Dr. Amit Ranjan Chakraborty
Chief Environment Management

EMD/C-41/254/21
May 28, 2021

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 2020 to March 2021) EC Compliance and monitoring reports of expansion of Steel plant (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-11011/691/2007-IA.II (I) dated May 11, 2010
2. MoEF&CC 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 (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 2020 to March 2021** along with monitoring data report for your kind consideration.

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

TATA STEEL LIMITED
Environment Management Jamshedpur 831 001 India
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Registered Office Bombay House 24 Homi Mody Street Fort Mumbai 400 001
Tel 91 22 66658282 Fax 91 22 66657724
Corporate Identity Number L27100MH1907PLC000260 Website www.tatasteel.com

Dr. Amit Ranjan Chakraborty
Chief Environment Management

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 6.8 to 9.7 MTPA Crude Steel Production
2. Six Monthly Compliance Status report of Environmental Clearance from expansion of 9.7 to 11 MTPA Crude Steel Production
3. Monitoring and analysis reports for October 2020 to March 2021

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 2020 to March 2021

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

A. 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.

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 4 years submitted to Ministry's Regional office, CPCB and JSPCB is as follows:

Six Monthly report	Submitted on
December 2020	November 27, 2020 vide letter no. EMD/C-41/460/20
June 2020	May 26, 2020 vide letter no. EMD/C-41/337/20
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

- The six-monthly compliance reports along with the monitored data is also uploaded on the following websites:

a. **MoEF&CC:** http://environmentclearance.nic.in/
b. **Company:**(https://www.tatasteel.com/corporate/our-organisation/environment/environment-compliance-reports/)

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.

Compliance Status:

- 4 nos. of online AAQMS have been commissioned to monitor PM10, PM2.5, SO2, NO2, CO, NH3 continuously.
- All ESPs have been upgraded of all relevant production units while the same is under progress at sinter plant #4 and LD Shop #2. The agreed emission for their upgraded emission has been guaranteed to be ≤50 mg/Nm^3.
- 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 a list of air pollution control devices for each of production unit as **Annexure-II**.
- 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 III.**

iii. Existing electrostatic precipitator (ESP) shall be upgraded and provided to new units to control gaseous emissions within 50 mg/Nm^3. 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.

Compliance Status:

- All ESPs have been upgraded of all relevant production units while the same is under progress at sinter plant #4 and LD Shop #2. The agreed emission for their upgraded emission has been guaranteed to be ≤50 mg/Nm^3.
- 3 nos. of bag filters have been provided in the Pellet Plant to control waste gas from the drying and grinding unit.
- 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.
- Bag Filters have been provided in the Cast House and Stock House of all the Blast Furnaces.
- 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. Monitoring reports for all relevant parameters from October 2020 to March 2021 is attached in **Annexure-I**.
- The status of completed and Ongoing projects is mentioned in **Annexure-III**.

iv. **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 H_2S content of coke oven gas in the by-product recovery section to below 500 mg/Nm^3. 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. are 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 desulphurized in Battery 10&11. H_2S content is maintained below 500 mg/Nm^3. Land based fume extraction system for pushing emission control for new coke ovens batteries #10 & #11 have been provided.

v. **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 6.90 in Battery#5, max % of PLL found to be 1.09 in Battery#7 and % of maximum PLO is found to be 2.00 in Battery#7 and maximum charging emission is found to be 62 sec in Battery#7.
- Byproduct gas is recovered and used for power generation in 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. 741 tonnes of Sulphur has been recovered from coke oven gas in FY'21 and sold to authorized buyers.

vi. **Only dry quenching method in the coke oven in new battery # 10 & 11 shall be adopted.**

Compliance Status:

- Coke dry quenching (CDQ) facility is commissioned in the new Coke Oven Batteries #10 and #11 and are in operation.

vii. **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 nos. of Ambient Air Quality stations have been commissioned inside plant for the monitoring of all 12 parameters as per G.S.R. No. 826(E) dated 16th November' 2009, and is being analyzed by the environment laboratory inside Works accredited with NABL accreditation no.TC-8363 dated 21.02.2019 having validity till 20.02.2022. All the monitoring results 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. Monitoring reports for all relevant parameters from October 2020 to March 2021 is attached in **Annexure-I**.

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 asphalting 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-II**.
- 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 470 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.
- All the internal roads have been constructed with concrete.
- All the fugitive emissions within plant locations are monitored and records are maintained.

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 30th May, 2008 shall be followed.**

Compliance Status:

- Several Projects have been implemented to control Gaseous Emission levels including secondary fugitive emissions from all the sources.
- Secondary fugitive dust emissions inside the plant in different areas is being controlled and monitored in line with the CPCB guidelines and MoEF&CC standards.

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 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 shall be carried out on regular basis to further reduce the dust emissions.

Compliance Status:

Under the traffic decongestion plan in Jamshedpur city:

- Strengthening of marine drive (Western corridor) has been implemented.
- South eastern corridor is under development with the government of Jharkhand.
- To control high traffic on the major roads of the town, decongestion work is being continued with the effort based on evolving need.

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.
- Maximum in bound and out bound material movements are done by railway wagons in order to reduce dust emissions.
- 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 vacuum cleaning sweepers are deployed within Works for regular cleaning and dust evacuation of roads.
- Dust from road being collected by these mechanized vacuum cleaning sweepers which are being reused in sinter making through RMBB.
- 2 nos. of mechanized vacuum cleaning sweepers are deployed in Jamshedpur town for regular cleaning and dust evacuation of roads.

xi. 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.
- Dry fog dust suppression and water sprinklers are provided to control dust emission during loading and unloading activity. A total of 470 nos. of points for dust suppression system (DS) are commissioned at various locations inside Works.
- Tyre washing facility has also been provided in 10 strategic locations to keep tyres clean to reduce dust emission on roads.

xii. 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 clarifloculation 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.

Compliance Status:

- 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). Treated water from plant (CETP) primary, secondary and tertiary treatment is used through recycling or used for dust suppression, slag quenching and green belt development etc. inside the plant. This CETP is being augmented from 4 MGD to 9 MGD to treat and recycle the balance wastewater generated from various units.
- New BOD plant has been commissioned and existing BOD has been upgraded to treat the additional effluent generated from Coke Oven Batteries including Batteries 10 & 11. A tertiary treatment with RO is being implemented at BOD plant to ensure zero discharge from coke oven.
- Wastewater containing suspended solids is passed through clarifloculation plant to recover and reuse the clarified water for cooling or cleaning. All the mills are equipped with respective primary effluent treatment plants with settling tanks and oil skimming facility.
- Closed circuit cooling systems have been installed. Catch pits at all the five designated outlets. have been constructed to recycle the treated effluent within plant. Zero effluent discharge has been achieved in 4 out of 5 designated outlets.
- All the effluent quality (pH, Ammoniacal Nitrogen, COD, BOD, Phenol, Cyanide, TSS, etc) are within discharge norms. Monitoring reports for all relevant parameters from October 2020 to March 2021 is attached in **Annexure-I**.

xiii. Efforts shall be made to make use of rainwater 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.

xiv. 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.
- The monthly monitoring report for all the relevant parameters are being submitted to JSPCB and six-monthly reports are being submitted to regional office of MoEF&CC at Ranchi and CPCB.

xv. 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 Bhubaneswar, Jharkhand, SPCB and CPCB.

Compliance Status:

- All the treated effluent from outlets are being monitored regularly.
- Online effluent monitoring system has been commissioned in all the outlets to monitor effluent quality on a real-time basis.
- Online effluent monitoring data is connected with CPCB and JSPCB.
- Surface water quality of rivers Subarnarekha and Kharkai is also being monitored as a part of regular monitoring.
- 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.
- Monitoring reports for all relevant parameters from October 2020 to March 2021 is attached in **Annexure-I**.

xvi. 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.

Compliance Status:

- As per the water balance and plan of zero effluent discharge, all the plant effluent is being recycled into different process units for various uses. The rainwater which is being discharged into the nearby nallah is being collected and in low lying area and settled water is let out thereafter.
- Closed circuit cooling systems have been installed. Catch pits at all the five designated outlets. have been constructed to recycle the treated effluent within plant. Zero effluent discharge has been achieved in 4 out of 5 designated outlets.

xvii. As proposed, the water consumption shall not exceed 5.7 m^3/Ton of steel at 9.7 MTPHY stage.

Compliance Status:

The specific water consumption has been reduced to 2.25 m^3/tcs during FY'21 as compared to 5.58 m^3/tcs for FY'14.

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
FY 21	2.25

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.

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 (BF) slag are provided to cement manufacturers for further utilization in cement making as per the MoUs signed with M/s Nuvoco Vistas, M/s Dalmia Cement, M/s ACC, M/s JSW Bengal and M/s Emami Cement.
- LD Slag after metal recovery 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 Aging inside Works
  - Use of LD Slag in road making & railway ballast.
- Flue dust generated are recycled within the plant, Mill scales, LD sludge, lime fines and flue dust are also recycled back to sinter plant.
- Blast Furnace gas cleaning plant (GCP) sludge is re-utilized within the manufacturing process.

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 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/reprocesses.

Compliance Status:

- Coal Tar sludge and BOD Sludge generated from By Product Plant is being recycled in coke plant by mixing with raw materials. The report for FY'21 is enclosed under **Annexure-IV**.

- In house secured landfill with HDPE liner has been constructed to dispose chrome sludge generated from Cold Rolling Mill.
- All other kind of process wastes are being reutilized in sinter plant.
- Oily waste and spent oil are sold to authorized recyclers/reprocessors.

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.

Compliance Status:

- LD Slag are used for road making.
- The TCLP test conducted by external approved agency. Report of same is enclosed under **Annexure-V**.
- Leachate potential of all heavy metals is negligible.
- Chrome Sludge is disposed in the captive 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 along with localized water harvesting.

Compliance Status:

- 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.

Compliance Status:

- 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.
- For the period during April 2020 to March 2021, the solid waste utilization was 104% excluding storage of LD slag at Galudih for processing. Status of Solid Waste, hazardous and other waste generation and utilization from April 2020 to March 2021 is enclosed as **Annexure – VII.**

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 Ranchi, Jharkhand SPCB and CPCB.

Compliance Status:

- Most of the process solid waste are reutilized within the manufacturing process.
- Information regarding solid waste and hazardous waste is being submitted in Environment Statement to the Board every year. Environment statement for FY'20 is attached as **Annexure-VI**.
- Status of Solid Waste, hazardous and other waste generation and utilization from April 2020 to March 2021 is enclosed as **Annexure – VII.**

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 and brick manufacturers for further utilization and "Memorandum of Understanding" shall be submitted to Ministry's Regional Office at Bhubaneswar.

Compliance Status:

- All the boilers of Captive power plants have been converted from coal fired to gas fired, thus there is no 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 FY'19.

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 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.
- Copy of updated On-site Emergency Plan & Disaster Control approval by Chief Inspector of Factories, Jharkhand vide letter no. 615 dated 29.05.2020 is attached as **Annexure-VIII.**

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.

Compliance Status:

- Total area under green cover within Jamshedpur town including steel works is approx. 2400 ha out of 5094 ha which is more than the required 33% green cover area.
- We have planted 1,17,109 nos. saplings during April 2020 to March 2021 inside the works, Jugsalai Muck Dump area and in Township in the same period. Every year plantation done in available space.

The following indigenous 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.*

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.

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 the same has been approved by Principal Chief Conservator of Forests – Wildlife (PCCF-WL) GoJ on Nov 13,

2017. Wildlife Conservation Plan will be implemented as directed by Department of Forest, Jharkhand.

xxviii. 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 – IV**.

xxix. All the commitments made to the public during the Public Hearing / Public Consultation meeting held on 18th June, 2009 shall be satisfactorily implemented and a separate budget for implementing the same shall be allocated and information submitted to the Ministry's Regional Office at Bhubaneswar.

Compliance Status:

All the commitments made to the public during the Public Hearing are being implemented.

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.

Compliance Status:

- 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.
- A total of ₹ 1094.82 Crores spent in and around Jamshedpur since FY'11 (since inception of 9.7 MTPA Projects) till FY'21 are as follows:

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
2021	267	102.42
	Total	**1094.82**

- It is reported in the Company's Integrated Report. These reports are available on the website of Tata Steel and may be seen/downloaded from https://www.tatasteel.com/investors/integrated-reportannual-report/

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.

Compliance Status:

- The construction work has been completed. All the necessary infrastructure and facilities such as food, medical health care, toilets, safe drinking water, etc. had been provided to construction labor during the project work.

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 abiding by all the compliance conditions made by JSPCB and State Government of Jharkhand.

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 (MoEF&CC).

Compliance Status:

- No further expansion or modifications beyond the existing capacity of 11 MTPA in the plant will be carried out without prior approval from MoEF&CC. The detail of production of various products for last five years are as follows:

Product	Unit	Capacity granted in EC	2016-17	2017-18	2018-19	2019-20	2020-21
Hot Metal	MTPA	12.5	10.83	10.9	10.8	10.77	9.87
Crude Steel		11	10.0	10.0	10.2	10.2	9.34

iii. The gaseous emissions from various process units shall conform to the load/mass based standards notified by this Ministry on 19th 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.

Compliance Status:

- ESPs are being upgraded of all relevant production units. Among these 6 ESPs of Sinter P1ant 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/Nm^3.
- 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.
- 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.

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 PM10, PM2.5, SO2 and NOx 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 nos. of online AAQMS have been commissioned to monitor PM_{10}, $PM_{2.5}$, SO_2, NOx & CO continuously inside the Works. There is one mobile monitoring facility & 8 manual AAQMS located both inside the plant and also outside the plant area.
- The monthly monitoring reports by NABL accredited environment laboratory is being submitted to JSPCB and six-monthly reports are being submitted to regional office of MoEF&CC, Ranchi and CPCB.
- Monitoring reports for all relevant parameters from October 2020 to March 2021 is attached in **Annexure-I**.

v. 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 from time to time. The treated wastewater shall be utilized for plantation purpose.

Compliance Status:

- 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). Treated water from plant (CETP) primary, secondary and tertiary treatment is used through recycling or used for dust suppression, slag quenching and green belt development etc. inside the plant conforming to the standards prescribed under GSR 422 (E) dated 19th May, 1993 and 31st December 1993 or as amended from time to time.
- Monitoring reports for all relevant parameters from October 2020 to March 2021 is attached in **Annexure-I**.

vi. 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 reports for all relevant parameters from October 2020 to March 2021 is attached in **Annexure-I**.

vii. 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 undergone 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.

Compliance Status:

- 38 nos. of rainwater harvesting structures have 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.

Compliance Status:

- All the environmental protection measures and safeguards such as APCEs, ETPs, hazardous waste proper handling, transfer and disposal have been deployed as recommended in the EIA/EMP report.
- 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.

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 the Ministry of Environment and Forests as well as the State Government. 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 Wastewater Discharge and Others including Greenery, Online Monitoring, etc.
- In FY 21 total capital expenditure for environment is 30Crore.
- 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.

Compliance Status:

- 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 SPCB and may also be seen at Website of the Ministry of 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. 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.

Compliance Status:

- 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.
- The clearance letter is also uploaded on the company website: (https://www.tatasteel.com/corporate/our-organisation/environment/environment-compliance-reports/)

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&CC 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.

- 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/)

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 MOEFCC 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.

Compliance Status:

- Six monthly compliance reports are being submitted regularly in soft copy by e-mail as well as uploaded on MoEF&CC website.

xvi. 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'20 has been submitted vide our letter no. EMD/C-23/408/20 dated September 18, 2020.
- The environmental statement has also been uploaded on the company's website: (https://www.tatasteel.com/corporate/our-organisation/environment/environment-compliance-reports/)

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.

Compliance Status:

- It has been complied as the project has been already completed and Consent to Operate has been issued by Jharkhand State Pollution Control Board.

ENVIRONMENTAL CLEARANCE COMPLIANCE STATUS REPORT

October 2020 to March 2021

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 nos. of online AAQMS have been commissioned to monitor PM_{10}, $PM_{2.5}$, SO_2, NO_2, CO, NH_3 continuously. All other AAQ parameters being analyzed by the environment laboratory inside Works accredited with NABL accreditation no.TC-8363 dated 21.02.2019 having validity till 20.02.2022. are also found within prescribed limit.
- All stacks are being monitored by online continuous emission monitoring system (CEMS) as per the standard given in MoEF&CC notification dated 31.03.2012.
- Real-time data of CEMS are connected with the server at CPCB, New Delhi and real-time data of AAQMS and CEMS are connected with the server at JSPCB, Ranchi.
- The six-monthly compliance reports are being submitted to Ministry's Regional office, CPCB and JSPCB. Monitoring reports for all relevant parameters from October 2020 to March 2021 is attached in **Annexure-I**.

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 4 years submitted to Ministry's Regional office, CPCB and JSPCB is as follows:

Six Monthly report	Submitted on
December 2020	November 27, 2020 vide letter no. EMD/C-41/460/20
June 2020	May 26, 2020 vide letter no. EMD/C-41/337/20
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

- The six-monthly compliance reports along with the monitored data is also uploaded on the following websites:

a. **MoEF&CC:** 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 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. Efforts shall be made to further reduce PM_{10} and $PM_{2.5}$ levels in the ambient air and a time bound action plan shall be submitted.

