recommendations made in the Charter on Corporate Responsibility for Environment Protection (CREP) for the Steel Plants shall be implemented	CREP recommendations have been implemented. Please find enclosed the same as Annexure – II of Monitoring and Analysis Report.
xxix.	All the commitments made to the public during the Public Hearing / Public Consultation meeting held on 18 th June, 2009 shall be satisfactorily implemented and a separate budget for implementing the same shall be allocated and	All the commitments made to the public during the Public Hearing are being implemented.

Compliance Status of Environmental Clearance of Expansion of Steel Plant (6.8 MTPA to 9.7 MTPA, Crude Steel Production) at Tata Steel Works, Jamshedpur, District East Singhbhum, Jharkhand vide MoEF Letter no J-11011/691/2007-IA. II (I) dated May 11, 2010

	information submitted to the Ministry's Regional Office at Bhubaneswar.																																					
xxx.	At least 5 % of the total cost of the project i.e. ₹ 750.00 Crores shall be earmarked towards the corporate social responsibility and item-wise details along with time bound action plan shall be prepared and submitted to the Ministry's Regional Office at Bhubaneswar. Implementation of such program shall be ensured accordingly in a time bound manner.	<p>It is being complied as per the requirement under the Companies Act. The amount spent by the Company on Corporate Social Responsibility (CSR) activities is given below.</p> <table border="1"> <thead> <tr> <th>FY</th> <th>Total Spent on CSR in Cr.</th> <th>CSR spent in and around JSR in Cr.</th> </tr> </thead> <tbody> <tr><td>2011</td><td>126</td><td>97.15</td></tr> <tr><td>2012</td><td>146</td><td>106.43</td></tr> <tr><td>2013</td><td>171</td><td>120.34</td></tr> <tr><td>2014</td><td>212</td><td>136.95</td></tr> <tr><td>2015</td><td>171</td><td>56.11</td></tr> <tr><td>2016</td><td>204</td><td>83.62</td></tr> <tr><td>2017</td><td>194</td><td>73.36</td></tr> <tr><td>2018</td><td>232</td><td>82.19</td></tr> <tr><td>2019</td><td>315</td><td>82.40</td></tr> <tr><td>2020</td><td>193</td><td>76.52</td></tr> <tr><td></td><td>Total</td><td>992.4</td></tr> </tbody> </table> <p>It is reported in the Company's Integrated Report. These reports are available on the website of Tata Steel and may be seen/downloaded.</p>	FY	Total Spent on CSR in Cr.	CSR spent in and around JSR in Cr.	2011	126	97.15	2012	146	106.43	2013	171	120.34	2014	212	136.95	2015	171	56.11	2016	204	83.62	2017	194	73.36	2018	232	82.19	2019	315	82.40	2020	193	76.52		Total	992.4
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xxxi.	The company shall provide housing for construction labour within the site with all necessary infrastructure and facilities such as fuel for cooking, mobile toilets, mobile STP, safe drinking water, medical health care, crèche etc. The housing may be in the form of temporary structures to be removed after the completion of the project.	As the project is already commissioned. Compliance to this condition is not applicable.																																				
General Conditions:																																						
i.	The project authorities must strictly adhere to the stipulations made by the Jharkhand Pollution Control Board (JSPCB) and the State Government.	We are regularly obtaining the CTO and authorization under Hazardous Waste from JSPCB.																																				
ii.	No further expansion or modifications in the plant should be carried out without prior approval of the Ministry of Environment and Forests.	<p>The Project informed that there shall be prior permission obtained for the concerned authorities in case of any medications, augmentation, and product mix change. The detail of production of various products for last five years is as follows:</p> <table border="1"> <thead> <tr> <th>Product</th> <th>Hot Metal</th> <th>Crude Steel</th> </tr> <tr> <th>Unit</th> <th colspan="2">MTPA</th> </tr> </thead> <tbody> <tr> <td>Capacity granted in EC</td> <td>12.5</td> <td>11</td> </tr> <tr> <td>2015-16</td> <td>10.65</td> <td>9.96</td> </tr> </tbody> </table>	Product	Hot Metal	Crude Steel	Unit	MTPA		Capacity granted in EC	12.5	11	2015-16	10.65	9.96																								
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Compliance Status of Environmental Clearance of Expansion of Steel Plant (6.8 MTPA to 9.7 MTPA, Crude Steel Production) at Tata Steel Works, Jamshedpur, District East Singhbhum, Jharkhand vide MoEF Letter no J-11011/691/2007-IA. II (I) dated May 11, 2010

		2016-17	10.8	10
		2017-18	10.9	10
		2018-19	10.8	10.2
		2019-20	10.77	10.2
iii.	The gaseous emissions from various process units shall conform to the load/mass based standards notified by this Ministry on 19 th May, 1993 and standards prescribed from time to time. The state Board may specify more stringent standards for the relevant parameters keeping in view the nature of the industry and its size and location.	<p>ESPs are being upgraded of all relevant production units. Among these 6 ESPs of Sinter Plant have already been upgraded. Several projects have been taken to monitor gaseous emissions from ESPs. The agreed emission for their upgraded emission has been guaranteed to be 50 mg/Nm³.</p> <p>ESPs have been provided in pellet plant (Hood Stack, Wind Box Stack and Central dedusting stack) and bag filters in other areas where dedusting as the main criteria.</p> <p>Bag Filters are provided in the Cast House and Stock House of H and I Blast Furnace each. As explained as above, 3 bag filters have been provided in the pellet plant to control waste gas from the drying and grinding unit of pellet plant.</p>		
iv.	At least four ambient air quality monitoring stations shall be established in the downward direction as well as where maximum ground level concentration of SPM, SO ₂ and NO _x are anticipated in consultation with the Jharkhand PCB. Data on ambient air quality and stack emission should be regularly submitted to this Ministry including its Regional Office at Bhubaneswar and the Jharkhand PCB/CPCB once in six months.	<p>4 online AAQMS have been commissioned to monitor PM₁₀, PM_{2.5}, SO₂, NO_x, CO, NH₃ continuously inside the Works. There is one mobile monitoring facility & 8 manual AAQMS located both inside the plant and also outside the plant area. Monitoring report is being submitted to JSPCB, CPCB and Regional Office.</p> <p>The monitoring data for the period April 2019 to March 2020, indicates that all the parameters (except PM₁₀ and PM_{2.5} in few occasions) are within the prescribed limit of NAAQS. PAHs, Lead and Ammonia are being done by CPCB recognized and In-house NABL accredited environment laboratory.</p> <p>The ambient air quality represents the status of environment, which includes impact of several external factors such as other industrial activities, traffic movement, commercial and domestic activities etc.</p>		
v.	Industrial wastewater shall 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 form time to time. The treated wastewater shall be utilized for plantation purpose.	<p>Surface and ground water monitoring at various locations are being done and analysis reports also being sent to RO, MoEFCC and JSPCB.</p>		
vi.	The overall noise levels in and around the plant area shall be kept well within the standards (85 dBA) by providing noise control measures including acoustic	<p>Personal Protective Equipment (PPE) have been provided to all the workers/officers to avoid any accompanied noise hazards. Facilities like silencers, enclosers, hood etc have been</p>		

Compliance Status of Environmental Clearance of Expansion of Steel Plant (6.8 MTPA to 9.7 MTPA, Crude Steel Production) at Tata Steel Works, Jamshedpur, District East Singhbhum, Jharkhand vide MoEF Letter no J-11011/691/2007-IA. II (I) dated May 11, 2010

	hoods, silencers, enclosures etc. on all sources of noise generation. The ambient noise levels should conform to the standards prescribed under EPA Rules, 1989 viz. 75 dBA (daytime) and 70 dBA (nighttime).	provided to reduce noise at source. The monitored data in the work zone reveals that the noise level does not exceeds >85 dBA for 8 hr exposures. Similarly, in the ambient also, the noise levels meet the prescribed standards. The ambient noise level monitoring is being done at different part of the Jamshedpur town in frequent interval outside Steel Works to assess the ambient noise level status. Noise level in the town is found beyond the standard in few occasions. The possible reason of equivalent noise levels in respect of all categories of areas exceeded the standards for day and night times is due to heavy traffic movement in the town, market and commercial activities, festivals and other domestic celebrations and frequent religious rituals. The Ambient noise level report of FY20 is enclosed under Annexure-I of Monitoring and Analysis Report.
vii.	Occupational Health Surveillance of the workers shall be done on a regular basis and records maintained as per the Factories Act.	Regular health surveillance is being conducted i.e. 2 times in a year to all the workers who have already attended more than 40 years of age. The workers having age less than 40 years are under gone occupational health surveillance program once in a year.
viii.	The company shall develop surface as well as ground water harvesting structures to harvest the rainwater for utilization in the lean season besides recharging the ground water table.	Rain Water Harvesting structure of 38 Nos. has been provided inside the plant area of which some area has the facility of Ground Water Recharge system. RWH structures have been constructed based on the maximum rainfall of last 20 yrs.
ix.	The project proponent shall also comply with all the environmental protection measures and safeguards recommended in the EIA/EMP report. Further, the company must undertake socio-economic development activities in the surrounding villages like community development programmes, educational programmes, drinking water supply and health care etc.	Socio economic development activities are regularly undertaken in and around Jamshedpur through the two agencies namely, Tata Steel Rural Development Society and Tata Steel Community Development & Welfare Services Centers. The development activities undertaken in the surrounding community are need based and are in the field of health care, education, mid-day meals in schools, sports and culture, self-employment, drinking water, rural electrification, etc. Tata Steel also facilitate the Institutes like R D Tata Technical Institute, Tata Football Academy, Tata Archery Foundation, etc. which encourages the local talent to develop themselves and participate at National and International levels.
x.	As proposed, 2,107.00 Crores and ₹ 60.00 Crores shall be earmarked towards total capital cost and recurring cost/annum for environmental pollution control measures and judiciously utilized to implement the conditions stipulated by	Capital expenditure on environment is being spent on Air Pollution Control, Solid Waste Management, Zero Waste Water Discharge and Others including Greenery, Online Monitoring,

Compliance Status of Environmental Clearance of Expansion of Steel Plant (6.8 MTPA to 9.7 MTPA, Crude Steel Production) at Tata Steel Works, Jamshedpur, District East Singhbhum, Jharkhand vide MoEF Letter no J-11011/691/2007-IA. II (I) dated May 11, 2010

	the Ministry of Environment and Forests as well as the State Government. The funds so provided shall not be diverted for any other purpose.	etc. The total budget for the same as allocated by TSL Board is ₹ 2340 Crores. In FY 20 total capital expenditure for environment is ₹358.6 Crore. The funds for capital investment on pollution control equipment are not diverted.
xi.	The Regional Office of this Ministry at Bhubaneswar/CPCB/Jharkhand SPCB will monitor the stipulated conditions. A six monthly compliance report and the monitored data along with statistical interpretation shall be submitted to them regularly.	Six monthly compliance reports and the monitored data are being submitted regularly.
xii.	The Project Proponent shall inform the public that the project has been accorded environmental clearance by the Ministry and copies of the clearance letter are available with the JSPCB and may also be seen at Website of the Ministry of Environment and Forests at http://envfor.nic.in . This shall be advertised within seven days from the date of issue of the clearance letter, at least in two local newspapers that are widely circulated in the region of which one shall be in the vernacular language of the locality concerned and a copy of the same shall be forwarded to the Regional office.	The Notice has been advertised in two local newspapers viz. Hindustan (Hindi) and Hindustan Times (English) on May 18, 2010 and communication to this effect was also sent to the MoEF vide our letter no. EMD/C-33/128/10 dated June 15, 2010.
xiii.	A copy of Clearance letter shall be sent by proponent to concerned Panchayat, Zila Parishad/Municipal Corporation/Urban Local Body and the Local NGO, if any, from whom suggestions/ representations, if any, were received while processing the proposal. The clearance letter shall also be put on the website of the company by the proponent.	The copy of Clearance letter has been sent to Zila Parishad, DIC, Local Body and all concerned vide EMD/C-33/129-137/10 dated June 15, 2010.
xiv.	The project proponent shall upload the status of compliance of the stipulated environment clearance conditions, including results of monitored data on their website and shall update the same periodically. It shall simultaneously be sent to the Regional Office of the MoEF, the respective Zonal Office of CPCB and the JPCB. The criteria pollutant levels namely; SPM, RSPM, SO ₂ , NO _x (ambient levels as well as stack emissions) or critical sectoral parameters, indicated for the projects shall be monitored and displayed at a convenient location near	Six monthly compliance reports and the monitored data are being submitted regularly. The ambient air quality parameters are being monitored and displayed at the main gate of the company in the public domain.

Compliance Status of Environmental Clearance of Expansion of Steel Plant (6.8 MTPA to 9.7 MTPA, Crude Steel Production) at Tata Steel Works, Jamshedpur, District East Singhbhum, Jharkhand vide MoEF Letter no J-11011/691/2007-IA. II (I) dated May 11, 2010

	the main gate of the company in the public domain.	
xv.	The project proponent shall also submit six monthly reports on the status of the compliance of the stipulated environmental conditions including results of monitored data (both in hard copies as well as by e-mail) to the Regional Office of MOEF at Bhubaneswar, the respective Zonal Office of CPCB and the JSPCB. The Regional Office of this Ministry at Bangalore / CPCB / JPCB shall monitor the stipulated conditions.	Six monthly compliance reports are being submitted regularly both in hard copy and by e-mail.
xvi.	The environmental statement for each financial year ending 31 st March in Form-V as is mandated to be submitted by the project proponent to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently, shall also be put on the website of the company along with the status of compliance of environmental conditions and shall also be sent to the respective Regional Offices of the MOEF by e-mail.	<p>The environmental statement for each financial year in Form-V is regularly being submitted to the Jharkhand State Pollution Control Board.</p> <p>Environment Statement for FY 19 has been submitted vide our letter no. EMD/C-23/209/19 dated September 20, 2019.</p> <p>The environmental statement is also uploaded on the website (https://www.tatasteel.com/corporate/our-organisation/environment/environment-compliance-reports/)</p>
xvii.	Project authorities shall inform the Regional Office as well as the Ministry, the date of financial closure and final approval of the project by the concerned authorities and the date of commencing the land development work.	It has been complied as the project has already been completed and Consent to Operate has been issued by Jharkhand State Pollution Control Board.

ENVIRONMENTAL CLEARANCE COMPLIANCE STATUS REPORT

October 2019 to March 2020

**Tata Steel Limited, Jamshedpur
(MAIN WORKS & TOWN)**

**Six Monthly Compliance Status report of Environmental
Clearance from expansion of 9.7 to 11 MTPA Crude Steel
Production**

**ENVIRONMENTAL MANAGEMENT DEPARTMENT
TATA STEEL LIMITED
JAMSHEDPUR**

A. Specific Conditions:

- i. **The project proponent should install 24x7 air monitoring devices to monitor air emissions, as provided by the CPCB and submit report to Ministry and its Regional Office.**

Compliance Status:

- 4 online AAQMS have been commissioned to monitor PM₁₀, PM_{2.5}, SO₂, NO₂, CO, NH₃ continuously. All other AAQ parameters being analyzed by CPCB recognized environment laboratory are also found within prescribed limit except PM₁₀, PM_{2.5}.
- Real-time data of the monitoring stations are connected with the server at CPCB and JSPCB.
- The six-monthly compliance reports are being submitted to Ministry's Regional office, CPCB and JSPCB. The report of air monitoring from April 2019 to March 2020 is enclosed under **Annexure-I** of Monitoring and Analysis Report.

- ii. **The Project Proponent should ensure the compliance of environmental safeguard stipulated in the earlier environment clearance letter dated 11th May, 2010 and submit the compliance report to the Ministry and its Regional Office, Ranchi.**

Compliance Status:

- The six-monthly compliance reports of all existing environment clearances granted by Ministry are being submitted to the regional office regularly. The report for last 5 years submitted to Ministry's Regional office, CPCB and JSPCB is as follows:

Six Monthly report	Submitted on
December 2019	November 27, 2019 vide letter no. EMD/C-41/238/19
June 2019	May 25, 2019 vide letter no. EMD/C-41/148/19
December 2018	November 28, 2018 vide letter no. EMD/C-41/429/18
June 2018	May 28, 2018 vide letter no. EMD/C-41/280/18.
December 2017	November 28, 2017 vide letter no. EMD/C-41/178/17
June 2017	May 25, 2017 vide letter no. EMD/C-41/77/17
December 2016	November 25, 2016 vide letter no. EMD/C-41/183/16
June 2016	June 01, 2016 vide letter no. EMD/C-41/78/16

- The six-monthly compliance reports along the monitored data is also uploaded on the following website
 - a. **MoEFCC:** <http://environmentclearance.nic.in/>
 - b. **Company:** (<https://www.tatasteel.com/corporate/our-organisation/environment/environment-compliance-reports/>)

- iii. **On-line ambient air quality monitoring shall be provided and sufficient air pollution control devices viz. Electrostatic precipitator (ESP), bag house, gas cleaning plant, bag filters etc. shall be provided to keep the emission levels below 50 mg/Nm³ by installing energy efficient technology. Low NO_x burners shall be installed to control NO_x emissions. At no time, the emission level shall go beyond the prescribed standards. Interlocking facilities shall be provided so that process can be automatically stopped in case emission level exceeds the limit. Efforts shall be made to further reduce PM₁₀ and PM_{2.5} levels in the ambient air and a time bound action plan shall be submitted.**

Compliance Status:

- ESPs are being upgraded of all relevant production units. Among these 6 ESPs of Sinter Plant have already been upgraded. Several projects have been taken to monitor gaseous emissions from ESPs. The agreed emission for their upgraded emission has been guaranteed to be 50 mg/Nm³.

Compliance Status of Environmental Clearance of Expansion of Steel Plant (9.7 MTPA to 11 MTPA, Crude Steel Production) at Tata Steel Works, Jamshedpur, District East Singhbhum, Jharkhand vide MoEF&CC Letter no J-11011/691/2007-IA. II (I) dated March 01, 2016

- 4 online AAQMS have been commissioned to monitor PM10, PM2.5, SO2, NO2, CO, NH3 continuously.
 - Please find enclosed a list of air pollution control devices for each of production unit as **Annexure I**.
 - Low NOx burners have been provided in all the new units.
 - Similarly, in almost all the units alert facility have been provided in case of units exceed any prescribed emission level as the interlocking is technically not feasible in all the production units.
 - Please find enclosed the updated status of implementation of action plan to reduce dust emission level in each of production unit and raw material storage area as **Annexure II**.
- iv. **Existing Electrostatic Precipitator (ESP) shall be upgraded and provided to new units to control gaseous emissions within 50 mg/Nm³. Waste gas from the drying and grinding unit of pellet plant shall be cleaned by bag filters. Adequate provisions shall be made to control NOx emissions. Bag house shall be provided to Lime kilns.**

Compliance Status:

- ESPs are being upgraded of all relevant production units. Among these 6 ESPs of Sinter Plant have already been upgraded. Several projects have been taken to monitor gaseous emissions from ESPs. The agreed emission for their upgraded emission has been guaranteed to be 50 mg/Nm³.
 - Bag Filters have been provided in the Cast House and Stock House of all the Blast Furnaces.
 - 3 nos. of bag filters have been provided in the Pellet Plant to control waste gas from the drying and grinding unit.
 - In case of concentrated ammonia liquor is incinerated, adopt high temperature incineration to destroy Dioxins and Furans. Low NOx burners have been provided in all the new units to meet the prescribed standards.
 - 12 nos. of Bag House have been provided in Lime Plant in process and dedusting units. The Year till date completion of projects are mentioned in **Annexure-II**.
- v. **Land based fume extraction system shall be provided to coke oven battery to arrest fugitive emissions during charging and pushing operations. The coke oven gas shall be desulphurized by reduction of H₂S content of coke oven gas in the by-product recovery section to below 500 mg/Nm³. On-line charging with high pressure liquor aspiration (HPLA) for extraction of oven gas, leak proof oven doors, hydraulic door and door frame cleaner, water sealed AP caps and charging & pusher side emission extractor device shall be provided for the coke oven batteries to maintain VOC emissions within permissible limit. Land based fume extraction system for pushing emission control from coke ovens shall be provided.**
- Compliance Status:**
- Land based fume extraction, desulphurization facilities, online charging with HPLA, Hydraulic door and door frame clearance, water seal AP caps and charging and pusher side emission extractor device etc. were in place in both coke ovens battery 10 & 11 to minimize leaks from doors CAPs, etc. and to meet the CREP recommendations.
 - Coke oven gas is being desulphurised in Battery 10&11. The monitoring report shows that H₂S content is below 500 mg/Nm³. The analysis report of same is enclosed under **Annexure-I** of Monitoring and Analysis Report.
- vi. **All the standards prescribed for the coke oven plants shall be followed as per the latest guidelines. Proper and full utilization of coke oven gases in power plant using heat recovery steam generators shall be ensured and no flue gases shall be discharged into the air. Sulphur shall be recovered from the coke oven gases from new product plant.**

Compliance Status:

- As per the CREP guidelines, % of PLD, PLL & PLO of all batteries are being monitored thrice in a month. The max % of PLD is found to be 9.26 in Battery#6, max % of PLL found to be 0.88 in Battery#6 and % of maximum PLO is found to be 1.19 in Battery#10 and maximum charging emission is found to be 62 sec in Battery#6.
- Byproduct gas is recovered and used for power generation captive Power House # 3, 4 & 5 and heating purpose in all the mills. Power is also being generated in TRT at G, H & I Blast Furnace. Sulphur is recovered from coke oven gas and sold to authorized buyers.

vii. Only dry quenching method in the coke oven in new battery shall be adopted.

Compliance Status:

- Coke Dry quenching (CDQ) facility is commissioned in the new Coke Oven Battery #10 and #11 and in operation.

viii. The National Ambient Air Quality Emission Standards issued by the Ministry vide G.S.R. No. 826(E) dated 16th November' 2009 shall be followed.

Compliance Status:

- 4 online AAQMS have been commissioned to monitor PM₁₀, PM_{2.5}, SO₂, NO_x, CO, NH₃ continuously.
- Ambient Air Quality is being monitored regularly inside as well as outside the plant area.
- All other AAQ parameters being analyzed by the environment laboratory inside Works which has been accredited with NABL accreditation no.TC-8363 dated 21.02.2019 having validity till 20.02.2021 and are found within prescribed limit.
- Monthly monitoring reports are being submitted to JSPCB and six-monthly monitoring reports are being submitted along with EC compliance reports to Ministry's Regional office, CPCB and JSPCB. The report of same from April 2019 to March 2020 is enclosed under **Annexure-I** of Monitoring and Analysis Report.

ix. In-plant control measures for checking fugitive emissions from all the vulnerable sources including bag filters and fume extraction system shall be provided. Dry fog dust suppression system / water sprinkling system shall be provided in raw material handling areas to control fugitive dust emissions. Fugitive emissions from different sources shall also be controlled by covered conveyors, water sprinkling in open yards and with dry fogging in the closed zones. Further, specific measures like asphaltting of the roads within premises shall be carried out to control fugitive emissions. Fugitive emissions shall be controlled, regularly monitored and records maintained.

Compliance Status:

- Necessary air pollution control measures are provided to control fugitive dust emission. Please find enclosed a list of air pollution control devices for each of production unit as **Annexure-I**.
- All the areas of dedusting operation as junction house, transfer tower, conveyors are connected with bag filters and/or dry fog dust suppression system.
- All these locations are being monitored once in month.
- A total of 495 nos. of points for dust suppression system (DS) are commissioned at various locations inside Works.
- A total of 76 nos. Industrial vacuum cleaners (IVC) are commissioned at various locations inside Works.

- x. **Gaseous emission levels including secondary fugitive emissions from all the sources shall be controlled within the latest permissible limits issued by the Ministry and regularly monitored. Guidelines / Code of Practice issued by the CPCB shall be followed. New standards issued by the Ministry vide G.S.R. 414(E) dated 30th May, 2008 shall be followed.**

Compliance Status:

- Secondary dust emission inside the plant in different areas is being monitored in about 448 locations monthly.
- Several Projects have been taken to monitor Gaseous Emission levels including secondary fugitive emissions are controlled within the permissible limits.

- xi. **Traffic decongestion plan shall be implemented in a time bound manner to reduce emissions in the Jamshedpur city and separate budget shall be allocated for implementing the same. Maximum in bound and out bound material movement shall be done by railway wagons only to reduce dust emissions. Measures like covered conveyors for handling of bulk materials, centralized screening of iron ore, rationalization of weighing system, use of higher capacity vehicles etc. shall be adopted to reduce dust emissions. Mechanized vacuum cleaning of arterial roads expansion**

Compliance Status:

Under the traffic decongestion plan in Jamshedpur city:

- Strengthening of marine drive (Western corridor) has been implemented.
- Traffic decongestion plan in other roads have been planned and will be implemented in coordination with Govt. of Jharkhand.

Inside the plant:

- Automatic traffic control system is in place to control the traffic density as well as the safely including secondary emission inside the plant.
- All the loaded trucks are ensured to be covered with tarpaulin sheets to avoid dust getting air borne and thus generation of secondary emission.
- Sign board have been placed on all the critical areas to keep the speed of the vehicle within 35 kmph to control secondary emission along the internal road (VIP Road) and similarly the vehicle speed is limited to 16 kmph in the units.
- All the loaded trucks/dumpers coming inside the plant with their valid PUC.
- 4 nos. of mechanized sweepers are deployed within Works for regular cleaning and dust evacuation of roads.
- For FY20 approx. 370 tonnes/month of dust from road being collected by these mechanized sweepers which are being reused in sinter making through RMBB.
- 2 nos. of mechanized sweepers are deployed in Jamshedpur town for regular cleaning and dust evacuation of roads.

- xii. **Vehicular pollution due to transportation of raw materials and finished products shall be controlled. Proper arrangements shall also be made to control dust emissions during loading and unloading of the raw material and finished product.**

Compliance Status:

- Approx. all the raw material is being transported through railways to reduce the road transport load and vehicular pollution.

Compliance Status of Environmental Clearance of Expansion of Steel Plant (9.7 MTPA to 11 MTPA, Crude Steel Production) at Tata Steel Works, Jamshedpur, District East Singhbhum, Jharkhand vide MoEF&CC Letter no J-11011/691/2007-IA. II (I) dated March 01, 2016

- Dry fog dust suppression and water sprinklers are provided to control dust emission during loading and unloading activity.
- Tyre washing facility has also been provided in 10 strategic locations to keep tyres clean to reduce dust emission on roads and being installed in 3 additional locations.

xiii. All the wastewater from various units shall be treated in the common effluent treatment plant (CETP) for primary, secondary and tertiary treatment and shall be either recycled or used for dust suppression, slag quenching and green belt development etc. within the lease hold area. The phenolic effluent from the by-product recovery section of coke oven battery shall be treated in BOD plant. Wastewater containing suspended solids shall be passed through clariflocculation plant to recover and reuse the clarified water for cooling or cleaning. Mill effluent containing oil and suspended solids shall be passed through oil skimmers and filter press. No treated wastewater shall be released outside recycling all the treated waste water in the plant itself including from the existing plant.

Compliance Status:

- Due to water recycling facilities, the total water requirement from River Subarnarekha is under permitted 33.3 MGD for Steel Works.
- A central effluent treatment plant (CETP) of 4 MGD has been constructed to treat and recycle most of the effluent by tertiary treatment with Reverse Osmosis (RO).
- New BOD plant has been commissioned and existing BOD has been upgraded to treat the additional effluent generated from Coke Oven Batteries including Battery 10 & 11.
- Closed circuit cooling systems have been installed. Catch pits at all the five designated drains have been constructed to recycle the treated effluent within plant.
- All the mills are equipped with respective effluent treatment plants with settling tanks and oil skimming facility.
- All the effluent quality (Ammoniacal Nitrogen, COD, BOD, Phenol, Cyanide, TSS, etc) are under discharge norms. The report of effluent quality monitoring from April 2019 to March 2020 is enclosed under **Annexure-I** of Monitoring and Analysis Report..

xiv. Efforts shall be made to make use of rain water harvested. If needed, capacity of the reservoir shall be enhanced to meet the maximum water requirement. Only balance water requirement shall be met from other sources.

Compliance Status:

- There are two ponds inside Steel works viz. Upper Cooling Pond (UCP) and Lower Cooling Pond (LCP), which stores and harvest most of the surface run off with cooling water of the units.
- 38 nos. of rainwater harvesting structures in different office buildings have been provided inside the plant area of which some area has the facility of Ground Water Recharge system.
- RWH structure has been constructed based on the maximum rainfall of last 20 yrs.

xv. Continuous monitoring of Total Organic Compounds (TOC) in the wastewater treated in BOD plant from the coke oven plant shall be done at the outlet of ETP (BOD plant). All the treated wastewater shall be monitored for pH, BOD, COD, oil & grease, cyanide, phenolic compounds, Chromium+6 etc. besides other relevant parameters.

Compliance Status:

- The BOD plant has facility of continuous monitoring of TOC.
- Similarly monitoring of other parameters on the outlet of the BOD plant is being done regularly.

Compliance Status of Environmental Clearance of Expansion of Steel Plant (9.7 MTPA to 11 MTPA, Crude Steel Production) at Tata Steel Works, Jamshedpur, District East Singhbhum, Jharkhand vide MoEF&CC Letter no J-11011/691/2007-IA. II (I) dated March 01, 2016

- The monthly monitoring data is being submitted to JSPCB and six-monthly reports are being submitted to regional office of MoEF&CC at Ranchi and CPCB.

xvi. Regular monitoring of influent and effluent and surface, sub-surface and ground water shall be ensured and treated wastewater shall meet the norms prescribed by the State Pollution Control Board or prescribed under the E(P) Act whichever are more stringent. Leachate study for the effluent generated and analysis shall also be regularly carried out and report submitted to the Ministry's Regional Office at Ranchi, Jharkhand, SPCB and CPCB.

Compliance Status:

- All the effluent viz. catches pits, service water etc are being monitored regularly.
- The treated effluents such as all ETP outlets and drains are being analyzed regularly.
- Online effluent monitoring system has been commissioned in all the drains to monitor effluent quality on a real-time basis.
- Online effluent monitoring data is connected with CPCB/JSPCB.
- River Water quality of Subarnarekha and Kharkai is also being monitored as a part of regular monitoring of surface water quality.
- There are two cooling water pond whose water quality is also regularly monitored as part of sub surface water quality.
- Ground water quality is also being monitored at 5 locations both inside and outside plant premises.
- The monthly monitoring data is being submitted to JSPCB and six-monthly reports are being submitted to regional office of MoEF&CC at Ranchi and CPCB. The report of same from April 2019 to March 2020 is enclosed under **Annexure-I** of Monitoring and Analysis Report.

xvii. All the blast furnace (BF) slag shall be granulated and provided to cement manufacturers for further utilization in cement making as per the MOUs signed with various companies including M/s Lafarge, M/s Eco-cement & M/s ACC. LD slag after metal recovery shall be used in sinter plant, blast furnaces and LD convertor, aggregates making, road ballast making, soil conditioning etc. All the flue dust generated shall be recycled within the plant to the maximum extent. Mill scales, LD sludge, lime fines and flue dust shall be recycled back to the sinter plant. The BF gas cleaning plant sludge shall be used for manufacturing briquettes.

Compliance Status:

- Online slag granulation facilities have been implemented in the all Blast Furnaces.
- All the BF Slag is being granulated and made available to the Cement plants for cement making.
- Blast Furnace gas cleaning plant (GCP) sludge is re-utilized in the process as well as being used for manufacturing briquettes.
- LD Slag is being used internally in the manufacturing process as well as externally in brick and road making works. "Tata Nirmaan" and "Tata Aggretto" are branded product of LD slag for its external utilization.
- Additional initiatives undertaken for improving the utilization of LD Slag:
 - Co-processing of LD Slag at Cement Kilns.
 - Open & closed Steam Ageing inside Works
 - Use of LD Slag in Road Making & railway Ballast

- xviii. **As proposed, coal tar sludge and BOD sludge shall be recycled for coke making by mixing with the coal charge and used in the coke ovens. Chromium sludge shall be disposed in a HDPE lined secured landfills as per the CPCB guidelines within the complex. All the other solid waste including broken refractory mass shall be properly disposed off in environment-friendly manner. Oily waste and spent oil shall be provided to authorized recyclers/reprocessors.**

Compliance Status:

- BOD Sludge and Coal Tar sludge generated from By Product Plant is being recycled in coke plant by mixing with raw materials. Quantity data of the same for FY20 is enclosed under **Annexure-II** of Monitoring and Analysis Report.
- All other kind of process wastes are being reutilized in sinter plant.
- In house secured landfill with HDPE liner has been constructed to dispose chrome sludge generated from Cold Rolling Mill.

- xix. **All the slag shall be used for land filling inside the plant or used as building material only after passing through Toxic Chemical Leachability Potential (TCLP) test. Toxic Chromium sludge and other hazardous substances recovered from the slag and output waste shall be disposed off in secured landfill as per CPCB guidelines.**

Compliance Status:

- LD Slag is being used for road making.
- The TCLP test conducted by external approved agency. Report of same is enclosed under **Annexure-I** of Monitoring and Analysis Report.
- Leachate potential of all Heavy metals is negligible.
- Chrome Sludge is being disposed in the captive secured landfill inside Works.
- Status of hazardous and other waste generation and utilization from April 2019 to March 2020 is enclosed as **Annexure – III**.

- xx. **Proper handling, storage, utilization and disposal of all the solid waste shall be ensured and regular report regarding toxic metal content in the waste material and its composition, end use of solid/hazardous waste shall be submitted to the Ministry's regional office at Ranchi, Jharkhand SPCB and CPCB.**

Compliance Status:

- Most of the solid waste is being reutilized.
- Information regarding solid waste and hazardous waste is being submitted in Environment Statement to the Board every year.
- Status of Solid Waste, hazardous and other waste generation and utilization from April 2019 to March 2020 is enclosed as **Annexure – III**.

- xxi. **Proper utilization of fly ash shall be ensured as per Fly Ash Notification, 1999 and subsequent amendment in 2003. All the fly ash shall be provided to cement and brick manufacturers for further utilization and "Memorandum of Understanding" shall be submitted to Ministry's Regional Office at Ranchi.**

Compliance Status:

- All the boilers of Captive power plants have been converted from coal fired to gas fired, thus there is no additional generation of fly ash in the power plant.
- Ash generation from the captive power plants has been stopped due to no coal firing at Power Plants since FY19.

Compliance Status of Environmental Clearance of Expansion of Steel Plant (9.7 MTPA to 11 MTPA, Crude Steel Production) at Tata Steel Works, Jamshedpur, District East Singhbhum, Jharkhand vide MoEF&CC Letter no J-11011/691/2007-IA. II (I) dated March 01, 2016

- xxii. A Risk and Disaster Management Plan alongwith the mitigation measures shall be prepared and a copy submitted to the Ministry's Regional Office at Ranchi, Jharkhand SPCB and CPCB within 3 months of issue of environment clearance letter.**

Compliance Status:

- Disaster Management Institute, Bhopal has verified and certified the Risk assessment report and Disaster Management Plan vide their letter no. DMI/IDMU/Con-227/24 dated April 16, 2012. The same has been submitted to JSPCB.

- xxiii. As proposed, green belt shall be developed in more than 33 % area within and around the plant premises as per the CPCB guidelines in consultation with DFO.**

Compliance Status:

- We have planted 1,01,095 nos. saplings during April 2019 to March 2020 inside the works, Jugsalai Muck Dump area and in Township in the same period. Every year plantation done in available space.

The following plant species are being planted:

- *Ficus, karanj, Cicilipinia, Palm, Ashoka, Mahogany, Caesalpinia Arjun, Sita Ashok, Bakul, Spathodia, Kanchan, Jural, Tabulia, Sissam, Termanelia Sp., Arica palm, foxtail palm, Tecoma, Kannel, Tababia, Ghandhraj, calendra, Tagar, Hemelia, Kamani, Karbi, Calendra etc.*

- xxiv. Prior permission from the State Forest Department shall be taken regarding likely impact of the expansion of the proposed steel plant on the reserve forests. Measures shall be taken to prevent impact of particulate emissions / fugitive emissions, if any from the proposed plant on the surrounding reserve forests viz. Jora Pahar PF, Sand Pcha Rahar PF, Deluse RF located within 10 km radius of the project. Further, Conservation Plan for the conservation of wild fauna in consultation with the State Forest Department shall be prepared and implemented.**

Compliance Status:

- Prior Permission from State Forest Department has been obtained vide their memo. No. 2605 dated October 29, 2010.
- Wildlife Conservation Plan for Tata Steel has been prepared with the help of approved external agency recommended by State Forest Department and submitted for approval vide our letter no. EMD/C-41/128/16 dated August 22, 2016.
- Wildlife Conservation Plan has been approved by Principal Chief Conservator of Forests – Wildlife (PCCF-WL) GoJ on Nov 13, 2017. PCCF-WL has informed MoEFCC for the above approval.

- xxv. All the recommendations made in the Charter on Corporate Responsibility for Environment Protection (CREP) for the Steel Plants shall be implemented.**

Compliance Status:

- CREP recommendations have been implemented. Please find enclosed the same as **Annexure – II** of Monitoring and Analysis report.

- xxvi. At least 5 % of the total cost of the project shall be earmarked towards the corporate social responsibility and item-wise details alongwith time bound action plan shall be prepared and submitted to the Ministry's Regional Office at Ranchi. Implementation of such program shall be ensured accordingly in a time bound manner.**

Compliance Status:

Compliance Status of Environmental Clearance of Expansion of Steel Plant (9.7 MTPA to 11 MTPA, Crude Steel Production) at Tata Steel Works, Jamshedpur, District East Singhbhum, Jharkhand vide MoEF&CC Letter no J-11011/691/2007-IA. II (I) dated March 01, 2016

- It is being complied as per the requirement under the Companies Act. The amount spent by the Company on Corporate Social Responsibility (CSR) activities is given below.
- Total ₹ 800 Crores is stated to be spent on CSR as per the total cost of project. A total of ₹ 992 Crores has been spent in and around Jamshedpur since FY'11 till FY'20.

FY	Total Spent on CSR in Cr.	CSR spent in and around Jamshedpur in Cr.
2011	126	97.15
2012	146	106.43
2013	171	120.34
2014	212	136.95
2015	171	56.11
2016	204	83.62
2017	194	73.36
2018	232	82.19
2019	315	159.73
2020	193	76.52
	Total	992.40

- It is reported in the Company's Integrated Report. These reports are available on the website of Tata Steel and may be seen/downloaded.

xxvii. The company shall provide housing for construction labour within the site with all necessary infrastructure and facilities such as fuel for cooking, mobile toilets, mobile STP, safe drinking water, medical health care, crèche etc. The housing may be in the form of temporary structures to be removed after the completion of the project.

Compliance Status:

- Necessary amenities for contractors like canteen, toilets, rest rooms, drinking water have been provided for all workers/contractors.

B. General Conditions:

i. The project authorities must strictly adhere to the stipulations made by the Jharkhand Pollution Control Board and the State Government.

Compliance Status:

- We are regularly obtaining the Consent to Operate and authorization under Hazardous Waste from Jharkhand State Pollution Control Board.

ii. No further expansion or modifications in the plant should be carried out without prior approval of the Ministry of Environment, Forests and Climate Change (MoEFCC).

Compliance Status:

- The Project informed that there shall be prior permission obtained for the concerned authorities in case of any medications, augmentation, and product mix change. The detail of production of various products for last five years are as follows:

Product	Unit	Capacity granted in EC	2015-16	2016-17	2017-18	2018-19	2019-20
Hot Metal	MTPA	12.5	10.65	10.83	10.9	10.8	10.77
Crude Steel		11	9.96	10.0	10.0	10.2	10.2

- iii. **At least four ambient air quality monitoring stations shall be established in the downward direction as well as where maximum ground level concentration of PM₁₀, PM_{2.5}, SO₂ and NO_x are anticipated in consultation with the SPCB. Data on ambient air quality and stack emission should be regularly submitted to this Ministry including its Regional Office at Ranchi and the SPCB/CPCB once in six months.**

Compliance Status:

- 4 online AAQMS have been commissioned to monitor PM₁₀, PM_{2.5}, SO₂, NO_x, CO, NH₃ continuously inside the Works. There is one mobile monitoring facility & 8 manual AAQMS located both inside the plant and also outside the plant area. Monitoring report is being submitted to JSPCB, CPCB and Regional Office.
 - The monitoring data for the period April 2019 to March 2020 indicates that all the parameters (except PM₁₀ and PM_{2.5} in few occasions) are within the prescribed limit of NAAQS. PAHs, Lead and Ammonia are being done by CPCB recognized and In-house NABL accredited environment laboratory.
 - The ambient air quality represents the status of environment, which includes impact of several external factors such as other industrial activities, traffic movement, commercial and domestic activities etc.
- iv. **Industrial wastewater shall be properly collected, treated so as to conform to the standards prescribed under GSR 422 (E) dated 19th May, 1993 and 31st December, 1993 or as amended form time to time. The treated wastewater shall be utilized for plantation purpose.**

Compliance Status:

- Surface and ground water monitoring at various locations are being done and analysis reports also being sent to RO, MoEFCC and JSPCB. Monitoring report of surface and ground water from April 2019 to March 2020 is enclosed under **Annexure-I** of Monitoring and Analysis Report.
- v. **The overall noise levels in and around the plant area shall be kept well within the standards (85 dB (A) by providing noise control measures including acoustic hoods, silencers, enclosures etc. on all sources of noise generation. The ambient noise levels should conform to the standards prescribed under EPA Rules, 1989 viz. 75 dB (A) (daytime) and 70 dB (A) (night-time).**

Compliance Status:

- Personal Protective Equipment (PPE) have been provided to all the workers/officers to avoid any accompanied noise hazards. Facilities like silencers, enclosures, hood etc have been provided to reduce noise at source. The monitored data in the work zone reveals that the noise level does not exceeds >85 dB (A) for 8 hr exposures. Similarly, in the ambient also, the noise levels meet the prescribed standards.
- The ambient noise level monitoring is being done at different part of the Jamshedpur town in frequent interval outside Steel Works to assess the ambient noise level status. Noise level in the town is found beyond the standard in few occasions. The possible reason of equivalent noise levels in respect of all categories of areas exceeded the standards for day and night times is due to heavy traffic movement in the town, market and commercial activities, festivals and other domestic celebrations and frequent religious rituals.
- Monitoring report of surface and ground water quality from April 2019 to March 2020 is enclosed under **Annexure-I** of Monitoring and Analysis Report.

- vi. Occupational Health Surveillance of the workers shall be done on a regular basis and records maintained as per the Factories Act.**

Compliance Status:

- Regular health surveillance is being conducted i.e. 2 times in a year to all the workers who have already attended more than 40 years of age. The workers having age less than 40 years are under gone occupational health surveillance program once in a year.

- vii. The company shall develop surface as well as ground water harvesting structures to harvest the rainwater for utilization in the lean season besides recharging the ground water table.**

Compliance Status:

- Rain Water Harvesting structure of 38 Nos. has been provided inside the plant area of which some area has the facility of Ground Water Recharge system. RWH structures have been constructed based on the maximum rainfall of last 20 yrs.

- viii. The project proponent shall also comply with all the environmental protection measures and safeguards recommended in the EIA/EMP report. Further, the company must undertake socio-economic development activities in the surrounding villages like community development programmes, educational programmes, drinking water supply and health care etc.**

Compliance Status:

- Socio economic development activities are regularly undertaken in and around Jamshedpur through the two agencies namely, Tata Steel Rural Development Society and Tata Steel Community Development & Welfare Services Centers. The development activities undertaken in the surrounding community are need based and are in the field of health care, education, mid-day meals in schools, sports and culture, self-employment, drinking water, rural electrification, etc. Tata Steel also facilitate the Institutes like R D Tata Technical Institute, Tata Football Academy, Tata Archery Foundation, etc. which encourages the local talent to develop themselves and participate at National and International levels.

- ix. Requisite funds shall be earmarked towards total capital cost and recurring cost/annum for environmental pollution control measures to implement the conditions stipulated by the Ministry of Environment, Forests and Climate Change (MoEFCC) as well as the State Government. An implementation schedule for implementing all the conditions stipulated herein shall be submitted to the Regional Office of the Ministry at Ranchi. The funds so provided shall not be diverted for any other purpose.**

Compliance Status:

- Capital expenditure on environment is being spent on Air Pollution Control, Solid Waste Management, Zero Waste Water Discharge and Others including Greenery, Online Monitoring, etc. The total budget for the same as allocated by TSL Board is ₹2340 Crores.
- In FY 20 total capital expenditure for environment is 358.6 Crore.
- The funds for capital investment on pollution control equipment are not diverted.

- x. A copy of Clearance letter shall be sent by proponent to concerned Panchayat, Zila Parishad/Municipal Corporation/Urban Local Body and the Local NGO, if any, from**

whom suggestions/ representations, if any, were received while processing the proposal. The clearance letter shall also be put on the website of the company by the proponent.

Compliance Status:

- The copy of Clearance letter has been sent to District Commissioner, Block Development Officer and Jamshedpur Notified Area Committee vide our letter no. EMD/C-41/32-34/16 dated March 04, 2016.

- xi. The project proponent shall upload the status of compliance of the stipulated environment clearance conditions, including results of monitored data on their website and shall update the same periodically. It shall simultaneously be sent to the Regional Office of the MoEFCC at Ranchi, the respective Zonal Office of CPCB and the JPCB. The criteria pollutant levels namely; PM10, SO2, NOx (ambient levels as well as stack emissions) or critical sectoral parameters, indicated for the projects shall be monitored and displayed at a convenient location near the main gate of the company in the public domain.**

Compliance Status:

- Six monthly compliance reports and the monitored data are being submitted regularly. The ambient air quality parameters are being monitored and displayed at the main gate of the company in the public domain.

- xii. The project proponent shall also submit six monthly reports on the status of the compliance of the stipulated environmental conditions including results of monitored data (both in hard copies as well as by e-mail) to the Regional Office of MOEFCC, the respective Zonal Office of CPCB and the JSPCB. The Regional Office of this Ministry at Ranchi / CPCB / JPCB shall monitor the stipulated conditions.**

Compliance Status:

- Six monthly compliance reports are being submitted regularly both in hard copy and by e-mail.

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

Compliance Status:

- The environmental statement for each financial year in Form-V is regularly being submitted to the Jharkhand State Pollution Control Board.
- Environment Statement for FY 19 has been submitted vide our letter no. EMD/C-23/209/19 dated September 20, 2019.
- The environmental statement has also been uploaded on the company's website: (<https://www.tatasteel.com/corporate/our-organisation/environment/environment-compliance-reports/>)

- xiv. The Project Proponent shall inform the public that the project has been accorded environmental clearance by the Ministry and copies of the clearance letter are available with the SPCB and may also be seen at Website of the Ministry of**

Compliance Status of Environmental Clearance of Expansion of Steel Plant (9.7 MTPA to 11 MTPA, Crude Steel Production) at Tata Steel Works, Jamshedpur, District East Singhbhum, Jharkhand vide MoEF&CC Letter no J-11011/691/2007-IA. II (I) dated March 01, 2016

Environment, Forests and Climate Change (MoEFCC) at <http://envfor.nic.in>. This shall be advertised within seven days from the date of issue of the clearance letter, at least in two local newspapers that are widely circulated in the region of which one shall be in the vernacular language of the locality concerned and a copy of the same shall be forwarded to the Regional office.

Compliance Status:

- The Notice has been advertised in two local newspapers viz. Prabhat Khabar (Hindi) and The Telegraph (English) on March 08, 2016. The same has also been informed to the regional office of MoEFCC at Ranchi on March 09, 2016.

xv. Project authorities shall inform the Regional Office as well as the Ministry, the date of financial closure and final approval of the project by the concerned authorities and the date of commencing the land development work.

Compliance Status:

- The final approval Consent to Operate for Steel Plant issued from JSPCB having Ref No. JSPCB/HO/RNC/CTO-975929/2016/1078 dated 2016-12-27 of the project by the concerned authorities.

Annexure-I

Details of Air/Water Pollution Control Equipment and Stacks with sampling arrangement

1. Unit wise Air/Water Pollution Control Equipment

Sl. No.	Area/Location	Air/Water Pollution Control Measures
1	Raw Material Handling Section	Covered storage under shed Covered conveyor Dry Fogging Water sprinkling Fabric filter based DE system Bag Filters Catchpit for storage of storm water
2	Coke Ovens	
	Battery # 5,6 & 7	Charging Gas Cleaning Cars (CGC) Dry Fogging Dust suppression Dust Extraction system for screen house Coke Dry Quenching
	Battery # 8 & 9	Coke Transfer Car (CTC) Charging Gas Transfer (CGT)
	Battery # 10 & 11	Main Charging by High Pressure LA Land based coke side dust extraction Hydro jet door cleaning Pushing and dedusting Bag filter Coke Dry Quenching
	Coke Oven By Product Plant	De-Sulphurisation BOD Plant (Advent Integral System)
3	Pellet Plant	Bag Filters Dust Suppression Wet Scrubber Electrostatic Precipitators
4	Sinter Plants	
	Sinter Plant# 1	Bag Filters Dust Suppression Foam Spray System Electrostatic Precipitators
	Sinter Plant# 2	Bag Filters Dust Suppression Foam Spray System Electrostatic Precipitators
	Sinter Plant# 3	Bag Filters Dust Suppression Foam Spray System Electrostatic Precipitators
	Sinter Plant# 4	Bag Filters Dust Suppression Foam Spray System Electrostatic Precipitators
4	Lime Plant	
	Process and dedusting	Bag Filters
	Stock Pile	DS System
	Track Hopper	DS System
	Wagon Tippler	DS System

Compliance Status of Environmental Clearance of Expansion of Steel Plant (9.7 MTPA to 11 MTPA, Crude Steel Production) at Tata Steel Works, Jamshedpur, District East Singhbhum, Jharkhand vide MoEF&CC Letter no J-11011/691/2007-IA. II (I) dated March 01, 2016

5	Blast Furnaces	
	C-F Blast Furnaces	Bag Filters Scrubbers DS System Gas Cleaning Plant with Press filter Effluent Treatment Plant
	G Blast Furnace	Bag Filters Scrubbers DS System Gas Cleaning Plant with Press filter Effluent Treatment Plant
	H Blast Furnace	Bag Filters Scrubbers DS System Gas Cleaning Plant with Press filter Effluent Treatment Plant
	I Blast Furnace	Bag Filters Scrubbers DS System Gas Cleaning Plant with Press filter Effluent Treatment Plant
6	Steel Melting Shops	
	LD 1	Bag Filters Electrostatic Precipitators Gas Cleaning Plant Effluent Treatment Plant
	LD 2	Bag Filters Electrostatic Precipitators Gas Cleaning Plant Effluent Treatment Plant
	LD 3	Bag Filters Electrostatic Precipitators Gas Cleaning Plant Effluent Treatment Plant
7	Power Plants	
	PH# 3	Effluent Treatment Plant
	PH# 4	Electrostatic Precipitators Effluent Treatment Plant
	PH# 5	Effluent Treatment Plant
8	Finishing Mills	
	Cold Rolling Mill	Scrubbers Effluent Treatment Plant
	Hot Strip Mill	Effluent Treatment Plant
	Merchant Mill	Effluent Treatment Plant
	CAPL	Scrubbers Mist Separators Effluent Treatment Plant
	Wire Rod Mill	Effluent Treatment Plant
	New Bar Mill	Effluent Treatment Plant
9	Steel Works - Common	Industrial Vacuum Cleaning System Mechanized Road sweeping system Water sprinklers Tyre Washing facilities Catch-pits at all drains for recycling Central Effluent Treatment Plant

Annexure-II

Up to Date Status of Environmental Upgradation Project

1. Stack Emission Reduction Progress Status

SL	Projects	Status	Completion date
1	F Blast furnace APC Systems	Completed	Jul'18
2	LD#1 DE System	Completed	Apr'18
3	LD#2 Dust Extraction System	Completed	Sep'16
4	SP# 1 Waste Gas ESP	Completed	May'14
5	SP# 2 De-dusting System (1 ESP and 1 Bag-filter)	Completed	Aug'17
6	SP# 3 De-dusting System	Completed	Dec'14
7	SP# 3 Waste Gas ESP	Completed	Oct'13
8	SP#2 Waste gas ESP ph.-I	Completed	Feb'13
9	CEMS	Completed	Oct'18
10	Lime Plant Process Bag-Filter (waste gas system)	Completed	Jun'18
11	SP#1&2 De-dusting System (DD ESP, Cold Region Bagfilter & Hi-line Bagfilter)	Completed	May'19
12	SP# 4 Waste Gas ESP	Completed	Jul'19
13	G-BF DD System - Stock House Bagfilter	Completed	June'19
14	G-BF DD System - Cast House Tap-B Bagfilter	Completed	Sep'19
15	CEMS (Phase-4) 13 analyzers installed & commissioned	Completed	Sep'19
16	LD#1 Secondary Emissions	Under progress	Jun'21
17	LD#2 Secondary Emissions	Under progress	Jul'20
18	Lime Plant De-dusting System	Under progress	Jun'20
19	G-BF DD System - Cast House Tap-A Bagfilter	Under progress	Apr'21

2. Fugitive dust control – Progress Status

SL	Projects	Status	Completion date
1	a) Tyre Washing at Various Locations – 05 m/c (LD#1,2, RMBB#1 and sludge dewatering) b) Tyre Washing at Various Locations – 05 m/c (LD#1, 2, HSM, Slag gate etc.)	Completed	Oct'16
2	DE System at RMM (Ventilation system)	Completed	Mar'16
3	Dust Extraction (DE) System at H Blast Furnace Stock House	Completed	Nov'17
4	Dust Suppression (DS) System at Coke Plant	Completed	Mar'17
5	Dust Suppression (DS) System at Lime Plant	Completed	Jun'15
6	Dust Suppression (DS) system at Ore circuit and Yard sprinkler	Completed	Mar'17
7	Dust Suppression (DS) System at RMBB#1	Completed	Jan'16
8	Dust Suppression (DS) System at RMBB#2	Completed	May'16
9	Dust Suppression (DS) System at Stock House C&F BF	Completed	Jun'15
10	Dust Suppression (DS) system at various locations (Fogging m/c)	Completed	Jun'15
11	Fabrication and Erection of ducting at H-BF Cast House	Completed	Apr'16
12	Fume Extraction System-HMP	Completed	Feb'15
13	Industrial Vacuum Cleaning (IVC) for Conveyor no. 149	Completed	Jun'13
14	Industrial Vacuum Cleaning (IVC) System at RMBB#1, 2 & SP#1, 2 & 3 (17 machines)	Completed	Sep'14
15	Industrial Vacuum Cleaning (IVC) System for H#BF	Completed	Mar'15
16	IVC at Locations I#BF, Coke Plant, SP#1 & SP#4, RMM & Pellet Plant	Completed	Jun'17
17	New Silo for Pneumatic Conveying System at G-BF	Completed	Apr'15
18	Tyre Washing Facility Inside Works (Phase -1)	Completed	Dec'12
19	Yard Sprinkler System at RMBB#1 & 2	Completed	May'16
20	Dust Extraction (DE) System at Coke Plant DE-#3&4	Completed	July'19

Compliance Status of Environmental Clearance of Expansion of Steel Plant (9.7 MTPA to 11 MTPA, Crude Steel Production) at Tata Steel Works, Jamshedpur, District East Singhbhum, Jharkhand vide MoEF&CC Letter no J-11011/691/2007-IA. II (I) dated March 01, 2016