Compliance Status:

- 4 nos. of online AAQMS have been commissioned to monitor PM10, PM2.5, SO2, NO2, CO, NH3 continuously.

- All ESPs have been upgraded of all relevant production units while the same is under progress at sinter plant #4 and LD Shop #2. The agreed emission for their upgraded emission has been guaranteed to be ≤50 mg/Nm^3.
- 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 a list of air pollution control devices for each of production unit as **Annexure-II**.
- 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-III.**

iv. Existing Electrostatic Precipitator (ESP) shall be upgraded and provided to new units to control gaseous emissions within 50 mg/Nm^3. 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:

- All ESPs have been upgraded of all relevant production units while the same is under progress at sinter plant #4 and LD Shop #2. The agreed emission for their upgraded emission has been guaranteed to be ≤50 mg/Nm^3.
- 3 nos. of bag filters have been provided in the Pellet Plant to control waste gas from the drying and grinding unit.
- 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.

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 H_2S content of coke oven gas in the by-product recovery section to below 500 mg/Nm^3. 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. are 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 desulphurized in Battery 10&11. H_2S content is maintained below 500 mg/Nm^3. Land based fume extraction system for pushing emission control for new coke ovens batteries #10 & #11 have been provided.

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 6.90 in Battery#5, max % of PLL

found to be 1.09 in Battery#7 and % of maximum PLO is found to be 2.00 in Battery#7 and maximum charging emission is found to be 62 sec in Battery#7.

- Byproduct gas is recovered and used for power generation in 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. 741 tonnes of Sulphur has been recovered from coke oven gas in FY'21 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 Batteries #10 and #11 and are 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 nos. of Ambient Air Quality stations have been commissioned inside plant for the monitoring of all 12 parameters as per G.S.R. No. 826(E) dated 16th November' 2009, and is being analyzed by the environment laboratory inside Works accredited with NABL accreditation no.TC-8363 dated 21.02.2019 having validity till 20.02.2022. All the monitoring results 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. Monitoring reports for all relevant parameters from October 2020 to March 2021 is attached in **Annexure-I**.

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 asphalting 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-II**.
- 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 470 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.
- All the internal roads have been constructed with concrete.
- All the fugitive emissions within plant locations are monitored and records are maintained.

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:

- Several Projects have been implemented to control Gaseous Emission levels including secondary fugitive emissions from all the sources.
- Secondary fugitive dust emissions inside the plant in different areas is being controlled and monitored in line with the CPCB guidelines and MoEF&CC standards.

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 shall be carried out on regular basis to further reduce the dust emissions.

Compliance Status:

Under the traffic decongestion plan in Jamshedpur city:

- Strengthening of marine drive (Western corridor) has been implemented.
- South eastern corridor is under development with the government of Jharkhand.
- To control high traffic on the major roads of the town, decongestion work is being continued with the effort based on evolving need.

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.
- Maximum in bound and out bound material movements are done by railway wagons in order to reduce dust emissions.
- 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 vacuum cleaning sweepers are deployed within Works for regular cleaning and dust evacuation of roads.
- Dust from road being collected by these mechanized vacuum cleaning sweepers which are being reused in sinter making through RMBB.
- 2 nos. of mechanized vacuum cleaning 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.

- Dry fog dust suppression and water sprinklers are provided to control dust emission during loading and unloading activity. A total of 470 nos. of points for dust suppression system (DS) are commissioned at various locations inside Works.
- Tyre washing facility has also been provided in 10 strategic locations to keep tyres clean to reduce dust emission on roads.

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 clarifloculation 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 the premises and 'Zero' discharge shall be adopted by recycling all the treated waste water in the plant itself including from the existing plant.

Compliance Status:

- 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). Treated water from plant (CETP) primary, secondary and tertiary treatment is used through recycling or used for dust suppression, slag quenching and green belt development etc. inside the plant. This CETP is being augmented from 4 MGD to 9 MGD to treat and recycle the balance wastewater generated from various units.
- New BOD plant has been commissioned and existing BOD has been upgraded to treat the additional effluent generated from Coke Oven Batteries including Batteries 10 & 11. A tertiary treatment with RO is being implemented at BOD plant to ensure zero discharge from coke oven.
- Wastewater containing suspended solids is passed through clarifloculation plant to recover and reuse the clarified water for cooling or cleaning. All the mills are equipped with respective primary effluent treatment plants with settling tanks and oil skimming facility.
- Closed circuit cooling systems have been installed. Catch pits at all the five designated outlets. have been constructed to recycle the treated effluent within plant. Zero effluent discharge has been achieved in 4 out of 5 designated outlets.
- All the effluent quality (pH, Ammoniacal Nitrogen, COD, BOD, Phenol, Cyanide, TSS, etc) are within discharge norms. Monitoring reports for all relevant parameters from October 2020 to March 2021 is attached in **Annexure-I**.

xiv. Efforts shall be made to make use of rainwater 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.
- The monthly monitoring report for all the relevant parameters are 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 treated effluent from outlets are being monitored regularly.
- Online effluent monitoring system has been commissioned in all the outlets to monitor effluent quality on a real-time basis.
- Online effluent monitoring data is connected with CPCB and JSPCB.
- Surface water quality of rivers Subarnarekha and Kharkai is also being monitored as a part of regular monitoring.
- 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.
- Monitoring reports for all relevant parameters from October 2020 to March 2021 is attached in **Annexure-I**.

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 (BF) slag are provided to cement manufacturers for further utilization in cement making as per the MoUs signed with M/s Nuvoco Vistas, M/s Dalmia Cement, M/s ACC, M/s JSW Bengal and M/s Emami Cement.

- LD Slag after metal recovery 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 Aging inside Works
  - Use of LD Slag in road making & railway ballast.
- Flue dust generated are recycled within the plant, Mill scales, LD sludge, lime fines and flue dust are also recycled back to sinter plant.
- Blast Furnace gas cleaning plant (GCP) sludge is re-utilized within the manufacturing process.

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/reprocesses.

Compliance Status:

- Coal Tar sludge and BOD Sludge generated from By Product Plant is being recycled in coke plant by mixing with raw materials. The report for FY'21 is enclosed under **Annexure-IV**.
- In house secured landfill with HDPE liner has been constructed to dispose chrome sludge generated from Cold Rolling Mill.
- All other kind of process wastes are being reutilized in sinter plant.
- Oily waste and spent oil are sold to authorized recyclers/reprocessors.

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 are used for road making.
- The TCLP test conducted by external approved agency. Report of same is enclosed under **Annexure-V**.
- Leachate potential of all heavy metals is negligible.
- Chrome Sludge is disposed in the captive secured landfill inside Works.

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 process solid waste are reutilized within the manufacturing process.
- Information regarding solid waste and hazardous waste is being submitted in Environment Statement to the Board every year. Environment statement for FY'20 is attached as **Annexure-VI**.
- Status of Solid Waste, hazardous and other waste generation and utilization from April 2020 to March 2021 is enclosed as **Annexure – VII.**

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 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 FY'19.

xxii. 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 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.
- Copy of updated On-site Emergency Plan & Disaster Control approval by Chief Inspector of Factories, Jharkhand vide letter no. 615 dated 29.05.2020 is attached as **Annexure-VIII.**

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:

- Total area under green cover within Jamshedpur town including steel works is approx. 2400 ha out of 5094 ha which is more than the required 33% green cover area.
- We have planted 1,17,109 nos. saplings during April 2020 to March 2021 inside the works, Jugsalai Muck Dump area and in Township in the same period. Every year plantation done in available space.

The following indigenous 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 the same has been approved by Principal Chief Conservator of Forests – Wildlife (PCCF-WL) GoJ on Nov 13,

2017. Wildlife Conservation Plan will be implemented as directed by Department of Forest, Jharkhand.

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 – IV**.

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:

- 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.
- A total of ₹ 1094.82 Crores spent in and around Jamshedpur since FY'11 (since inception of 9.7 MTPA Projects) till FY'21 are as follows:

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
2021	267	102.42
	Total	**1094.82**

- It is reported in the Company's Integrated Report. These reports are available on the website of Tata Steel and may be seen/downloaded from https://www.tatasteel.com/investors/integrated-reportannual-report/

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:

- The construction work has been completed. All the necessary infrastructure and facilities such as food, medical health care, toilets, safe drinking water, etc. had been provided to construction labor during the project work.

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 abiding by all the compliance conditions made by JSPCB and State Government of Jharkhand.

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 (MoEF&CC).**

Compliance Status:

- No further expansion or modifications beyond the existing capacity of 11 MTPA in the plant will be carried out without prior approval from MoEF&CC. The detail of production of various products for last five years are as follows:

Product	Unit	Capacity granted in EC	2016-17	2017-18	2018-19	2019-20	2020-21
Hot Metal	MTPA	12.5	10.83	10.9	10.8	10.8	9.87
Crude Steel		11	10.0	10.0	10.2	10.2	9.34

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, PM2.5, SO2 and NOx 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 nos. of online AAQMS have been commissioned to monitor PM_{10}, $PM_{2.5}$, SO_2, NOx & CO continuously inside the Works. There are 8 nos. of manual AAQMS located both inside and outside the plant area.
- The monthly monitoring reports by NABL accredited environment laboratory is being submitted to JSPCB and six-monthly reports are being submitted to regional office of MoEF&CC, Ranchi and CPCB.
- Monitoring reports for all relevant parameters from October 2020 to March 2021 is attached in **Annexure-I**.

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 from time to time. The treated wastewater shall be utilized for plantation purpose.**

Compliance Status:

- 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). Treated water from plant (CETP) primary, secondary and tertiary treatment is used through recycling or used for dust suppression, slag quenching and green belt development etc. inside the plant conforming to the standards prescribed under GSR 422 (E) dated 19th May, 1993 and 31st December 1993 or as amended from time to time.
- Monitoring reports for all relevant parameters from October 2020 to March 2021 is attached in **Annexure-I**.

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 reports for all relevant parameters from October 2020 to March 2021 is attached in **Annexure-I**.

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 undergone 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:

- 38 nos. of rainwater harvesting structures have 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:

- All the environmental protection measures and safeguards such as APCEs, ETPs, hazardous waste proper handling, transfer and disposal have been deployed as recommended in the EIA/EMP report.
- 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.

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 (MoEF&CC) 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 Wastewater Discharge and Others including Greenery, Online Monitoring, etc.
- In FY 21 total capital expenditure for environment is 30 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.
- The clearance letter is also uploaded on the company website: (https://www.tatasteel.com/corporate/our-organisation/environment/environment-compliance-reports/)

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 MoEF&CC 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.

- 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/)

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 in soft copy by e-mail as well as uploaded on MoEF&CC website.

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'20 has been submitted vide our letter no. EMD/C-23/408/20 dated September 18, 2020.
- 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 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:

- It is complied as the project has been already completed and Consent to Operate has been issued by Jharkhand State Pollution Control Board.

Annexure-I

TATA STEEL LIMITED

ENVIRONMENT MANAGEMENT DEPARTMENT - LABORATORY

AMBIENT AIR QUALITY REPORT FOR INSIDE WORKS - (OCT-20 TO MAR-21)

TC- 8363

Location	Parameter	UoM	Oct-20	Nov-20	Dec-20	Jan-21	Feb-21	Mar-21
WPFA	Particulate Matter, PM10	µg/m3	95.8	166.9	223.8	237.0	208.6	234.0
	Particulate Matter, PM2.5	µg/m3	58.2	91.3	130.4	155.0	105.3	73.2
	Sulphur Dioxide (SO2)	µg/m3	27.9	10.0	24.2	31.0	30.8	11.9
	Nitrogen Dioxide, (NO2)	µg/m3	19.5	49.0	81.7	87.0	80.7	43.2
	Carbon Monoxide(CO)	mg/m3	0.8	0.7	0.7	0.8	0.7	0.5
	Ammonia (NH3)	µg/m3	20.8	68.0	34.2	71.0	86.0	63.7
	Ozone (O3)	µg/m3	11.6	10.0	10.3	8.0	12.1	21.2
	Nickel (Ni)	ng/m3	6.2	6.2	4.6	5.4	5.6	4.3
	Arsenic (As)	ng/m3	NT	NT	NT	NT	NT	NT
	Lead (Pb)	µg/m3	0.1	0.2	0.1	0.1	0.1	0.2
	Benzene (C6H6)	µg/m3	< 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
CRM	**Parameter**	**UoM**	**Oct-20**	**Nov-20**	**Dec-20**	**Jan-21**	**Feb-21**	**Mar-21**
	Particulate Matter, PM10	µg/m3	105.8	225.7	286.0	265.0	282.2	NA
	Particulate Matter, PM2.5	µg/m3	46.3	106.2	143.6	139.0	117.4	114.0
	Sulphur Dioxide (SO2)	µg/m3	15.5	13.6	44.4	47.0	47.7	13.5
	Nitrogen Dioxide, (NO2)	µg/m3	42.2	100.0	116.7	84.0	73.9	68.3
	Carbon Monoxide(CO)	mg/m3	0.0	0.0	0.3	0.4	0.4	0.3
	Ammonia (NH3)	µg/m3	19.8	15.6	22.1	24.5	42.0	63.9
	Ozone (O3)	µg/m3	10.5	8.6	7.5	9.4	20.0	13.7
	Nickel (Ni)	ng/m3	7.4	5.3	4.3	6.2	6.0	5.7
	Arsenic (As)	ng/m3	NT	NT	NT	NT	NT	NT
	Lead (Pb)	µg/m3	0.2	0.1	0.1	0.1	0.2	0.2
	Benzene (C6H6)	µg/m3	< 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
PH#3	**Parameter**	**UoM**	**Oct-20**	**Nov-20**	**Dec-20**	**Jan-21**	**Feb-21**	**Mar-21**
	Particulate Matter, PM10	µg/m3	105.8	220.2	290.9	289.0	231.9	NA
	Particulate Matter, PM2.5	µg/m3	46.3	108.5	167.2	164.0	121.1	79.3
	Sulphur Dioxide (SO2)	µg/m3	15.5	28.4	19.8	19.0	21.9	12.3
	Nitrogen Dioxide, (NO2)	µg/m3	42.2	39.7	63.0	43.0	92.0	55.9
	Carbon Monoxide(CO)	mg/m3	0.0	0.5	0.4	0.4	0.4	0.5
	Ammonia (NH3)	µg/m3	19.8	46.9	38.6	35.6	61.0	45.4
	Ozone (O3)	µg/m3	10.5	9.2	8.2	8.9	23.0	14.8
	Nickel (Ni)	ng/m3	7.4	7.5	6.1	5.9	5.3	4.1
	Arsenic (As)	ng/m3	NT	NT	NT	NT	NT	NT
	Lead (Pb)	µg/m3	0.2	0.2	0.2	0.3	0.2	0.3
	Benzene (C6H6)	µg/m3	< 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
PH#6	**Parameter**	**UoM**	**Oct-20**	**Nov-20**	**Dec-20**	**Jan-21**	**Feb-21**	**Mar-21**
	Particulate Matter, PM10	µg/m3	77.1	82.5	217.5	85.0	211.0	NA
	Particulate Matter, PM2.5	µg/m3	9.7	68.5	132.6	65.8	59.0	73.4
	Sulphur Dioxide (SO2)	µg/m3	11.3	7.8	23.2	25.4	36.8	28.8
	Nitrogen Dioxide, (NO2)	µg/m3	43.6	69.4	63.3	40.4	50.1	59.4
	Carbon Monoxide(CO)	mg/m3	0.5	0.5	0.3	0.4	0.4	0.3
	Ammonia (NH3)	µg/m3	42.8	43.1	32.1	26.7	167.0	96.3
	Ozone (O3)	µg/m3	12.4	11.8	10.1	11.7	12.0	17.5
	Nickel (Ni)	ng/m3	12.4	10.5	8.1	8.6	6.8	6.3
	Arsenic (As)	ng/m3	NT	NT	NT	NT	NT	NT
	Lead (Pb)	µg/m3	0.3	0.3	0.2	0.3	0.3	0.3
	Benzene (C6H6)	µg/m3	< 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

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
WPFA - West Plant First Aid Station
CRM - Cold Roll Mill
PH - Power House
NT - Not Traced

*** This test report is generated by NABL Accredited TATA STEEL LIMITED JSR EMD LAB having accreditation No.TC-8363 dated 21-02-2019 having validity till 20-02-2021**

J. Nagarjuna Reddy

Sr. Manager
Monitoring and Analysis

Anoop Srivastava

Head
Environment Monitoring, Testing & Analysis (TSJ)

TATA STEEL

TATA STEEL LIMITED

ENVIRONMENT MANAGEMENT DEPARTMENT - LABORATORY

AMBIENT AIR QUALITY REPORT FOR JSR TOWN - (OCT-20 TO MAR-21)