21	Dust Extraction (DE) System at Misc. area (RMBB#1 & G BF surroundings and Diamond crossing area)	Completed	June'19
22	Dust Extraction (DE) System at RMBB#1 (7 Bagfilters)	Completed	June'19
23	Dust Extraction (DE) System at RMBB#2 DE#7	Completed	Mar'20
24	Tyre Wash System – Systems at BF Sludge area and LD#2 area	Completed	July'19
25	Lime Plant DE System – DE#12 Bagfilter	Completed	July'19
26	Tyre Wash System – Systems at LD#2 area	Completed	Aug'19
27	Misc Area DE System – DE#1,2,9,10 &11 Bag filter	Completed	Mar'20
28	Mist Beam at LD Shops LD#2 (10 nos.)	Completed	Mar'20
29	DFDS at LD Services LD#3	Completed	Mar'20
30	DFDS at LD Services LD#2	Under Progress	Apr'20
31	Mist Beam at LD Shops LD#1 (11 nos.), MRSPP (4 nos.)	Under Progress	May'20
32	Dust Extraction (DE) System at RMBB#2 DE#6&8	Under Progress	May'20
33	Misc Area DE System – DE#12 Bag filter	Under Progress	May'20
34	Fume Extraction System at HMPP (Pit#6)	Under Progress	Dec'20

3. Solid waste utilization Progress Status

SL	Facility description in Mar'17 CEC	Status	Completion date
1	Composting Plant & Trash Incinerator	Completed	Aug'12
2	De-oiling Plant for Mill Scale and Sludge	Completed	May'14
3	Infrastructure Development at Galudih Phase – I	Completed	Jun'14
4	Infrastructure for LD slag processing - Galudih Ph – II	Completed	Mar'17
5	Magnetic Drums – MRSPP	Completed	Jan'14
6	Blast furnace Sludge Drying	Completed	June'19
7	Infrastructure development for LD Slag Dumping at Bhatkunda	Completed	Sep'19
8	Revert Homogenization	Under Progress	-

4. Effluent Treatment Projects Progress Status

SL	Facility description in Mar'17 CEC	Status	Completion date
1	a) HSM Catch Pit b) Tuiladungri (Increase in Pumping Capacity)	Completed	May'13
2	Blast Furnace Cyanide Treatment	Completed	
3	Damp Pump House	Completed	Jan'16
4	Garam Nallah and Jugsalai-I Catch Pit	Completed	Dec'14
5	Greenery Development	Completed	Mar'15
6	Rain Water Harvesting	Completed	Feb'14
7	Storage, pumping & distribution of recycled water for low end use	Completed	Jan'15
8	Susungariah Catch Pit (Pump No-1)	Completed	Jan'14
9	Waste Water Re-cycling from Ram Mandir Nallah	Completed	Jun'15
10	BF Sludge Drying System	Completed	Jul'19
11	BOT Tertiary Treatment Plant	Under Progress	Jun'22
12	Clarified Water Pipeline from CETP to PH#3	Under Progress	May'20

Annexure -III

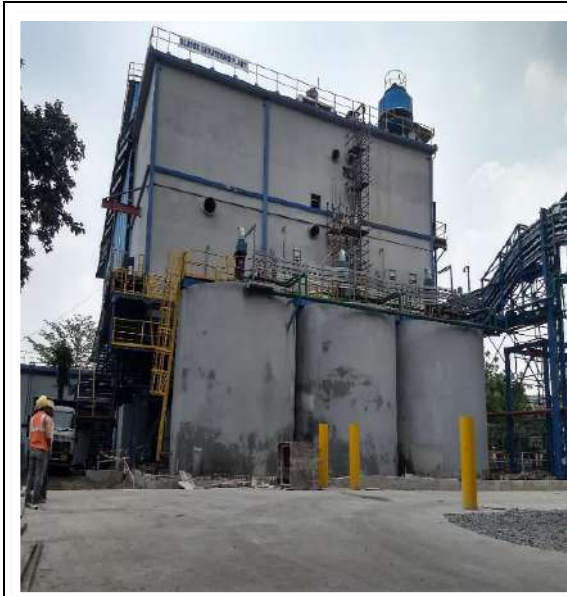
Status of solid and Other Waste Generation and Utilization

(April 2019 to March 2020)

(All data in tonnes)

Sl.	Particulars	Generation	Internal	External Cons. & Sales	Total Utilisation	Utilization
1	Flue Dust	1,23,309	1,28,050		1,28,050	104%
2	GCP Sludge	1,35,418	1,45,272	9,591	1,54,863	114%
3	Lime Fines	2,13,417	1,95,522	18,250	2,13,772	100%
4	LD Sludge	4,00,081	4,19,444		4,19,444	105%
5	Kiln Dust	18,364	18,407		18,407	100%
6	Mill Scale	1,01,599	1,01,204	760	1,01,964	100%
7	Mill Sludge	2,482	2,478		2,478	100%
8	Iron Oxide	9,920	2,023	6,895	8,918	90%
9	Fe bearing muck	12,126	11,841		11,841	98%
10	ESP/DE Dust	52,770	56,549		56,549	107%
A	Process Solid Waste	10,69,887	10,81,373	35,496	11,16,869	104%
1	LD Slag Metallic	17,04,502	4,99,928		4,99,928	113%
2	LD Slag Non Metallic		2,57,003	11,64,258	14,21,262	
B	LD Slag	17,04,502	7,56,932	11,64,258	19,21,190	
1	Granulated BF Slag	38,54,605		38,26,687	38,26,687	99%
2	Air Cooled BF Slag	3,00,769	8,019	1,89,369	1,97,389	66%
C	Blast Furnace Slag	41,55,373	8,019	40,16,057	40,24,076	
D	Total	69,29,762	18,46,324	52,15,811	70,62,136	102%

Sludge Dewatering Plant



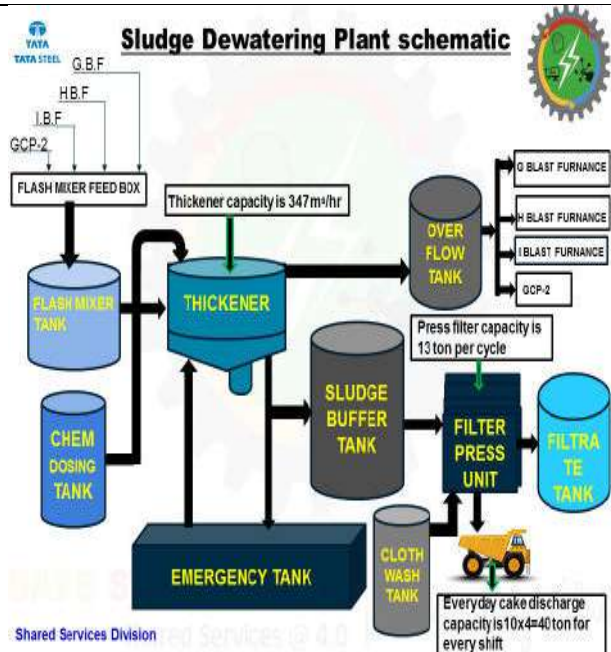
Sludge Dewatering Plant



Sludge Dewatering Plant Thickener Area



Sludge Dewatering Plant Filter Press Room



Sludge Dewatering Plant schematic

Central Effluent Treatment Plant



Clarifier



Reverse Osmosis Building



Process Effluent: Biological Oxidation Plant at Coke Ovens, Effluent Treatment Plants



Effluent Analyzers & Monitoring

Upgradation of ESPs



Sinter Plant 1 Waste Gas ESP



Sinter Plant 2 Waste Gas ESP



Sinter Plant 2 Refurbished ESP



Sinter Plant 3 Refurbished ESP



Sinter Plant 3 New Waste Gas ESP



Sinter Plant 2 New Waste Gas ESP

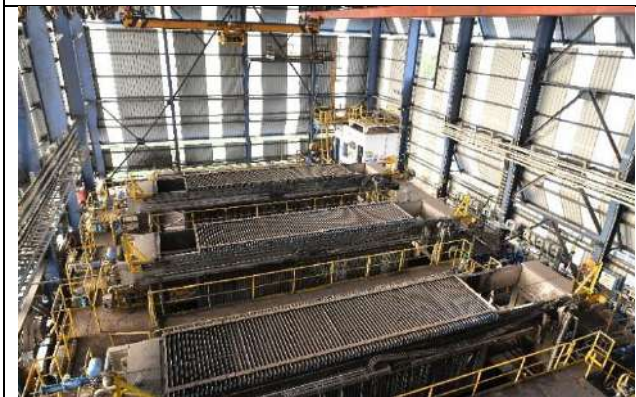
Compliance Status of Environmental Clearance of Expansion of Steel Plant (9.7 MTPA to 11 MTPA, Crude Steel Production) at Tata Steel Works, Jamshedpur, District East Singhbhum, Jharkhand vide MoEF&CC Letter no J-11011/691/2007-IA. II (I) dated March 01, 2016



Tyre Washing Facility (TWF)



CDQ 40 MW Power Plant



Blast Furnace Sludge Drying Plant



High Efficiency BF with high Top Pressure, Stove Waste Heat Recovery, TRT, Cast House Slag Granulation



Covered Shed for Coal and Pellet



Waste Heat Recovery in Coke Dry Quenching

Compliance Status of Environmental Clearance of Expansion of Steel Plant (9.7 MTPA to 11 MTPA, Crude Steel Production) at Tata Steel Works, Jamshedpur, District East Singhbhum, Jharkhand vide MoEF&CC Letter no J-11011/691/2007-IA. II (I) dated March 01, 2016



NABL Accredited EMD Laboratory



ICP at EMD Laboratory



Stack Analyzers & Monitoring



Stack: Bag Filters, ESP, Scrubbers & Cyclone



Open Steam Aging plant for LD Slag



Greenery inside Works

MONITORING & ANALYSIS REPORT

April 2019 to March 2020

Tata Steel Limited, Jamshedpur
(MAIN WORKS & TOWN)

ENVIRONMENTAL MANAGEMENT DEPARTMENT
TATA STEEL LIMITED
JAMSHEDPUR

TATA STEEL LIMITED
ENVIRONMENT MANAGEMENT DEPARTMENT - LABORATORY
AMBIENT AIR QUALITY REPORT FOR JSR TOWN - APRIL 2019 TO MARCH 2020

Location	Parameter	UoM	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20
River Pump House	Particulate Matter, PM10	µg/m3	94.9	93.5	72.3	68.8	74.0	66.0	135.0	173.3	254.0	153.0	213.0	102.3
	Particulate Matter, PM2.5	µg/m3	52.8	52.2	44.2	44.9	40.0	41.0	63.0	92.0	107.0	65.0	99.0	44.3
	Sulphur Dioxide (SO2)	µg/m3	9.0	10.4	9.3	9.6	8.0	9.0	14.0	13.8	26.0	24.0	20.0	19.0
	Nitrogen Dioxide, (NO2)	µg/m3	12.9	14.6	13.6	15.4	16.0	25.0	28.0	56.5	62.0	52.0	62.0	33.3
	Carbon Monoxide(CO)	mg/m3	0.4	0.3	0.4	0.3	0.3	0.3	0.3	0.5	0.5	0.4	0.4	0.5
	Ammonia (NH3)	µg/m3	34.3	31.4	30.2	27.3	33.0	58.0	128.0	63.2	154.0	86.0	109.0	82.7
	Ozone (O3)	µg/m3	19.1	19.5	20.8	22.3	6.0	14.0	21.0	21.0	13.0	20.0	18.0	15.0
	Nickel (Ni)	ng/m3	0.2	0.2	0.2	<1.0	<1.0	<1.0	<1.0	14.7	7.9	8.8	12.0	11.8
	Arsenic (As)	ng/m3	0.0	0.0	0.0	NT	NT	NT	NT	NT	NT	NT	NT	NT
	Lead (Pb)	µg/m3	0.3	0.2	0.2	0.2	0.2	0.5	0.1	0.0	0.2	0.1	0.1	0.1
	Benzene (C6H6)	µg/m3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo alpha Pyrene (BaP)	ng/m3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Southern Sewage Treatment Plant	Parameter	UoM	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20
	Particulate Matter, PM10	µg/m3	103.2	102.9	96.6	83.5	38.0	93.0	112.0	162.5	232.0	180.0	222.0	153.9
	Particulate Matter, PM2.5	µg/m3	56.4	57.1	55.8	47.3	15.0	34.0	49.0	66.0	99.0	75.0	97.0	70.5
	Sulphur Dioxide (SO2)	µg/m3	9.1	10.6	11.2	9.2	13.0	6.0	17.0	21.4	26.0	21.0	18.0	11.7
	Nitrogen Dioxide, (NO2)	µg/m3	13.5	15.0	16.2	14.5	23.0	15.0	55.0	57.0	46.0	47.0	51.0	38.1
	Carbon Monoxide(CO)	mg/m3	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.6	0.4	0.3	0.4	0.4
	Ammonia (NH3)	µg/m3	33.2	30.3	31.0	24.2	98.0	76.0	15.0	68.6	106.0	83.0	94.0	82.9
	Ozone (O3)	µg/m3	23.6	25.1	21.2	22.8	15.0	15.0	59.0	18.0	16.0	20.0	15.0	11.1
	Nickel (Ni)	ng/m3	0.21	0.24	0.19	<1.0	<1.0	<1.0	<1.0	5.8	9	11	12	12
	Arsenic (As)	ng/m3	0.01	0.01	0.01	NT	NT	NT	NT	NT	NT	NT	NT	NT
	Lead (Pb)	µg/m3	0.31	0.27	0.21	0.18	0.13	0.18	0.12	0.05	0.2	0.1	0.5	0.5
	Benzene (C6H6)	µg/m3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo alpha Pyrene (BaP)	ng/m3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Golmuri	Parameter	UoM	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20
	Particulate Matter, PM10	µg/m3	109.8	122.2	107.5	85.3	86.0	58.0	153.0	218.0	254.0	179.0	264.0	161.2
	Particulate Matter, PM2.5	µg/m3	58.0	60.4	57.7	45.0	26.0	34.0	64.0	92.0	105.0	77.0	109.0	73.7
	Sulphur Dioxide (SO2)	µg/m3	10.4	11.6	11.3	11.9	27.0	9.0	18.0	13.6	20.0	28.0	19.0	14.6
	Nitrogen Dioxide, (NO2)	µg/m3	14.5	17.1	17.0	18.2	43.0	26.0	48.0	44.9	62.0	71.0	55.0	40.6
	Carbon Monoxide(CO)	mg/m3	0.4	0.4	0.4	0.4	0.3	0.3	0.4	0.3	0.4	0.3	0.3	0.2
	Ammonia (NH3)	µg/m3	35.2	31.9	29.4	29.4	36.0	79.0	200.0	85.2	121.0	107.0	103.0	47.6
	Ozone (O3)	µg/m3	23.9	22.5	21.9	18.5	18.0	23.0	17.0	16.3	13.0	16.0	24.0	18.1
	Nickel (Ni)	ng/m3	0.26	0.24	0.25	<1.0	<1.0	<1.0	<1.0	10.9	16	11	13	14
	Arsenic (As)	ng/m3	0.01	0.01	0.01	NT	NT	NT	NT	NT	NT	NT	NT	NT
	Lead (Pb)	µg/m3	0.25	0.25	0.22	0.17	0.1	0.42	0.13	0.02	0.1	0.1	0.2	0.2
	Benzene (C6H6)	µg/m3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo alpha Pyrene (BaP)	ng/m3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Jugsalai / TATA Pigments	Parameter	UoM	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20
	Particulate Matter, PM10	µg/m3	104.1	115.7	108.9	94.5	88.0	50.0	120.0	269.0	282.0	164.0	260.0	193.5
	Particulate Matter, PM2.5	µg/m3	58.4	58.8	57.9	54.4	26.0	26.0	55.0	105.0	118.0	71.0	106.0	83.3
	Sulphur Dioxide (SO2)	µg/m3	10.3	11.4	11.6	11.8	13.0	10.0	21.0	31.2	26.0	22.0	21.0	13.7
	Nitrogen Dioxide, (NO2)	µg/m3	14.5	16.0	16.4	19.3	21.0	43.0	45.0	75.0	63.0	65.0	62.0	40.8
	Carbon Monoxide(CO)	mg/m3	0.5	0.5	0.5	0.5	0.3	0.3	0.4	0.4	0.5	0.5	0.4	0.4
	Ammonia (NH3)	µg/m3	43.1	36.1	35.1	28.8	70.0	93.0	38.0	85.7	97.0	77.0	84.0	51.4
	Ozone (O3)	µg/m3	25.5	22.2	24.2	23.4	14.0	16.0	15.0	19.0	19.0	14.0	19.0	22.7
	Nickel (Ni)	ng/m3	0.3	0.3	0.3	<1.0	<1.0	<1.0	<1.0	11.5	12.4	7.4	15.8	16.2
	Arsenic (As)	ng/m3	0.0	0.0	0.0	NT	NT	NT	NT	NT	NT	NT	NT	NT
	Lead (Pb)	µg/m3	0.3	0.3	0.3	0.2	0.1	0.1	0.1	0.0	0.2	0.2	0.2	0.2
	Benzene (C6H6)	µg/m3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo alpha Pyrene (BaP)	ng/m3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	

Note:

Standards applicable as per National Ambient Air Quality Standards vide Notification No.: B-29016/20/90/PCI-L dated 18th November 2009.

UoM - Unit of Measurement

IS – Indian Standard

RPH - River Pump House

SSTP - Southern Sewage Treatment Plant

NT - Not Traced

* The above locations were monitored by NABL/MoEF Certified Lab and hence the results given are same as mentioned in their respective reports.

TATA STEEL LIMITED
ENVIRONMENT MANAGEMENT DEPARTMENT - LABORATORY
WORKS DRAINS EFFLUENT QUALITY TEST REPORT SUMMARY FROM APRIL 2019 TO MARCH 2020

Sample Location	Parameter	UoM	Apr-19			May-19			Jun-19			Jul-19			Aug-19			Sep-19		
			Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg
Susun Gharria Drain	Ammonical Nitrogen (as N)	mg/L	15.7	1.7	3.7	7.6	0.2	2.5	9.9	0.8	3.9	10.3	1.1	2.5	14.0	0.9	2.8	12.1	1.2	2.9
	Free Cyanide (as CN-)	mg/L	0.19	0.11	0.17	0.19	0.01	0.16	0.19	0.09	0.16	0.19	0.10	0.14	0.18	0.09	0.14	0.18	0.11	0.15
	Oil & Grease	mg/L	5.6	4.0	4.7	5.6	1.6	4.5	5.6	3.2	4.7	5.6	1.6	4.4	6.8	1.6	4.6	6.0	1.6	3.5
	Total Suspended solids	mg/L	91.0	28.0	44.3	67.0	20.0	38.5	63.0	20.0	36.9	96.0	14.0	38.8	76.0	15.0	37.2	62.0	33.0	46.0
	Chemical Oxygen Demand, COD	mg/L	120.0	48.0	80.9	99.0	37.0	67.6	91.0	35.0	53.0	240.0	37.0	68.4	155.0	28.0	72.5	90.0	29.0	57.9
	Biological Oxygen Demand, BOD	mg/L	15.3	3.2	9.7	15.8	3.1	9.4	12.8	3.2	6.4	12.7	3.1	6.7	13.0	3.2	7.7	11.3	3.2	6.7
	pH	-	8.3	7.3	7.9	8.3	7.4	7.8	8.5	7.3	7.9	8.2	7.1	7.7	8.4	7.1	7.9	8.4	7.4	7.8
	Phenol	mg/L	0.4	0.0	0.2	0.5	0.0	0.2	0.4	0.0	0.2	0.8	0.1	0.2	0.3	0.0	0.1	0.3	0.0	0.2
HSM Drain	Parameter	UoM	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg
	Ammonical Nitrogen (as N)	mg/L	11.8	1.0	5.5	16.0	1.3	7.4	39.8	2.0	10.5	16.8	2.2	7.8	15.8	1.3	7.0	11.5	0.9	4.9
	Free Cyanide (as CN-)	mg/L	0.18	0.05	0.13	0.19	0.08	0.15	0.18	0.09	0.16	0.18	0.06	0.16	0.17	0.07	0.13	0.17	0.08	0.14
	Oil & Grease	mg/L	5.6	4.0	4.8	5.6	2.4	4.7	6.8	2.4	4.9	6.4	2.4	4.9	7.0	2.0	4.6	5.2	1.6	3.7
	Total Suspended solids	mg/L	96.0	17.0	42.4	52.0	6.0	28.3	90.0	18.0	41.2	58.0	15.0	34.5	69.0	15.0	41.2	51.0	30.0	41.4
	Chemical Oxygen Demand, COD	mg/L	144.0	46.0	85.4	149.0	24.0	56.0	74.0	37.0	55.0	174.0	31.0	68.3	96.0	22.0	67.0	110.0	28.0	55.0
	Biological Oxygen Demand, BOD	mg/L	13.2	6.1	10.2	19.1	6.1	8.6	12.9	3.1	7.3	25.6	3.2	8.5	11.3	3.3	7.8	9.7	3.1	5.8
	pH	-	8.5	7.1	7.9	8.5	6.7	7.9	8.4	7.2	7.9	8.5	6.9	7.7	8.4	7.0	8.0	8.4	6.8	8.0
Phenol	mg/L	0.4	0.0	0.2	0.2	0.0	0.1	0.3	0.0	0.1	0.4	0.0	0.1	0.4	0.0	0.1	0.4	0.1	0.2	
BOT TREATED	Parameter	UoM	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg
	Ammonical Nitrogen (as N)	mg/L	8.4	0.7	2.1	12.4	0.2	2.9	12.4	0.2	2.9	3.7	0.9	1.4	5.1	0.8	1.7	6.7	0.8	1.8
	Free Cyanide (as CN-)	mg/L	0.19	0.10	0.17	0.19	0.10	0.17	0.19	0.11	0.17	0.19	0.10	0.15	0.19	0.10	0.16	0.16	0.11	0.14
	Oil & Grease	mg/L	5.6	4.0	4.9	6.0	4.0	5.0	7.2	4.0	5.3	6.0	1.6	4.4	5.6	3.2	4.5	5.2	1.6	3.7
	Total Suspended solids	mg/L	98.0	29.0	55.7	76.0	19.0	48.6	60.0	18.0	43.7	95.0	30.0	49.8	58.0	18.0	39.8	62.0	26.0	37.5
	Chemical Oxygen Demand, COD	mg/L	249.0	147.0	208.4	234.0	170.0	208.8	180.0	101.0	156.5	240.0	150.0	195.6	242.0	138.0	188.4	190.0	134.0	165.5
	Biological Oxygen Demand, BOD	mg/L	28.8	20.1	25.6	21.9	20.1	21.1	21.7	10.3	13.3	25.8	6.4	19.7	25.9	12.7	19.0	25.8	12.6	18.5
	pH	-	8.5	6.7	7.5	8.4	6.6	7.3	8.4	6.6	7.3	8.0	6.6	7.2	8.3	6.8	7.3	8.2	6.7	7.2
Phenol	mg/L	0.4	0.0	0.2	0.4	0.1	0.1	0.3	0.0	0.1	0.3	0.0	0.1	0.4	0.0	0.2	0.3	0.1	0.1	

TATA STEEL LIMITED
ENVIRONMENT MANAGEMENT DEPARTMENT - LABORATORY
WORKS DRAINS EFFLUENT QUALITY TEST REPORT SUMMARY FROM APRIL 2019 TO MARCH 2020

Sample Location	Parameter	UoM	Oct-19			Nov-19			Dec-19			Jan-20			Feb-20			Mar-20		
			Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg
Susun Gharia Drain	Ammonical Nitrogen (as N)	mg/L	24.3	0.9	3.6	7.3	1.2	3.6	6.8	1.6	2.9	9.7	1.2	3.1	8.6	1.0	2.9	8.0	0.9	2.8
	Free Cyanide (as CN-)	mg/L	0.18	0.10	0.13	0.18	0.11	0.15	0.17	0.10	0.14	0.17	0.10	0.14	0.17	0.11	0.15	0.19	0.10	0.15
	Oil & Grease	mg/L	5.6	2.4	4.7	5.2	1.2	3.5	6.8	3.2	5.0	6.4	3.2	4.6	6.0	2.8	4.2	5.2	3.2	4.3
	Total Suspended solids	mg/L	83.0	22.0	42.3	58.0	24.0	41.6	91.0	4.0	37.0	61.0	21.0	37.1	53.0	9.0	31.0	84.0	17.0	42.5
	Chemical Oxygen Demand, COD	mg/L	106.0	28.0	60.7	92.0	33.0	58.6	136.0	41.0	66.5	141.0	46.0	78.5	122.0	55.0	86.1	80.0	40.0	58.2
	Biological Oxygen Demand, BOD	mg/L	24.2	3.2	8.3	13.0	4.9	7.9	11.3	6.5	8.5	13.0	5.0	9.8	14.4	8.0	11.1	9.8	4.9	6.8
	pH	-	8.4	7.1	7.8	8.4	7.0	7.8	8.1	7.2	7.8	8.2	7.2	7.8	8.2	7.2	7.7	8.3	7.0	7.6
	Phenol	mg/L	0.3	0.0	0.1	0.7	0.1	0.2	0.8	0.6	0.7	0.8	0.1	0.4	0.9	0.1	0.4	0.4	0.1	0.2
HSM Drain	Parameter	UoM	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg
	Ammonical Nitrogen (as N)	mg/L	11.0	1.2	4.1	9.3	1.0	4.1	19.1	0.9	3.2	8.6	0.8	2.6	13.8	0.7	3.3	11.7	1.0	3.4
	Free Cyanide (as CN-)	mg/L	0.17	0.05	0.13	0.17	0.03	0.13	0.16	0.05	0.11	0.16	0.05	0.11	0.16	0.05	0.12	0.18	0.07	0.13
	Oil & Grease	mg/L	5.2	2.8	4.3	5.6	1.6	3.7	5.6	2.4	4.3	5.2	1.2	2.5	5.6	3.2	4.4	5.2	3.2	4.4
	Total Suspended solids	mg/L	80.0	33.0	50.4	59.0	28.0	42.0	95.0	17.0	43.9	65.0	11.0	33.8	56.0	13.0	32.5	90.0	13.0	42.5
	Chemical Oxygen Demand, COD	mg/L	163.0	31.0	63.4	127.0	30.0	56.7	133.0	32.0	72.5	101.0	48.0	72.3	176.0	45.0	76.2	120.0	33.0	64.0
	Biological Oxygen Demand, BOD	mg/L	19.0	3.2	8.1	14.7	3.2	7.5	13.1	4.8	8.3	12.8	6.4	9.4	19.1	6.3	8.8	13.2	4.8	7.0
	pH	-	8.5	8.0	8.3	8.4	7.0	8.0	8.5	7.6	8.2	8.4	7.0	8.1	8.4	7.5	8.0	8.4	7.1	7.8
Phenol	mg/L	0.4	0.1	0.1	0.3	0.1	0.1	0.3	0.1	0.1	0.3	0.1	0.1	0.5	0.0	0.3	0.5	0.1	0.1	
BOT TREATED	Parameter	UoM	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg
	Ammonical Nitrogen (as N)	mg/L	6.1	0.7	1.6	12.4	0.4	2.9	1.9	0.8	0.9	19.7	0.8	2.6	3.5	0.4	1.1	3.5	0.4	1.1
	Free Cyanide (as CN-)	mg/L	0.17	0.10	0.14	0.16	0.10	0.14	0.17	0.07	0.11	0.18	0.08	0.14	0.17	0.10	0.14	0.17	0.10	0.14
	Oil & Grease	mg/L	5.6	2.4	4.2	5.2	1.2	3.0	8.0	3.6	5.1	6.8	2.8	4.3	5.6	2.0	3.4	5.6	2.0	3.4
	Total Suspended solids	mg/L	77.0	20.0	38.5	55.0	22.0	34.6	68.0	11.0	41.2	74.0	29.0	53.1	96.0	25.0	50.2	90.0	32.0	56.2
	Chemical Oxygen Demand, COD	mg/L	230.0	131.0	182.5	244.0	151.0	182.9	202.0	136.0	174.1	234.0	158.0	193.1	246.0	147.0	199.5	243.0	175.0	203.0
	Biological Oxygen Demand, BOD	mg/L	26.2	13.0	20.1	25.9	12.9	19.4	26.1	13.0	18.2	26.4	13.0	22.8	26.6	13.0	21.8	26.4	18.6	22.8
	pH	-	8.1	6.8	7.3	8.4	6.7	7.4	8.4	6.8	7.2	8.0	6.8	7.3	8.1	6.6	7.4	8.4	6.8	7.4
Phenol	mg/L	0.2	0.1	0.1	0.3	0.0	0.1	0.3	0.1	0.2	0.3	0.0	0.1	0.5	0.1	0.3	0.3	0.1	0.2	

Note

Standards applicable as per Environment (Protection) (Third Amendment) Rules, 2012 issued in Gazette of India Notification vide No.: G. S. R. 277 (E) dated March 31, 2012.

TATA STEEL LIMITED
GROUNDWATER MONITORING - Done by NABL/ MoEF Certified Lab FROM APRIL 2019 TO MARCH 2020

Month	Sampling Locations	pH	Temperature	Conductivity	Total Dissolved Solids	Total Suspended Solids	Color	Odor	Alkalinity as CaCO ₃	Total Hardness as CaCO ₃	Calcium as Ca	Sodium as Na	Potassium as K	Chlorides as Cl ⁻	Sulphates as SO ₄ ⁻²	Total Phosphorus as P
		--	oC	μMho/Cm	mg/L	mg/L	CU	--	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Apr-19	Baganhattu Bore water	6.43	28.3	1434.0	702.7	<10	< 1.0	Agreeable	108.0	337.3	86.7	34.0	2.7	60.0	96.8	0.7
	SonariBore water	6.79	31.6	882.0	432.2	<10	< 1.0	Agreeable	121.6	207.4	53.6	29.0	2.3	54.7	42.8	0.3
	Parvati GhatBore water	6.99	31.1	2031.0	995.2	<10	< 1.0	Agreeable	214.0	477.7	69.4	68.9	3.2	116.0	114.8	0.5
	Jugsalai Bore Water	7.08	31.4	975.0	477.8	<10	< 1.0	Agreeable	260.0	229.3	55.5	36.1	2.5	55.9	39.4	0.5
	Jemco Bore Water	6.79	31.3	609.0	298.4	<10	< 1.0	Agreeable	110.0	143.2	68.3	39.4	2.9	73.9	28.7	0.3
May-19	Baganhattu Bore water	7.41	30.0	681.0	440.0	<10	< 1.0	Agreeable	206.0	361.0	105.2	34.0	2.5	19.3	33.4	0.9
	SonariBore water	7.63	28.4	378.0	232.0	<10	< 1.0	Agreeable	95.0	168.0	53.6	19.0	2.1	63.2	29.7	0.3
	Parvati GhatBore water	7.1	29.0	1892.0	1220.0	<10	< 1.0	Agreeable	415.0	702.9	150.7	115.7	1.8	199.5	93.9	0.4
	Jugsalai Bore Water	7.15	29.5	999.0	642.0	<10	< 1.0	Agreeable	335.0	391.1	105.2	58.6	3.5	104.5	58.1	0.3
	Jemco Bore Water	7.27	29.8	952.0	601.0	<10	< 1.0	Agreeable	275.0	396.0	101.2	45.5	1.1	84.4	45.0	0.4
Jun-19	Baganhattu Bore water	7.36	28.8	1471.0	720.8	<10	< 1.0	Agreeable	214.0	360.5	141.0	96.0	2.1	112.0	32.6	0.9
	SonariBore water	7.36	29.1	746.0	365.5	<10	< 1.0	Agreeable	187.0	183.0	56.4	48.0	3.4	78.0	28.4	0.8
	Parvati GhatBore water	7.02	30.0	2271.0	1112.8	<10	< 1.0	Agreeable	76.0	562.0	242.0	68.0	3.8	168.0	54.6	0.8
	Jugsalai Bore Water	7.04	29.8	1059.0	518.9	<10	< 1.0	Agreeable	79.0	264.0	136.0	42.0	2.6	108.0	29.8	0.7
	Jemco Bore Water	6.82	30.0	694.0	340.1	<10	< 1.0	Agreeable	68.0	176.0	98.0	36.0	3.8	72.0	28.6	0.7
Jul-19	Baganhattu Bore water	8.02	26.1	1390.0	681.1	<10	< 1.0	Agreeable	107.9	503.4	130.3	168.5	1.7	157.1	223.4	0.6
	SonariBore water	7.58	26.3	886.0	434.1	<10	< 1.0	Agreeable	122.2	393.7	115.7	40.2	4.0	68.7	89.5	0.5
	Parvati GhatBore water	7.17	29.7	1947.0	954.0	<10	< 1.0	Agreeable	213.7	793.9	201.3	147.8	0.6	133.7	194.9	0.4
	Jugsalai Bore Water	7.16	29.4	1021.0	500.3	<10	< 1.0	Agreeable	260.0	368.9	105.0	78.6	3.4	86.5	55.6	0.4
	Jemco Bore Water	6.88	29.8	751.0	368.0	<10	< 1.0	Agreeable	109.9	233.1	70.6	75.3	0.4	52.3	173.2	0.4
Aug-19	Baganhattu Bore water	8	25.7	1566.0	767.3	<10	< 1.0	Agreeable	205.7	324.7	128.4	164.6	1.2	141.4	173.7	0.8
	SonariBore water	7.38	26.7	908.0	444.9	<10	< 1.0	Agreeable	95.2	292.6	115.5	40.5	4.1	63.6	76.4	0.2
	Parvati GhatBore water	6.96	26.8	1992.0	976.1	<10	< 1.0	Agreeable	415.0	770.9	178.3	124.8	0.5	110.7	171.9	0.5
	Jugsalai Bore Water	7	26.7	1072.0	525.3	<10	< 1.0	Agreeable	334.9	349.9	86.0	59.6	3.2	67.5	36.6	0.2
	Jemco Bore Water	6.84	27.1	967.0	473.8	36	< 1.0	Agreeable	274.7	218.6	85.9	82.3	1.6	53.4	227.9	0.3
Sep-19	Baganhattu Bore water	6.55	26.4	1459.0	714.9	<10	< 1.0	Agreeable	214.2	594.2	116.4	42.3	2.4	403.1	161.7	1.0
	SonariBore water	7.08	26.2	2147.0	1052.0	<10	< 1.0	Agreeable	186.9	342.6	105.5	171.9	0.7	171.0	66.4	0.7
	Parvati GhatBore water	6.93	26.2	1020.0	499.8	<10	< 1.0	Agreeable	75.7	451.6	169.3	46.1	3.9	76.1	162.9	0.6
	Jugsalai Bore Water	7.36	26.7	1070.0	524.3	<10	< 1.0	Agreeable	78.7	512.6	74.0	49.0	1.7	58.7	24.6	0.6
	Jemco Bore Water	6.76	26.6	644.0	315.6	42	< 1.0	Agreeable	68.0	233.8	76.9	50.5	2.9	36.0	218.9	0.8

TATA STEEL LIMITED
GROUNDWATER MONITORING - Done by NABL/ MoEF Certified Lab FROM APRIL 2019 TO MARCH 2020

Month	Sampling Locations	Nitrate Nitrogen as N	Nitrite Nitrogen as N	Fluorides as F ⁻	Silica as SiO ₂	Iron as Fe	Manganese as Mn	Hexavalent Chromium as Cr+6	Copper as Cu	Total Chromium as Cr	Cadmium Cd	Nickel as Ni	Zinc as Zn	Lead as Pb	Nitrogen (Ammonia) as N	Total Nitrogen	Oil & Grease
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Apr-19	Baganhattu Bore water	6.34	0.21	0.86	10.16	0.34	< 0.05	< 0.05	0.032	< 0.05	< 0.001	0.03	< 0.5	< 0.001	0.26	8.64	< 1.0
	SonariBore water	6.24	0.14	0.72	14.60	0.36	< 0.05	< 0.05	0.026	< 0.05	< 0.001	0.04	< 0.5	< 0.001	0.18	6.92	< 1.0
	Parvati GhatBore water	5.86	0.03	0.61	17.20	0.28	< 0.05	< 0.05	0.034	< 0.05	< 0.001	0.08	< 0.5	< 0.001	0.24	7.16	< 1.0
	Jugsalai Bore Water	5.22	0.02	0.58	12.80	0.27	< 0.05	< 0.05	0.028	< 0.05	< 0.001	0.06	< 0.5	< 0.001	0.32	8.12	< 1.0
	Jemco Bore Water	1.32	0.01	0.28	12.60	0.29	< 0.05	< 0.05	0.026	< 0.05	< 0.001	0.02	< 0.5	< 0.001	0.26	6.24	< 1.0
May-19	Baganhattu Bore water	4.50	0.02	0.90	17.50	0.34	< 0.05	< 0.05	0.023	< 0.05	< 0.001	0.055	< 0.5	< 0.001	0.32	7.44	< 1.0
	SonariBore water	5.60	0.04	0.92	8.60	0.28	< 0.05	< 0.05	0.03	< 0.05	< 0.001	0.08	< 0.5	< 0.001	0.25	6.95	< 1.0
	Parvati GhatBore water	6.50	0.15	1.70	21.90	0.18	< 0.05	< 0.05	0.035	< 0.05	< 0.001	0.11	< 0.5	< 0.001	0.32	7.10	< 1.0
	Jugsalai Bore Water	5.80	0.07	1.60	10.10	0.18	< 0.05	< 0.05	0.033	< 0.05	< 0.001	0.052	< 0.5	< 0.001	0.25	7.25	< 1.0
	Jemco Bore Water	6.40	0.05	1.40	9.70	0.39	< 0.05	< 0.05	0.018	< 0.05	< 0.001	0.09	< 0.5	< 0.001	0.30	2.10	< 1.0
Jun-19	Baganhattu Bore water	4.80	0.05	1.64	12.62	0.21	< 0.05	< 0.05	0.04	< 0.05	< 0.001	0.07	< 0.5	< 0.001	0.46	8.62	< 1.0
	SonariBore water	6.40	0.50	1.02	13.40	0.16	< 0.05	< 0.05	0.03	< 0.05	< 0.001	0.06	< 0.5	< 0.001	0.28	7.42	< 1.0
	Parvati GhatBore water	6.20	1.21	0.86	16.81	0.14	< 0.05	< 0.05	0.06	< 0.05	< 0.001	0.16	< 0.5	< 0.001	0.36	7.24	< 1.0
	Jugsalai Bore Water	2.80	0.86	0.72	11.24	0.19	< 0.05	< 0.05	0.09	< 0.05	< 0.001	0.08	< 0.5	< 0.001	0.34	6.89	< 1.0
	Jemco Bore Water	3.60	0.67	0.92	12.86	0.22	< 0.05	< 0.05	0.06	< 0.05	< 0.001	0.12	< 0.5	< 0.001	0.38	7.21	< 1.0
Jul-19	Baganhattu Bore water	8.64	0.69	0.94	10.04	0.22	< 0.05	< 0.05	0.02	< 0.05	< 0.001	0.018	< 0.5	< 0.001	0.14	6.54	< 1.0
	SonariBore water	8.50	0.57	0.17	14.73	0.49	< 0.05	< 0.05	0.014	< 0.05	< 0.001	0.028	< 0.5	< 0.001	0.31	5.12	< 1.0
	Parvati GhatBore water	8.96	2.27	0.74	17.11	0.19	< 0.05	< 0.05	0.022	< 0.05	< 0.001	0.068	< 0.5	< 0.001	0.15	6.77	< 1.0
	Jugsalai Bore Water	7.13	2.02	0.06	12.68	0.15	< 0.05	< 0.05	0.016	< 0.05	< 0.001	0.048	< 0.5	< 0.001	0.20	6.32	< 1.0
	Jemco Bore Water	5.96	1.95	0.22	12.73	0.42	< 0.05	< 0.05	0.014	< 0.05	< 0.001	0.008	< 0.5	< 0.001	0.39	4.14	< 1.0
Aug-19	Baganhattu Bore water	8.49	1.77	1.03	17.41	0.25	< 0.05	< 0.05	0.011	< 0.05	< 0.001	0.043	< 0.5	< 0.001	0.23	5.34	< 1.0
	SonariBore water	10.00	1.68	0.18	8.48	0.16	< 0.05	< 0.05	0.016	< 0.05	< 0.001	0.066	< 0.5	< 0.001	0.13	6.56	< 1.0
	Parvati GhatBore water	8.07	2.15	0.62	22.03	0.31	< 0.05	< 0.05	0.021	< 0.05	< 0.001	0.096	< 0.5	< 0.001	0.45	5.30	< 1.0
	Jugsalai Bore Water	6.24	1.90	0.05	10.01	0.09	< 0.05	< 0.05	0.019	< 0.05	< 0.001	0.038	< 0.5	< 0.001	0.16	6.86	< 1.0
	Jemco Bore Water	3.96	1.61	0.44	9.58	0.27	< 0.05	< 0.05	0.004	< 0.05	< 0.001	0.076	< 0.5	< 0.001	0.18	3.98	< 1.0
Sep-19	Baganhattu Bore water	3.40	1.80	0.40	12.75	0.34	< 0.05	< 0.05	0.026	< 0.05	< 0.001	0.056	< 0.5	< 0.001	0.59	8.23	< 1.0
	SonariBore water	21.40	2.50	1.00	13.31	0.07	< 0.05	< 0.05	0.027	< 0.05	< 0.001	0.057	< 0.5	< 0.001	0.19	5.32	< 1.0
	Parvati GhatBore water	12.60	1.10	0.50	16.69	0.02	< 0.05	< 0.05	0.057	< 0.05	< 0.001	0.157	< 0.5	< 0.001	0.24	5.14	< 1.0
	Jugsalai Bore Water	4.30	2.00	0.60	11.15	0.10	< 0.05	< 0.05	0.087	< 0.05	< 0.001	0.077	< 0.5	< 0.001	0.25	5.09	< 1.0
	Jemco Bore Water	2.32	1.60	0.35	12.99	0.35	< 0.05	< 0.05	0.057	< 0.05	< 0.001	0.117	< 0.5	< 0.001	0.51	5.11	< 1.0

TATA STEEL LIMITED
GROUNDWATER MONITORING - Done by NABL/ MoEF Certified Lab FROM APRIL 2019 TO MARCH 2020

Month	Sampling Locations	Chemical Oxygen Demand	Biological Oxygen Demand (3 Days at 27°C)	Residual Chlorine as Cl	Sulphide as S ⁻²	Phenolic Compounds as Phenols	Total Cyanide	Free Cyanide	Thio Cyanide	Arsenic as As	Mercury	Aluminum	Vanadium	PAH
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Apr-19	Baganhattu Bore water	31.20	< 2.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	SonariBore water	18.40	< 2.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	Parvati GhatBore water	21.20	2.2	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	Jugsalai Bore Water	16.80	< 2.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	Jemco Bore Water	12.50	< 2.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
May-19	Baganhattu Bore water	32.00	12	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	SonariBore water	4.00	< 2.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	Parvati GhatBore water	6.00	3.2	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	Jugsalai Bore Water	16.00	4.8	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	Jemco Bore Water	12.00	4.2	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
Jun-19	Baganhattu Bore water	32.00	12.8	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	SonariBore water	16.00	6.4	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	Parvati GhatBore water	12.00	4.2	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	Jugsalai Bore Water	16.00	6.2	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	Jemco Bore Water	14.00	5.2	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
Jul-19	Baganhattu Bore water	29.10	<4.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	SonariBore water	16.60	<4.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	Parvati GhatBore water	20.81	<4.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	Jugsalai Bore Water	15.00	<4.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	Jemco Bore Water	10.40	<4.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
Aug-19	Baganhattu Bore water	29.90	<4.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	SonariBore water	3.61	<4.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	Parvati GhatBore water	4.20	<4.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	Jugsalai Bore Water	15.61	<4.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	Jemco Bore Water	9.90	<4.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
Sep-19	Baganhattu Bore water	31.61	<4.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	SonariBore water	13.90	<4.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	Parvati GhatBore water	9.90	<4.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	Jugsalai Bore Water	14.20	<4.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	Jemco Bore Water	11.90	<4.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent

TATA STEEL LIMITED

GROUNDWATER MONITORING - Done by NABL/ MoEF Certified Lab FROM APRIL 2019 TO MARCH 2020

Month	Sampling Locations	pH	Temperature	Conductivity	Total Dissolved Solids	Total Suspended Solids	Color	Odor	Alkalinity as CaCO ₃	Total Hardness as CaCO ₃	Calcium as Ca	Sodium as Na	Potassium as K	Chlorides as Cl ⁻	Sulphates as SO ₄ ⁻²	Total Phosphorus as P
		--	oC	μMho/Cm	mg/L	mg/L	CU	--	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Oct-19	Baganhattu Bore water	6.86	26.6	655.0	321.0	<10	< 1.0	Agreeable	172.2	196.8	79.1	31.4	2.6	79.6	91.8	0.6
	SonariBore water	7.17	26.4	928.0	454.7	<10	< 1.0	Agreeable	212.2	243.6	46.0	26.4	2.2	52.7	37.8	0.3
	Parvati GhatBore water	7.22	27.8	735.1	360.2	<10	< 1.0	Agreeable	172.2	183.8	61.8	66.3	3.1	53.7	109.8	0.4
	Jugsalai Bore Water	7.5	27.4	371.6	182.1	<10	< 1.0	Agreeable	151.2	315.0	47.9	33.5	2.4	42.8	34.4	0.4
	Jemco Bore Water	7.04	26.6	676.0	331.2	<10	< 1.0	Agreeable	100.2	138.1	60.7	36.8	2.8	50.0	23.7	0.2
Nov-19	Baganhattu Bore water	6.86	25.2	684.0	333.0	<10	< 1.0	Agreeable	174.2	227.2	97.6	31.4	2.4	72.0	28.4	0.8
	SonariBore water	7	27.1	1023.0	501.3	<10	< 1.0	Agreeable	253.0	407.6	46.0	16.4	1.9	87.6	24.7	0.2
	Parvati GhatBore water	7.23	27.5	1041.0	510.1	<10	< 1.0	Agreeable	380.5	421.5	143.1	113.1	1.7	60.7	88.9	0.3
	Jugsalai Bore Water	7.31	28.1	1012.0	495.9	<10	< 1.0	Agreeable	388.6	425.6	97.6	56.0	3.4	61.7	53.1	0.2
	Jemco Bore Water	6.92	28.6	661.0	323.9	<10	< 1.0	Agreeable	202.4	223.1	93.6	42.9	1.0	50.8	40.0	0.3
Dec-19	Baganhattu Bore water	6.92	25.2	683.0	334.7	<10	< 1.0	Agreeable	196.0	208.7	133.4	93.4	2.0	58.0	27.6	0.8
	SonariBore water	6.97	25.1	920.0	450.8	<10	< 1.0	Agreeable	236.0	255.5	48.8	45.4	3.3	80.0	23.4	0.7
	Parvati GhatBore water	7.1	25.5	605.0	296.5	<10	< 1.0	Agreeable	196.0	195.7	234.4	65.4	3.7	50.0	49.6	0.7
	Jugsalai Bore Water	7.82	25.0	315.0	154.4	<10	< 1.0	Agreeable	175.0	326.9	128.4	39.4	2.5	56.8	24.8	0.6
	Jemco Bore Water	6.9	25.3	717.0	351.3	<10	< 1.0	Agreeable	124.0	150.0	90.4	33.4	3.7	46.0	23.6	0.6
Jan-20	Baganhattu Bore water	7.74	22.7	382.0	187.2	<10	< 1.0	Agreeable	198.0	239.1	122.7	165.9	1.5	50.0	218.5	0.5
	SonariBore water	7.02	23.8	688.0	337.1	<10	< 1.0	Agreeable	194.0	221.7	108.1	37.6	3.9	55.0	84.6	0.4
	Parvati GhatBore water	6.91	22.1	771.0	377.8	<10	< 1.0	Agreeable	221.8	214.6	193.7	145.2	0.5	56.4	189.9	0.3
	Jugsalai Bore Water	7.4	22.9	713.0	349.4	<10	< 1.0	Agreeable	213.7	223.2	97.4	76.0	3.2	52.4	50.6	0.3
	Jemco Bore Water	7.73	22.7	329.0	161.2	<10	< 1.0	Agreeable	286.0	369.6	63.0	72.7	0.3	123.0	168.2	0.3
Feb-20	Baganhattu Bore water	7.15	22.9	721.0	353.3	<10	< 1.0	Agreeable	208.0	277.1	120.8	162.0	1.1	57.0	168.7	0.7
	SonariBore water	7.1	23.9	923.0	452.3	<10	< 1.0	Agreeable	240.0	391.8	107.9	37.9	4.0	85.0	71.4	0.1
	Parvati GhatBore water	7.22	24.1	2178.0	1067.2	<10	< 1.0	Agreeable	564.0	844.2	170.7	122.2	0.4	169.9	166.9	0.4
	Jugsalai Bore Water	7.11	23.8	2277.0	1115.7	<10	< 1.0	Agreeable	548.0	887.4	78.4	57.0	3.1	168.9	31.6	0.1
	Jemco Bore Water	7.06	23.5	665.0	325.9	<10	< 1.0	Agreeable	108.0	205.6	78.3	79.7	1.5	48.0	222.9	0.2
Mar-20	Baganhattu Bore water	7	27.9	738.0	361.6	<10	< 1.0	Agreeable	216.0	234.3	108.8	39.7	2.3	64.0	156.7	0.9
	SonariBore water	6.98	28.5	941.0	461.1	<10	< 1.0	Agreeable	232.0	365.2	97.9	169.3	0.6	86.0	61.4	0.6
	Parvati GhatBore water	6.98	25.9	933.2	457.3	<10	< 1.0	Agreeable	257.3	521.0	161.7	43.5	3.8	80.2	157.9	0.6
	Jugsalai Bore Water	6.96	26.0	933.2	457.3	<10	< 1.0	Agreeable	303.3	272.6	66.4	46.4	1.6	165.1	19.6	0.5
	Jemco Bore Water	6.81	28.7	720.0	352.8	<10	< 1.0	Agreeable	153.3	186.5	69.3	47.9	2.8	164.1	213.9	0.7

TATA STEEL LIMITED
GROUNDWATER MONITORING - Done by NABL/ MoEF Certified Lab FROM APRIL 2019 TO MARCH 2020

Month	Sampling Locations	Nitrate Nitrogen as N	Nitrite Nitrogen as N	Fluorides as F ⁻	Silica as SiO ₂	Iron as Fe	Manganese as Mn	Hexavalent Chromium as Cr+6	Copper as Cu	Total Chromium as Cr	Cadmium Cd	Nickel as Ni	Zinc as Zn	Lead as Pb	Nitrogen (Ammonia) as N	Total Nitrogen	Oil & Grease
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Oct-19	Baganhattu Bore water	7.32	0.36	0.94	12.56	0.50	< 0.05	< 0.05	0.043	< 0.05	< 0.001	0.0420	< 0.5	< 0.001	0.39	9.67	< 1.0
	Sonari Bore water	7.22	0.29	0.80	17.00	0.52	< 0.05	< 0.05	0.037	< 0.05	< 0.001	0.0520	< 0.5	< 0.001	0.31	7.95	< 1.0
	Parvati Ghat Bore water	6.84	0.18	0.69	19.60	0.44	< 0.05	< 0.05	0.045	< 0.05	< 0.001	0.0920	< 0.5	< 0.001	0.37	8.19	< 1.0
	Jugsalai Bore Water	6.20	0.17	0.66	15.20	0.43	< 0.05	< 0.05	0.039	< 0.05	< 0.001	0.0720	< 0.5	< 0.001	0.45	9.15	< 1.0
	Jemco Bore Water	2.30	0.16	0.36	15.00	0.45	< 0.05	< 0.05	0.037	< 0.05	< 0.001	0.0320	< 0.5	< 0.001	0.39	7.27	< 1.0
Nov-19	Baganhattu Bore water	5.48	0.17	0.98	19.90	0.50	< 0.05	< 0.05	0.034	< 0.05	< 0.001	0.0670	< 0.5	< 0.001	0.45	8.47	< 1.0
	Sonari Bore water	6.58	0.19	1.00	11.00	0.44	< 0.05	< 0.05	0.041	< 0.05	< 0.001	0.0920	< 0.5	< 0.001	0.38	7.98	< 1.0
	Parvati Ghat Bore water	7.48	0.30	1.78	24.30	0.34	< 0.05	< 0.05	0.046	< 0.05	< 0.001	0.1220	< 0.5	< 0.001	0.45	8.13	< 1.0
	Jugsalai Bore Water	6.78	0.22	1.68	12.50	0.34	< 0.05	< 0.05	0.044	< 0.05	< 0.001	0.0640	< 0.5	< 0.001	0.38	8.28	< 1.0
	Jemco Bore Water	7.38	0.20	1.48	12.10	0.55	< 0.05	< 0.05	0.029	< 0.05	< 0.001	0.1020	< 0.5	< 0.001	0.43	3.13	< 1.0
Dec-19	Baganhattu Bore water	5.78	0.20	1.72	15.02	0.37	< 0.05	< 0.05	0.051	< 0.05	< 0.001	0.0820	< 0.5	< 0.001	0.59	9.65	< 1.0
	Sonari Bore water	7.38	0.65	1.10	15.80	0.32	< 0.05	< 0.05	0.041	< 0.05	< 0.001	0.0720	< 0.5	< 0.001	0.41	8.45	< 1.0
	Parvati Ghat Bore water	7.18	1.36	0.94	19.21	0.30	< 0.05	< 0.05	0.071	< 0.05	< 0.001	0.1720	< 0.5	< 0.001	0.49	8.27	< 1.0
	Jugsalai Bore Water	3.78	1.01	0.80	13.64	0.35	< 0.05	< 0.05	0.101	< 0.05	< 0.001	0.0920	< 0.5	< 0.001	0.47	7.92	< 1.0
	Jemco Bore Water	4.58	0.82	1.00	15.26	0.38	< 0.05	< 0.05	0.071	< 0.05	< 0.001	0.1320	< 0.5	< 0.001	0.51	8.24	< 1.0
Jan-20	Baganhattu Bore water	9.62	0.84	1.02	12.44	0.38	< 0.05	< 0.05	0.031	< 0.05	< 0.001	0.0300	< 0.5	< 0.001	0.27	7.57	< 1.0
	Sonari Bore water	9.48	0.72	0.25	17.13	0.65	< 0.05	< 0.05	0.025	< 0.05	< 0.001	0.0400	< 0.5	< 0.001	0.44	6.15	< 1.0
	Parvati Ghat Bore water	9.94	2.42	0.82	19.51	0.35	< 0.05	< 0.05	0.033	< 0.05	< 0.001	0.0800	< 0.5	< 0.001	0.28	7.8	< 1.0
	Jugsalai Bore Water	8.11	2.17	0.14	15.08	0.31	< 0.05	< 0.05	0.027	< 0.05	< 0.001	0.0600	< 0.5	< 0.001	0.33	7.35	< 1.0
	Jemco Bore Water	6.94	2.10	0.30	15.13	0.58	< 0.05	< 0.05	0.025	< 0.05	< 0.001	0.0200	< 0.5	< 0.001	0.52	5.17	< 1.0
Feb-20	Baganhattu Bore water	9.47	1.92	1.11	19.81	0.41	< 0.05	< 0.05	0.022	< 0.05	< 0.001	0.0550	< 0.5	< 0.001	0.36	6.37	< 1.0
	Sonari Bore water	10.98	1.83	0.26	10.88	0.32	< 0.05	< 0.05	0.027	< 0.05	< 0.001	0.0780	< 0.5	< 0.001	0.26	7.59	< 1.0
	Parvati Ghat Bore water	9.05	2.30	0.70	24.43	0.47	< 0.05	< 0.05	0.032	< 0.05	< 0.001	0.1080	< 0.5	< 0.001	0.58	6.33	< 1.0
	Jugsalai Bore Water	7.22	2.05	0.13	12.41	0.25	< 0.05	< 0.05	0.03	< 0.05	< 0.001	0.0500	< 0.5	< 0.001	0.29	7.89	< 1.0
	Jemco Bore Water	4.94	1.76	0.52	11.98	0.43	< 0.05	< 0.05	0.015	< 0.05	< 0.001	0.0880	< 0.5	< 0.001	0.31	5.01	< 1.0
Mar-20	Baganhattu Bore water	4.38	1.95	0.48	15.15	0.50	< 0.05	< 0.05	0.037	< 0.05	< 0.001	0.0680	< 0.5	< 0.001	0.72	9.26	< 1.0
	Sonari Bore water	22.38	2.65	1.08	15.71	0.23	< 0.05	< 0.05	0.038	< 0.05	< 0.001	0.0690	< 0.5	< 0.001	0.32	6.35	< 1.0
	Parvati Ghat Bore water	13.58	1.25	0.58	19.09	0.18	< 0.05	< 0.05	0.068	< 0.05	< 0.001	0.1690	< 0.5	< 0.001	0.37	6.17	< 1.0
	Jugsalai Bore Water	5.28	2.15	0.68	13.55	0.26	< 0.05	< 0.05	0.098	< 0.05	< 0.001	0.0890	< 0.5	< 0.001	0.38	6.12	< 1.0
	Jemco Bore Water	3.30	1.75	0.43	15.39	0.51	< 0.05	< 0.05	0.068	< 0.05	< 0.001	0.1290	< 0.5	< 0.001	0.64	6.14	< 1.0