TC- 8363

Location	Parameter	UoM	Oct-20	Nov-20	Dec-20	Jan-21	Feb-21	Mar-21
WPFA	Particulate Matter, PM10	µg/m3	91.0	178.0	205.5	252.0	244.0	368.2
	Particulate Matter, PM2.5	µg/m3	43.0	51.0	59.5	90.0	77.0	62.4
	Sulphur Dioxide (SO2)	µg/m3	9.0	13.0	9.5	15.0	10.0	17.3
	Nitrogen Dioxide, (NO2)	µg/m3	41.0	47.0	31.0	33.0	41.0	60.5
	Carbon Monoxide(CO)	mg/m3	0.4	0.4	0.4	0.3	0.4	0.3
	Ammonia (NH3)	µg/m3	207.0	90.0	39.0	85.0	61.0	103.9
	Ozone (O3)	µg/m3	7.0	18.0	11.0	10.0	7.0	14.9
	Nickel (Ni)	ng/m3	4.6	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
	Arsenic (As)	ng/m3	NT	NT	NT	NT	NT	NT
	Lead (Pb)	µg/m3	0.2	0.2	0.1	0.1	0.1	0.2
	Benzene (C6H6)	µg/m3	< 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
CRM	**Parameter**	**UoM**	**Oct-20**	**Nov-20**	**Dec-20**	**Jan-21**	**Feb-21**	**Mar-21**
	Particulate Matter, PM10	µg/m3	99.0	176.0	196.0	261.0	229.0	318.9
	Particulate Matter, PM2.5	µg/m3	41.0	67.0	57.0	94.0	72.0	95.1
	Sulphur Dioxide (SO2)	µg/m3	14.0	12.0	13.5	12.0	16.0	9.9
	Nitrogen Dioxide, (NO2)	µg/m3	47.0	48.0	51.0	49.0	41.0	44.6
	Carbon Monoxide(CO)	mg/m3	0.3	0.3	0.3	0.3	0.3	0.4
	Ammonia (NH3)	µg/m3	165.0	97.0	106.5	52.0	77.0	113.0
	Ozone (O3)	µg/m3	21.0	19.0	20.5	2.0	15.0	13.4
	Nickel (Ni)	ng/m3	5.9	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
	Arsenic (As)	ng/m3	NT	NT	NT	NT	NT	NT
	Lead (Pb)	µg/m3	0.21	0.23	0.2	0.2	0.1	0.1
	Benzene (C6H6)	µg/m3	< 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

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

WPFA - West Plant First Aid Station

CRM - Cold Roll Mill

PH - Power House

NT - Not Traced

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J. Nagarjuna Reddy

Sr. Manager
Monitoring and Analysis

Anoop Srivastava

Head
Environment Monitoring, Testing & Analysis (TSJ)

TATA STEEL

TATA STEEL LIMITED
ENVIRONMENT MANAGEMENT DEPARTMENT - LABORATORY
WORKS DRAINS EFFLUENT QUALITY TEST REPORT SUMMARY FROM OCT-20 to MAR-21

TC- 8363

Sample Location	Parameter	UoM	Oct-20			Nov-20			Dec-20			Jan-21			Feb-21			Mar-21		
			Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg
Susun Gharia Drain	pH	-	8.4	7.4	7.9	8.4	7.4	7.9	8.3	7.5	7.9	8.2	7.1	7.7	8.1	7.3	7.8	8.1	7.4	7.8
	Total Suspended solids	mg/L	79.0	19.0	39.7	88.0	24.0	52.6	81.0	18.0	51.0	80.0	29.0	56.9	77.0	10.0	38.3	76.0	18.0	52.9
	Oil & Grease	mg/L	4.8	2.4	3.3	4.4	2.8	3.7	4.4	2.0	3.1	4.0	2.0	3.0	3.6	1.6	2.9	3.6	1.2	2.4
	Ammonical Nitrogen (as N)	mg/L	14.7	2.3	8.1	14.5	1.7	6.6	13.3	1.9	5.0	20.7	2.3	6.4	10.0	2.8	5.6	7.8	1.2	2.7
	Cyanide (as CN-)	mg/L	0.2	0.1	0.1	0.2	0.0	0.1	0.2	0.1	0.1	0.2	0.1	0.2	0.2	0.1	0.2	0.2	0.1	0.2
	Biological Oxygen Demand, BOD	mg/L	14.8	8.2	11.0	14.6	7.8	9.7	13.3	4.7	8.6	13.0	4.7	8.9	13.0	4.5	7.7	16.0	7.5	11.4
	Chemical Oxygen Demand, COD	mg/L	188.0	89.0	113.2	170.0	75.0	108.6	180.0	56.0	97.4	186.0	48.0	94.9	88.0	48.0	64.6	202.0	88.0	125.5
	Phenol	mg/L	0.9	0.4	0.6	0.5	0.1	0.2	0.5	0.1	0.2	0.4	0.0	0.2	0.3	0.1	0.1	0.5	0.1	0.3
BOT TREATED	**Parameter**	**UoM**	**Max**	**Min**	**Avg**	**Max**	**Min**	**Avg**	**Max**	**Min**	**Avg**	**Max**	**Min**	**Avg**	**Max**	**Min**	**Avg**	**Max**	**Min**	**Avg**
	pH	-	8.4	7.2	7.7	8.0	7.0	7.6	8.0	7.1	7.5	8.1	7.0	7.5	8.0	6.9	7.4	7.9	6.8	7.5
	Total Suspended solids	mg/L	82.0	25.0	49.3	88.0	36.0	68.1	92.0	34.0	63.7	90.0	38.0	73.6	60.0	15.0	43.1	88.0	35.0	63.1
	Oil & Grease	mg/L	5.2	3.6	4.2	5.2	3.6	4.5	4.8	2.8	3.8	4.8	2.8	3.8	4.4	1.6	3.0	2.8	0.8	1.7
	Ammonical Nitrogen (as N)	mg/L	37.9	14.2	25.5	35.8	1.4	11.2	15.9	1.4	5.1	46.3	1.7	9.7	33.0	1.5	17.7	7.3	0.8	2.4
	Cyanide (as CN-)	mg/L	0.2	0.1	0.2	0.2	0.1	0.2	0.2	0.1	0.1	0.2	0.1	0.1	0.2	0.1	0.1	0.2	0.1	0.2
	Biological Oxygen Demand, BOD	mg/L	26.4	12.8	22.2	25.9	12.9	21.2	18.6	9.1	13.9	18.1	9.0	13.0	26.4	6.6	15.3	26.1	18.1	23.0
	Chemical Oxygen Demand, COD	mg/L	229.0	196.0	213.0	238.0	206.0	222.4	230.0	160.0	207.6	238.0	180.0	222.6	218.0	118.0	172.5	244.0	173.0	229.2
	Phenol	mg/L	0.3	0.1	0.2	0.3	0.2	0.2	0.3	0.1	0.2	0.3	0.1	0.2	0.3	0.1	0.2	0.3	0.1	0.2
CRM	**Parameter**	**UoM**	**Max**	**Min**	**Avg**	**Max**	**Min**	**Avg**	**Max**	**Min**	**Avg**	**Max**	**Min**	**Avg**	**Max**	**Min**	**Avg**	**Max**	**Min**	**Avg**
	pH	-	7.9	7.0	7.5	7.6	7.0	7.4	7.5	7.0	7.2	7.8	7.3	7.5	7.8	6.9	7.3	7.8	7.1	7.4
	Total Suspended solids	mg/L	79.0	32.0	47.0	69.0	14.0	43.0	60.0	15.0	42.3	72.0	26.0	49.0	84.0	26.0	52.0	58.0	23.0	39.5
	Oil & Grease	mg/L	4.0	1.6	2.6	3.2	1.2	2.3	4.0	2.0	3.0	3.2	1.2	2.2	3.6	0.8	2.3	2.8	1.2	1.6
	Ammonical Nitrogen (as N)	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Cyanide (as CN-)	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Biological Oxygen Demand, BOD	mg/L	14.6	8.0	10.5	15.8	8.0	11.0	10.7	4.7	7.5	9.9	4.7	7.8	14.6	4.5	9.2	14.7	4.8	11.2
	Chemical Oxygen Demand, COD	mg/L	151.0	89.0	119.0	158.0	66.0	112.0	147.0	58.0	88.3	128.0	62.0	92.8	172.0	37.0	94.0	162.0	61.0	122.2
	Phenol	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note

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

J. Nagarjuna Reddy

Sr. Manager
Monitoring and Analysis

Anoop Srivastava

Head
Environment Monitoring, Testing & Analysis (TSJ)

TATA STEEL LIMITED

GROUNDWATER MONITORING - Done by NABL/ MoEF Certified Lab (Oct-20 to Mar-21)

TC- 8363

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-20	Baganhattu Bore water	6.88	27.7	821.0	402.3	<10	< 1.0	Agreeable	203.2	293.0	72.2	24.9	2.4	57.2	92.0	0.7
	SonariBore water	6.96	27.7	1069.0	523.8	<10	< 1.0	Agreeable	235.1	325.0	41.7	20.3	2.0	79.0	144.0	0.4
	Parvati GhatBore water	8.7	27.9	1060.0	519.4	<10	< 1.0	Agreeable	241.0	240.0	56.3	57.0	2.9	80.9	24.5	0.4
	Jugsalai Bore Water	7.96	27.9	971.0	475.8	<10	< 1.0	Agreeable	261.0	193.0	43.5	26.9	2.2	72.0	129.0	0.5
	Jemco Bore Water	6.99	27.7	668.0	327.3	55	< 1.0	Agreeable	157.4	216.0	55.3	29.9	2.6	45.0	99.8	0.4
Nov-20	Baganhattu Bore water	7.02	27.1	778.0	381.2	<10	< 1.0	Agreeable	233.0	305.7	89.2	24.9	2.2	61.5	72.2	0.5
	SonariBore water	6.95	28.1	990.0	485.1	<10	< 1.0	Agreeable	264.0	209.0	41.7	11.1	1.8	79.9	72.4	0.2
	Parvati GhatBore water	7.36	26.2	807.0	395.4	<10	< 1.0	Agreeable	252.0	246.0	131.1	100.1	1.6	62.2	42.4	0.2
	Jugsalai Bore Water	7.22	26.7	968.0	474.3	<10	< 1.0	Agreeable	332.0	261.0	89.2	47.6	3.1	79.2	52.1	0.2
	Jemco Bore Water	6.89	26.7	687.0	336.6	24	< 1.0	Agreeable	96.0	209.0	85.5	35.5	0.9	47.1	163.4	0.2
Dec-20	Baganhattu Bore water	6.83	25.4	762.0	373.4	<10	< 1.0	Agreeable	145.0	196.0	122.2	82.0	1.9	56.2	81.6	0.2
	SonariBore water	6.84	25.2	960.0	470.4	<10	< 1.0	Agreeable	243.0	303.0	44.3	37.8	3.1	69.9	113.2	4.2
	Parvati GhatBore water	7.33	26.1	810.0	396.9	<10	< 1.0	Agreeable	260.0	269.0	215.1	56.2	3.4	66.0	31.0	0.1
	Jugsalai Bore Water	7.37	25.4	911.0	446.4	<10	< 1.0	Agreeable	276.0	293.0	117.6	32.3	2.3	78.0	33.8	0.1
	Jemco Bore Water	7.42	24.9	564.0	276.4	44	< 1.0	Agreeable	130.0	181.0	82.6	26.8	3.4	59.9	146.0	0.5
Jan-21	Baganhattu Bore water	7.3	29.7	713.0	349.4	<10	< 1.0	Agreeable	148.0	308.0	112.4	148.6	1.5	51.0	109.9	0.2
	SonariBore water	6.87	27.9	952.0	466.5	<10	< 1.0	Agreeable	260.0	204.0	98.9	30.7	3.6	87.6	55.5	0.2
	Parvati GhatBore water	6.99	25.9	1925.0	943.3	<10	< 1.0	Agreeable	221.8	815.0	177.7	129.6	0.5	88.2	138.5	0.2
	Jugsalai Bore Water	7	25.9	2310.0	856.2	<10	< 1.0	Agreeable	262.1	1082.0	89.0	65.9	3.0	99.1	126.3	0.2
	Jemco Bore Water	6.8	28.8	606.0	296.9	<10	< 1.0	Agreeable	184.2	181.0	57.4	62.9	0.3	49.5	110.1	0.4
Feb-21	Baganhattu Bore water	6.56	28.7	742.0	363.6	<10	< 1.0	Agreeable	176.0	270.0	110.6	145.1	1.0	71.9	149.1	0.3
	SonariBore water	6.85	26.4	883.0	432.7	<10	< 1.0	Agreeable	164.0	277.8	98.7	30.9	3.7	89.0	61.6	0.4
	Parvati GhatBore water	7.16	26.9	863.0	422.9	<10	< 1.0	Agreeable	139.1	250.0	156.5	108.5	0.4	75.0	147.5	0.5
	Jugsalai Bore Water	7.18	27.2	978.0	479.2	<10	< 1.0	Agreeable	143.3	326.1	71.6	48.5	2.9	85.0	25.7	0.2
	Jemco Bore Water	7.01	28.1	618.0	302.8	<10	< 1.0	Agreeable	148.0	173.0	71.5	69.3	1.4	44.9	197.9	0.3
Mar-21	Baganhattu Bore water	6.84	31.8	762.0	373.4	<10	< 1.0	Agreeable	201.3	74.3	99.5	32.6	2.1	62.5	59.7	0.3
	SonariBore water	6.95	30.5	880.0	431.2	<10	< 1.0	Agreeable	106.2	341.8	89.5	151.8	0.6	61.8	52.6	0.2
	Parvati GhatBore water	7.19	31.8	1021.0	500.3	<10	< 1.0	Agreeable	464.4	237.0	148.2	36.1	3.5	146.1	139.4	0.4
	Jugsalai Bore Water	7.13	31.3	719.8	352.7	<10	< 1.0	Agreeable	181.7	247.0	60.5	38.7	1.5	115.9	14.9	0.3
	Jemco Bore Water	6.94	30.8	633.0	310.2	<10	< 1.0	Agreeable	111.2	189.3	63.2	40.1	2.6	48.4	140.0	0.5

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TATA STEEL LIMITED

GROUNDWATER MONITORING - Done by NABL/ MoEF Certified Lab (Oct-20 to Mar-21)