TATA STEEL LIMITED

GROUNDWATER MONITORING - Done by NABL/ MoEF Certified Lab FROM APRIL 2019 TO MARCH 2020

Month	Sampling Locations	COD	BOD (3 Days at 27°C)	Residual Chlorine as Cl	Sulphide as S ⁻²	Phenolic Compounds as Phenols	Total Cyanide	Free Cyanide	Thio Cyanide	Arsenic as As	Mercury	Aluminum	Vanadium	PAH
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Oct-19	Baganhattu Bore water	34.07	< 2.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	SonariBore water	21.27	< 2.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	Parvati GhatBore water	24.07	2.2	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	Jugsalai Bore Water	19.67	< 2.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	Jemco Bore Water	15.37	< 2.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
Nov-19	Baganhattu Bore water	34.87	< 2.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	SonariBore water	28.00	< 2.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	Parvati GhatBore water	8.87	2.2	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	Jugsalai Bore Water	18.87	< 2.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	Jemco Bore Water	14.87	< 2.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
Dec-19	Baganhattu Bore water	25.00	<4.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	SonariBore water	18.87	<4.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	Parvati GhatBore water	18.00	<4.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	Jugsalai Bore Water	18.87	<4.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	Jemco Bore Water	32.00	<4.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
Jan-20	Baganhattu Bore water	34.00	<4.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	SonariBore water	19.47	<4.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	Parvati GhatBore water	23.68	<4.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	Jugsalai Bore Water	17.87	<4.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	Jemco Bore Water	28.00	<4.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
Feb-20	Baganhattu Bore water	33.00	<4.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	SonariBore water	30.00	<4.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	Parvati GhatBore water	7.07	<4.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	Jugsalai Bore Water	18.48	<4.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	Jemco Bore Water	33.00	<4.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
Mar-20	Baganhattu Bore water	36.00	<4.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	SonariBore water	34.00	<4.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	Parvati GhatBore water	12.77	<4.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	Jugsalai Bore Water	17.07	<4.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	Jemco Bore Water	14.77	<4.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent

TATA STEEL LIMITED
ENVIRONMENT MANAGEMENT DEPARTMENT- LABORATORY
RIVER WATER MONITORING DONE BY NABL/MoEF LAB (APRIL 2019 to MARCH 2020)

Month	Locations	pH	Temperature	Conductivity	Turbidity	Total Dissolved Solids	TSS	Color	Odor
		--	oC	μMho/Cm	NTU	mg/L	mg/L	CU	--
Apr-19	KHARKHAI RIVER (NEAR DUMUHANI)	8.68	28.20	444.00	< 0.05	217.56	<10	< 1.0	Agreeable
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	8.24	28.60	451.00	< 0.05	220.99	<10	< 1.0	Agreeable
	SWARNREKHA RIVER(NEAR BAGUN HATU)	7.92	29.30	252.00	< 0.05	123.48	<10	< 1.0	Agreeable
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	7.45	29.00	366.00	< 0.05	179.34	<10	< 1.0	Agreeable
May-19	KHARKHAI RIVER (NEAR DUMUHANI)	7.95	29.00	259.00	< 0.05	126.91	<10	< 1.0	Agreeable
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	8.39	29.80	268.20	< 0.05	131.42	<10	< 1.0	Agreeable
	SWARNREKHA RIVER(NEAR BAGUN HATU)	8.42	27.10	311.00	< 0.05	152.39	<10	< 1.0	Agreeable
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	8.40	27.40	217.00	< 0.05	106.33	<10	< 1.0	Agreeable
Jun-19	KHARKHAI RIVER (NEAR DUMUHANI)	8.21	28.80	248.00	< 0.05	121.52	<10	< 1.0	Agreeable
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	7.91	29.20	472.00	< 0.05	231.28	<10	< 1.0	Agreeable
	SWARNREKHA RIVER(NEAR BAGUN HATU)	7.81	29.20	382.00	< 0.05	187.18	<10	< 1.0	Agreeable
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	7.99	29.10	255.00	< 0.05	124.95	<10	< 1.0	Agreeable
Jul-19	KHARKHAI RIVER (NEAR DUMUHANI)	7.35	26.30	276.00	< 0.05	135.24	<10	< 1.0	Agreeable
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	7.10	26.30	325.00	< 0.05	159.25	<10	< 1.0	Agreeable
	SWARNREKHA RIVER(NEAR BAGUN HATU)	7.38	26.50	313.00	< 0.05	153.37	<10	< 1.0	Agreeable
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	7.50	26.10	293.00	< 0.05	143.57	<10	< 1.0	Agreeable
Aug-19	KHARKHAI RIVER (NEAR DUMUHANI)	7.91	27.10	245.00	< 0.05	120.05	<10	< 1.0	Agreeable
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	8.14	27.00	218.00	< 0.05	106.82	<10	< 1.0	Agreeable
	SWARNREKHA RIVER(NEAR BAGUN HATU)	7.87	26.50	283.00	< 0.05	138.67	<10	< 1.0	Agreeable
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	7.95	26.40	239.00	< 0.05	117.11	<10	< 1.0	Agreeable
Sep-19	KHARKHAI RIVER (NEAR DUMUHANI)	7.91	26.00	226.30	< 0.05	110.90	<10	< 1.0	Agreeable
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	7.98	26.30	199.40	< 0.05	97.70	<10	< 1.0	Agreeable
	SWARNREKHA RIVER(NEAR BAGUN HATU)	8.13	26.10	295.60	< 0.05	144.80	<10	< 1.0	Agreeable
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	7.97	25.70	198.90	< 0.05	97.50	<10	< 1.0	Agreeable

TATA STEEL LIMITED
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RIVER WATER MONITORING DONE BY NABL/MoEF LAB (APRIL 2019 to MARCH 2020)

Month	Locations	pH	Temperature	Conductivity	Turbidity	Total Dissolved Solids	TSS	Color	Odor
		--	oC	µMho/Cm	NTU	mg/L	mg/L	CU	--
Oct-19	KHARKHAI RIVER (NEAR DUMUHANI)	7.93	26.50	248	2.54	121.52	<10	< 1.0	Agreeable
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	8.19	26.20	324	5.59	158.76	<10	< 1.0	Agreeable
	SWARNREKHA RIVER(NEAR BAGUN HATU)	8.09	26.30	320	5.66	156.80	<10	< 1.0	Agreeable
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	8.07	26.20	208	4.78	101.92	<10	< 1.0	Agreeable
Nov-19	KHARKHAI RIVER (NEAR DUMUHANI)	8.28	26.60	342	3.12	167.58	<10	< 1.0	Agreeable
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	8.58	26.30	293	5.96	143.57	<10	< 1.0	Agreeable
	SWARNREKHA RIVER(NEAR BAGUN HATU)	8.02	26.20	308	< 0.05	146.20	<10	< 1.0	Agreeable
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	7.98	26.30	216	< 0.05	102.34	<10	< 1.0	Agreeable
Dec-19	KHARKHAI RIVER (NEAR DUMUHANI)	8.06	24.80	395	6.46	193.55	<10	< 1.0	Agreeable
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	8.41	25.10	307	3.86	150.43	<10	< 1.0	Agreeable
	SWARNREKHA RIVER(NEAR BAGUN HATU)	7.94	25.40	372	3.17	182.28	<10	< 1.0	Agreeable
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	8.11	25.40	258	2.00	126.42	<10	< 1.0	Agreeable
Jan-20	KHARKHAI RIVER (NEAR DUMUHANI)	7.79	22.60	383	< 0.05	159.80	<10	< 1.0	Agreeable
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	7.80	22.30	374	3.12	183.26	<10	< 1.0	Agreeable
	SWARNREKHA RIVER(NEAR BAGUN HATU)	7.84	22.60	385	4.67	188.65	<10	< 1.0	Agreeable
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	7.82	22.70	406	6.89	198.94	<10	< 1.0	Agreeable
Feb-20	KHARKHAI RIVER (NEAR DUMUHANI)	8.28	24.50	429	10.60	210.21	<10	< 1.0	Agreeable
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	8.75	24.50	723	3.97	354.27	<10	< 1.0	Agreeable
	SWARNREKHA RIVER(NEAR BAGUN HATU)	7.75	22.60	385	6.36	188.65	<10	< 1.0	Agreeable
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	8.30	22.80	255	4.05	124.95	<10	< 1.0	Agreeable
Mar-20	KHARKHAI RIVER (NEAR DUMUHANI)	7.64	28.60	337	3.03	165.13	<10	< 1.0	Agreeable
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	8.23	28.30	364	3.26	178.36	<10	< 1.0	Agreeable
	SWARNREKHA RIVER(NEAR BAGUN HATU)	7.73	27.90	442	11.45	216.58	<10	< 1.0	Agreeable
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	7.93	28.00	234	1.87	114.66	<10	< 1.0	Agreeable

TATA STEEL LIMITED
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RIVER WATER MONITORING DONE BY NABL/MoEF LAB (APRIL 2019 to MARCH 2020)

Month	Locations	Alkalinity	Total Hardness	Calcium	Magnesium	Sodium	Potassium	Chloride
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Apr-19	KHARKHAI RIVER (NEAR DUMUHANI)	134	132	28.06	8.82	35.53	4.62	30.29
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	136	134	80.16	8.87	32.84	3.86	30.77
	SWARNREKHA RIVER(NEAR BAGUN HATU)	94	82	30.06	6.16	17.77	2.04	16.42
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	110	29	22.04	7.00	22.00	3.31	21.4
May-19	KHARKHAI RIVER (NEAR DUMUHANI)	67	98.37	25.81	8.23	19.09	1.91	15.65
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	72	94.99	24.95	7.93	17.05	1.58	13.4
	SWARNREKHA RIVER(NEAR BAGUN HATU)	94	86.09	23.09	6.9	23.7	3.30	21.18
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	86	72.76	18.93	6.18	13.82	1.73	11.73
Jun-19	KHARKHAI RIVER (NEAR DUMUHANI)	122	88.62	23.42	7.31	20.501	3.82	19.26
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	126	144.71	38.45	11.82	35.59	5.78	37.02
	SWARNREKHA RIVER(NEAR BAGUN HATU)	85	120.21	32.55	8.66	38.13	7.64	41
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	98	98.61	25.61	8.41	21.91	4.26	21.48
Jul-19	KHARKHAI RIVER (NEAR DUMUHANI)	108	105.6	28.606	8.3	18.763	2.83	15.386
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	106	93.2	24.747	7.6	13.163	2.36	12.072
	SWARNREKHA RIVER(NEAR BAGUN HATU)	108	105.1	28.068	8.5	22.252	4.5	21.88
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	100	103.5	28.187	8	16.188	3.07	15.95
Aug-19	KHARKHAI RIVER (NEAR DUMUHANI)	122	66.03	24.8	6.72	15.11	2.44	13.24
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	126	61.05	22.8	6.29	13.85	1.94	11.21
	SWARNREKHA RIVER(NEAR BAGUN HATU)	85	69.14	26.04	7.29	18.32	3.87	17.58
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	98	65.18	24.45	6.86	13.55	2.55	12.8
Sep-19	KHARKHAI RIVER (NEAR DUMUHANI)	58	92.48	22.7	4.62	13.01	1.6	9.4
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	63	133.76	19.7	3.19	10.75	1.1	16.3
	SWARNREKHA RIVER(NEAR BAGUN HATU)	85	100.31	23.94	5.19	16.22	3.5	25.2
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	77	83.67	21.35	3.76	10.45	1.3	7.5

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RIVER WATER MONITORING DONE BY NABL/MoEF LAB (APRIL 2019 to MARCH 2020)

Month	Locations	Alkalinity	Total Hardness	Calcium	Magnesium	Sodium	Potassium	Chloride
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Oct-19	KHARKHAI RIVER (NEAR DUMUHANI)	129.2	103.9	26.6	7.8	31.6	3.7	12.1
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	131.2	103.3	78.7	7.8	29.0	2.9	8.7
	SWARNREKHA RIVER(NEAR BAGUN HATU)	89.2	99.4	28.6	5.1	13.9	1.1	25.0
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	105.2	84.8	20.6	6.0	18.1	2.4	8.4
Nov-19	KHARKHAI RIVER (NEAR DUMUHANI)	156.6	109.2	24.4	7.2	15.2	1.0	19.9
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	148.6	105.0	23.5	6.9	13.2	0.6	19.9
	SWARNREKHA RIVER(NEAR BAGUN HATU)	104.5	106.8	21.7	5.9	19.8	2.4	13.7
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	106.4	103.2	17.5	5.1	9.9	0.8	18.9
Dec-19	KHARKHAI RIVER (NEAR DUMUHANI)	144.0	111.4	22.0	6.3	16.6	2.9	28.0
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	124.0	93.9	37.0	10.8	31.7	4.9	24.0
	SWARNREKHA RIVER(NEAR BAGUN HATU)	132.0	87.0	31.1	7.6	34.2	6.7	40.0
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	120.0	78.3	24.2	7.4	18.0	3.3	20.0
Jan-20	KHARKHAI RIVER (NEAR DUMUHANI)	114.0	101.6	27.2	7.3	14.9	1.9	17.6
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	124.0	123.9	23.3	6.6	9.3	1.4	18.0
	SWARNREKHA RIVER(NEAR BAGUN HATU)	100.0	84.8	26.6	7.5	18.4	3.6	35.0
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	102.0	121.7	26.8	7.0	12.3	2.1	32.0
Feb-20	KHARKHAI RIVER (NEAR DUMUHANI)	148.0	151.5	23.4	5.7	11.2	1.5	39.0
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	152.0	162.3	21.4	5.3	10.0	1.0	38.0
	SWARNREKHA RIVER(NEAR BAGUN HATU)	120.0	108.2	24.6	6.3	14.4	2.9	48.0
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	11.0	88.7	23.0	5.8	9.7	1.6	25.0
Mar-20	KHARKHAI RIVER (NEAR DUMUHANI)	116.0	89.7	21.3	3.6	9.1	0.7	30.0
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	136.0	102.6	18.3	2.2	6.9	0.2	26.0
	SWARNREKHA RIVER(NEAR BAGUN HATU)	109.2	79.5	22.5	4.2	12.3	2.6	60.0
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	108.0	62.8	19.9	2.7	6.6	0.4	28.0

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RIVER WATER MONITORING DONE BY NABL/MoEF LAB (APRIL 2019 to MARCH 2020)

Month	Locations	SO ₄ ⁻²	P	Nitrate Nitrogen as N	Nitrite Nitrogen as N	F ⁻	SiO ₂	Fe	Mn
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Apr-19	KHARKHAI RIVER (NEAR DUMUHANI)	43.38	<0.1	1.202	0.42	0.406	5.03	0.107	< 0.05
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	36.14	<0.1	1.219	0.426	0.308	9.23	0.122	< 0.05
	SWARNREKHA RIVER(NEAR BAGUN HATU)	14.32	<0.1	1.337	0.388	0.233	5.31	0.109	< 0.05
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	18.23	<0.1	1.278	0.362	0.216	3.91	0.287	< 0.05
May-19	KHARKHAI RIVER (NEAR DUMUHANI)	18.4	<0.1	1.39	0.39	0.163	3.29	0.343	< 0.05
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	20.63	<0.1	1.18	0.39	0.14	6.53	0.200	< 0.05
	SWARNREKHA RIVER(NEAR BAGUN HATU)	18.15	<0.1	1.35	0.38	0.74	3.51	0.129	< 0.05
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	10.39	<0.1	1.34	0.38	0.2	5.18	0.133	< 0.05
Jun-19	KHARKHAI RIVER (NEAR DUMUHANI)	15.61	<0.1	1.19	0.404	0.341	4.7	<0.1	< 0.05
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	55.57	<0.1	1.14	0.43	0.356	5.8	0.203	< 0.05
	SWARNREKHA RIVER(NEAR BAGUN HATU)	31.11	<0.1	1.21	0.414	1.157	3.9	0.211	< 0.05
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	18.64	<0.1	1.36	0.411	0.366	3.01	<0.1	< 0.05
Jul-19	KHARKHAI RIVER (NEAR DUMUHANI)	19.77	<0.1	1.36	0.428	0.43	4.93	0.14	< 0.05
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	13.37	<0.1	1.26	0.422	0.293	9.43	0.09	< 0.05
	SWARNREKHA RIVER(NEAR BAGUN HATU)	23.44	<0.1	1.49	0.419	0.484	5.01	0.23	< 0.05
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	20.83	<0.1	1.51	0.421	0.248	3.93	0.11	< 0.05
Aug-19	KHARKHAI RIVER (NEAR DUMUHANI)	17.39	<0.1	3.97	1.56	0.34	3.19	1.20	< 0.05
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	14.9	<0.1	3.9	1.56	0.19	6.23	0.14	< 0.05
	SWARNREKHA RIVER(NEAR BAGUN HATU)	21.59	<0.1	4.2	1.55	0.4	3.71	0.40	< 0.05
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	16.66	<0.1	4	1.55	0.35	5.2	1.30	< 0.05
Sep-19	KHARKHAI RIVER (NEAR DUMUHANI)	15.29	<0.1	1.3	1.3	0.3	4.6	0.12	< 0.05
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	11.8	<0.1	2.3	1.3	0.3	5.5	0.06	< 0.05
	SWARNREKHA RIVER(NEAR BAGUN HATU)	19.49	<0.1	1.6	1.3	0.8	4.1	0.21	< 0.05
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	13.56	<0.1	1.4	1.3	0.2	2.91	0.08	< 0.05

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RIVER WATER MONITORING DONE BY NABL/MoEF LAB (APRIL 2019 to MARCH 2020)

Month	Locations	SO ₄ ⁻²	P	Nitrate Nitrogen as N	Nitrite Nitrogen as N	F ⁻	SiO ₂	Fe	Mn
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Oct-19	KHARKHAI RIVER (NEAR DUMUHANI)	40.2	<0.1	1.50	1.12	0.308	3.94	0.165	< 0.05
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	32.9	<0.1	1.34	1.13	0.21	8.14	0.288	< 0.05
	SWARNREKHA RIVER(NEAR BAGUN HATU)	11.1	<0.1	1.24	1.11	0.135	4.22	0.159	< 0.05
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	15.0	<0.1	1.21	1.12	0.118	2.82	0.229	< 0.05
Nov-19	KHARKHAI RIVER (NEAR DUMUHANI)	15.2	<0.1	1.27	0.52	0.065	2.2	0.205	< 0.05
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	17.4	<0.1	1.06	0.52	0.042	5.44	0.220	< 0.05
	SWARNREKHA RIVER(NEAR BAGUN HATU)	14.9	<0.1	1.23	0.51	0.642	2.42	0.207	< 0.05
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	7.2	<0.1	1.22	0.51	0.102	4.09	0.385	< 0.05
Dec-19	KHARKHAI RIVER (NEAR DUMUHANI)	12.4	<0.1	1.07	0.53	0.243	3.61	0.441	< 0.05
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	52.4	<0.1	1.02	0.56	0.258	4.71	0.298	< 0.05
	SWARNREKHA RIVER(NEAR BAGUN HATU)	27.9	<0.1	1.09	0.54	1.059	2.81	0.227	< 0.05
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	15.4	<0.1	1.24	0.54	0.268	1.92	0.231	< 0.05
Jan-20	KHARKHAI RIVER (NEAR DUMUHANI)	16.6	<0.1	1.24	0.56	0.332	3.84	0.210	< 0.05
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	10.2	<0.1	1.14	0.55	0.195	8.34	0.301	< 0.05
	SWARNREKHA RIVER(NEAR BAGUN HATU)	20.2	<0.1	1.37	0.55	0.386	3.92	0.309	< 0.05
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	17.6	<0.1	1.39	0.55	0.15	2.84	0.287	< 0.05
Feb-20	KHARKHAI RIVER (NEAR DUMUHANI)	14.2	<0.1	3.85	1.69	0.242	2.1	0.238	< 0.05
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	11.7	<0.1	3.78	1.69	0.092	5.14	0.188	< 0.05
	SWARNREKHA RIVER(NEAR BAGUN HATU)	18.4	<0.1	4.08	1.68	0.302	2.62	0.328	< 0.05
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	13.5	<0.1	3.88	1.68	0.252	4.11	0.208	< 0.05
Mar-20	KHARKHAI RIVER (NEAR DUMUHANI)	12.1	<0.1	1.40	0.16	0.202	3.51	1.295	< 0.05
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	8.6	<0.1	1.60	0.10	0.202	4.41	0.234	< 0.05
	SWARNREKHA RIVER(NEAR BAGUN HATU)	16.3	<0.1	1.60	0.23	0.702	3.01	0.498	< 0.05
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	10.4	<0.1	1.70	0.30	0.102	1.82	1.395	< 0.05

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Month	Locations	Cr (VI)	Cu	Cr	Cd	Ni	Zn	Pb	Nitrogen (Ammonia) as N	Total Nitrogen	O & G	COD
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Apr-19	KHARKHAI RIVER (NEAR DUMUHANI)	< 0.05	< 0.03	< 0.05	< 0.01	< 0.01	< 0.1	< 0.005	0.42	1.86	< 1.0	8
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	< 0.05	< 0.03	< 0.05	< 0.01	< 0.01	< 0.1	< 0.005	0.52	3.07	< 1.0	28
	SWARNREKHA RIVER(NEAR BAGUN HATU)	< 0.05	< 0.03	< 0.05	< 0.01	< 0.01	< 0.1	< 0.005	0.85	1.41	< 1.0	22
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	< 0.05	< 0.03	< 0.05	< 0.01	< 0.01	< 0.1	< 0.005	0.56	1.56	< 1.0	25
May-19	KHARKHAI RIVER (NEAR DUMUHANI)	< 0.05	< 0.03	< 0.05	< 0.01	0.015	< 0.1	0.018	0.32	6.4	< 1.0	20
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	< 0.05	< 0.03	< 0.05	< 0.01	< 0.01	< 0.1	0.026	0.48	10.8	< 1.0	35
	SWARNREKHA RIVER(NEAR BAGUN HATU)	< 0.05	< 0.03	< 0.05	< 0.01	< 0.01	< 0.1	0.006	0.29	12.4	< 1.0	32
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	< 0.05	0.03	< 0.05	< 0.01	< 0.01	< 0.1	0.008	0.31	12.1	< 1.0	19
Jun-19	KHARKHAI RIVER (NEAR DUMUHANI)	< 0.05	< 0.03	< 0.05	< 0.01	< 0.01	< 0.1	0.005	0.39	6.8	< 1.0	10
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	< 0.05	< 0.03	< 0.05	< 0.01	< 0.01	< 0.1	0.009	0.52	12.5	< 1.0	13
	SWARNREKHA RIVER(NEAR BAGUN HATU)	< 0.05	< 0.03	< 0.05	< 0.01	< 0.01	< 0.1	0.020	0.33	12	< 1.0	26
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	< 0.05	< 0.03	< 0.05	< 0.01	< 0.01	< 0.1	0.009	0.51	9.2	< 1.0	17
Jul-19	KHARKHAI RIVER (NEAR DUMUHANI)	< 0.05	< 0.03	< 0.05	< 0.01	< 0.01	< 0.1	0.008	0.32	1.76	< 1.0	23
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	< 0.05	< 0.03	< 0.05	< 0.01	< 0.01	< 0.1	0.005	0.72	3.27	< 1.0	14
	SWARNREKHA RIVER(NEAR BAGUN HATU)	< 0.05	< 0.03	< 0.05	< 0.01	< 0.01	< 0.1	0.009	0.55	1.11	< 1.0	21
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	< 0.05	< 0.03	< 0.05	< 0.01	< 0.01	< 0.1	0.008	0.58	1.58	< 1.0	18
Aug-19	KHARKHAI RIVER (NEAR DUMUHANI)	< 0.05	< 0.03	< 0.05	< 0.01	< 0.01	< 0.1	0.006	0.22	6.3	< 1.0	<10
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	< 0.05	< 0.03	< 0.05	< 0.01	< 0.01	< 0.1	0.008	0.18	10.5	< 1.0	12
	SWARNREKHA RIVER(NEAR BAGUN HATU)	< 0.05	< 0.03	< 0.05	< 0.01	< 0.01	< 0.1	0.026	0.49	12.6	< 1.0	<10
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	< 0.05	< 0.03	< 0.05	< 0.01	< 0.01	< 0.1	0.006	0.33	12.12	< 1.0	<10
Sep-19	KHARKHAI RIVER (NEAR DUMUHANI)	< 0.05	< 0.03	< 0.05	< 0.01	< 0.01	< 0.1	0.008	0.29	6.7	< 1.0	23
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	< 0.05	< 0.03	< 0.05	< 0.01	< 0.01	< 0.1	0.005	0.22	12.2	< 1.0	20
	SWARNREKHA RIVER(NEAR BAGUN HATU)	< 0.05	< 0.03	< 0.05	< 0.01	< 0.01	< 0.1	0.026	0.53	12.2	< 1.0	25
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	< 0.05	< 0.03	< 0.05	< 0.01	< 0.01	< 0.1	0.006	0.41	9.1	< 1.0	20

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Month	Locations	Cr (VI)	Cu	Cr	Cd	Ni	Zn	Pb	Nitrogen (Ammonia) as N	Total Nitrogen	O & G	COD
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Oct-19	KHARKHAI RIVER (NEAR DUMUHANI)	< 0.05	< 0.03	< 0.05	< 0.01	< 0.01	< 0.1	< 0.005	0.53	2.81	< 1.0	34
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	< 0.05	< 0.03	< 0.05	< 0.01	< 0.01	< 0.1	< 0.005	0.63	4.02	< 1.0	37
	SWARNREKHA RIVER(NEAR BAGUN HATU)	< 0.05	< 0.03	< 0.05	< 0.01	< 0.01	< 0.1	< 0.005	0.96	2.36	< 1.0	47
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	< 0.05	< 0.03	< 0.05	< 0.01	< 0.01	< 0.1	< 0.005	0.67	2.51	< 1.0	36
Nov-19	KHARKHAI RIVER (NEAR DUMUHANI)	< 0.05	< 0.03	< 0.05	< 0.01	0.015	< 0.1	0.018	0.43	7.35	< 1.0	42
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	< 0.05	< 0.03	< 0.05	< 0.01	< 0.01	< 0.1	0.026	0.59	11.75	< 1.0	39
	SWARNREKHA RIVER(NEAR BAGUN HATU)	< 0.05	< 0.03	< 0.05	< 0.01	< 0.01	< 0.1	0.006	0.40	13.35	< 1.0	36
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	< 0.05	0.03	< 0.05	< 0.01	< 0.01	< 0.1	0.008	0.42	13.05	< 1.0	51
Dec-19	KHARKHAI RIVER (NEAR DUMUHANI)	< 0.05	< 0.03	< 0.05	< 0.01	< 0.01	< 0.1	0.005	0.50	7.75	< 1.0	37
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	< 0.05	< 0.03	< 0.05	< 0.01	< 0.01	< 0.1	0.009	0.63	13.45	< 1.0	34
	SWARNREKHA RIVER(NEAR BAGUN HATU)	< 0.05	< 0.03	< 0.05	< 0.01	< 0.01	< 0.1	0.020	0.44	12.95	< 1.0	49
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	< 0.05	< 0.03	< 0.05	< 0.01	< 0.01	< 0.1	0.009	0.62	10.15	< 1.0	44
Jan-20	KHARKHAI RIVER (NEAR DUMUHANI)	< 0.05	< 0.03	< 0.05	< 0.01	< 0.01	< 0.1	0.008	0.43	2.71	< 1.0	37
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	< 0.05	< 0.03	< 0.05	< 0.01	< 0.01	< 0.1	0.005	0.83	4.22	< 1.0	43
	SWARNREKHA RIVER(NEAR BAGUN HATU)	< 0.05	< 0.03	< 0.05	< 0.01	< 0.01	< 0.1	0.009	0.66	2.06	< 1.0	51
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	< 0.05	< 0.03	< 0.05	< 0.01	< 0.01	< 0.1	0.008	0.69	2.53	< 1.0	41
Feb-20	KHARKHAI RIVER (NEAR DUMUHANI)	< 0.05	< 0.03	< 0.05	< 0.01	< 0.01	< 0.1	0.006	0.33	7.25	< 1.0	44
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	< 0.05	< 0.03	< 0.05	< 0.01	< 0.01	< 0.1	0.008	0.29	11.45	< 1.0	42
	SWARNREKHA RIVER(NEAR BAGUN HATU)	< 0.05	< 0.03	< 0.05	< 0.01	< 0.01	< 0.1	0.026	0.60	13.55	< 1.0	49
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	< 0.05	< 0.03	< 0.05	< 0.01	< 0.01	< 0.1	0.006	0.44	13.07	< 1.0	42
Mar-20	KHARKHAI RIVER (NEAR DUMUHANI)	< 0.05	< 0.03	< 0.05	< 0.01	< 0.01	< 0.1	0.008	0.40	7.65	< 1.0	51
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	< 0.05	< 0.03	< 0.05	< 0.01	< 0.01	< 0.1	0.005	0.33	13.15	< 1.0	42
	SWARNREKHA RIVER(NEAR BAGUN HATU)	< 0.05	< 0.03	< 0.05	< 0.01	< 0.01	< 0.1	0.026	0.64	13.15	< 1.0	52
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	< 0.05	< 0.03	< 0.05	< 0.01	< 0.01	< 0.1	0.006	0.52	10.05	< 1.0	40

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Month	Locations	BOD (3days at 270C)	Bariu m as Ba	Boro n as B	Residua l Chlorin e as Cl	Sulphi de as S 2	Phenolic Compou nds as Phenols	Cyanide as CN	Arseni c as As	Seleniu m as Se	Merc ury	Molybd enum as Mo	Alumin um	PAH
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Apr-19	KHARKHAI RIVER (NEAR DUMUHANI)	17.2	< 1.0	< 1.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.02	Absent
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	20.4	< 1.0	< 1.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.02	Absent
	SWARNREKHA RIVER(NEAR BAGUN HATU)	16	< 1.0	< 1.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.02	Absent
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	15.2	< 1.0	< 1.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.02	Absent
May-19	KHARKHAI RIVER (NEAR DUMUHANI)	8	< 1.0	< 1.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.02	Absent
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	14	< 1.0	< 1.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.02	Absent
	SWARNREKHA RIVER(NEAR BAGUN HATU)	12.8	< 1.0	< 1.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.02	Absent
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	7.6	< 1.0	< 1.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.02	Absent
Jun-19	KHARKHAI RIVER (NEAR DUMUHANI)	4.2	< 1.0	< 1.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.08	Absent
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	5.46	< 1.0	< 1.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.08	Absent
	SWARNREKHA RIVER(NEAR BAGUN HATU)	10.5	< 1.0	< 1.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.11	Absent
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	7.14	< 1.0	< 1.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.08	Absent
Jul-19	KHARKHAI RIVER (NEAR DUMUHANI)	3.1	< 1.0	< 1.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.02	Absent
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	1.6	< 1.0	< 1.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.02	Absent
	SWARNREKHA RIVER(NEAR BAGUN HATU)	3.3	< 1.0	< 1.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.02	Absent
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	1.6	< 1.0	< 1.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.02	Absent
Aug-19	KHARKHAI RIVER (NEAR DUMUHANI)	<4	< 1.0	< 1.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.02	Absent
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	<4	< 1.0	< 1.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.02	Absent
	SWARNREKHA RIVER(NEAR BAGUN HATU)	<4	< 1.0	< 1.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.02	Absent
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	<4	< 1.0	< 1.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.02	Absent
Sep-19	KHARKHAI RIVER (NEAR DUMUHANI)	<4	< 1.0	< 1.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.02	Absent
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	<4	< 1.0	< 1.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.02	Absent
	SWARNREKHA RIVER(NEAR BAGUN HATU)	<4	< 1.0	< 1.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.02	Absent
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	<4	< 1.0	< 1.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.02	Absent

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Month	Locations	BOD (3days at 27C)	Bariu m as Ba	Boro n as B	Residua l Chlorin e as Cl	Sulphi de as S 2	Phenolic Compou nds as Phenols	Cyanide as CN	Arseni c as As	Seleniu m as Se	Merc ury	Molybd enum as Mo	Alumin um	PAH
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Oct-19	KHARKHAI RIVER (NEAR DUMUHANI)	3.2	< 1.0	< 1.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.02	Absent
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	3.1	< 1.0	< 1.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.02	Absent
	SWARNREKHA RIVER(NEAR BAGUN HATU)	6.3	< 1.0	< 1.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.02	Absent
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	4.8	< 1.0	< 1.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.02	Absent
Nov-19	KHARKHAI RIVER (NEAR DUMUHANI)	9.7	< 1.0	< 1.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.02	Absent
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	6.5	< 1.0	< 1.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.02	Absent
	SWARNREKHA RIVER(NEAR BAGUN HATU)	4.8	< 1.0	< 1.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.02	Absent
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	6.5	< 1.0	< 1.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.02	Absent
Dec-19	KHARKHAI RIVER (NEAR DUMUHANI)	4.8	< 1.0	< 1.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.08	Absent
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	4.8	< 1.0	< 1.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.08	Absent
	SWARNREKHA RIVER(NEAR BAGUN HATU)	6.5	< 1.0	< 1.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.11	Absent
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	6.5	< 1.0	< 1.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.08	Absent
Jan-20	KHARKHAI RIVER (NEAR DUMUHANI)	6.5	< 1.0	< 1.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.02	Absent
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	4.9	< 1.0	< 1.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.02	Absent
	SWARNREKHA RIVER(NEAR BAGUN HATU)	4.9	< 1.0	< 1.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.02	Absent
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	4.8	< 1.0	< 1.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.02	Absent
Feb-20	KHARKHAI RIVER (NEAR DUMUHANI)	3.2	< 1.0	< 1.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.02	Absent
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	5.4	< 1.0	< 1.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.02	Absent
	SWARNREKHA RIVER(NEAR BAGUN HATU)	4.8	< 1.0	< 1.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.02	Absent
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	6.5	< 1.0	< 1.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.02	Absent
Mar-20	KHARKHAI RIVER (NEAR DUMUHANI)	6.4	< 1.0	< 1.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.02	Absent
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	4.8	< 1.0	< 1.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.02	Absent
	SWARNREKHA RIVER(NEAR BAGUN HATU)	6.6	< 1.0	< 1.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.02	Absent
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	4.9	< 1.0	< 1.0	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.02	Absent

Tata Steel Limited
Main works Jamshedpur
Online Stack Emission Report

Sl.no	PLANT	STACK	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19
			PM	PM	PM	PM	PM	PM
1	Power House	PH-4-Boiler-4	31.55	21.51	41.57	4.84	11.42	45.85
2	Coke Plant	Battery#05	25.02	24.59	26.39	25.24	27.33	23.08
3	Coke Plant	Battery#06	26.24	25.98	28.46	36.51	30.84	27.59
4	Coke Plant	Battery#07	19.32	21.14	-	-	22.09	31.11
5	Coke Plant	Battery#08	27.21	16.94	-	15.18	18.76	11.18
6	Coke Plant	Battery#09	18.64	9.19	7.99	-	7.31	12.10
7	Coke Plant	Battery 10 Process	23.02	20.02	-	-	14.51	12.75
8	Coke Plant	Battery 11 Process	23.81	25.92	-	-	24.91	35.69
9	Coke Plant	Battery 10 Pushing Dedusting	6.43	6.60	-	-	22.87	9.13
10	Coke Plant	Battery 11 Pushing Dedusting	12.22	11.18	-	-	13.08	12.33
11	Sinter Plant#1	SP-1 Waste Gas	42.20	46.61	52.14	50.65	49.34	58.84
12	Sinter Plant#2	SP-2 Waste Gas	38.47	21.94	21.19	32.01	24.01	31.36
13	Sinter Plant#3	SP-3 Combind (WG & DD)	69.29	78.13	67.26	-	72.02	67.04
14	Sinter Plant#4	SP-4-Combind (WG & DD)	69.99	73.77	68.88	-	67.29	63.39
15	Sinter Plant#1	SP-1 Dedusting	19.66	-	-	-	-	4.01
16	Blast Furnace	HMPP	4.49	6.22	7.82	-	12.61	9.31
17	Blast Furnace	G- Stock House	34.97	32.59	21.20	-	-	-
18	Blast Furnace	G- Cast House	19.16	23.64	24.20	-	26.24	18.54
19	Blast Furnace	H- Stock House	10.27	7.80	8.25	-	7.39	8.24
20	Blast Furnace	H- Cast House	12.90	12.42	13.30	-	6.17	6.08
21	Blast Furnace	I- Stock House	11.03	8.15	10.85	-	9.80	10.33
22	Blast Furnace	I- Cast House	8.00	6.67	8.07	-	8.70	8.79
23	Blast Furnace	I- PCI	8.72	6.78	6.22	-	7.51	9.49
24	LD#2	LD#02-Secondary Emission-01	3.63	4.17	4.48	-	4.64	3.92
25	LD#2	LD#02-Secondary Emission-02	3.79	3.85	3.78	-	3.80	4.05
26	LD#3	LD#03-Ladle Furnace#01	11.41	11.80	9.50	-	10.59	8.79
27	LD#3	LD#03-Ladle Furnace#02	16.21	8.50	4.10	-	9.43	8.35
28	LD#3	LD#03-Secondary Emission	8.09	8.42	8.22	-	6.60	7.01
29	Lime Plant	Merz Klin#07 Process	8.48	10.70	6.61	-	11.00	9.74
30	Lime Plant	Merz Klin 7 DE15	3.92	4.47	2.29	-	4.99	9.18
31	Lime Plant	Merz Klin 8 Process	5.09	5.73	6.10	3.86	3.59	3.83
32	Lime Plant	Merz Klin 9 Process	3.99	4.58	5.19	5.31	-	13.10
33	Pellet Plant	PP-ProcessGas-Wind Box	13.36	6.12	4.12	-	4.22	28.90
34	Pellet Plant	PP-ProcessGas-Hood	12.04	-	-	-	-	19.96
35	Pellet Plant	PP-Central-Dedusting	5.34	5.29	4.12	-	4.69	5.09
36	Pellet Plant	PP-Drying Section	11.76	12.55	10.34	-	11.97	8.87
37	Pellet Plant	PP Grinding Section#01	6.66	15.81	16.71	-	12.52	11.86
38	Pellet Plant	PP Grinding Section#02	5.50	12.19	12.65	-	10.64	9.88
39	LD#1	LD#01-Ladle Furnace#01	0.74	9.08	39.31	39.28	9.82	4.97
40	LD#1	LD#01-Ladle Furnace#02	2.25	3.89	9.13	9.49	15.96	12.50
41	LD#1	LD#01-Ladle Furnace#03	1.59	3.72	6.53	5.95	6.66	7.79
42	LD#1	LD#01-Secondary Emission	8.39	7.45	7.85	5.60	3.81	5.34
43	Lime Plant	Merz Klin#01 Process	1.78	1.27	2.50	-	1.46	1.66
44	Lime Plant	Merz Klin#02 Process	8.91	5.44	4.21	4.68	4.75	4.50
45	Lime Plant	Merz Klin#03 (Combined st	-	6.23	6.24	-	4.37	3.76
46	Lime Plant	Merz Klin#05 Process	1.28	1.49	1.07	-	0.93	1.15
47	Blast Furnace	F- Cast House	4.08	4.20	4.51	4.54	4.53	3.27
48	LD#2	LD#02-Ladle Furnace#01	15.87	22.23	6.06	-	14.35	2.91
49	LD#2	LD#02-Ladle Furnace#02	8.74	22.74	19.01	13.31	14.18	13.73
50	Sinter Plant#3	SP-3-Dedusting	2.25	2.41	2.97	-	7.90	6.98
51	Power House	PH-3 & Boiler-07&08	49.00	-	-	-	-	-

52	Sinter Plant#2	SP-2-High Line	1.84	2.55	2.27	2.27	2.59	2.58
53	Sinter Plant#2	SP 2 Dedusting	8.98	8.05	4.43	9.18	9.32	8.88
54	Blast Furnace	H--PCI-01	-	10.23	8.28	8.52	8.13	9.11
55	Blast Furnace	H--PCI-02	-	12.74	3.99	3.76	2.45	1.52
56	Blast Furnace	H- Stock House DE System	0.41	0.34	0.34	0.31	0.42	0.68
57	Blast Furnace	G- PCI-01	22.66	19.80	16.78	24.92	20.11	27.18
58	Blast Furnace	G- PCI-02	5.62	5.47	4.98	4.27	4.67	6.85
59	Blast Furnace	G- PCI-03	10.52	10.98	9.94	7.84	6.01	7.65
60	Blast Furnace	G- Stove	-	-	-	1.48	1.41	1.53
61	Blast Furnace	F- Stock House-DE	1.33	1.34	1.31	1.12	1.16	1.36
62	LD#2	LD#02-DE#01	-	-	-	-	-	-
63	LD#2	LD#02-DE#02	6.00	6.00	6.00	-	6.00	6.00
64	LD#2	LD#02-DE#03	-	-	-	-	-	-
65	LD#2	LD#02-DE#04	6.70	6.70	6.36	-	5.70	5.70
66	LD#2	LD#02-DE#05	4.05	3.92	3.66	-	-	-
67	LD#2	LD#02-DE#06	0.14	4.88	4.44	4.19	3.72	3.24
68	LD#2	LD#02-DE#07	4.85	5.85	74.40	-	-	26.42
69	LD#2	LD#02-DE#08	4.84	5.71	5.67	5.24	4.75	6.47
70	LD#2	LD#02-DE#09	8.70	8.69	8.69	8.70	8.70	8.68
71	Power House	PH-5-Boiler#A	49.48	-	-	-	-	-
72	Power House	PH-5-Boiler-B&C	8.24	-	-	-	-	-
73	Power House	PH-3-Boiler#5	24.84	21.24	28.09	-	20.31	12.15
74	Power House	PH-3-Boiler#6	22.68	35.56	26.35	-	21.85	12.63
75	Power House	PH-4-Boiler#1&2	13.81	15.68	11.53	-	14.20	11.85
76	Power House	PH-4-Boiler-5	-	-	-	-	-	-
77	Blast Furnace	C--Stove	2.51	2.09	1.68	3.12	3.84	3.71
78	Blast Furnace	E--Stove	2.68	2.93	2.41	-	2.06	2.55
79	Blast Furnace	E--Stock & Cast House - PM	8.30	15.01	6.80	-	10.53	7.36
80	Blast Furnace	F--Stove	-	-	-	-	1.65	1.70
81	Blast Furnace	F- PCI	10.41	4.21	0.72	0.82	0.91	1.04
82	Blast Furnace	H- Stove	-	1.41	1.48	-	1.67	1.85
83	Lime Plant	Merz Klin#06 Process	-	2.44	2.53	2.11	2.23	2.40
84	Lime Plant	MK#06-DE#12	2.59	2.61	2.90	-	-	-
85	Lime Plant	Merz Klin#08-DE#01B	6.75	9.13	4.04	-	5.10	8.31
86	Lime Plant	Merz Klin#09-DE#09	2.48	2.38	2.85	-	3.45	3.93
87	Sinter Plant#1	SinterPlant-01-BH-HL	11.23	19.67	22.81	-	4.67	1.99
88	Mills	New Bar Mill	-	-	-	-	4.86	8.21
89	Mills	Wire Rod Mill	-	-	-	-	53.83	38.97
90	Mills	Merchant mill	-	-	-	27.17	25.48	24.55
91	LD#2	LD#2SE-NEW-PM	-	-	-	-	-	-
92	Sinter Plant#1	Sinter-Plant#1-Cold-PM	-	-	-	-	1.01	0.91
93	Mills	CRM PLTCM	-	-	-	-	1.59	1.85
94	Mills	CRM BAF	-	-	-	4.99	2.30	1.69
95	Mills	CRM CGL-1	-	-	-	-	1.83	2.01
96	Blast Furnace	I- Stove	-	-	-	2.39	2.64	3.15
97	Mills	HSM RHF-3	-	-	-	-	4.54	3.31
98	Mills	HSM RHF-1	-	-	-	-	1.99	2.86
99	Mills	HSM RHF-2	-	-	-	-	2.36	2.46
100	Mills	CRM CGL-2	-	-	-	-	-	2.85


Sr. Manager

Env. Online Instruments



Head

Monitoring, Testing and Analysis

TATA STEEL LIMITED
WORKS, JAMSHEDPUR
ENVIRONMENT MANAGEMENT DEPARTMENT
ONLINE STACK PM, SO₂ and NO_x EMISSION MONITORING REPORT (mg/Nm³)
ONLINE STACK MONITORING REPORT SUMMARY FROM Oct-19 to Mar-20

Stack Location	Oct-19			Nov-19			Dec-19			Jan-20			Feb-20			Mar-20		
	PM	SO ₂	NO _x	PM	SO ₂	NO _x	PM	SO ₂	NO _x	PM	SO ₂	NO _x	PM	SO ₂	NO _x	PM	SO ₂	NO _x
LD#2 LF#1	4.6	-	-	7.8	-	-	8.0	-	-	14.0	-	-	10.5	-	-	6.5	-	-
LD#2 LF#2	16.0	-	-	9.1	-	-	7.6	-	-	6.3	-	-	9.7	-	-	12.0	-	-
LD#2 DE1	UM	-	-	UM	-	-	16.1	-	-	13.7	-	-	10.9	-	-	6.6	-	-
LD#2 DE2	6.0	-	-	6.1	-	-	6.3	-	-	6.3	-	-	6.2	-	-	6.1	-	-
LD#2 DE3	UM	-	-	8.1	-	-	4.1	-	-	1.1	-	-	1.7	-	-	11.2	-	-
LD#2 DE4	5.7	-	-	6.3	-	-	8.0	-	-	9.7	-	-	9.1	-	-	9.3	-	-
LD#2 DE5	3.3	-	-	3.6	-	-	3.3	-	-	2.8	-	-	2.7	-	-	2.4	-	-
LD#2 DE6	4.0	-	-	4.6	-	-	5.1	-	-	5.9	-	-	6.3	-	-	5.7	-	-
LD#2 DE7	UM	-	-	1.9	-	-	3.4	-	-	2.1	-	-	2.1	-	-	2.5	-	-
LD#2 DE8	1.3	-	-	2.6	-	-	3.9	-	-	4.4	-	-	4.2	-	-	2.8	-	-
LD#2 DE9	8.6	-	-	8.5	-	-	2.7	-	-	3.8	-	-	4.0	-	-	2.5	-	-
LD#3 Sec. Emission	6.4	-	-	6.3	-	-	6.4	-	-	6.1	-	-	6.0	-	-	6.3	-	-
LD#3 LF1	4.3	-	-	3.2	-	-	4.6	-	-	5.0	-	-	7.9	-	-	5.5	-	-
LD#3 LF2	7.4	-	-	4.8	-	-	4.7	-	-	4.8	-	-	5.1	-	-	4.7	-	-
Lime Plants																		
Mearz kiln no.1	1.6	-	-	1.3	-	-	1.5	-	-	1.4	-	-	1.7	-	-	2.7	-	-
Mearz kiln no.2	4.0	-	-	4.5	-	-	3.2	-	-	1.5	-	-	2.0	-	-	1.8	-	-
Mearz kiln no.3&4	4.4	-	-	4.6	-	-	4.6	-	-	3.4	-	-	5.8	-	-	6.8	-	-
Mearz kiln no.5	1.6	-	-	3.3	-	-	1.4	-	-	1.5	-	-	0.6	-	-	0.7	-	-
Mearz kiln no.6	MSD till 20th Jan 2020									3.4	-	-	2.4	-	-	2.1	-	-
DE12	MSD till 20th Jan 2020									3.2	-	-	3.3	-	-	2.6	-	-
Mearz kiln no.7	8.7	-	-	10.2	-	-	8.1	-	-	10.0	-	-	8.8	-	-	4.8	-	-
DE15	5.7	-	-	2.2	-	-	2.6	-	-	2.7	-	-	2.7	-	-	10.3	-	-
Mearz kiln no.8	4.5	-	-	4.5	-	-	5.0	-	-	5.6	-	-	5.9	-	-	4.1	-	-
DE1B	8.7	-	-	5.3	-	-	3.8	-	-	4.3	-	-	-	-	-	5.7	-	-
Mearz kiln no.9	9.4	-	-	4.6	-	-	3.5	-	-	4.5	-	-	5.4	-	-	3.7	-	-
DE9	3.5	-	-	4.1	-	-	4.7	-	-	4.5	-	-	-	-	-	7.4	-	-
Power Houses																		
PH#3(Blr.no.5)	12.2	-	-	11.9	-	-	10.3	-	-	9.9	14.9	9.0	12.0	32.8	6.3	12.1	30.6	10.8
PH#3(Blr.no.6)	16.0	35.7	-	12.1	22.7	-	9.9	7.6	15.9	11.2	26.8	12.3	13.0	34.3	7.6	14.2	29.8	10.8
PH#3(Blr.no.7&8)	39.2	-	-	35.8	-	-	22.5	-	-	28.6	-	-	33.2	36.5	15.0	36.4	3.4	14.5
PH#4(Blr.no.1&2)	14.3	-	-	13.3	-	-	6.4	-	-	6.0	73.6	13.2	9.5	73.4	14.3	11.9	79.1	18.3
PH#4(Blr.no.4)	50.1	62.7	28.0	30.2	62.6	78.6	48.5	-	-	29.0	533.2	151.2	27.6	445.6	136.9	26.1	-	117.6
PH#4(Blr.no.5)	UM	-	-	UM	-	-	31.2	-	-	62.4	89.9	246.7	17.6	122.8	187.2	12.6	122.4	117.2
PH#5(Blr.no.A)	UM	-	-	31.3	-	-	34.5	-	-	38.0	-	-	13.6	24.7	7.1	11.3	46.2	9.2
PH#5(Blr.no.B&C)	15.7	-	-	16.9	-	-	17.0	-	-	4.1	-	-	4.4	19.6	6.6	4.0	21.3	4.2
Rolling Mills																		
Merchant mill	24.6	-	-	24.0	-	-	23.6	-	-	23.2	-	-	-	-	-	19.2	-	-
Wire Rod Mill	10.6	-	-	8.7	-	-	9.9	-	-	14.9	-	-	-	-	-	22.9	-	-
Cold Rolling Mill (PLTCM)	2.0	-	-	1.8	-	-	1.8	-	-	1.7	-	-	-	-	-	1.2	-	-
Cold Rolling Mill (BAF)	3.0	-	-	3.3	-	-	2.8	-	-	2.4	-	-	-	-	-	2.3	-	-
Cold Rolling Mill (CGL-1)	2.9	-	-	16.2	-	-	3.7	-	-	3.9	-	-	-	-	-	3.0	-	-
Cold Rolling Mill (CGL-2)	2.9	-	-	3.6	-	-	3.8	-	-	4.3	-	-	-	-	-	5.2	-	-
Hot Strip Mill RHF 1	3.9	-	-	4.4	-	-	3.8	-	-	3.8	-	-	-	-	-	3.7	-	-
Hot Strip Mill RHF 2	4.7	-	-	2.8	-	-	3.0	-	-	3.1	-	-	-	-	-	3.4	-	-
Hot Strip Mill RHF 3	3.9	-	-	3.5	-	-	3.8	-	-	4.2	-	-	-	-	-	3.0	-	-
New Bar Mill	6.3	-	-	6.5	-	-	6.2	-	-	6.0	-	-	-	-	-	5.9	-	-

Note - Standards applicable as per Environment (Protection) (Third Amendment) Rules, 2012 issued in Gazette of India Notification no. GSR 277 (E) –Dated March 31, 2012

UM - Under Maintenance
MSD- Major Shut Down

TATA STEEL LIMITED
WORKS, JAMSHEDPUR
ENVIRONMENT MANAGEMENT DEPARTMENT
MANUAL STACK PM,SO2 and NOx MONITORING REPORT (mg/Nm3)
MANUAL STACK MONITORING REPORT SUMMARY FROM OCT-19 to MAR-20