TC- 8363

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-20	Baganhattu Bore water	6.70	0.04	0.37	44.50	0.03	< 0.05	< 0.05	0.050	< 0.05	< 0.001	0.023	< 0.5	< 0.001	0.20	6.89	< 1.0
	SonariBore water	11.90	0.02	0.22	21.80	0.26	< 0.05	< 0.05	0.040	< 0.05	< 0.001	0.032	< 0.5	< 0.001	0.13	5.35	< 1.0
	Parvati GhatBore water	11.70	0.02	0.31	27.10	0.23	< 0.05	< 0.05	0.030	< 0.05	< 0.001	0.068	< 0.5	< 0.001	0.18	5.56	< 1.0
	Jugsalai Bore Water	0.20	0.03	0.77	23.85	1.70	< 0.05	< 0.05	0.030	< 0.05	< 0.001	0.050	< 0.5	< 0.001	0.25	6.43	< 1.0
	Jemco Bore Water	5.40	0.04	0.64	24.87	0.04	< 0.05	< 0.05	0.100	< 0.05	< 0.001	0.014	< 0.5	< 0.001	0.20	4.73	< 1.0
Nov-20	Baganhattu Bore water	3.20	0.03	0.42	33.90	0.03	< 0.05	< 0.05	0.019	< 0.05	< 0.001	0.046	< 0.5	< 0.001	0.25	5.81	< 1.0
	SonariBore water	12.50	0.04	0.31	21.50	0.02	< 0.05	< 0.05	0.025	< 0.05	< 0.001	0.068	< 0.5	< 0.001	0.19	5.37	< 1.0
	Parvati GhatBore water	1.70	0.08	0.82	15.20	0.03	< 0.05	< 0.05	0.030	< 0.05	< 0.001	0.095	< 0.5	< 0.001	0.25	5.51	< 1.0
	Jugsalai Bore Water	3.00	0.06	0.82	18.30	0.03	< 0.05	< 0.05	0.028	< 0.05	< 0.001	0.043	< 0.5	< 0.001	0.19	5.64	< 1.0
	Jemco Bore Water	2.00	0.05	0.98	21.70	0.05	< 0.05	< 0.05	0.014	< 0.05	< 0.001	0.077	< 0.5	< 0.001	0.23	1.01	< 1.0
Dec-20	Baganhattu Bore water	3.30	0.10	0.13	17.00	0.11	< 0.05	< 0.05	0.034	< 0.05	< 0.001	0.059	< 0.5	< 0.001	0.38	6.88	< 1.0
	SonariBore water	2.90	0.06	0.06	12.80	0.06	< 0.05	< 0.05	0.025	< 0.05	< 0.001	0.050	< 0.5	< 0.001	0.22	5.80	< 1.0
	Parvati GhatBore water	0.90	0.03	0.74	18.95	0.07	< 0.05	< 0.05	0.052	< 0.05	< 0.001	0.140	< 0.5	< 0.001	0.29	5.63	< 1.0
	Jugsalai Bore Water	0.50	0.02	0.63	22.85	0.12	< 0.05	< 0.05	0.079	< 0.05	< 0.001	0.068	< 0.5	< 0.001	0.27	5.32	< 1.0
	Jemco Bore Water	0.20	0.10	0.90	13.15	0.15	< 0.05	< 0.05	0.052	< 0.05	< 0.001	0.104	< 0.5	< 0.001	0.31	5.61	< 1.0
Jan-21	Baganhattu Bore water	6.70	0.08	0.31	12.80	0.05	< 0.05	< 0.05	0.016	< 0.05	< 0.001	0.013	< 0.5	< 0.001	0.09	5.00	< 1.0
	SonariBore water	9.30	0.05	0.30	8.89	0.04	< 0.05	< 0.05	0.011	< 0.05	< 0.001	0.022	< 0.5	< 0.001	0.24	3.73	< 1.0
	Parvati GhatBore water	7.30	0.14	0.67	17.65	0.03	< 0.05	< 0.05	0.018	< 0.05	< 0.001	0.058	< 0.5	< 0.001	0.10	5.21	< 1.0
	Jugsalai Bore Water	8.90	0.24	0.72	14.65	0.12	< 0.05	< 0.05	0.013	< 0.05	< 0.001	0.040	< 0.5	< 0.001	0.14	4.81	< 1.0
	Jemco Bore Water	6.70	0.13	0.31	14.98	0.11	< 0.05	< 0.05	0.011	< 0.05	< 0.001	0.004	< 0.5	< 0.001	0.32	2.84	< 1.0
Feb-21	Baganhattu Bore water	4.70	0.07	0.45	14.32	0.07	< 0.05	< 0.05	0.008	< 0.05	< 0.001	0.035	< 0.5	< 0.001	0.17	3.92	< 1.0
	SonariBore water	9.80	0.04	6.10	15.30	0.08	< 0.05	< 0.05	0.013	< 0.05	< 0.001	0.056	< 0.5	< 0.001	0.08	5.02	< 1.0
	Parvati GhatBore water	3.50	0.05	6.65	12.80	0.06	< 0.05	< 0.05	0.017	< 0.05	< 0.001	0.083	< 0.5	< 0.001	0.37	3.89	< 1.0
	Jugsalai Bore Water	2.00	0.07	1.10	13.60	0.05	< 0.05	< 0.05	0.015	< 0.05	< 0.001	0.031	< 0.5	< 0.001	0.11	5.29	< 1.0
	Jemco Bore Water	3.90	0.06	1.10	18.67	0.07	< 0.05	< 0.05	0.002	< 0.05	< 0.001	0.065	< 0.5	< 0.001	0.13	2.70	< 1.0
Mar-21	Baganhattu Bore water	4.80	0.04	0.77	22.65	0.08	< 0.05	< 0.05	0.022	< 0.05	< 0.001	0.047	< 0.5	< 0.001	0.50	6.53	< 1.0
	SonariBore water	6.20	0.05	0.68	23.21	0.06	< 0.05	< 0.05	0.023	< 0.05	< 0.001	0.048	< 0.5	< 0.001	0.14	3.91	< 1.0
	Parvati GhatBore water	3.30	0.04	0.34	23.65	0.06	< 0.05	< 0.05	0.050	< 0.05	< 0.001	0.138	< 0.5	< 0.001	0.18	3.74	< 1.0
	Jugsalai Bore Water	3.80	0.07	0.69	22.50	0.07	< 0.05	< 0.05	0.077	< 0.05	< 0.001	0.066	< 0.5	< 0.001	0.19	3.70	< 1.0
	Jemco Bore Water	1.50	0.08	0.29	25.20	0.08	< 0.05	< 0.05	0.050	< 0.05	< 0.001	0.102	< 0.5	< 0.001	0.42	3.72	< 1.0

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TC- 8363

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
Oct-20	Baganhattu Bore water	52.0	6.4	< 1.0	Nil	0.07	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	SonariBore water	43.0	4.3	< 1.0	Nil	0.07	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	Parvati GhatBore water	52.0	5.3	< 1.0	Nil	0.08	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	Jugsalai Bore Water	62.0	7.6	< 1.0	Nil	0.1	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	Jemco Bore Water	58.0	7.2	< 1.0	Nil	0.09	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
Nov-20	Baganhattu Bore water	93.0	10.9	< 1.0	Nil	0.09	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	SonariBore water	45.0	5.5	< 1.0	Nil	0.1	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	Parvati GhatBore water	46.0	6.5	< 1.0	Nil	0.12	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	Jugsalai Bore Water	38.0	5.4	< 1.0	Nil	0.05	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	Jemco Bore Water	33.0	4.3	< 1.0	Nil	0.04	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
Dec-20	Baganhattu Bore water	50.0	3.2	< 1.0	Nil	0.07	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	SonariBore water	30.0	4.0	< 1.0	Nil	0.08	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	Parvati GhatBore water	65.0	6.2	< 1.0	Nil	0.09	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	Jugsalai Bore Water	53.0	6.5	< 1.0	Nil	0.1	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	Jemco Bore Water	70.0	7.6	< 1.0	Nil	0.12	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
Jan-21	Baganhattu Bore water	37.0	4.5	< 1.0	Nil	0.05	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	SonariBore water	22.0	2.0	< 1.0	Nil	0.04	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	Parvati GhatBore water	35.0	3.2	< 1.0	Nil	0.06	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	Jugsalai Bore Water	56.0	6.6	< 1.0	Nil	0.05	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	Jemco Bore Water	44.0	4.7	< 1.0	Nil	0.02	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
Feb-21	Baganhattu Bore water	45.0	5.0	< 1.0	Nil	0.09	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	SonariBore water	35.0	2.0	< 1.0	Nil	0.06	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	Parvati GhatBore water	33.0	2.0	< 1.0	Nil	0.09	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	Jugsalai Bore Water	38.0	2.0	< 1.0	Nil	0.06	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	Jemco Bore Water	28.0	2.0	< 1.0	Nil	0.05	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
Mar-21	Baganhattu Bore water	32.0	2.0	< 1.0	Nil	0.04	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	SonariBore water	28.0	3.4	< 1.0	Nil	0.04	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	Parvati GhatBore water	33.0	3.6	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	Jugsalai Bore Water	36.0	2.9	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent
	Jemco Bore Water	42.0	3.1	< 1.0	Nil	< 0.001	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.03	< 0.01	Absent

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Month	Locations	pH	Temperature	Conductivity	Turbidity	Total Dissolved Solids	TSS	Color	Odor
		--	oC	µMho/Cm	NTU	mg/L	mg/L	CU	--
Oct-20	KHARKHAI RIVER (NEAR DUMUHANI)	8.41	27.60	294	< 0.05	144.06	<10	< 1.0	Agreeable
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	8.68	28.10	284	< 0.05	139.16	<10	< 1.0	Agreeable
	SWARNREKHA RIVER(NEAR BAGUN HATU)	8.26	27.70	405	< 0.05	198.45	<10	< 1.0	Agreeable
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	8.61	27.90	267	< 0.05	130.83	<10	< 1.0	Agreeable
Nov-20	KHARKHAI RIVER (NEAR DUMUHANI)	7.81	27.10	352	< 0.05	172.60	<10	< 1.0	Agreeable
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	7.94	26.88	456	< 0.05	223.44	<10	< 1.0	Agreeable
	SWARNREKHA RIVER(NEAR BAGUN HATU)	7.96	27.20	417	< 0.05	204.33	<10	< 1.0	Agreeable
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	7.89	26.57	263	< 0.05	128.71	<10	< 1.0	Agreeable
Dec-20	KHARKHAI RIVER (NEAR DUMUHANI)	7.72	24.90	477	< 0.05	233.73	<10	< 1.0	Agreeable
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	7.98	24.40	382	< 0.05	187.18	<10	< 1.0	Agreeable
	SWARNREKHA RIVER(NEAR BAGUN HATU)	8.04	25.20	400	< 0.05	196.00	<10	< 1.0	Agreeable
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	8.02	25.50	258	< 0.05	126.42	<10	< 1.0	Agreeable
Jan-21	KHARKHAI RIVER (NEAR DUMUHANI)	8.27	27.40	352	< 0.05	172.48	<10	< 1.0	Agreeable
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	7.63	26.90	434	< 0.05	212.66	<10	< 1.0	Agreeable
	SWARNREKHA RIVER(NEAR BAGUN HATU)	7.77	29.30	360	< 0.05	176.40	<10	< 1.0	Agreeable
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	7.48	28.00	267	< 0.05	130.83	<10	< 1.0	Agreeable
Feb-21	KHARKHAI RIVER (NEAR DUMUHANI)	7.96	25.90	277	< 0.05	135.73	<10	< 1.0	Agreeable
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	7.83	25.90	529	< 0.05	259.21	<10	< 1.0	Agreeable
	SWARNREKHA RIVER(NEAR BAGUN HATU)	7.86	27.50	436	< 0.05	213.64	<10	< 1.0	Agreeable
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	8.27	27.50	246	< 0.05	120.54	<10	< 1.0	Agreeable
Mar-21	KHARKHAI RIVER (NEAR DUMUHANI)	7.85	31.00	405	< 0.05	198.45	<10	< 1.0	Agreeable
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	7.72	31.90	918	< 0.05	449.82	<10	< 1.0	Agreeable
	SWARNREKHA RIVER(NEAR BAGUN HATU)	7.52	31.00	402	< 0.05	196.80	<10	< 1.0	Agreeable
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	7.80	31.60	237	< 0.05	116.10	<10	< 1.0	Agreeable

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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-20	KHARKHAI RIVER (NEAR DUMUHANI)	111.6	102.0	24.4	7.3	30.9	4.6	11.8
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	119.5	99.9	73.4	7.3	28.4	3.9	11.8
	SWARNREKHA RIVER(NEAR BAGUN HATU)	111.6	104.0	26.3	4.8	14.4	2.2	24.6
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	97.6	106.0	18.8	5.6	18.3	3.4	12.8
Nov-20	KHARKHAI RIVER (NEAR DUMUHANI)	143.0	120.1	22.3	6.7	15.6	2.1	26.0
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	169.0	154.5	21.5	6.5	13.7	1.8	32.7
	SWARNREKHA RIVER(NEAR BAGUN HATU)	128.0	140.0	19.8	5.5	19.9	3.4	47.5
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	121.3	92.6	15.9	4.8	10.7	1.9	18.4
Dec-20	KHARKHAI RIVER (NEAR DUMUHANI)	147.0	153.0	20.1	5.9	16.9	3.9	36.9
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	129.0	141.0	34.2	10.1	31.0	5.7	25.9
	SWARNREKHA RIVER(NEAR BAGUN HATU)	90.7	109.0	28.7	7.1	33.3	7.4	45.1
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	94.7	85.0	22.1	6.9	18.2	4.3	22.0
Jan-21	KHARKHAI RIVER (NEAR DUMUHANI)	116.0	97.9	25.0	6.8	15.3	2.9	26.9
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	152.0	151.0	21.3	6.2	10.1	2.5	35.8
	SWARNREKHA RIVER(NEAR BAGUN HATU)	120.0	108.0	24.4	7.0	18.5	4.5	45.0
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	116.0	89.7	24.6	6.5	12.9	3.2	24.7
Feb-21	KHARKHAI RIVER (NEAR DUMUHANI)	84.0	71.1	21.4	5.3	11.9	2.6	25.0
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	144.0	142.2	19.5	4.9	10.7	2.1	43.0
	SWARNREKHA RIVER(NEAR BAGUN HATU)	136.0	134.0	22.5	5.9	14.9	3.9	59.9
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	116.0	103.8	21.0	5.5	10.5	2.7	21.9
Mar-21	KHARKHAI RIVER (NEAR DUMUHANI)	75.6	132.9	19.4	3.4	10.0	1.8	25.3
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	129.6	253.2	16.6	2.1	7.8	1.3	47.4
	SWARNREKHA RIVER(NEAR BAGUN HATU)	122.4	101.3	20.6	3.9	12.9	3.6	45.3
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	104.4	82.3	18.1	2.6	7.6	1.5	20.1

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Month	Locations	$SO4^{-2}$	P	Nitrate Nitrogen as N	Nitrite Nitrogen as N	F^-	SiO2	Fe	Mn
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Oct-20	KHARKHAI RIVER (NEAR DUMUHANI)	10.9	0.15	0.20	0.04	0.25	11.25	0.19	< 0.05
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	10.5	0.14	0.20	0.03	0.26	10.35	0.34	< 0.05
	SWARNREKHA RIVER(NEAR BAGUN HATU)	24.0	0.08	0.25	0.02	0.64	10.25	0.18	< 0.05
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	11.3	0.05	0.30	0.03	0.53	11.40	0.17	< 0.05
Nov-20	KHARKHAI RIVER (NEAR DUMUHANI)	22.2	0.22	0.80	0.12	0.34	12.00	0.24	< 0.05
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	25.4	0.09	1.30	0.08	0.08	12.66	0.19	< 0.05
	SWARNREKHA RIVER(NEAR BAGUN HATU)	27.6	0.08	3.00	0.06	0.75	10.10	0.05	< 0.05
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	12.5	0.05	1.20	0.05	0.81	10.03	0.06	< 0.05
Dec-20	KHARKHAI RIVER (NEAR DUMUHANI)	48.8	0.08	0.30	0.12	0.23	10.40	0.04	< 0.05
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	34.9	0.07	0.20	0.04	0.12	10.70	0.03	< 0.05
	SWARNREKHA RIVER(NEAR BAGUN HATU)	27.9	0.21	0.50	0.18	0.23	9.20	0.03	< 0.05
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	19.7	0.1	0.10	0.08	0.32	4.18	0.02	< 0.05
Jan-21	KHARKHAI RIVER (NEAR DUMUHANI)	23.5	0.02	0.60	0.08	0.66	3.73	0.01	< 0.05
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	26.7	0.31	2.80	0.12	0.29	6.15	0.05	< 0.05
	SWARNREKHA RIVER(NEAR BAGUN HATU)	28.8	0.15	2.10	0.09	0.48	5.24	0.03	< 0.05
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	13.7	0.03	0.21	0.06	0.30	4.82	0.02	< 0.05
Feb-21	KHARKHAI RIVER (NEAR DUMUHANI)	50.0	0.11	2.50	0.06	6.00	5.80	0.03	< 0.05
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	36.1	0.24	2.10	0.05	4.22	6.62	0.04	< 0.05
	SWARNREKHA RIVER(NEAR BAGUN HATU)	29.2	0.16	1.70	0.13	3.02	7.12	0.04	< 0.05
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	20.9	0.12	1.80	0.12	2.05	6.32	0.03	< 0.05
Mar-21	KHARKHAI RIVER (NEAR DUMUHANI)	36.4	0.09	2.10	0.08	0.32	4.22	0.03	< 0.05
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	30.7	0.12	2.23	0.09	0.41	7.05	0.02	< 0.05
	SWARNREKHA RIVER(NEAR BAGUN HATU)	23.5	0.2	2.40	0.11	0.48	8.06	0.10	< 0.05
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	41.1	0.13	1.90	0.11	0.36	8.12	0.09	< 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
Oct-20	KHARKHAI RIVER (NEAR DUMUHANI)	< 0.05	< 0.03	< 0.05	< 0.01	< 0.01	< 0.1	< 0.005	0.37	1.00	<1.0	76
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	< 0.05	< 0.03	< 0.05	< 0.01	< 0.01	< 0.1	< 0.005	0.05	1.00	1.2	52
	SWARNREKHA RIVER(NEAR BAGUN HATU)	< 0.05	< 0.03	< 0.05	< 0.01	< 0.01	< 0.1	< 0.005	0.54	1.00	<1.0	48
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	< 0.05	< 0.03	< 0.05	< 0.01	< 0.01	< 0.1	< 0.005	0.04	1.00	<1.0	51
Nov-20	KHARKHAI RIVER (NEAR DUMUHANI)	< 0.05	< 0.03	< 0.05	< 0.01	0.015	< 0.1	< 0.005	0.61	1.00	<1.0	70.8
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	< 0.05	< 0.03	< 0.05	< 0.01	< 0.01	< 0.1	< 0.005	1.48	4.20	<1.0	47
	SWARNREKHA RIVER(NEAR BAGUN HATU)	< 0.05	< 0.03	< 0.05	< 0.01	< 0.01	< 0.1	< 0.005	0.46	1.00	<1.0	120
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	< 0.05	0.03	< 0.05	< 0.01	< 0.01	< 0.1	< 0.005	0.44	1.00	1.2	109
Dec-20	KHARKHAI RIVER (NEAR DUMUHANI)	< 0.05	< 0.03	< 0.05	< 0.01	< 0.01	< 0.1	< 0.005	0.39	1.00	<1.0	51
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	< 0.05	< 0.03	< 0.05	< 0.01	< 0.01	< 0.1	< 0.005	0.22	1.00	<1.0	33
	SWARNREKHA RIVER(NEAR BAGUN HATU)	< 0.05	< 0.03	< 0.05	< 0.01	< 0.01	< 0.1	< 0.005	0.34	1.00	<1.0	38
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	< 0.05	< 0.03	< 0.05	< 0.01	< 0.01	< 0.1	< 0.005	0.42	1.00	<1.0	37
Jan-21	KHARKHAI RIVER (NEAR DUMUHANI)	< 0.05	< 0.03	< 0.05	< 0.01	< 0.01	< 0.1	< 0.005	0.66	1.00	<1.0	25
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	< 0.05	< 0.03	< 0.05	< 0.01	< 0.01	< 0.1	< 0.005	1.63	5.32	<1.0	49
	SWARNREKHA RIVER(NEAR BAGUN HATU)	< 0.05	< 0.03	< 0.05	< 0.01	< 0.01	< 0.1	< 0.005	0.75	1.00	<1.0	42
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	< 0.05	< 0.03	< 0.05	< 0.01	< 0.01	< 0.1	< 0.005	0.61	1.00	<1.0	60
Feb-21	KHARKHAI RIVER (NEAR DUMUHANI)	< 0.05	< 0.03	< 0.05	< 0.01	< 0.01	< 0.1	< 0.005	0.37	1.00	<1.0	25
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	< 0.05	< 0.03	< 0.05	< 0.01	< 0.01	< 0.1	< 0.005	0.46	1.00	<1.0	69
	SWARNREKHA RIVER(NEAR BAGUN HATU)	< 0.05	< 0.03	< 0.05	< 0.01	< 0.01	< 0.1	< 0.005	0.72	1.00	<1.0	33
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	< 0.05	< 0.03	< 0.05	< 0.01	< 0.01	< 0.1	< 0.005	1.78	1.00	<1.0	25
Mar-21	KHARKHAI RIVER (NEAR DUMUHANI)	< 0.05	< 0.03	< 0.05	< 0.01	< 0.01	< 0.1	< 0.005	0.82	1.00	<1.0	44
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	< 0.05	< 0.03	< 0.05	< 0.01	< 0.01	< 0.1	< 0.005	0.66	1.00	<1.0	68
	SWARNREKHA RIVER(NEAR BAGUN HATU)	< 0.05	< 0.03	< 0.05	< 0.01	< 0.01	< 0.1	< 0.005	0.40	1.00	<1.0	45
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	< 0.05	< 0.03	< 0.05	< 0.01	< 0.01	< 0.1	< 0.005	0.49	1.00	<1.0	35

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Month	Locations	BOD (3days at 270C)	Barium as Ba	Boron as B	Residual Chlorine as Cl	Sulphide as S^{-2}	Phenolic Compounds as Phenols	Cyanide as CN	Arsenic as As	Selenium as Se	Mercury	Molybdenum as Mo	Aluminum	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-20	KHARKHAI RIVER (NEAR DUMUHANI)	7.6	< 1.0	< 1.0	< 1.0	Nil	0.04	0.00	< 0.01	< 0.01	< 0.01	<0.01	< 0.02	Absent
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	8.6	< 1.0	< 1.0	< 1.0	Nil	0.06	0.01	< 0.01	< 0.01	< 0.01	<0.01	< 0.02	Absent
	SWARNREKHA RIVER(NEAR BAGUN HATU)	5.2	< 1.0	< 1.0	< 1.0	Nil	0.05	0.01	< 0.01	< 0.01	< 0.01	<0.01	< 0.02	Absent
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	5.2	< 1.0	< 1.0	< 1.0	Nil	0.07	0.01	< 0.01	< 0.01	< 0.01	<0.01	< 0.02	Absent
Nov-20	KHARKHAI RIVER (NEAR DUMUHANI)	7.1	< 1.0	< 1.0	< 1.0	Nil	0.05	0.05	< 0.01	< 0.01	< 0.01	<0.01	< 0.02	Absent
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	5.0	< 1.0	< 1.0	< 1.0	Nil	0.06	0.07	< 0.01	< 0.01	< 0.01	<0.01	< 0.02	Absent
	SWARNREKHA RIVER(NEAR BAGUN HATU)	8.6	< 1.0	< 1.0	< 1.0	Nil	0.04	0.06	< 0.01	< 0.01	< 0.01	<0.01	< 0.02	Absent
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	8.5	< 1.0	< 1.0	< 1.0	Nil	0.01	0.05	< 0.01	< 0.01	< 0.01	<0.01	< 0.02	Absent
Dec-20	KHARKHAI RIVER (NEAR DUMUHANI)	4.8	< 1.0	< 1.0	< 1.0	Nil	0.10	0.01	< 0.01	< 0.01	< 0.01	<0.01	0.08	Absent
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	4.0	< 1.0	< 1.0	< 1.0	Nil	0.12	0.01	< 0.01	< 0.01	< 0.01	<0.01	0.08	Absent
	SWARNREKHA RIVER(NEAR BAGUN HATU)	3.3	< 1.0	< 1.0	< 1.0	Nil	0.07	0.01	< 0.01	< 0.01	< 0.01	<0.01	0.11	Absent
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	3.3	< 1.0	< 1.0	< 1.0	Nil	0.08	0.01	< 0.01	< 0.01	< 0.01	<0.01	0.08	Absent
Jan-21	KHARKHAI RIVER (NEAR DUMUHANI)	2.0	< 1.0	< 1.0	< 1.0	Nil	0.06	0.03	< 0.01	< 0.01	< 0.01	<0.01	< 0.02	Absent
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	4.6	< 1.0	< 1.0	< 1.0	Nil	0.04	0.06	< 0.01	< 0.01	< 0.01	<0.01	< 0.02	Absent
	SWARNREKHA RIVER(NEAR BAGUN HATU)	6.2	< 1.0	< 1.0	< 1.0	Nil	0.06	0.02	< 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	0.05	0.03	< 0.01	< 0.01	< 0.01	<0.01	< 0.02	Absent
Feb-21	KHARKHAI RIVER (NEAR DUMUHANI)	2.0	< 1.0	< 1.0	< 1.0	Nil	0.06	0.03	< 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	0.05	0.04	< 0.01	< 0.01	< 0.01	<0.01	< 0.02	Absent
	SWARNREKHA RIVER(NEAR BAGUN HATU)	3.0	< 1.0	< 1.0	< 1.0	Nil	0.09	0.04	< 0.01	< 0.01	< 0.01	<0.01	< 0.02	Absent
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	2.0	< 1.0	< 1.0	< 1.0	Nil	0.08	0.03	< 0.01	< 0.01	< 0.01	<0.01	< 0.02	Absent
Mar-21	KHARKHAI RIVER (NEAR DUMUHANI)	4.3	< 1.0	< 1.0	< 1.0	Nil	0.06	0.04	< 0.01	< 0.01	< 0.01	<0.01	< 0.02	Absent
	KHARKHAI RIVER (NEAR ADITYAPUR BRIDGE)	3.6	< 1.0	< 1.0	< 1.0	Nil	0.05	0.02	< 0.01	< 0.01	< 0.01	<0.01	< 0.02	Absent
	SWARNREKHA RIVER(NEAR BAGUN HATU)	3.0	< 1.0	< 1.0	< 1.0	Nil	< 0.001	0.02	< 0.01	< 0.01	< 0.01	<0.01	< 0.02	Absent
	SWARNREKHA RIVER(NEAR MANGO BRIDGE)	2.0	< 1.0	< 1.0	< 1.0	Nil	< 0.001	0.04	< 0.01	< 0.01	< 0.01	<0.01	< 0.02	Absent

J. Nagarjuna Reddy

Sr. Manager
Monitoring and Analysis

Anoop Srivastava

Head
Environment Monitoring, Testing
& Analysis (TSJ)

TATA STEEL

TATA STEEL LIMITED

ENVIRONMENTAL MONITORING REPORT OF MAIN WORKS JAMSHEDPUR

ONLINE STACK MONITORING REPORT FROM OCTOBER 2020 TO MARCH 2021

			Oct'20			Nov'20			Dec'20		
SL. No.	Department	Stack	PM (mg/Nm3)	SO2 (mg/Nm3)	NOx (mg/Nm3)	PM (mg/Nm3)	SO2 (mg/Nm3)	NOx (mg/Nm3)	PM (mg/Nm3)	SO2 (mg/Nm3)	NOx (mg/Nm3)
1	Blast Furnace	C - Stove	<5	-	0.9	<5	-	-	MSD	-	-
2	Blast Furnace	E - Stock & Cast House	9.0	-	-	7.9	-	-	6.7	-	-
3	Blast Furnace	E - Stove	<5	88.2	25.3	<5	95.0	22.6	<5	90.9	18.4
4	Blast Furnace	F - Cast House	6.0	-	-	6.9	-	-	6.7	-	-
5	Blast Furnace	F - PCI	<5	-	-	<5	-	-	9.6	-	-
6	Blast Furnace	F - Stock House-DE	<5	-	-	<5	-	-	<5	-	-
7	Blast Furnace	F - Stove	<5	69.2	15.9	<5	72.6	15.6	5.0	78.6	17.0
8	Blast Furnace	G - Cast House	21.5	-	-	17.1	-	-	17.2	-	-
9	Blast Furnace	G - PCI-01	15.9	-	-	12.3	-	-	12.9	-	-
10	Blast Furnace	G - PCI-02	<5	-	-	<5	-	-	<5	-	-
11	Blast Furnace	G - PCI-03	7.5	-	-	8.0	-	-	10.2	-	-
12	Blast Furnace	G - Stock House	<5	-	-	<5	-	-	<5	-	-
13	Blast Furnace	G - Stove	<5	33.2	14.4	<5	49.9	10.4	<5	118.9	13.8
14	Blast Furnace	H - Cast House	7.8	-	-	8.2	-	-	5.6	-	-
15	Blast Furnace	H - PCI-01	5.6	-	-	<5	-	-	5.1	-	-
16	Blast Furnace	H - PCI-02	5.7	-	-	<5	-	-	<5	-	-
17	Blast Furnace	H - Stock House	9.6	-	-	12.7	-	-	11.3	-	-
18	Blast Furnace	H - Stock House - DE	<5	-	-	<5	-	-	<5	-	-
19	Blast Furnace	H - Stove	5.9	58.9	2.3	6.1	47.5	3.7	5.2	69.0	2.1
20	Blast Furnace	HMPP	9.5	-	-	17.2	-	-	24.4	-	-
21	Blast Furnace	I - Cast House	7.2	-	-	6.9	-	-	8.2	-	-
22	Blast Furnace	I - PCI	14.4	-	-	16.2	-	-	14.2	-	-
23	Blast Furnace	I - Stock House	6.2	-	-	7.0	-	-	7.0	-	-
24	Blast Furnace	I - Stove	<5	61.8	22.5	<5	45.9	22.8	<5	58.4	21.9
25	Coke Plant	Battery 05	8.2	31.0	35.0	5.8	98.9	35.5	9.7	-	-
26	Coke Plant	Battery 06	35.0	139.7	29.6	29.0	105.0	29.9	33.2	-	-
27	Coke Plant	Battery 07	27.7	161.0	30.7	29.9	147.3	31.1	26.7	147.1	31.1
28	Coke Plant	Battery 08	15.0	65.2	257.0	14.5	38.0	82.0	14.5	20.4	127.3
29	Coke Plant	Battery 09	7.3	61.1	175.4	8.1	53.2	163.7	9.3	122.7	150.9
30	Coke Plant	Battery 10	19.0	176.5	262.5	22.2	77.8	261.4	27.3	64.8	224.9
31	Coke Plant	Battery 10 Pushing Dedusting	6.8	-	-	5.0	-	-	5.9	-	-
32	Coke Plant	Battery 11	37.9	73.9	261.9	35.5	66.1	268.5	33.8	51.0	211.2
33	Coke Plant	Battery 11 Pushing Dedusting	5.0	-	-	<5	-	-	<5	-	-
34	LD 1	LD 01 - Ladle Furnace 01	14.5	-	-	22.2	-	-	11.0	-	-
35	LD 1	LD 01 - Ladle Furnace 02	11.7	-	-	11.5	-	-	6.2	-	-
36	LD 1	LD 01 - Ladle Furnace 03	11.6	-	-	11.7	-	-	8.5	-	-
37	LD 1	LD 01 - Secondary Emission	9.5	-	-	9.7	-	-	9.7	-	-
38	LD 2	LD 02 - DE 01	7.4	-	-	6.9	-	-	6.7	-	-
39	LD 2	LD 02 - DE 02	6.2	-	-	6.3	-	-	6.3	-	-
40	LD 2	LD 02 - DE 03	<5	-	-	6.0	-	-	5.0	-	-
41	LD 2	LD 02 - DE 04	8.2	-	-	8.9	-	-	8.8	-	-
42	LD 2	LD 02 - DE 05	7.7	-	-	6.0	-	-	7.1	-	-
43	LD 2	LD 02 - DE 06	9.1	-	-	8.6	-	-	8.5	-	-
44	LD 2	LD 02 - DE 07	<5	-	-	<5	-	-	<5	-	-
45	LD 2	LD 02 - DE 08	<5	-	-	<5	-	-	<5	-	-
46	LD 2	LD 02 - DE 09	8.2	-	-	6.1	-	-	6.4	-	-
47	LD 2	LD 02 - Ladle Furnace 01	8.3	-	-	12.0	-	-	14.3	-	-
48	LD 2	LD 02 - Ladle Furnace 02	15.2	-	-	11.4	-	-	6.5	-	-
49	LD 2	LD 02 - Secondary Emission - 01	MSD	-	-	MSD	-	-	MSD	-	-
50	LD 2	LD 02 - Secondary Emission - 02	<5	-	-	5.5	-	-	10.8	-	-
51	LD 2	LD 02 - Secondary Emission - 03	8.3	-	-	8.5	-	-	8.0	-	-
52	LD 3	LD 03 - Ladle Furnace 01	<5	-	-	5.3	-	-	7.8	-	-
53	LD 3	LD 03 - Ladle Furnace 02	<5	-	-	5.9	-	-	<5	-	-
54	LD 3	LD 03 - Secondary Emission	5.3	-	-	5.1	-	-	5.6	-	-
55	Lime Plant	Merz Kiln 01	MSD	-	-	MSD	-	-	<5	-	-
56	Lime Plant	Merz Kiln 02	<5	-	-	<5	-	-	<5	-	-
57	Lime Plant	Merz Kiln 03& 04	5.7	-	-	6.2	-	-	5.2	-	-
58	Lime Plant	Merz Kiln 05	<5	-	-	<5	-	-	<5	-	-