Stack Location	Oct-19			Nov-19			Dec-19			Jan-20			Feb-20			Mar-20		
	PM	SO ₂	NOx	PM	SO ₂	NOx	PM	SO ₂	NOx	PM	SO ₂	NOx	PM	SO ₂	NOx	PM	SO ₂	NOx
Blast Furnaces																		
CBF Stove	-	-	-	-	-	-	-	-	-	8.5	-	-	-	-	-	-	-	-
EBF Stock and Cast House	1.1	-	-	-	-	-	-	-	-	4.4	-	-	-	-	-	-	-	-
FBF Stove	-	-	-	-	-	-	6.8	-	-	-	-	-	-	-	-	-	-	-
FBF Stock House	-	-	-	1.8	-	-	-	-	-	1.5	-	-	-	-	-	-	-	-
FBF Cast House	-	-	-	-	-	-	-	-	-	9.6	-	-	-	-	-	-	-	-
FBF Coal Injection	-	-	-	3.5	-	-	<5	-	-	12.8	-	-	-	-	-	5.5	-	-
GBF Stove	-	-	-	-	-	-	12.3	-	-	22.22	20.6	80.2	1.0	35.6	10.9	44.5	-	-
GBF Stock House	0.4	-	-	-	-	-	-	-	-	-	-	-	1.6	-	-	3.0	-	-
GBF Cast House 2	-	-	-	15.7	-	-	-	-	-	-	-	-	2	-	-	-	-	-
GBF Coal Injection 1	45.7	-	-	34.4	-	-	11.7	-	-	16.8	-	-	20.1	-	-	-	-	-
GBF Coal Injection 2	-	-	-	3.0	-	-	<5	-	-	6.7	-	-	4.4	-	-	5.8	-	-
GBF Coal Injection 3	-	-	-	-	-	-	<5	-	-	51.3	-	-	-	-	-	15.6	-	-
HBF Stock House	-	-	-	-	-	-	13.00	-	-	7.7	-	-	7.9	-	-	14.4	-	-
HBF Cast House	-	-	-	-	-	-	<5	-	-	-	-	-	10.2	-	-	-	-	-
HBF Coal Injection 1(OLD)	6.41	-	-	5.9	-	-	9.52	-	-	5.2	-	-	6.2	-	-	-	-	-
HBF Coal Injection 2(NEW)	-	-	-	-	-	-	-	-	-	-	-	-	11.6	-	-	13.8	15.7	-
IBF Stock House	-	-	-	11.3	-	-	7.8	-	-	15.9	-	-	15.9	-	-	3.4	-	-
IBF Cast House	7.0	2	8	7.8	-	-	-	-	-	8.5	-	-	-	-	-	4	-	-
IBF Coal Injection	1.6	78.3	14.9	-	-	-	34.7	-	-	11.2	16.5	72.83	-	-	-	-	-	-
Sinter Plants																		
SP1 WG	66.4	-	-	72.5	-	-	54.7	19.2	78.4	70	17.88	78.39	-	-	-	49.0	-	-
SP1 DD & Hot Region	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16.8	-	-
SP1 Highline	-	-	-	-	-	-	5.5	-	-	-	-	-	-	-	-	-	-	-
SP2 WG	41.6	-	-	60.5	-	-	57.4	10.0	64.7	63	-	-	-	-	-	-	-	-
SP2 Dedusting	-	-	-	-	-	-	-	-	-	-	-	-	38	-	-	-	-	-
SP3 WG & DD	48.5	20.1	78.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SP3 Dedusting	2.8	-	-	-	-	-	<5	-	-	4.2	-	-	4	-	-	14.1	-	-
SP4 WG & DD	54.2	-	-	96.2	-	-	52.8	19.5	76.0	-	-	-	-	-	-	-	-	-
Coke Plant																		
CP Battery 5	-	-	-	68.5	-	-	30.8	388.1	178.1	49.06	334.73	218.23	61.51	-	-	-	-	-
CP Battery 6	-	-	-	62.2	-	-	-	-	-	67.76	283.1	204.76	67	-	-	-	-	-
CP Battery 7	-	-	-	-	-	-	-	-	-	52.88	278.65	192.58	-	-	-	-	-	-
CP Battery 8	17	169.6	4.3	-	-	-	-	-	-	-	-	-	-	-	-	20.5	-	-
CP Battery 9	44	39	256	75.5	-	-	98.7	423.6	193.8	-	-	-	-	-	-	31.3	-	-
CP Battery 10	-	-	-	26.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CP Battery 11	-	-	-	33.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CP Battery 11 P&D	-	-	-	-	-	-	10.6	-	-	-	-	-	-	-	-	-	-	-
Pellet Plant																		
PP-Process Gas Cleaning WB	26.3	-	-	31.5	-	-	-	-	-	-	-	-	29	67	413.5	-	-	-
PP-Grinding 1	8.0	-	4.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PP-Process Gas Cleaning Hood	15.4	68.0	2.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LD Shops																		
LD#1 LF#1	-	-	-	-	-	-	-	-	-	8.5	-	-	-	-	-	9.1	-	-
LD#1 LF#2	-	-	-	-	-	-	-	-	-	20.7	-	-	-	-	-	4.72	-	-
LD#1 LF#3	-	-	-	24.3	-	-	29.7	-	-	34.5	-	-	-	-	-	3.3	-	-
LD#2 Sec. Emission # 1	-	-	-	-	-	-	-	-	-	5.48	-	-	-	-	-	-	-	-
LD#2 Sec. Emission # 3	-	-	-	-	-	-	18.8	-	-	-	-	-	-	-	-	-	-	-
LD#2 LF#1	-	-	-	-	-	-	-	-	-	10.9	-	-	-	-	-	-	-	-
LD#2 DE8	-	-	-	5.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LD#3 LF1	-	-	-	-	-	-	6.6	-	-	-	-	-	-	-	-	-	-	-
LD#3 LF2	12.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TATA STEEL LIMITED
WORKS, JAMSHEDPUR
ENVIRONMENT MANAGEMENT DEPARTMENT
MANUAL STACK PM,SO₂ and NO_x MONITORING REPORT (mg/Nm³)
MANUAL STACK MONITORING REPORT SUMMARY FROM OCT-19 to MAR-20

Stack Location	Oct-19			Nov-19			Dec-19			Jan-20			Feb-20			Mar-20		
	PM	SO ₂	NO _x	PM	SO ₂	NO _x	PM	SO ₂	NO _x	PM	SO ₂	NO _x	PM	SO ₂	NO _x	PM	SO ₂	NO _x
Lime Plants																		
Mearz kiln no.1	-	-	-	1.3	-	-	-	-	-	-	-	-	-	-	-	2.9	-	-
Mearz kiln no.2	1.0	-	-	-	-	-	<5	11.1	69.9	1.32	-	-	2.2	-	-	2.8	-	19
Mearz kiln no.3&4	-	-	-	-	-	-	-	-	-	13.8	-	-	-	-	-	5.0	-	55
Mearz kiln no.6	-	-	-	-	-	-	-	-	-	-	-	-	1.4	-	-	1.1	-	-
DE12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.1	-	-
Mearz kiln no.7	-	-	-	1.0	-	-	-	-	-	-	-	-	4.6	-	-	-	-	-
DE15	-	-	-	2.7	-	-	-	-	-	2.5	-	-	-	-	-	-	-	-
Mearz kiln no.8	2	1	28	-	-	-	-	-	-	4.26	13.6	79.1	-	-	-	9.1	-	7
DE1B	2.7	-	-	4.2	-	-	-	-	-	2.64	-	-	-	-	-	3.4	-	-
Mearz kiln no.9	5.4	145.6	118.2	6.0	-	-	-	-	-	22.2	-	-	-	-	-	8.8	-	21
DE9	3.4	-	-	-	-	-	-	-	-	7.98	-	-	-	-	-	7.7	-	-
Power Houses																		
PH#3(Blr.no.5)	-	-	-	16.8	-	-	-	-	-	31.7	-	-	-	14	-	-	-	-
PH#3(Blr.no.6)	-	-	-	15.6	-	-	-	-	-	21.2	-	-	-	20	-	17.92	-	-
PH#3(Blr.no.7&8)	-	-	-	-	-	-	20.5	16.3	81.7	-	-	-	-	-	-	20.9	-	-
PH#4(Blr.no.1&2)	-	-	-	-	-	-	14.5	15.6	99.1	-	-	-	19.3	-	-	19.4	-	-
PH#4(Blr.no.4)	-	-	-	-	-	-	23.3	-	-	19	-	-	27.9	39.35	51	38.5	-	-
PH#4(Blr.no.5)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12.6	-	-
PH#5(Blr.no.A)	-	-	-	24.7	-	-	19.6	-	-	21.04	41.55	114.31	18.5	-	-	-	-	-
PH#5(Blr.no.B&C)	-	-	-	-	-	-	17.8	-	-	-	-	-	17.0	-	-	-	-	-
Rolling Mills																		
Merchant mill	22.2	-	-	21.2	-	-	45.0	-	-	22.9	-	-	-	-	-	23.6	-	-
Wire Rod Mill	36	5	10	2.1	-	-	-	-	-	41.2	-	-	-	-	-	-	-	-
Cold Rolling Mill (PLTCM)	-	-	-	-	-	-	-	-	-	20.5	-	36.6	-	-	-	-	-	-
Cold Rolling Mill (BAF)	3.8	-	-	-	-	-	-	-	-	17.92	-	-	-	-	-	13.9	-	-
Cold Rolling Mill (CGL-1)	-	-	-	-	-	-	-	-	-	15.2	-	-	-	-	-	-	-	-
Cold Rolling Mill (ARP-Old)	147.6	-	-	-	-	-	-	-	-	112.3	-	-	147.0	-	-	100	-	-
Cold Rolling Mill (ARP- New)	-	-	-	-	-	-	106.6	-	-	158.5	-	-	-	-	-	136	-	-
Hot Strip Mill RHF 1	-	-	-	-	-	-	-	-	-	19.9	-	-	-	-	-	-	-	-
Hot Strip Mill RHF 2	10.7	-	-	-	-	-	-	-	-	21.2	-	-	-	-	-	-	-	-
New Bar Mill	47.2	-	-	-	-	-	47.3	16.6	83.6	-	-	-	-	-	-	-	-	-

Note - Standards applicable as per Environment (Protection) (Third Amendment) Rules, 2012 issued in Gazette of India Notification no. GSR 277 (E) –Dated March 31, 2012.

UM - Under Maintenance
MSD- Major Shut Down

TATA STEEL LIMITED
H₂S Content in Coke Oven Gas after Desulphurization
FROM APRIL 2019 TO MARCH 2020

H₂S Content in Coke Oven Gas after Desulphurization for FY20			
SN	Month	UoM	H₂S Content
1	Apr-19	mg/Nm ³	345
2	May-19	mg/Nm ³	337
3	Jun-19	mg/Nm ³	349
4	Jul-19	mg/Nm ³	334
5	Aug-19	mg/Nm ³	363
6	Sep-19	mg/Nm ³	338
7	Oct-19	mg/Nm ³	358
8	Nov-19	mg/Nm ³	346
9	Dec-19	mg/Nm ³	410
10	Jan-20	mg/Nm ³	312
11	Feb-20	mg/Nm ³	346
12	Mar-20	mg/Nm ³	305



NABL
Accredited Laboratory

ULR – TC74711900000658F

WEST BENGAL WASTE MANAGEMENT LTD.

(A Division of RAMKY Enviro Engineers Ltd.)
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LABORATORY
(Recognized by WBPCB)

WBWML/GF/LAB-310



TEST REPORT

Name and Address of Customer : M/s Tata Steel Ltd.
Jamshedpur, Jharkhand - 831009.
Sample Description : DS slag.
Sample Collected by : WBWML
Date of Sampling : 18th November'2019
Sample Registration No. and Date : CA – 19/414, 25th November'2019
Sample Receipt Condition : Sample recd. in plastic pouch.
Analysis Starting Date : 25th November'2019
Analysis Completion Date : 30th November'2019
Test Required : Comprehensive Analysis
Report No. and Date : CAR - 19/414, 30th November'2019
Sub-contracting of Analysis : None

TEST RESULT

Sl. no.	Parameter	Unit	Method	Observation / Result	CPCB Std. and WLT / TCLP Limit for Direct Landfill
1	Bulk Density	Gm/cc	ASTM Std. : D 5057 – 10	1.93	–
2	Paint Filter Liquid Test	–	SW-846 : 9095 A	Pass	Pass
3	pH (at 25.0°C)	–	USEPA 1998, SW-846 : 9045C	12.77	4.0-12.0
4	Calorific Value	kcal/kg	IS : 1350 (Part II) – 1975 (RA 2010)	< 250	< 2500.0
5	Flash Point	°C	USEPA 1998, SW-846 : 1020A	> 60	> 60.0
6	Loss on Drying at 103-105 °C	% (w/w)	Std. Methods : 2540 G : 2017	7.16	–
7	Loss on Ignition at 550 °C (Dry Basis)	% (w/w)	Std. Methods : 2540 G : 2017	2.81	< 20.0 (non-biodegradables) < 5.0 (biodegradables)
8	Water Soluble Organics	% (w/w)	DIN : 38414 Part 4 (S4) Std. Methods : 2540 E : 2017	1.91	< 10.0
9	Oil and Grease (As n-Hexane Extractable)	% (w/w)	USEPA 1998, SW-846 : 9071A	< 1.00	< 4.0
10	Cadmium – Total	mg/kg	USEPA 1998, SW-846 : 7000 B	3.95	–
11	Cadmium – WLT	mg/L	DIN : 38414 Part 4 (S4) Std. Methods : 3111 B : 2017	0.02	< 0.20
12	Cadmium – TCLP	mg/L	USEPA 1998, SW-846 : 1311 Std. Methods : 3111 B : 2017	0.02	< 1.00
13	Chromium – Total	mg/kg	USEPA 1998, SW-846 : 7000 B	555.18	–
14	Chromium (VI) – WLT	mg/L	DIN : 38414 Part 4 (S4) Std. Methods : 3500-Cr B : 2017	< 0.10	< 0.50
15	Chromium – TCLP	mg/L	USEPA 1998, SW-846 : 1311 Std. Methods : 3111 B : 2017	0.25	< 5.0

Towards sustainable growth

Sl. no.	Parameter	Unit	Method	Observation / Result	CPCB Std. and WLT / TCLP Limit for Direct Landfill
16	Copper – Total	mg/kg	USEPA 1998, SW-846 :7000 B	8.03	–
17	Copper – WLT	mg/L	DIN : 38414 Part 4 (S4) Std. Methods : 3111 B :2017	0.28	< 10.0
18	Lead – Total	mg/kg	USEPA 1998, SW-846 :7000 B	14.43	–
19	Lead – WLT	mg/L	DIN : 38414 Part 4 (S4) Std. Methods : 3111 B :2017	0.32	< 2.0
20	Lead – TCLP	mg/L	USEPA 1998, SW-846 : 1311 Std. Methods : 3111 B :2017	0.66	< 5.0
21	Nickel – Total	mg/kg	SW-846 : 3050B, 7000 B	59.59	–
22	Nickel – WLT	mg/L	DIN : 38414 Part 4 (S4) Std. Methods : 3111 B :2017	0.13	< 3.0
23	Zinc – Total	mg/kg	USEPA 1998, SW-846 :7000 B	64.46	–
24	Zinc – WLT	mg/L	DIN : 38414 Part 4 (S4) Std. Methods : 3111 B :2017	0.08	< 10.0

Note:

CPCB – Central Pollution Control Board

WLT – Water Leaching Test

TCLP – Toxicity Characteristics Leaching Procedure

ASTM – American Society for Testing and Materials

IS – Indian Standard

SW 846 – Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, USEPA, May 1997

Std. Methods – Standard Methods for the Examination of Water & Wastewater, 23rd Edition, APHA/AWWA/WEF, 2017

DIN : 38414 Part 4 (S4) – German Standard Procedure for Water, Wastewater, and Sediment Testing-Group S (Sludge and Sediment);

Determination of Leachability (S4), 1984

NA – Not Analyzed, ND – Not Detected

The comprehensive analysis report refers only to the 'as received' sample of waste**The relevance vis-à-vis applicability of the report solely relates to the category no. as per the latest Hazardous Waste Rules as or as would be assigned by the concerned statutory authority****The report cannot be produced in part or in full without the permission of West Bengal Waste Management Limited**


Checked by


Tarun Kumar Mirdya
(Lab. Manager)
Authorized Signatory

WEST BENGAL WASTE MANAGEMENT LTD.

(A Division of RAMKY Enviro Engineers Ltd.)
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 E-mail : laboratorywbwml@ramky.com
 CIN : U90002WB2004PLC098219



LABORATORY TEST REPORT

Name and Address of Customer : M/s Tata Steel Ltd.
 Jamshedpur, Jharkhand - 831009.
 Sample Description : DS slag.
 Sample Collected by : WBWML
 Date of Sampling : 18th November'2019
 Sample Registration No. and Date : CA – 19/414, 25th November'2019
 Sample Receipt Condition : Sample recd. in plastic pouch.
 Analysis Starting Date : 25th November'2019
 Analysis Completion Date : 30th November'2019
 Test Required : Comprehensive Analysis
 Report No. and Date : CAR - 19/414, 30th November'2019
 Sub-contracting of Analysis : None

TEST RESULT

Sl. no.	Parameter	Unit	Method	Observation / Result	CPCB Std. and WLT / TCLP Limit for Direct Landfill
1	Physical State	–	Visual observation	Dry solid	–
2	Color	–	Visual observation	Grey	–
3	Texture	–	Visual observation	Lumps & Powder	–
4	Reactive Cyanide	mg/kg	SW-846 : Ch. 7 (7.3.3), 9014	< 1.00	–
5	Reactive Sulfide	mg/kg	SW-846 : Ch. 7 (7.3.4), 9034	< 5.00	–
6	Cyanide – Total	mg/kg	SW-846 : 9010B, 9014	< 1.00	–
7	Cyanide – WLT	mg/L	DIN : 38414 Part 4 (S4) Std. Methods : 4500-CN ⁻ C SW-846 : 9014	< 0.05	< 2.0
8	Fluoride – Total	mg/kg	Std. Methods : 4500-F ⁻ B, D	< 1.00	–
9	Fluoride – WLT	mg/L	DIN : 38414 Part 4 (S4) Std. Methods : 4500F ⁻ B, D	< 1.00	< 50.0
10	Nitrate – WLT	mg/L	DIN : 38414 Part 4 (S4) Std. Methods : 4500-NO ₃ ⁻ E	< 0.10	< 30.0
11	Ammonia – WLT	mg/L	DIN : 38414 Part 4 (S4) Std. Methods : 4500-NH ₃ B, C	< 5.00	< 1000.0
12	Arsenic – Total	mg/kg	SW-846 : 3050B Std. Methods:3500-As B :2017	< 1.00	–
13	Arsenic – WLT	mg/L	DIN : 38414 Part 4 (S4) Std. Methods:3500-As B :2017	< 0.10	< 1.0
14	Phenol – WLT	mg/L	DIN : 38414 Part 4 (S4) SW-846 : 9065	< 1.00	< 100.0
15	Mercury – Total	mg/kg	SW-846 : 7471A Std. Methods : 3112 B :2017	NA	–
16	Mercury – WLT	mg/L	DIN : 38414 Part 4 (S4) SW-846 : 7470A Std. Methods : 3112 B :2017	NA	< 0.10
17	Vanadium – Total	mg/kg	SW-846 : 3050B, 7910	NA	–
18	Vanadium – WLT	mg/L	SW-846 : 3010A, 7910	NA	< 0.20 *

19	Benzene	mg/L	GC-MS	ND	< 0.50
20	Carbon tetrachloride	mg/L	GC-MS	ND	< 0.50
21	Chlordane	mg/L	GC-MS	ND	< 0.03
22	Chlorobenzene	mg/L	GC-MS	ND	< 100.0
23	Chloroform	mg/L	GC-MS	ND	< 6.0
24	o-, m-, p-Cresol	mg/L	GC-MS	ND	< 200.0 each
25	Endrin	mg/L	GC-MS	ND	< 0.02
26	Ethyl Methyl Ketone	mg/L	GC-MS	ND	< 200.0
27	Heptachlor (and its epoxide)	mg/L	GC-MS	ND	< 0.008
28	Hexachlorobenzene	mg/L	GC-MS	ND	< 0.13
29	Hexachlorobutadiene	mg/L	GC-MS	ND	< 0.50
30	Hexachloroethane	mg/L	GC-MS	ND	< 3.0
31	Indene	mg/L	GC-MS	ND	< 0.40
32	Methoxychlor	mg/L	GC-MS	ND	< 10.0
33	Nitrobenzene	mg/L	GC-MS	ND	< 2.0
34	Pentachlorophenol	mg/L	GC-MS	ND	< 100.0
35	Pyridine	mg/L	GC-MS	ND	< 5.0
36	Tetrachloroethylene	mg/L	GC-MS	ND	< 0.70
37	Toxaphene	mg/L	GC-MS	ND	< 0.50
38	Trichloroethylene	mg/L	GC-MS	ND	< 0.50
39	Vinyl Chloride	mg/L	GC-MS	ND	< 0.20
40	1,1-Dichloroethylene	mg/L	GC-MS	ND	< 0.70
41	1,2-Dichloroethane	mg/L	GC-MS	ND	< 0.50
42	1,4-Dichlorobenzene	mg/L	GC-MS	ND	< 7.50
43	2,4-D	mg/L	GC-MS	ND	< 10.0
44	2,4-Dinitrotoluene	mg/L	GC-MS	ND	< 0.13
45	2,4,5-TP (Silvex)	mg/L	GC-MS	ND	< 1.0
46	2,4,5-Trichlorophenol	mg/L	GC-MS	ND	< 400.0
47	2,4,6-Trichlorophenol	mg/L	GC-MS	ND	< 2.0

Enclosed GC-MS Chromatogram D:\GC-MS Analysis - Solvent DCM\Data File\Single processing\CAR-19. 414 Tata Steel Ltd.- DS slag. Qgd.

Note:

CPCB – Central Pollution Control Board

WLT – Water Leaching Test

TCLP – Toxicity Characteristics Leaching Procedure

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SW 846 – Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, USEPA, May 1997

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The relevance vis-à-vis applicability of the report solely relates to the category no. as per the latest Hazardous Waste Rules as or as would be assigned by the concerned statutory authority.

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Checked by


Tarun Kumar Mudda
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Authorized Signatory



NABL
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ULR – TC74711900000659F

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LABORATORY
(Recognized by WBPCB)

WBWML/GF/LAB-310



TEST REPORT

Name and Address of Customer : M/s Tata Steel Ltd.
Jamshedpur, Jharkhand - 831009.
Sample Description : LF slag.
Sample Collected by : WBWML
Date of Sampling : 18th November'2019
Sample Registration No. and Date : CA – 19/415, 25th November'2019
Sample Receipt Condition : Sample recd. in plastic pouch.
Analysis Starting Date : 25th November'2019
Analysis Completion Date : 30th November'2019
Test Required : Comprehensive Analysis
Report No. and Date : CAR - 19/415, 30th November'2019
Sub-contracting of Analysis : None

TEST RESULT

Sl. no.	Parameter	Unit	Method	Observation / Result	CPCB Std. and WLT / TCLP Limit for Direct Landfill
1	Bulk Density	Gm/cc	ASTM Std. : D 5057 – 10	2.12	–
2	Paint Filter Liquid Test	–	SW-846 : 9095 A	NA	Pass
3	pH (at 25.0°C)	–	USEPA 1998, SW-846 : 9045C	12.86	4.0-12.0
4	Calorific Value	kcal/kg	IS : 1350 (Part II) – 1975 (RA 2010)	< 250	< 2500.0
5	Flash Point	°C	USEPA 1998, SW-846 : 1020A	> 60	> 60.0
6	Loss on Drying at 103-105 °C	% (w/w)	Std. Methods : 2540 G : 2017	2.66	–
7	Loss on Ignition at 550 °C (Dry Basis)	% (w/w)	Std. Methods : 2540 G : 2017	2.53	< 20.0 (non-biodegradables) < 5.0(biodegradables)
8	Water Soluble Organics	% (w/w)	DIN : 38414 Part 4 (S4) Std. Methods : 2540 E : 2017	0.40	< 10.0
9	Oil and Grease (As n-Hexane Extractable)	% (w/w)	USEPA 1998, SW-846 : 9071A	< 1.00	< 4.0
10	Cadmium – Total	mg/kg	USEPA 1998, SW-846 :7000 B	2.68	–
11	Cadmium – WLT	mg/L	DIN : 38414 Part 4 (S4) Std. Methods : 3111 B :2017	0.02	< 0.20
12	Cadmium – TCLP	mg/L	USEPA 1998, SW-846 : 1311 Std. Methods : 3111 B :2017	0.09	< 1.00
13	Chromium – Total	mg/kg	USEPA 1998, SW-846 :7000 B	345.22	–
14	Chromium (VI) – WLT	mg/L	DIN : 38414 Part 4 (S4) Std. Methods:3500-Cr B :2017	< 0.10	< 0.50
15	Chromium – TCLP	mg/L	USEPA 1998, SW-846 : 1311 Std. Methods : 3111 B :2017	0.27	< 5.0

Towards sustainable growth

Sl. no.	Parameter	Unit	Method	Observation / Result	CPCB Std. and WLT / TCLP Limit for Direct Landfill
16	Copper – Total	mg/kg	USEPA 1998,SW-846 :7000 B	7.13	–
17	Copper – WLT	mg/L	DIN : 38414 Part 4 (S4) Std. Methods : 3111 B :2017	0.36	< 10.0
18	Lead – Total	mg/kg	USEPA 1998,SW-846 :7000 B	6.81	–
19	Lead – WLT	mg/L	DIN : 38414 Part 4 (S4) Std. Methods : 3111 B :2017	0.55	< 2.0
20	Lead – TCLP	mg/L	USEPA 1998, SW-846 : 1311 Std. Methods : 3111 B :2017	0.69	< 5.0
21	Nickel – Total	mg/kg	SW-846 : 3050B, 7000 B	61.17	–
22	Nickel – WLT	mg/L	DIN : 38414 Part 4 (S4) Std. Methods : 3111 B :2017	0.04	< 3.0
23	Zinc – Total	mg/kg	USEPA 1998,SW-846 :7000 B	30.76	–
24	Zinc – WLT	mg/L	DIN : 38414 Part 4 (S4) Std. Methods : 3111 B :2017	0.05	< 10.0

Note:

CPCB – Central Pollution Control Board

WLT – Water Leaching Test

TCLP – Toxicity Characteristics Leaching Procedure

ASTM – American Society for Testing and Materials

IS – Indian Standard

SW 846 – Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, USEPA, May 1997

Std. Methods – Standard Methods for the Examination of Water & Wastewater, 23rd Edition, APHA/AWWA/WEF, 2017


DIN : 38414 Part 4 (S4) – German Standard Procedure for Water, Wastewater, and Sediment Testing-Group S (Sludge and Sediment);

Determination of Leachability (S4), 1984

NA – Not Analyzed, ND – Not Detected

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Checked by



Tarun Kumar Middya
(Lab. Manager)
Authorized Signatory

WEST BENGAL WASTE MANAGEMENT LTD.

(A Division of RAMKY Enviro Engineers Ltd.)

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CIN : U90002WB2004PLC098219

WBWML/GF/LAB-310



LABORATORY TEST REPORT

Name and Address of Customer : M/s Tata Steel Ltd.
Jamshedpur, Jharkhand - 831009.

Sample Description : LF slag.

Sample Collected by : WBWML

Date of Sampling : 18th November'2019

Sample Registration No. and Date : CA - 19/415, 25th November'2019

Sample Receipt Condition : Sample recd. in plastic pouch.