TATA STEEL

TATA STEEL LIMITED

ENVIRONMENTAL MONITORING REPORT OF MAIN WORKS JAMSHEDPUR

ONLINE STACK MONITORING REPORT FROM OCTOBER 2020 TO MARCH 2021

			Oct'20			Nov'20			Dec'20		
SL. No.	Department	Stack	PM (mg/Nm3)	SO2 (mg/Nm3)	NOx (mg/Nm3)	PM (mg/Nm3)	SO2 (mg/Nm3)	NOx (mg/Nm3)	PM (mg/Nm3)	SO2 (mg/Nm3)	NOx (mg/Nm3)
59	Lime Plant	Merz Kiln 06	<5	-	-	<5	-	-	<5	-	-
60	Lime Plant	Merz Kiln 06 - DE 12	<5	-	-	5.2	-	-	5.0	-	-
61	Lime Plant	Merz Kiln 07	10.7	-	-	11.3	-	-	7.0	-	-
62	Lime Plant	Merz Kiln 08 - DE 01B	<5	-	-	<5	-	-	<5	-	-
63	Lime Plant	Merz Kiln 09 - DE 09	<5	-	-	<5	-	-	MSD	-	-
64	Lime Plant	Merz Kiln 7 DE15	<5	-	-	<5	-	-	<5	-	-
65	Lime Plant	Merz Kiln 8	<5	-	-	<5	-	-	<5	-	-
66	Lime Plant	Merz Kiln 9	<5	-	-	<5	-	-	<5	-	-
67	Mills	CRM BAF	<5	-	-	<5	-	-	5.5	-	-
68	Mills	CRM CGL - 1	<5	-	-	<5	-	-	5.2	-	-
69	Mills	CRM CGL - 2	<5	-	-	<5	-	-	<5	-	-
70	Mills	CRM PLTCM	<5	-	-	<5	-	-	<5	-	-
71	Mills	HSM RHF - 1	20.9	-	-	21.8	-	-	23.5	-	-
72	Mills	HSM RHF - 2	53.1	-	-	46.5	-	-	59.2	-	-
73	Mills	HSM RHF - 3	54.3	-	-	48.5	-	-	46.5	-	-
74	Mills	Merchant mill	17.2	-	-	19.1	-	-	20.6	-	-
75	Mills	New Bar Mill	15.6	-	-	17.7	-	-	19.6	-	-
76	Mills	Wire Rod Mill	17.3	-	-	21.4	-	-	15.5	-	-
77	Pellet Plant	PP - Central - Dedusting	6.3	-	-	6.2	-	-	6.4	-	-
78	Pellet Plant	PP - Drying Section	14.0	-	-	14.0	-	-	11.6	-	-
79	Pellet Plant	PP - Gas - Hood	11.3	-	-	9.1	-	-	8.0	-	-
80	Pellet Plant	PP - Gas - Wind Box	18.8	-	-	17.3	-	-	20.1	-	-
81	Pellet Plant	PP Grinding Section 01	9.9	-	-	10.4	-	-	14.4	-	-
82	Pellet Plant	PP Grinding Section 02	8.2	-	-	8.9	-	-	9.8	-	-
83	Power House	PH - 3 - Boiler 5	10.2	56.1	23.6	9.8	41.4	22.1	12.4	39.5	14.1
84	Power House	PH - 3 - Boiler 6	12.1	47.8	16.3	12.4	34.3	15.9	13.2	43.9	14.2
85	Power House	PH - 3 - Boiler - 07&08	33.0	51.2	16.8	29.6	41.0	17.7	34.8	49.4	16.0
86	Power House	PH - 4 - Boiler - 4	35.3	219.7	99.9	36.0	208.4	101.7	36.5	99.9	84.9
87	Power House	PH - 4 - Boiler - 5	13.6	40.6	37.6	14.6	32.9	40.0	13.9	25.0	42.4
88	Power House	PH - 4 - Boiler 1&2	7.1	99.2	52.2	7.0	112.5	57.2	21.9	127.7	38.0
89	Power House	PH - 5 - Boiler - B&C	11.4	2.1	1.9	12.7	2.4	1.9	15.3	2.7	1.5
90	Power House	PH - 5 - Boiler A	18.9	38.4	16.2	19.7	25.4	16.6	19.0	33.5	12.4
91	Sinter Plant 1	SP - 1 Dedusting	<5	-	-	5.1	-	-	<5	-	-
92	Sinter Plant 1	SP - 1 Waste Gas	50.6	115.2	75.4	44.5	115.1	38.2	44.6	128.1	42.4
93	Sinter Plant 2	SP - 2 Dedusting	10.4	-	-	9.1	-	-	5.8	-	-
94	Sinter Plant 2	SP - 2 High Line	<5	-	-	<5	-	-	<5	-	-
95	Sinter Plant 2	SP - 2 Waste Gas	32.3	53.8	37.5	39.0	39.5	34.3	30.6	96.7	49.6
96	Sinter Plant 3	SP - 3 Combined (WG & DD)	29.2	62.0	34.1	33.8	97.3	35.4	32.0	144.1	41.1
97	Sinter Plant 3	SP - 3 Dedusting	7.0	-	-	<5	-	-	<5	-	-
98	Sinter Plant 4	SP - 4 Combined (WG & DD)	65.1	194.0	48.3	53.7	116.7	47.5	48.7	66.6	49.8

MSD - Major Shutdown

Note-
Standards applicable as per CTO, Ref No. JSPCB/HO/RNC/CTO-975929/2016/1078 dated 27/12/2016.

Sr. Manager
Env. Online Instruments

Anoop Srivastava

Head - Environment
Monitoring, Testing and Analysis

TATA STEEL

TATA STEEL LIMITED

ENVIRONMENTAL MONITORING REPORT OF MAIN WORKS JAMSHEDPUR

ONLINE STACK MONITORING REPORT FROM OCTOBER 2020 TO MARCH 2021

			Jan'21			Feb'21			Mar'21		
SL. No.	Department	Stack	PM (mg/Nm3)	SO2 (mg/Nm3)	NOx (mg/Nm3)	PM (mg/Nm3)	SO2 (mg/Nm3)	NOx (mg/Nm3)	PM (mg/Nm3)	SO2 (mg/Nm3)	NOx (mg/Nm3)
1	Blast Furnace	C - Stove	MSD	-	-	<5	-	-	<5	-	-
2	Blast Furnace	E - Stock & Cast House	7.9	-	-	7.8	-	-	8.0	-	-
3	Blast Furnace	E - Stove	<5	100.1	19.2	<5	87.2	21.5	<5	78.6	21.6
4	Blast Furnace	F - Cast House	7.0	-	-	8.8	-	-	6.2	-	-
5	Blast Furnace	F - PCI	13.3	-	-	12.1	-	-	13.7	-	-
6	Blast Furnace	F - Stock House-DE	<5	-	-	<5	-	-	<5	-	-
7	Blast Furnace	F - Stove	6.1	74.0	34.8	7.0	68.9	40.4	11.5	74.7	42.6
8	Blast Furnace	G - Cast House	21.8	-	-	11.3	-	-	<5	-	-
9	Blast Furnace	G - PCI-01	14.2	-	-	12.2	-	-	14.2	-	-
10	Blast Furnace	G - PCI-02	<5	-	-	<5	-	-	<5	-	-
11	Blast Furnace	G - PCI-03	10.8	-	-	8.4	-	-	6.7	-	-
12	Blast Furnace	G - Stock House	<5	-	-	<5	-	-	<5	-	-
13	Blast Furnace	G - Stove	<5	91.1	14.6	<5	27.7	11.7	<5	84.9	10.6
14	Blast Furnace	H - Cast House	<5	-	-	<5	-	-	<5	-	-
15	Blast Furnace	H - PCI-01	<5	-	-	5.2	-	-	5.1	-	-
16	Blast Furnace	H - PCI-02	5.2	-	-	<5	-	-	7.5	-	-
17	Blast Furnace	H - Stock House	<5	-	-	<5	-	-	<5	-	-
18	Blast Furnace	H - Stock House - DE	<5	-	-	<5	-	-	<5	-	-
19	Blast Furnace	H - Stove	5.6	64.5	1.0	<5	53.9	0.5	5.1	80.2	-
20	Blast Furnace	HMPP	24.5	-	-	13.4	-	-	23.4	-	-
21	Blast Furnace	I - Cast House	8.4	-	-	8.5	-	-	9.2	-	-
22	Blast Furnace	I - PCI	18.4	-	-	9.6	-	-	5.3	-	-
23	Blast Furnace	I - Stock House	7.7	-	-	7.1	-	-	7.4	-	-
24	Blast Furnace	I - Stove	<5	50.6	25.0	<5	33.8	11.8	<5	42.7	4.1
25	Coke Plant	Battery 05	6.1	-	-	5.9	109.6	35.2	6.4	117.4	34.0
26	Coke Plant	Battery 06	39.6	-	-	26.4	215.2	31.0	24.7	224.5	31.4
27	Coke Plant	Battery 07	22.8	146.9	31.1	24.2	147.2	31.1	26.3	159.9	50.2
28	Coke Plant	Battery 08	13.9	49.7	143.7	15.7	77.6	190.8	19.4	109.9	236.7
29	Coke Plant	Battery 09	10.6	155.3	128.8	7.2	64.5	170.1	6.0	87.8	222.7
30	Coke Plant	Battery 10	35.1	128.6	233.0	22.2	208.5	243.3	20.0	342.7	280.5
31	Coke Plant	Battery 10 Pushing Dedusting	6.0	-	-	<5	-	-	<5	-	-
32	Coke Plant	Battery 11	37.3	68.3	243.6	28.6	32.9	230.5	19.1	75.2	202.4
33	Coke Plant	Battery 11 Pushing Dedusting	<5	-	-	<5	-	-	<5	-	-
34	LD 1	LD 01 - Ladle Furnace 01	10.0	-	-	6.4	-	-	9.6	-	-
35	LD 1	LD 01 - Ladle Furnace 02	6.2	-	-	<5	-	-	6.3	-	-
36	LD 1	LD 01 - Ladle Furnace 03	9.1	-	-	8.5	-	-	8.7	-	-
37	LD 1	LD 01 - Secondary Emission	<5	-	-	6.8	-	-	<5	-	-
38	LD 2	LD 02 - DE 01	6.1	-	-	7.0	-	-	11.6	-	-
39	LD 2	LD 02 - DE 02	6.3	-	-	6.3	-	-	6.1	-	-
40	LD 2	LD 02 - DE 03	<5	-	-	<5	-	-	<5	-	-
41	LD 2	LD 02 - DE 04	8.5	-	-	8.3	-	-	8.2	-	-
42	LD 2	LD 02 - DE 05	5.2	-	-	5.4	-	-	5.0	-	-
43	LD 2	LD 02 - DE 06	8.3	-	-	8.0	-	-	7.8	-	-
44	LD 2	LD 02 - DE 07	<5	-	-	5.6	-	-	5.7	-	-
45	LD 2	LD 02 - DE 08	<5	-	-	<5	-	-	<5	-	-
46	LD 2	LD 02 - DE 09	<5	-	-	<5	-	-	<5	-	-
47	LD 2	LD 02 - Ladle Furnace 01	14.6	-	-	20.8	-	-	39.8	-	-
48	LD 2	LD 02 - Ladle Furnace 02	5.5	-	-	9.0	-	-	10.2	-	-
49	LD 2	LD 02 - Secondary Emission - 01	MSD	-	-	<5	-	-	<5	-	-
50	LD 2	LD 02 - Secondary Emission - 02	10.5	-	-	10.9	-	-	12.1	-	-
51	LD 2	LD 02 - Secondary Emission - 03	7.2	-	-	7.0	-	-	6.9	-	-
52	LD 3	LD 03 - Ladle Furnace 01	7.8	-	-	<5	-	-	<5	-	-
53	LD 3	LD 03 - Ladle Furnace 02	<5	-	-	<5	-	-	5.7	-	-
54	LD 3	LD 03 - Secondary Emission	5.7	-	-	6.1	-	-	5.6	-	-
55	Lime Plant	Merz Kiln 01	<5	-	-	<5	-	-	<5	-	-
56	Lime Plant	Merz Kiln 02	<5	-	-	<5	-	-	<5	-	-
57	Lime Plant	Merz Kiln 03& 04	5.3	-	-	6.2	-	-	5.2	-	-
58	Lime Plant	Merz Kiln 05	<5	-	-	<5	-	-	<5	-	-

TATA STEEL

TATA STEEL LIMITED

ENVIRONMENTAL MONITORING REPORT OF MAIN WORKS JAMSHEDPUR

ONLINE STACK MONITORING REPORT FROM OCTOBER 2020 TO MARCH 2021

			Jan'21			Feb'21			Mar'21		
SL. No.	Department	Stack	PM (mg/Nm3)	SO2 (mg/Nm3)	NOx (mg/Nm3)	PM (mg/Nm3)	SO2 (mg/Nm3)	NOx (mg/Nm3)	PM (mg/Nm3)	SO2 (mg/Nm3)	NOx (mg/Nm3)
59	Lime Plant	Merz Kiln 06	<5	-	-	<5	-	-	<5	-	-
60	Lime Plant	Merz Kiln 06 - DE 12	<5	-	-	5.6	-	-	6.0	-	-
61	Lime Plant	Merz Kiln 07	7.7	-	-	6.3	-	-	10.4	-	-
62	Lime Plant	Merz Kiln 08 - DE 01B	<5	-	-	<5	-	-	<5	-	-
63	Lime Plant	Merz Kiln 09 - DE 09	MSD	-	-	MSD	-	-	MSD	-	-
64	Lime Plant	Merz Kiln 7 DE15	<5	-	-	<5	-	-	<5	-	-
65	Lime Plant	Merz Kiln 8	<5	-	-	<5	-	-	<5	-	-
66	Lime Plant	Merz Kiln 9	<5	-	-	<5	-	-	<5	-	-
67	Mills	CRM BAF	6.1	-	-	5.1	-	-	<5	-	-
68	Mills	CRM CGL - 1	<5	-	-	<5	-	-	<5	-	-
69	Mills	CRM CGL - 2	<5	-	-	<5	-	-	<5	-	-
70	Mills	CRM PLTCM	<5	-	-	<5	-	-	<5	-	-
71	Mills	HSM RHF - 1	19.7	-	-	19.5	-	-	19.9	-	-
72	Mills	HSM RHF - 2	30.2	-	-	9.3	-	-	8.2	-	-
73	Mills	HSM RHF - 3	16.3	-	-	14.4	-	-	14.1	-	-
74	Mills	Merchant mill	18.3	-	-	18.6	-	-	15.0	-	-
75	Mills	New Bar Mill	23.3	-	-	24.2	-	-	20.2	-	-
76	Mills	Wire Rod Mill	17.1	-	-	6.9	-	-	7.9	-	-
77	Pellet Plant	PP - Central - Dedusting	6.2	-	-	6.4	-	-	6.9	-	-
78	Pellet Plant	PP - Drying Section	8.8	-	-	9.0	-	-	10.1	-	-
79	Pellet Plant	PP - Gas - Hood	8.5	-	-	8.9	-	-	11.1	-	-
80	Pellet Plant	PP - Gas - Wind Box	15.5	-	-	11.4	-	-	17.9	-	-
81	Pellet Plant	PP Grinding Section 01	12.0	-	-	12.8	-	-	13.4	-	-
82	Pellet Plant	PP Grinding Section 02	8.4	-	-	8.1	-	-	8.6	-	-
85	Power House	PH - 3 - Boiler - 07&08	55.2	23.1	17.5	57.4	7.1	13.9	30.8	42.6	13.0
83	Power House	PH - 3 - Boiler 5	12.2	40.7	16.0	10.6	25.9	12.6	13.4	38.0	12.2
84	Power House	PH - 3 - Boiler 6	13.1	38.8	14.0	18.5	20.2	13.9	14.5	39.2	11.1
86	Power House	PH - 4 - Boiler - 4	34.6	56.2	70.3	35.9	37.1	37.7	29.6	31.2	34.9
87	Power House	PH - 4 - Boiler - 5	17.4	74.2		13.9	-	-	20.3	24.2	89.5
88	Power House	PH - 4 - Boiler 1&2	32.7	140.0	43.3	28.3	130.0	42.0	28.4	166.0	40.8
89	Power House	PH - 5 - Boiler - B&C	15.8	3.4	2.0	11.8	0.8	1.2	12.7	1.4	1.5
90	Power House	PH - 5 - Boiler A	19.6	33.8	13.6	21.6	25.3	12.9	21.2	29.8	10.2
91	Sinter Plant 1	SP - 1 Dedusting	<5	-	-	<5	-	-	<5	-	-
92	Sinter Plant 1	SP - 1 Waste Gas	33.0	121.0	93.3	49.5	141.7	116.8	54.3	117.2	125.1
93	Sinter Plant 2	SP - 2 Dedusting	8.6	-	-	10.2	-	-	17.3	-	-
94	Sinter Plant 2	SP - 2 High Line	<5	-	-	<5	-	-	<5	-	-
95	Sinter Plant 2	SP - 2 Waste Gas	28.4	193.9	92.8	28.2	150.8	91.6	30.1	139.1	103.9
96	Sinter Plant 3	SP - 3 Combined (WG & DD)	38.4	244.0	87.7	42.2	128.4	111.8	46.0	98.9	90.8
97	Sinter Plant 3	SP - 3 Dedusting	<5	-	-	<5	-	-	7.1	-	-
98	Sinter Plant 4	SP - 4 Combined (WG & DD)	43.5	72.7	54.5	58.2	69.7	94.9	59.4	62.0	107.8

MSD - Major Shutdown

Note-
Standards applicable as per CTO, Ref No. JSPCB/HO/RNC/CTO-975929/2016/1078 dated 27/12/2016.

Sr. Manager
Env. Online Instruments

Anoop Srivastava

Head - Environment
Monitoring, Testing and Analysis

TATA STEEL

TATA STEEL LIMITED

ENVIRONMENTAL MONITORING REPORT OF MAIN WORKS JAMSHEDPUR

MANUAL STACK MONITORING REPORT FROM OCTOBER 2020 TO MARCH 2021

TC- 8363

			Oct'20			Nov'20			Dec'20		
SL. No.	Department	Stack	PM (mg/Nm3)	SO2 (mg/Nm3)	NOx (mg/Nm3)	PM (mg/Nm3)	SO2 (mg/Nm3)	NOx (mg/Nm3)	PM (mg/Nm3)	SO2 (mg/Nm3)	NOx (mg/Nm3)
1	Blast Furnace	C - Stove	-	-	-	-	-	-	-	-	-
2	Blast Furnace	E - Stock & Cast House	-	-	-	-	-	-	<5	-	-
3	Blast Furnace	E - Stove	-	-	-	-	-	-	-	-	-
4	Blast Furnace	F - Cast House	-	-	-	-	-	-	-	-	-
5	Blast Furnace	F - PCI	<5	-	-	<5	-	-	11.1	-	-
6	Blast Furnace	F - Stock House-DE	<5	-	-	-	-	-	-	-	-
7	Blast Furnace	F - Stove	-	-	-	-	-	-	6.0	-	-
8	Blast Furnace	G - Cast House	-	-	-	-	-	-	-	-	-
9	Blast Furnace	G - PCI-01	31.3	-	-	13.6	-	-	-	-	-
10	Blast Furnace	G - PCI-02	<5	-	-	-	-	-	-	-	-
11	Blast Furnace	G - PCI-03	13.0	-	-	-	-	-	-	-	-
12	Blast Furnace	G - Stock House	-	-	-	<5	-	-	-	-	-
13	Blast Furnace	G - Stove	-	-	-	<5	-	-	21.8	-	-
14	Blast Furnace	H - Cast House	<5	-	-	<5	-	-	<5	-	-
15	Blast Furnace	H - PCI-01	6.0	-	-	-	-	-	-	-	-
16	Blast Furnace	H - PCI-02	-	-	-	18.4	-	-	<5	-	-
17	Blast Furnace	H - Stock House	-	-	-	-	-	-	<5	-	-
18	Blast Furnace	H - Stock House - DE	-	-	-	-	-	-	-	-	-
19	Blast Furnace	H - Stove	-	-	-	-	-	-	-	-	-
20	Blast Furnace	HMPP	-	-	-	-	-	-	-	-	-
21	Blast Furnace	I - Cast House	-	-	-	6.6	-	-	-	-	-
22	Blast Furnace	I - PCI	-	-	-	9.5	-	-	5.8	-	-
23	Blast Furnace	I - Stock House	-	-	-	-	-	-	<5	-	-
24	Blast Furnace	I - Stove	-	-	-	-	-	-	-	-	-
25	Coke Plant	Battery 05	-	-	-	34.2	-	-	-	-	-
26	Coke Plant	Battery 06	33.6	-	-	-	-	-	-	-	-
27	Coke Plant	Battery 07	-	-	-	-	-	-	-	-	-
28	Coke Plant	Battery 08	-	-	-	16.1	-	-	-	-	-
29	Coke Plant	Battery 09	-	-	-	-	-	-	-	-	-
30	Coke Plant	Battery 10	-	-	-	19.5	-	-	-	-	-
31	Coke Plant	Battery 10 Pushing Dedusting	-	-	-	-	-	-	-	-	-
32	Coke Plant	Battery 11	-	-	-	20.7	-	-	-	-	-
33	Coke Plant	Battery 11 Pushing Dedusting	-	-	-	-	-	-	-	-	-
34	LD 1	LD 01 - Ladle Furnace 01	-	-	-	-	-	-	-	-	-
35	LD 1	LD 01 - Ladle Furnace 02	-	-	-	11.1	-	-	-	-	-
36	LD 1	LD 01 - Ladle Furnace 03	-	-	-	-	-	-	<5	-	-
37	LD 1	LD 01 - Secondary Emission	7.7	-	-	-	-	-	-	-	-
38	LD 2	LD 02 - DE 01	-	-	-	-	-	-	-	-	-
39	LD 2	LD 02 - DE 02	-	-	-	-	-	-	-	-	-
40	LD 2	LD 02 - DE 03	-	-	-	5.3	-	-	<5	-	-
41	LD 2	LD 02 - DE 04	-	-	-	-	-	-	-	-	-
42	LD 2	LD 02 - DE 05	-	-	-	-	-	-	-	-	-
43	LD 2	LD 02 - DE 06	-	-	-	-	-	-	-	-	-
44	LD 2	LD 02 - DE 07	-	-	-	-	-	-	-	-	-
45	LD 2	LD 02 - DE 08	-	-	-	-	-	-	-	-	-
46	LD 2	LD 02 - DE 09	-	-	-	-	-	-	<5	-	-
47	LD 2	LD 02 - Ladle Furnace 01	-	-	-	15.9	-	-	-	-	-
48	LD 2	LD 02 - Ladle Furnace 02	-	-	-	<5	-	-	-	-	-
49	LD 2	LD 02 - Secondary Emission - 01	-	-	-	-	-	-	-	-	-
50	LD 2	LD 02 - Secondary Emission - 02	-	-	-	43.1	-	-	-	-	-
51	LD 2	LD 02 - Secondary Emission - 03	-	-	-	-	-	-	-	-	-
52	LD 3	LD 03 - Ladle Furnace 01	-	-	-	10.5	-	-	-	-	-
53	LD 3	LD 03 - Ladle Furnace 02	-	-	-	-	-	-	<5	-	-
54	LD 3	LD 03 - Secondary Emission	-	-	-	7.5	-	-	-	-	-
55	Lime Plant	Merz Kiln 01	-	-	-	-	-	-	<5	-	-
56	Lime Plant	Merz Kiln 02	-	-	-	-	-	-	<5	-	-
57	Lime Plant	Merz Kiln 03& 04	-	-	-	-	-	-	<5	-	-

TATA STEEL

TATA STEEL LIMITED

ENVIRONMENTAL MONITORING REPORT OF MAIN WORKS JAMSHEDPUR

MANUAL STACK MONITORING REPORT FROM OCTOBER 2020 TO MARCH 2021

TC- 8363

			Oct'20			Nov'20			Dec'20		
SL. No.	Department	Stack	PM (mg/Nm3)	SO2 (mg/Nm3)	NOx (mg/Nm3)	PM (mg/Nm3)	SO2 (mg/Nm3)	NOx (mg/Nm3)	PM (mg/Nm3)	SO2 (mg/Nm3)	NOx (mg/Nm3)
58	Lime Plant	Merz Kiln 05	-	-	-	-	-	-	-	-	-
59	Lime Plant	Merz Kiln 06	-	-	-	-	-	-	-	-	-
60	Lime Plant	Merz Kiln 06 - DE 12	-	-	-	-	-	-	-	-	-
61	Lime Plant	Merz Kiln 07	-	-	-	-	-	-	-	-	-
62	Lime Plant	Merz Kiln 08 - DE 01B	-	-	-	-	-	-	<5	-	-
63	Lime Plant	Merz Kiln 09 - DE 09	-	-	-	-	-	-	-	-	-
64	Lime Plant	Merz Kiln 7 DE15	-	-	-	-	-	-	-	-	-
65	Lime Plant	Merz Kiln 8	-	-	-	-	-	-	-	-	-
66	Lime Plant	Merz Kiln 9	-	-	-	-	-	-	6.5	-	-
67	Mills	CRM BAF	-	-	-	-	-	-	6.4	-	-
68	Mills	CRM CGL - 1	-	-	-	-	-	-	<5	-	-
69	Mills	CRM CGL - 2	-	-	-	-	-	-	-	-	-
70	Mills	CRM PLTCM	-	-	-	-	-	-	-	-	-
71	Mills	HSM RHF - 1	-	-	-	-	-	-	-	-	-
72	Mills	HSM RHF - 2	-	-	-	-	-	-	-	-	-
73	Mills	HSM RHF - 3	-	-	-	-	-	-	-	-	-
74	Mills	Merchant mill	-	-	-	-	-	-	<5	-	-
75	Mills	New Bar Mill	68.2	-	-	-	-	-	-	-	-
76	Mills	Wire Rod Mill	37.3	-	-	29.0	-	-	-	-	-
77	Pellet Plant	PP - Central - Dedusting	-	-	-	-	-	-	-	-	-
78	Pellet Plant	PP - Drying Section	-	-	-	61.5	-	-	-	-	-
79	Pellet Plant	PP - Gas - Hood	15.3	-	-	-	-	-	-	-	-
80	Pellet Plant	PP - Gas - Wind Box	-	-	-	-	-	-	-	-	-
81	Pellet Plant	PP Grinding Section 01	<5	-	-	-	-	-	-	-	-
82	Pellet Plant	PP Grinding Section 02	18.5	-	-	-	-	-	-	-	-
85	Power House	PH - 3 - Boiler - 07&08	-	-	-	13.8	-	-	-	-	-
83	Power House	PH - 3 - Boiler 5	-	-	-	13.6	-	-	-	-	-
84	Power House	PH - 3 - Boiler 6	-	-	-	-	-	-	14.0	-	-
86	Power House	PH - 4 - Boiler - 4	-	-	-	-	-	-	-	-	-
87	Power House	PH - 4 - Boiler - 5	27.8	-	-	-	-	-	-	-	-
88	Power House	PH - 4 - Boiler 1&2	-	-	-	18.1	-	-	19.5	-	-
89	Power House	PH - 5 - Boiler - B&C	-	-	-	-	-	-	-	-	-
90	Power House	PH - 5 - Boiler A	-	-	-	19.7	-	-	-	-	-
91	Sinter Plant 1	SP - 1 Dedusting	-	-	-	-	-	-	<5	-	-
92	Sinter Plant 1	SP - 1 Waste Gas	55.5	-	-	-	-	-	-	-	-
93	Sinter Plant 2	SP - 2 Dedusting	-	-	-	13.4	-	-	-	-	-
94	Sinter Plant 2	SP - 2 High Line	-	-	-	<5	-	-	-	-	-
95	Sinter Plant 2	SP - 2 Waste Gas	84.0	-	-	99.1	-	-	-	-	-
96	Sinter Plant 3	SP - 3 Combined (WG & DD)	-	-	-	-	-	-	-	-	-
97	Sinter Plant 3	SP - 3 Dedusting	<5	-	-	-	-	-	-	-	-
98	Sinter Plant 4	SP - 4 Combined (WG & DD)	-	-	-	-	-	-	58.5	-	-
99	CRM	ARP(Old)	-	-	-	120.3	-	-	138.88	-	-
100	CRM	ARP(New)	-	-	-	128.4	-	-	130.7	-	-

MSD - Major Shutdown

Note-
Standards applicable as per CTO, Ref No. JSPCB/HO/RNC/CTO-975929/2016/1078 dated 27/12/2016.

Sr. Manager
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Anoop Srivastava

Head - Environment
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TATA STEEL LIMITED

ENVIRONMENTAL MONITORING REPORT OF MAIN WORKS JAMSHEDPUR

MANUAL STACK MONITORING REPORT FROM OCTOBER 2020 TO MARCH 2021

TC- 8363

			Jan'21			Feb'21			Mar'21		
SL. No.	Department	Stack	PM (mg/Nm3)	SO2 (mg/Nm3)	NOx (mg/Nm3)	PM (mg/Nm3)	SO2 (mg/Nm3)	NOx (mg/Nm3)	PM (mg/Nm3)	SO2 (mg/Nm3)	NOx (mg/Nm3)
1	Blast Furnace	C - Stove	-	-	-	-	-	-	<5	-	-
2	Blast Furnace	E - Stock & Cast House	-	-	-	-	-	-	<5	-	-
3	Blast Furnace	E - Stove	-	-	-	-	-	-	-	-	-
4	Blast Furnace	F - Cast House	-	-	-	-	-	-	<5	-	-
5	Blast Furnace	F - PCI	<5.0	-	-	10.0	-	-	-	-	-
6	Blast Furnace	F - Stock House-DE	-	-	-	-	-	-	-	-	-
7	Blast Furnace	F - Stove	12.9	-	-	-	-	-	-	-	-
8	Blast Furnace	G - Cast House	-	-	-	-	-	-	-	-	-
9	Blast Furnace	G - PCI-01	-	-	-	-	-	-	-	-	-
10	Blast Furnace	G - PCI-02	12.2	-	-	<5	-	-	-	-	-
11	Blast Furnace	G - PCI-03	-	-	-	8.3	-	-	-	-	-
12	Blast Furnace	G - Stock House	-	-	-	-	-	-	38.8	-	-
13	Blast Furnace	G - Stove	15.3	-	-	-	-	-	-	-	-
14	Blast Furnace	H - Cast House	-	-	-	-	-	-	-	-	-
15	Blast Furnace	H - PCI-01	-	-	-	16.8	-	-	5.7	-	-
16	Blast Furnace	H - PCI-02	28.2	-	-	5.6	-	-	8.5	-	-
17	Blast Furnace	H - Stock House	<5.0	-	-	-	-	-	-	-	-
18	Blast Furnace	H - Stock House - DE	-	-	-	-	-	-	<5	-	-
19	Blast Furnace	H - Stove	-	-	-	-	-	-	-	-	-
20	Blast Furnace	HMPP	-	-	-	-	-	-	-	-	-
21	Blast Furnace	I - Cast House	-	-	-	-	-	-	-	-	-
22	Blast Furnace	I - PCI	19.1	-	-	8.8	-	-	-	-	-
23	Blast Furnace	I - Stock House	7.8	-	-	-	-	-	-	-	-
24	Blast Furnace	I - Stove	-	-	-	-	-	-	-	-	-
25	Coke Plant	Battery 05	18.8	-	-	-	-	-	-	-	-
26	Coke Plant	Battery 06	23.9	-	-	-	-	-	-	-	-
27	Coke Plant	Battery 07	-	-	-	43.4	-	-	-	-	-
28	Coke Plant	Battery 08	-	-	-	22.0	-	-	-	-	-
29	Coke Plant	Battery 09	-	-	-	-	-	-	8.2	-	-
30	Coke Plant	Battery 10	-	-	-	23.7	-	-	-	-	-
31	Coke Plant	Battery 10 Pushing Dedusting	<5.0	-	-	-	-	-	-	-	-
32	Coke Plant	Battery 11	-	-	-	18.1	-	-	-	-	-
33	Coke Plant	Battery 11 Pushing Dedusting	-	-	-	5.6	-	-	-	-	-
34	LD 1	LD 01 - Ladle Furnace 01	-	-	-	9.4	-	-	-	-	-
35	LD 1	LD 01 - Ladle Furnace 02	-	-	-	4.4	-	-	-	-	-
36	LD 1	LD 01 - Ladle Furnace 03	-	-	-	-	-	-	-	-	-
37	LD 1	LD 01 - Secondary Emission	6.4	-	-	-	-	-	-	-	-
38	LD 2	LD 02 - DE 01	-	-	-	-	-	-	<5	-	-
39	LD 2	LD 02 - DE 02	-	-	-	-	-	-	5.4	-	-
40	LD 2	LD 02 - DE 03	-	-	-	-	-	-	-	-	-
41	LD 2	LD 02 - DE 04	-	-	-	-	-	-	<5	-	-
42	LD 2	LD 02 - DE 05	<5.0	-	-	-	-	-	<5	-	-
43	LD 2	LD 02 - DE 06	-	-	-	-	-	-	6.1	-	-
44	LD 2	LD 02 - DE 07	-	-	-	-	-	-	<5	-	-
45	LD 2	LD 02 - DE 08	-	-	-	7.5	-	-	-	-	-
46	LD 2	LD 02 - DE 09	-	-	-	<5	-	-	-	-	-
47	LD 2	LD 02 - Ladle Furnace 01	-	-	-	-	-	-	-	-	-
48	LD 2	LD 02 - Ladle Furnace 02	-	-	-	-	-	-	5.5	-	-
49	LD 2	LD 02 - Secondary Emission - 01	-	-	-	<5	-	-	-	-	-
50	LD 2	LD 02 - Secondary Emission - 02	-	-	-	-	-	-	-	-	-
51	LD 2	LD 02 - Secondary Emission - 03	<5.0	-	-	-	-	-	6.9	-	-
52	LD 3	LD 03 - Ladle Furnace 01	7.2	-	-	-	-	-	-	-	-
53	LD 3	LD 03 - Ladle Furnace 02	-	-	-	<5	-	-	-	-	-
54	LD 3	LD 03 - Secondary Emission	-	-	-	-	-	-	-	-	-
55	Lime Plant	Merz Kiln 01	-	-	-	-	-	-	-	-	-
56	Lime Plant	Merz Kiln 02	-	-	-	-	-	-	-	-	-
57	Lime Plant	Merz Kiln 03& 04	-	-	-	-	-	-	-	-	-
58	Lime Plant	Merz Kiln 05	-	-	-	-	-	-	-	-	-