Analysis Starting Date : 25th November'2019

Analysis Completion Date : 30th November'2019

Test Required : Comprehensive Analysis

Report No. and Date : CAR - 19/415, 30th November'2019

Sub-contracting of Analysis : None

TEST RESULT

Sl. no.	Parameter	Unit	Method	Observation / Result	CPCB Std. and WLT / TCLP Limit for Direct Landfill
1	Physical State	-	Visual observation	Dry solid	-
2	Color	-	Visual observation	Grey	-
3	Texture	-	Visual observation	Lumps & Powder	-
4	Reactive Cyanide	mg/kg	SW-846 : Ch. 7 (7.3.3), 9014	< 1.00	-
5	Reactive Sulfide	mg/kg	SW-846 : Ch. 7 (7.3.4), 9034	< 5.00	-
6	Cyanide - Total	mg/kg	SW-846 : 9010B, 9014	< 1.00	-
7	Cyanide - WLT	mg/L	DIN : 38414 Part 4 (S4) Std. Methods : 4500-CN C SW-846 : 9014	< 0.05	< 2.0
8	Fluoride - Total	mg/kg	Std. Methods : 4500-F B, D	< 1.00	-
9	Fluoride - WLT	mg/L	DIN : 38414 Part 4 (S4) Std. Methods : 4500F B, D	< 1.00	< 50.0
10	Nitrate - WLT	mg/L	DIN : 38414 Part 4 (S4) Std. Methods : 4500-NO ₃ E	< 0.10	< 30.0
11	Ammonia - WLT	mg/L	DIN : 38414 Part 4 (S4) Std. Methods : 4500-NH ₃ B, C	< 5.00	< 1000.0
12	Arsenic - Total	mg/kg	SW-846 : 3050B Std. Methods:3500-As B :2017	< 1.00	-
13	Arsenic - WLT	mg/L	DIN : 38414 Part 4 (S4) Std. Methods:3500-As B :2017	< 0.10	< 1.0
14	Phenol - WLT	mg/L	DIN : 38414 Part 4 (S4) SW-846 : 9065	< 1.00	< 100.0
15	Mercury - Total	mg/kg	SW-846 : 7471A Std. Methods : 3112 B :2017	NA	-
16	Mercury - WLT	mg/L	DIN : 38414 Part 4 (S4) SW-846 : 7470A Std. Methods : 3112 B :2017	NA	< 0.10
17	Vanadium - Total	mg/kg	SW-846 : 3050B, 7910	NA	-
18	Vanadium - WLT	mg/L	SW-846 : 3010A, 7910	NA	< 0.20 *

19	Benzene	mg/L	GC-MS	ND	< 0.50
20	Carbon tetrachloride	mg/L	GC-MS	ND	< 0.50
21	Chlordane	mg/L	GC-MS	ND	< 0.03
22	Chlorobenzene	mg/L	GC-MS	ND	< 100.0
23	Chloroform	mg/L	GC-MS	ND	< 6.0
24	o-, m-, p-Cresol	mg/L	GC-MS	ND	< 200.0 each
25	Endrin	mg/L	GC-MS	ND	< 0.02
26	Ethyl Methyl Ketone	mg/L	GC-MS	ND	< 200.0
27	Heptachlor (and its epoxide)	mg/L	GC-MS	ND	< 0.008
28	Hexachlorobenzene	mg/L	GC-MS	ND	< 0.13
29	Hexachlorobutadiene	mg/L	GC-MS	ND	< 0.50
30	Hexachloroethane	mg/L	GC-MS	ND	< 3.0
31	Indene	mg/L	GC-MS	ND	< 0.40
32	Methoxychlor	mg/L	GC-MS	ND	< 10.0
33	Nitrobenzene	mg/L	GC-MS	ND	< 2.0
34	Pentachlorophenol	mg/L	GC-MS	ND	< 100.0
35	Pyridine	mg/L	GC-MS	ND	< 5.0
36	Tetrachloroethylene	mg/L	GC-MS	ND	< 0.70
37	Toxaphene	mg/L	GC-MS	ND	< 0.50
38	Trichloroethylene	mg/L	GC-MS	ND	< 0.50
39	Vinyl Chloride	mg/L	GC-MS	ND	< 0.20
40	1,1-Dichloroethylene	mg/L	GC-MS	ND	< 0.70
41	1,2-Dichloroethane	mg/L	GC-MS	ND	< 0.50
42	1,4-Dichlorobenzene	mg/L	GC-MS	ND	< 7.50
43	2,4-D	mg/L	GC-MS	ND	< 10.0
44	2,4-Dinitrotoluene	mg/L	GC-MS	ND	< 0.13
45	2,4,5-TP (Silvex)	mg/L	GC-MS	ND	< 1.0
46	2,4,5-Trichlorophenol	mg/L	GC-MS	ND	< 400.0
47	2,4,6-Trichlorophenol	mg/L	GC-MS	ND	< 2.0

Enclosed GC-MS Chromatogram D:\GC-MS Analysis - Solvent DCM\Data File\Single processing\CAR-19.415 Tata Steel Ltd.- LF slag. Qgd.

Note:

CPCB – Central Pollution Control Board
 WLT – Water Leaching Test
 TCLP – Toxicity Characteristics Leaching Procedure
 ASTM – American Society for Testing and Materials
 IS – Indian Standard
 SW 846 – Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, USEPA, May 1997
 Std. Methods – Standard Methods for the Examination of Water & Wastewater, 23rd Edition, APHA/AWWA/WEF, 2017
 DIN : 38414 Part 4 (S4) – German Standard Procedure for Water, Wastewater, and Sediment Testing-Group S (Sludge and Sediment);
 Determination of Leachability (S4), 1984
 NA – Not Analyzed, ND – Not Detected

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 Checked by


 Tarun Kumar Middya
 (Lab. Manager)
 Authorized Signatory



NABL
Accredited Laboratory

ULR – TC74711900000660F

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Dist. : Purba Midnapore, State : West Bengal
T : 03224-278238/39, Fax : 278240
E-mail : laboratorywbwml@ramky.com

LABORATORY
(Recognized by WBPCB)



TEST REPORT

Name and Address of Customer : M/s Tata Steel Ltd.
Jamshedpur, Jharkhand - 831009.
Sample Description : LD slag.
Sample Collected by : WBWML
Date of Sampling : 18th November'2019
Sample Registration No. and Date : CA – 19/416, 25th November'2019
Sample Receipt Condition : Sample recd. in plastic pouch.
Analysis Starting Date : 25th November'2019
Analysis Completion Date : 30th November'2019
Test Required : Comprehensive Analysis
Report No. and Date : CAR - 19/416, 30th November'2019
Sub-contracting of Analysis : None

TEST RESULT

Sl. no.	Parameter	Unit	Method	Observation / Result	CPCB Std. and WLT / TCLP Limit for Direct Landfill
1	Bulk Density	Gm/cc	ASTM Std. : D 5057 – 10	1.91	–
2	Paint Filter Liquid Test	–	SW-846 : 9095 A	NA	Pass
3	pH (at 25.0°C)	–	USEPA 1998, SW-846 : 9045C	12.10	4.0-12.0
4	Calorific Value	kcal/kg	IS : 1350 (Part II) – 1975 (RA 2010)	< 250	< 2500.0
5	Flash Point	°C	USEPA 1998, SW-846 : 1020A	> 60	> 60.0
6	Loss on Drying at 103-105 °C	% (w/w)	Std. Methods : 2540 G : 2017	8.99	–
7	Loss on Ignition at 550 °C (Dry Basis)	% (w/w)	Std. Methods : 2540 G : 2017	3.13	< 20.0 (non-biodegradables) < 5.0 (biodegradables)
8	Water Soluble Organics	% (w/w)	DIN : 38414 Part 4 (S4) Std. Methods : 2540 E : 2017	0.92	< 10.0
9	Oil and Grease (As n-Hexane Extractable)	% (w/w)	USEPA 1998, SW-846 : 9071A	< 1.00	< 4.0
10	Cadmium – Total	mg/kg	USEPA 1998, SW-846 : 7000 B	2.94	–
11	Cadmium – WLT	mg/L	DIN : 38414 Part 4 (S4) Std. Methods : 3111 B : 2017	< 0.02	< 0.20
12	Cadmium – TCLP	mg/L	USEPA 1998, SW-846 : 1311 Std. Methods : 3111 B : 2017	0.06	< 1.00
13	Chromium – Total	mg/kg	USEPA 1998, SW-846 : 7000 B	542.48	–
14	Chromium (VI) – WLT	mg/L	DIN : 38414 Part 4 (S4) Std. Methods : 3500-Cr B : 2017	0.25	< 0.50
15	Chromium – TCLP	mg/L	USEPA 1998, SW-846 : 1311 Std. Methods : 3111 B : 2017	0.44	< 5.0

Towards sustainable growth

Sl. no.	Parameter	Unit	Method	Observation / Result	CPCB Std. and WLT / TCLP Limit for Direct Landfill
16	Copper – Total	mg/kg	USEPA 1998, SW-846 :7000 B	3.56	–
17	Copper – WLT	mg/L	DIN : 38414 Part 4 (S4) Std. Methods : 3111 B :2017	0.40	< 10.0
18	Lead – Total	mg/kg	USEPA 1998, SW-846 :7000 B	11.95	–
19	Lead – WLT	mg/L	DIN : 38414 Part 4 (S4) Std. Methods : 3111 B :2017	0.46	< 2.0
20	Lead – TCLP	mg/L	USEPA 1998, SW-846 : 1311 Std. Methods : 3111 B :2017	0.57	< 5.0
21	Nickel – Total	mg/kg	SW-846 : 3050B, 7000 B	33.65	–
22	Nickel – WLT	mg/L	DIN : 38414 Part 4 (S4) Std. Methods : 3111 B :2017	0.13	< 3.0
23	Zinc – Total	mg/kg	USEPA 1998, SW-846 :7000 B	15.56	–
24	Zinc – WLT	mg/L	DIN : 38414 Part 4 (S4) Std. Methods : 3111 B :2017	0.10	< 10.0

Note:

CPCB – Central Pollution Control Board

WLT – Water Leaching Test

TCLP – Toxicity Characteristics Leaching Procedure

ASTM – American Society for Testing and Materials

IS – Indian Standard

SW 846 – Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, USEPA, May 1997

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Tarun Kumar Middya
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 E-mail : laboratorywbwml@ramky.com
 CIN : U90002WB2004PLC098219



LABORATORY TEST REPORT

Name and Address of Customer : M/s Tata Steel Ltd.
 Jamshedpur, Jharkhand - 831009
 Sample Description : LD slag.
 Sample Collected by : WBWML
 Date of Sampling : 18th November'2019
 Sample Registration No. and Date : CA - 19/416, 25th November'2019
 Sample Receipt Condition : Sample recd. in plastic pouch.
 Analysis Starting Date : 25th November'2019
 Analysis Completion Date : 30th November'2019
 Test Required : Comprehensive Analysis
 Report No. and Date : CAR - 19/416, 30th November'2019
 Sub-contracting of Analysis : None

TEST RESULT

Sl. no.	Parameter	Unit	Method	Observation / Result	CPCB Std. and WLT / TCLP Limit for Direct Landfill
1	Physical State	-	Visual observation	Dry Solid	-
2	Color	-	Visual observation	Grey	-
3	Texture	-	Visual observation	Lumps & Powder	-
4	Reactive Cyanide	mg/kg	SW-846 : Ch. 7 (7.3.3), 9014	< 1.00	-
5	Reactive Sulfide	mg/kg	SW-846 : Ch. 7 (7.3.4), 9034	< 5.00	-
6	Cyanide - Total	mg/kg	SW-846 : 9010B, 9014	< 1.00	-
7	Cyanide - WLT	mg/L	DIN : 38414 Part 4 (S4) Std. Methods : 4500-CN ⁻ C SW-846 : 9014	< 0.05	< 2.0
8	Fluoride - Total	mg/kg	Std. Methods : 4500-F ⁻ B, D	< 1.00	-
9	Fluoride - WLT	mg/L	DIN : 38414 Part 4 (S4) Std. Methods : 4500F ⁻ B, D	< 1.00	< 50.0
10	Nitrate - WLT	mg/L	DIN : 38414 Part 4 (S4) Std. Methods : 4500-NO ₃ ⁻ E	< 0.10	< 30.0
11	Ammonia - WLT	mg/L	DIN : 38414 Part 4 (S4) Std. Methods : 4500-NH ₃ B, C	< 5.00	< 1000.0
12	Arsenic - Total	mg/kg	SW-846 : 3050B Std. Methods:3500-As B :2017	< 1.00	-
13	Arsenic - WLT	mg/L	DIN : 38414 Part 4 (S4) Std. Methods:3500-As B :2017	< 0.10	< 1.0
14	Phenol - WLT	mg/L	DIN : 38414 Part 4 (S4) SW-846 : 9065	< 1.00	< 100.0
15	Mercury - Total	mg/kg	SW-846 : 7471A Std. Methods : 3112 B :2017	NA	-
16	Mercury - WLT	mg/L	DIN : 38414 Part 4 (S4) SW-846 : 7470A Std. Methods : 3112 B :2017	NA	< 0.10
17	Vanadium - Total	mg/kg	SW-846 : 3050B, 7910	NA	-
18	Vanadium - WLT	mg/L	SW-846 : 3010A, 7910	NA	< 0.20 *

19	Benzene	mg/L	GC-MS	ND	< 0.50
20	Carbon tetrachloride	mg/L	GC-MS	ND	< 0.50
21	Chlordane	mg/L	GC-MS	ND	< 0.03
22	Chlorobenzene	mg/L	GC-MS	ND	< 100.0
23	Chloroform	mg/L	GC-MS	ND	< 6.0
24	o-, m-, p-Cresol	mg/L	GC-MS	ND	< 200.0 each
25	Endrin	mg/L	GC-MS	ND	< 0.02
26	Ethyl Methyl Ketone	mg/L	GC-MS	ND	< 200.0
27	Heptachlor (and its epoxide)	mg/L	GC-MS	ND	< 0.008
28	Hexachlorobenzene	mg/L	GC-MS	ND	< 0.13
29	Hexachlorobutadiene	mg/L	GC-MS	ND	< 0.50
30	Hexachloroethane	mg/L	GC-MS	ND	< 3.0
31	Indene	mg/L	GC-MS	ND	< 0.40
32	Methoxychlor	mg/L	GC-MS	ND	< 10.0
33	Nitrobenzene	mg/L	GC-MS	ND	< 2.0
34	Pentachlorophenol	mg/L	GC-MS	ND	< 100.0
35	Pyridine	mg/L	GC-MS	ND	< 5.0
36	Tetrachloroethylene	mg/L	GC-MS	ND	< 0.70
37	Toxaphene	mg/L	GC-MS	ND	< 0.50
38	Trichloroethylene	mg/L	GC-MS	ND	< 0.50
39	Vinyl Chloride	mg/L	GC-MS	ND	< 0.20
40	1,1-Dichloroethylene	mg/L	GC-MS	ND	< 0.70
41	1,2-Dichloroethane	mg/L	GC-MS	ND	< 0.50
42	1,4-Dichlorobenzene	mg/L	GC-MS	ND	< 7.50
43	2,4-D	mg/L	GC-MS	ND	< 10.0
44	2,4-Dinitrotoluene	mg/L	GC-MS	ND	< 0.13
45	2,4,5-TP (Silvex)	mg/L	GC-MS	ND	< 1.0
46	2,4,5-Trichlorophenol	mg/L	GC-MS	ND	< 400.0
47	2,4,6-Trichlorophenol	mg/L	GC-MS	ND	< 2.0

Enclosed GC-MS Chromatogram D:\GC-MS Analysis - Solvent DCM\Data File\Single processing\CAR-19. 416 Tata Steel Ltd.- LD slag. Qgd.

Note:

CPCB – Central Pollution Control Board

WLT – Water Leaching Test

TCLP – Toxicity Characteristics Leaching Procedure

ASTM – American Society for Testing and Materials

IS – Indian Standard

SW 846 – Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, USEPA, May 1997

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Authorized Signatory

Annexure-II

**CHARTER FOR CORPORATE RESPONSIBILITY FOR ENVIRONMENT
PROTECTION (CREP)
INTEGRATED IRON AND STEEL PLANT, TATA STEEL LIMITED,
JAMSHEDPUR**

**STATUS OF COMPLIANCE FOR VARIOUS ACTION POINTS
(Jan - Mar 2020)**

Action point 1: Coke Oven Plants

- To meet the parameters PLD (% leaking doors), PLL (% leaking lids), PLO (% leaking off take), of the notified standards under EPA within three years (by December 2005)

Compliance Status: Complied

Apr'19 to Mar'20:

No. of Batteries	No. of Observations	Parameters											
		PLD (%)			PLO (%)			PLL (%)			Charging Emissions (Sec.)		
		Max.	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.
Battery#5	23	8.33	1.67	3.83	0.00	0.00	0.00	0.00	0.00	0.00	57.00	30.00	41.74
Battery#6	23	9.26	1.69	3.97	0.00	0.00	0.00	0.88	0.00	0.04	62.00	32.00	44.74
Battery#7	23	3.92	1.00	2.02	0.00	0.00	0.00	0.00	0.00	0.00	50.00	32.00	40.78
Battery#8	24	5.00	1.47	2.44	0.00	0.00	0.00	0.00	0.00	0.00	28.00	18.00	21.33
Battery#9	24	4.41	1.49	2.33	0.00	0.00	0.00	0.76	0.00	0.03	26.00	17.00	21.17
Battery#10	23	5.36	2.35	3.69	1.19	0.00	0.10	0.78	0.00	0.05	30.00	12.00	18.08
Battery#11	23	4.17	1.76	2.92	0.00	0.00	0.00	0.00	0.00	0.00	38.00	12.00	19.43

- To rebuild at least 40% of the coke oven batteries in next 10 years (December 2012).

Compliance Status: Complied

Battery No.	Date of Commissioning	
	Initial	After Rebuilding
Battery # 5 (SC)	1988	Converted to Stamp charged-1995*
Battery # 6 (SC)	1988	Converted to Stamp charged-1993*
Battery # 7 (SC)	1988	Converted to Stamp charged-1989*
Battery # 8 (SC)	1998	
Battery # 9 (SC)	2000	
Battery # 10 (SC)	2012	
Battery # 11 (SC)	2014	

SC=Stamp Charged

Several rounds of hot repairs have taken place for rebuilding the damaged oven walls.

Action point 2: Steel Melting Shop

- Fugitive emissions to reduce 30% by March 2004 and 100% compliance with norms by March 2008 (including installation of secondary de-dusting facilities)
- Secondary de- dusting facilities at SMS: **Yes**

Compliance Status: Complied

- All the Steel Melting Shops (LD#1, LD#2 and LD#3) have been provided with secondary emission control system.
- Fugitive emission in SMS (Apr'19 to Mar'20):

Name of the Unit	No. of Observations	PM (mg/m3)		
		Max	Min	Avg
LD#1	145	150	0.3	8.0
LD#2	268	155	0.1	24.5
LD#3	145	32.2	0.1	3.23

Action point 3: Blast Furnace

- Direct inject of reducing agents- by June 2013

Compliance Status: Complied

- Coal/Coal Tar and oil injection facilities are provided in all the Blast Furnaces.
(Apr'19 to Mar'20)

Blast Furnace	Fuel Injected	Apr'19 to Mar'20 (kg/thm)
C BF	Coal Tar	46
D BF	Phase out	Down for relining
E BF	Coal Tar	29
F BF	Coal Dust	188
G BF	Coal Dust	190
H BF	Coal Dust	204
I BF	Coal Dust	205

Action point 4: Solid Waste / Hazardous Waste Management

- Utilization of Steel Melting Shop (SMS)/ Blast Furnace (BF) Slag as per the following schedule:
By 2004- 70%
By 2006- 80%
By 2008- 100%

Compliance Status: Present level

- All the Blast Furnaces which are in regular operation are fitted with On-line Slag Granulation Facility.

	BF Slag	LD Slag
Percentage utilized (%)	96.84%	113%
Type of utilization	Cement Making	Reuse in Sinter Plant, In-house construction etc.

- Charge of tar sludge/ ETP sludge to Coke Oven by June 2003.

Compliance Status: Complied

- 100% of tar sludge and ETP sludge from Coke Ovens is being recycled/reused.
- Inventorization of the Hazardous Waste as per Hazardous Waste (M&H) Rules, 1989 as amended from time to time and implementation of the Rules by December 2003.

Compliance Status: Complied

Hazardous Waste	Quantity generated Apr'19 to Mar'20 (Tonnes)	Quantity charged to Coke Oven in Apr'19 to Mar'20 (Tonnes)	Method of transport
Coal Tar Sludge	6156	6156	Transported by trucks and sold users.
BOT Plant Sludge	288	288	Transported by trucks and charged by conveyors; Mixing with Coal and used in coke making in battery
Grease	158.48	-	Transported by trucks and sold to authorized users.
Waste Oil sludge	2865.47	-	Sold to authorized party and incinerated
Zinc Dust Ash	208	-	Sold to authorized recyclers

Action point 5: Water conservation / Water Pollution

- Reducing specific water consumption to 5 m³/t for long products and 8 m³/t for flat products by 2005

Compliance Status: Complied

Specific water consumption details for Apr'19 to Mar'20:

Specific water consumption (m³/tcs)	
Long Products (m³/tcs_{FP})	Flat Products (m³/tcs_{LP})
2.19	3.11

- To operate CO-BP effluent treatment plant efficiently to achieve the notified effluent discharge standards- By July 2004

Compliance Status: Complied

Effluent Treatment Plant is meeting the statutory norms.

	Parameter	UoM	Statutory Limit	Apr-19			May-19			Jun-19			Jul-19			Aug-19			Sep-19		
				Max	Min	Avg.	Max	Min	Avg.	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg
BOT TREATED	pH	-	6.0-8.5	8.47	6.71	7.48	8.42	6.56	7.31	8.4	6.6	7.3	3.7	0.9	1.4	5.1	0.8	1.7	6.7	0.8	1.8
	Ammonical Nitrogen (as N)	mg/L	50	8.4	0.7	2.1	12.4	0.2	2.9	12	0.2	2.9	0.19	0.10	0.15	0.19	0.10	0.16	0.16	0.11	0.14
	Free Cyanide (as CN-)	mg/L	0.2	0.19	0.1	0.17	0.19	0.1	0.17	0.2	0.1	0.2	6.0	1.6	4.4	5.6	3.2	4.5	5.2	1.6	3.7
	Oil & Grease	mg/L	10	5.6	4	4.9	6	4	5	7.2	4	5.3	95	30	50	58	18	40	62	26	38
	Total Suspended solids	mg/L	100	98	29	55.7	76	19	48.6	60	18	44	240	150	196	242	138	188	190	134	165
	Chemical Oxygen Demand, COD	mg/L	250	249	147	208	234	170	209	180	101	157	25.8	6.4	19.7	25.9	12.7	19.0	25.8	12.6	18.5
	Biological Oxygen Demand, BOD	mg/L	30	28.8	20.1	25.6	21.9	20.1	21.1	22	10	13	8.03	6.59	7.19	8.29	6.78	7.27	8.20	6.68	7.25
	Phenol	mg/L	1	0.4	0.04	0.2	0.4	0.08	0.1	0.3	0	0.1	0.3	0.01	0.1	0.4	0.01	0.2	0.3	0.05	0.1

	Parameter	UoM	Statutory Limit	Oct'19			Nov'19			Dec'19			Jan'20			Feb'20			Mar'20		
				Max	Min	Avg.	Max	Min	Avg.	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg
BOT TREATED	pH	-	6.0-8.5	8.06	6.80	7.35	8.41	6.73	7.37	8.43	6.79	7.19	7.99	6.81	7.3	8.14	6.64	7.39	8.42	6.83	7.44
	Ammonical Nitrogen (as N)	mg/L	50	6.1	0.7	1.6	12.4	0.4	2.9	1.9	0.8	0.9	19.7	0.8	2.6	3.5	0.4	1.1	3.5	0.4	1.1
	Free Cyanide (as CN-)	mg/L	0.2	0.17	0.10	0.14	0.16	0.10	0.14	0.17	0.07	0.11	0.18	0.08	0.14	0.17	0.1	0.14	0.17	0.10	0.14
	Oil & Grease	mg/L	10	5.6	2.4	4.2	5.2	1.2	3.0	8.0	3.6	5.1	6.8	2.8	4.3	5.6	2	3.4	5.6	2.0	3.4
	Total Suspended solids	mg/L	100	77	20	39	55	22	35	68	11	41	74	29	53.1	96	25	50.2	90	32	56
	Chemical Oxygen Demand, COD	mg/L	250	230	131	183	244	151	183	202	136	174	234	158	193	246	147	199.5	243	175	203
	Biological Oxygen Demand, BOD	mg/L	30	26	13	20	26	13	19	26	13	18	26.4	13	22.8	26.6	13	21.8	26	19	23
	Phenol	mg/L	1	0.20	0.05	0.1	0.29	0.04	0.13	0.28	0.07	0.15	0.28	0.02	0.15	0.49	0.05	0.26	0.28	0.06	0.16

Action point 6: Continuous stack monitoring system & its calibration, and installation of on-line ambient air quality monitoring station by June 2005.

Compliance Status: Complied

- Online stack monitoring system have been installed at major stacks.
- 4 AAQMS stations have been commissioned.

Locations/ Area	No. of Stacks connected to CPCB, New Delhi for OCEMS	No. of Stacks to be connected to CPCB, New Delhi for OCEMS	Remarks
Blast Furnace	25	-	-
Coke Oven	9	-	-
LD Shop	21	-	-
Lime Plant	12	-	-
Mills	10	-	-
Pellet Plant	6	-	-
Power Plant	8	-	-
Sinter Plant	8	-	-
Total	99	-	-

Action Point 7: Operation of pollution Control Equipment

To operate the existing pollution control equipment efficiently and to have proper record of run hours, failure time and efficiency with immediate effect. Compliance report in this regard to be submitted to CPCB/SPCB every three months/Six months.

Compliance Status: Complied

Status of Air Pollution Control Equipment (Apr'19- Mar'20)

- We have implemented online monitoring to all Bag filters to measure its availability. And overall availability of bag filter at various locations inside works of last three months is 94%.
- Differential pressure of the Bag filters is being monitored regularly to ensure the efficiency.

Status of Wastewater Pollution Control Equipment (Apr'19 - Mar'20)

Area/Location	Water Pollution Control System	Availability (%)
Coke Plant	BOT Plant	100%
A-F Blast Furnace	Waste water treatment plant	100%
G Blast Furnace	Waste water treatment plant	100%
H Blast Furnace	Waste water treatment plant	100%
I Blast Furnace	Waste water treatment plant	100%
LD1 and BC	Waste water treatment plant	100%
LD2 and SC	Waste water treatment plant	100%
LD3 and TSCR	Waste water treatment plant	100%
Wire Rod Mill	Waste water treatment plant	100%
Hot Strip Mill	Waste water treatment plant	100%
Cold Rolling Mill	Waste water treatment plant	100%
New Bar Mill	Waste water treatment plant	100%
Merchant Mill	Waste water treatment plant	100%
CETP	Waste water treatment plant	100%

Action point 8: Implementation of LCA study

To implement the recommendations of Life Cycle Assessment (LCA) study sponsored by MoEF&CC by December 2003.

Compliance Status: Complied

- Reduction of Green House Gases by:
 - ❖ Reduction in power consumption
 - ❖ Use of by-products gases for power generation- **Yes/ No**
 - ❖ Promotion of Energy Optimisation technology, including energy audit- **Yes/ No**

To set targets for Resource Conservation such as Raw material, energy and water consumption to match International Standards

	YTD FY20	Target for FY21
Specific Water Consumption (m ³ /TCS)	2.80	2.58
Energy consumption (GCal/ TCS)	5.631	5.496
Steps taken for Resource Conservation	Yes	Yes
Environmental monitoring laboratory	Yes	Yes

provided (Y/N)		
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- Up-gradation in the monitoring analysis facilities for air and water pollutants. Also, to impart elaborate training to the manpower in the environmental monitoring laboratories, so as realistic data can be obtained
- Monitoring facilities upgraded : **Yes/No**
- Training provided to laboratory personnel : **Yes/No**
- To improve housekeeping : **Being Done**

Action point 9: Clean Technologies

The industry will initiate steps to adopt the following clean technologies / measures to improve the performance of the industry towards production, energy and environment.

- Energy recovery of top Blast Furnace (BF) gas.
- Use of Tar-free runner linings.
- De-dusting of Cast House at tap holes, runners, skimmers, ladle and charging points
- Suppression of fugitive emissions using nitrogen gas or any other inert gas.

- To study the possibility of slag and fly ash Transportation back to the abandoned mines to fill up the cavities through empty railway wagons when they return to the mines and its implementation.
- Processing of the waste containing flux & ferrous wastes through waste recycling plant.
- To implement rain water harvesting.

Clean technologies to be implemented	Status, Provided Yes/ No
Energy recovery of top Blast Furnace (BF) gas	TRT has been commissioned in G, H & I Blast Furnace.
Use of Tar-free runner linings.	Tar lining in the runner is not used.
De-dusting of Cast House at tap holes, runners, skimmers, ladle	De-dusting facility in the cast house has been provided in F, G, H & I Blast Furnaces.
Suppression of fugitive emissions using nitrogen gas or any other inert gas	We have studied this system in detail and found the same very unsafe and have decided to not to go for it.

	Instead, dust extraction facilities have been installed wherever required.
To study the possibility of slag and fly ash transportation back to the abandoned mines, to fill up the cavities through empty railway wagons while they return back to the mines and its implementation.	None of our mines are abandoned so far. However, all the coal-fired boilers in Steel Works have been converted to gas firing. Coal will be fired only in emergency in one Boiler from where limited quantity of ash is being disposed in slurry form in captive ash pond.
Processing of the waste containing flux & ferrous wastes through waste recycling plant.	We have a metal recovery and slag processing plant for the same and such material is used in iron and steel making processes.
Implement rain water harvesting	Rainwater harvesting is in practice inside the Steel Works. Surface run-off is collected in cooling ponds/ catchments and pick up of fresh water from river is reduced during rainy seasons. Rainwater Harvesting has been installed in 38 locations (Steelenium Hall, SHE, MPDS, LD 3, rebar mill ECR, R&D and ITS Building) within Works.