TATA STEEL

TATA STEEL LIMITED

ENVIRONMENTAL MONITORING REPORT OF MAIN WORKS JAMSHEDPUR

MANUAL STACK MONITORING REPORT FROM OCTOBER 2020 TO MARCH 2021

TC- 8363

			Jan'21			Feb'21			Mar'21		
SL. No.	Department	Stack	PM (mg/Nm3)	SO2 (mg/Nm3)	NOx (mg/Nm3)	PM (mg/Nm3)	SO2 (mg/Nm3)	NOx (mg/Nm3)	PM (mg/Nm3)	SO2 (mg/Nm3)	NOx (mg/Nm3)
59	Lime Plant	Merz Kiln 06	-	-	-	-	-	-	-	-	-
60	Lime Plant	Merz Kiln 06 - DE 12	-	-	-	-	-	-	-	-	-
61	Lime Plant	Merz Kiln 07	-	-	-	-	-	-	-	-	-
62	Lime Plant	Merz Kiln 08 - DE 01B	-	-	-	-	-	-	<5	-	-
63	Lime Plant	Merz Kiln 09 - DE 09	-	-	-	-	-	-	-	-	-
64	Lime Plant	Merz Kiln 7 DE15	-	-	-	-	-	-	-	-	-
65	Lime Plant	Merz Kiln 8	-	-	-	-	-	-	-	-	-
66	Lime Plant	Merz Kiln 9	-	-	-	8.2	-	-	-	-	-
67	Mills	CRM BAF	-	-	-	8.1	-	-	-	-	-
68	Mills	CRM CGL - 1	<5.0	-	-	-	-	-	-	-	-
69	Mills	CRM CGL - 2	-	-	-	-	-	-	-	-	-
70	Mills	CRM PLTCM	-	-	-	-	-	-	-	-	-
71	Mills	HSM RHF - 1	-	-	-	-	-	-	17.8	-	-
72	Mills	HSM RHF - 2	17.1	-	-	-	-	-	-	-	-
73	Mills	HSM RHF - 3	-	-	-	-	-	-	9.0	-	-
74	Mills	Merchant mill	-	-	-	8.5	-	-	-	-	-
75	Mills	New Bar Mill	-	-	-	-	-	-	61.9	-	-
76	Mills	Wire Rod Mill	-	-	-	17.1	-	-	15.2	-	-
77	Pellet Plant	PP - Central - Dedusting	-	-	-	-	-	-	-	-	-
78	Pellet Plant	PP - Drying Section	<5.0	-	-	-	-	-	8.5	-	-
79	Pellet Plant	PP - Gas - Hood	-	-	-	-	-	-	-	-	-
80	Pellet Plant	PP - Gas - Wind Box	27.0	-	-	-	-	-	-	-	-
81	Pellet Plant	PP Grinding Section 01	-	-	-	5.6	-	-	-	-	-
82	Pellet Plant	PP Grinding Section 02	-	-	-	-	-	-	-	-	-
85	Power House	PH - 3 - Boiler - 07&08	-	-	-	13.2	-	-	-	-	-
83	Power House	PH - 3 - Boiler 5	-	-	-	7.7	-	-	-	-	-
84	Power House	PH - 3 - Boiler 6	19.9	-	-	<5	-	-	-	-	-
86	Power House	PH - 4 - Boiler - 4	-	-	-	-	-	-	21.5	-	-
87	Power House	PH - 4 - Boiler - 5	-	-	-	-	-	-	-	-	-
88	Power House	PH - 4 - Boiler 1&2	-	-	-	-	-	-	-	-	-
89	Power House	PH - 5 - Boiler - B&C	12.9	-	-	-	-	-	-	-	-
90	Power House	PH - 5 - Boiler A	-	-	-	-	-	-	-	-	-
91	Sinter Plant 1	SP - 1 Dedusting	-	-	-	-	-	-	-	-	-
92	Sinter Plant 1	SP - 1 Waste Gas	42.7	103.0	-	59.6	72.5	-	65.6	-	-
93	Sinter Plant 2	SP - 2 Dedusting	-	-	-	22.4	-	-	-	-	-
94	Sinter Plant 2	SP - 2 High Line	-	-	-	<5	-	-	-	-	-
95	Sinter Plant 2	SP - 2 Waste Gas	-	-	-	37.1	-	-	-	-	-
96	Sinter Plant 3	SP - 3 Combined (WG & DD)	-	-	-	-	-	-	-	-	-
97	Sinter Plant 3	SP - 3 Dedusting	-	-	-	-	-	-	<5	-	-
98	Sinter Plant 4	SP - 4 Combined (WG & DD)	-	-	-	-	-	-	-	-	-
99	CRM	ARP(Old)	119.3	-	-	94.7	-	-	112.9	-	-
100	CRM	ARP(New)	113.4	-	-	-	-	-	144.5	-	-

MSD - Major Shutdown

Note-
Standards applicable as per CTO, Ref No. JSPCB/HO/RNC/CTO-975929/2016/1078 dated 27/12/2016.

Sr. Manager
Env. Online Instruments

Anoop Srivastava

Head - Environment
Monitoring, Testing and Analysis

TATA STEEL LIMITED
ENVIRONMENT MANAGEMENT DEPARTMENT - LABORATORY
NOISE LEVEL MONITORING REPORT FROM OCT-20 TO MAR-21

TC- 8363

SN	Area	UoM	Oct-20		Nov-20		Dec-20		Jan-21		Feb-21		Mar-21	
			Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
1	Near N Road Boundary Wall	dB(A) Leq	59.6	52.7	68.5	56.4	63.7	50.8	67.8	56.5	68.3	57.1	73.5	68.7
2	Near L Town Boundary Wall		61.0	58.2	67.2	69.3	64.5	71.7	81.4	63.8	73.2	65.1	83.4	72.8
3	Near Burma Mines Gate		64.7	61.6	62.9	57.6	70.7	54.4	72.9	61.4	72.4	64.3	66.8	71.6
4	Near Jugsalai Gate		62.0	54.5	51.4	48.2	62.3	55.6	73.1	51.6	70.6	66.3	77.7	76.2

Note:
Standards applicable as per Noise Pollution (Regulation and Control) (Amendment) Rules, 2000 notified vide S. O. 1046 (E), dated 22-11-2000

J. Nagarjuna Reddy

Sr. Manager
Monitoring and Analysis

Anoop Srivastava

Head
Environment Monitoring, Testing & Analysis (TSJ)

TATA STEEL

TATA STEEL LIMITED
ENVIRONMENT MANAGEMENT DEPARTMENT - LABORATORY
NOISE LEVEL MONITORING REPORT SUMMARY FROM OCT-20 TO MAR-21

TC- 8363

S.no	Area	UoM	Oct-20		Nov-20		Dec-20		Jan-21		Feb-21		Mar-21	
			Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
A)	**SILENCE ZONE**													
1	TMH (Near Statue)		59.7	36.8	69.8	59.9	53.1	49.2	69.2	52.1	54.7	55.2	63.8	59.8
2	JUSCO School Kadma	dB(A)	64.9	38.6	65.6	61.9	58.9	53.6	86.1	55.4	72.6	56.1	66.9	56.1
3	Narbheram School Bistupur	Leq	58.8	44.2	70.4	64.3	73.7	64.8	82.3	55.2	80.6	59.7	71.7	58.2
4	South Park School Bistupur		55.2	46.7	63.9	59.4	66.9	48.3	75.6	52.1	67.7	59.1	68.9	57.4
5	Old Court Area (Jubilee Park Side)		68.8	51.4	73.4	66.6	75.7	72.2	80.3	75.8	77.8	68.1	77.3	74.1
B)	**RESIDENTIAL ZONE**													
1	Circuit House Area (North)		54.3	50.1	76.8	61.2	64.2	51.4	69.7	52.2	72.5	61.3	71.4	64.2
2	B.H. Area		59.3	49.5	62.8	60.9	62.0	52.1	59.4	50.3	71.3	59.8	68.8	64.3
3	Farm Area	dB(A)	65.8	60.3	62.7	62.5	59.4	50.3	66.5	53.6	71.2	56.7	77.9	61.7
4	Baridih Basti	Leq	61.1	58.2	61.4	57.2	66.1	54.4	72.1	54.3	75.6	61.4	71.9	59.8
5	Carriage Colony Burma Mines		62.1	53.7	67.7	65.6	72.3	51.2	73.7	53.1	69.2	58.3	67.2	56.7
6	Agrico Colony		57.7	52.4	63.1	60.5	66.8	56.3	70.8	58.1	80.3	62.4	68.7	68.1
7	South Park		60.3	51.8	60.3	60.0	65.7	52.0	76.8	53.4	76.8	56.3	72.2	55.3
C)	**COMMERCIAL ZONE**													
1	Sakchi Market		60.4	56.8	80.2	71.2	74.3	55.8	78.3	64.6	78.9	70.3	79.5	70.4
2	Golmuri Market	dB(A)	66.8	54.7	78.3	68.4	70.7	56.2	80.4	61.3	79.8	70.2	79.8	71.8
3	Burma Mines Market	Leq	67.0	59.5	73.3	62.1	69.4	52.0	84.5	60.2	83.6	69.8	82.1	75.2
4	Apna Bazar Bistupur		56.5	51.4	72.6	66.3	68.6	55.6	70.2	59.3	78.5	67.3	72.5	70.1
5	'R' Road Bistupur (behind Nalanda Hotel)		60.0	59.2	75.5	63.2	53.4	50.3	83.2	58.2	67.1	65.9	71.0	69.3
D)	**INDUSTRIAL ZONE**													
1	EAST SIDE/ near HSM Drain		64.8	61.4	70.1	56.5	63.7	50.8	73.3	55.0	60.8	60.4	70.4	56.3
2	WEST SIDE /Near Ramm Mandir		63.4	60.8	68.8	59.0	70.2	57.2	78.8	63.0	70.2	58.1	72.6	66.2
3	NORTH/ Garam Nalla drain	dB(A)	61.0	58.2	69.4	70.1	64.5	71.7	82.2	65.2	82.4	69.8	69.1	72.6
4	NORTH EAST slag road gate	Leq	66.3	63.5	66.9	57.4	70.7	54.4	74.0	57.6	69.9	67.7	73.2	70.1
5	NORTH WEST/General Office		59.6	55.4	68.2	55.1	60.6	52.1	68.5	59.9	61.3	60.4	67.4	56.3
6	SOUTH EAST/Burmamines Gate		64.7	51.9	61.9	58.9	62.3	55.6	71.5	60.3	72.4	64.3	66.8	71.6
7	SOUTH WEST/Jugsali Drain		62.0	53.7	56.3	47.2	59.0	53.2	72.6	49.5	70.6	66.3	72.7	55.4

Note:

Standards applicable as per Noise Pollution (Regulation and Control) (Amendment) Rules, 2000 notified vide S. O. 1046 (E), dated 22-11-2000

J. Nagarjuna Reddy

Sr. Manager
Monitoring and Analysis

Anoop Srivastava

Head
Environment Monitoring, Testing & Analysis (TSJ)

Annexure-II

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
5	**Lime Plant**	
	Process and dedusting	Bag Filters
	Stock Pile	DS System
	Track Hopper	DS System
	Wagon Tippler	DS System
6	**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
7	**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
8	**Power Plants**	
	PH# 3	Effluent Treatment Plant
	PH# 4	Electrostatic Precipitators Effluent Treatment Plant
	PH# 5	Effluent Treatment Plant
9	**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-III

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	Mar'24
17	LD#2 Secondary Emissions	Under progress	Nov'21
18	Lime Plant De-dusting System	Under progress	Aug'21
19	G-BF DD System – Cast House Tap-A Bagfilter	Under progress	Dec'22
20	SP #4 old ESP refurbishment	Under progress	Sep'21
21	CDQ 10&11 to I-BF coke connectivity DE System	Under progress	Oct'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

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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	Completed	Apr'20
31	Dust Extraction (DE) System at RMBB#2 DE#6&8	Completed	Apr'21
32	Mist Beam at LD Shops LD#1 (11 nos.), MRSPP (4 nos.)	Under Progress	Aug'21
33	Misc Area DE System – DE#12 Bag filter	Under Progress	May'21
34	Fume Extraction System at HMPP (Pit#6)	Under Progress	Jul'21
35	Tyre Wash at LD#1	Under Progress	Nov'21
36	Fume Extraction System at LD#1 LF	Under Progress	Dec'22
37	CFDS at Lime Plant	Under Progress	Jul'21

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	Jul'19
7	Infrastructure development for LD Slag Dumping at Bhatkunda	Completed	Sep'19
8	Slag road for KSMS	Under Progress	Dec'21

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	Clarified Water Pipeline from CETP to PH#3	Completed	Dec'20
12	BOT Tertiary Treatment Plant	Under Progress	Mar'24
13	Water system upgradation at LD#1 & LD#2	Under Progress	Sep'22
14	Upgradation of CETP from 4 MGD to 9 MGD	Under Progress	Jun'22

Annexure-IV

CHARTER FOR CORPORATE RESPONSIBILITY FOR ENVIRONMENT PROTECTION (CREP)
INTEGRATED IRON AND STEEL PLANT, TATA STEEL LIMITED, JAMSHEDPUR
STATUS OF COMPLIANCE FOR VARIOUS ACTION POINTS
(Apr'20 – Mar'21)

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'20 to Mar'21:

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	21	6.90	1.67	3.01	0.00	0.00	0.00	0.00	0.00	0.00	58.00	40.00	48.57
Battery#6	24	5.17	1.79	3.61	1.96	0.00	0.26	0.94	0.00	0.25	57.00	38.00	51.81
Battery#7	24	4.88	0.96	3.01	2.00	0.00	0.10	1.09	0.00	0.15	62.00	36.00	51.14
Battery#8	24	3.68	1.49	2.23	0.00	0.00	0.00	0.00	0.00	0.00	35.00	18.00	23.24
Battery#9	24	3.79	1.47	2.35	0.00	0.00	0.00	0.00	0.00	0.00	28.00	18.00	21.81
Battery#10	24	5.29	2.87	3.67	1.20	0.00	0.06	0.39	0.00	0.02	40.00	16.00	21.81
Battery#11	24	4.17	1.76	2.84	1.16	0.00	0.06	0.39	0.00	0.02	38.00	13.00	18.38

- 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'20 to Mar'21):

Name of the Unit	No. of Observations	PM (mg/m3)		
		Max	Min	Avg
LD#1	145	67	1.5	10.3
LD#2	268	150	1.3	20.5
LD#3	145	2.8	0.1	1.5

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'20 to Mar'21)

Blast Furnace	Fuel Injected	Apr'20 to Mar'21 (kg/thm)
C BF	Coal Tar	27
D BF	Phase out	-
E BF	Coal Tar	40
F BF	Coal Dust	178
G BF	Coal Dust	188
H BF	Coal Dust	198
I BF	Coal Dust	192

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 (%)	104 %	107 %
Type of utilization	Cement Making	Reuse in Sinter Plant, In-house construction etc.
Actions to be taken for ensuring 100% utilization	-	

- 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'20 to Mar'21 (Tonnes)	Quantity charged to Coke Oven in Apr'20 to Mar'21 (Tonnes)	Method of transport
Coal Tar Sludge	2858	2858	Transported by trucks and utilized in-house.
BOT Plant Sludge	567	567	Transported by trucks and charged by conveyors; Mixing with Coal and used in coke making in battery
Waste Grease	160.7	-	Sold to authorized recyclers
Waste Oil sludge	2093.47	-	Sold to authorized party and incinerated
Zinc Dust Ash	197	-	Sold to authorized recyclers
Used Empty Batteries	66	-	Sold to authorized recyclers

Action point 5: Water conservation / Water Pollution

- Reducing specific water consumption to 5 m^3/t for long products and 8 m^3/t for flat products by 2005

Compliance Status: Complied

Specific water consumption details for Apr'20 to Mar'21:

Specific water consumption (m3/tcs)	
Long Products (m^3/tcs_{FP})	**Flat Products (m^3/tcs_{LP})**
1.49	2.63

- 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-20			May-20			Jun-20			Jul-20			Aug-20			Sep-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	8.3	6.9	7.5	8.5	7.0	7.8	8.2	7.1	7.6	8.1	7.1	7.7	8.2	6.8	7.6	8.4	7.2	7.7
	Total Suspended solids	mg/L	100	91.0	22.0	54.9	80.0	19.0	57.1	86.0	30.0	51.9	82.0	30.0	47.1	86.0	30.0	55.0	96.0	19.0	41.7
	Oil & Grease	mg/L	10	6.4	2.8	4.4	5.6	2.4	4.2	5.6	2.8	4.1	7.2	3.2	4.4	4.4	1.2	3.6	4.8	2.0	3.7
	Ammoniacal Nitrogen (as N)	mg/L	50	7.6	0.6	2.0	48.5	1.9	21.3	47.6	7.9	24.5	42.9	12.2	26.8	40.2	11.5	29.7	48.2	20.1	37.7
	Cyanide (as CN^-)	mg/L	0.2	0.2	0.1	0.2	0.2	0.1	0.1	0.2	0.1	0.2	0.2	0.1	0.2	0.2	0.1	0.2	0.2	0.1	0.2
	Biological Oxygen Demand, BOD	mg/L	30	26.2	12.4	19.9	26.9	16.5	23.4	26.4	12.8	21.6	25.9	19.1	23.1	26.2	19.1	22.4	26.4	19.3	23.0
	Chemical Oxygen Demand, COD	mg/L	250	226.0	140.0	196.7	240.0	170.0	215.4	245.0	161.0	222.1	240.0	180.0	216.0	242.0	148.0	209.3	240.0	180.0	209.2
	Phenol	mg/L	1	0.3	0.1	0.2	0.2	0.1	0.2	0.3	0.1	0.1	0.3	0.1	0.2	0.3	0.0	0.1	0.3	0.1	0.2

	Parameter	UoM	Statutory Limit	Oct-20			Nov-20			Dec-20			Jan-21			Feb-21			Mar-21		
				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	8.4	7.2	7.7	8.4	7.2	7.7	8.4	7.2	7.7	8.1	7.0	7.5	8.0	6.9	7.4	7.9	6.8	7.5
	Total Suspended solids	**mg/L**	100	82.0	25.0	49.3	82.0	25.0	49.3	82.0	25.0	49.3	90.0	38.0	73.6	60.0	15.0	43.1	88.0	35.0	63.1
	Oil & Grease	**mg/L**	10	5.2	3.6	4.2	5.2	3.6	4.2	5.2	3.6	4.2	4.8	2.8	3.8	4.4	1.6	3.0	2.8	0.8	1.7
	Ammoniacal Nitrogen (as N)	**mg/L**	50	37.9	14.2	25.5	37.9	14.2	25.5	37.9	14.2	25.5	46.3	1.7	9.7	33.0	1.5	17.7	7.3	0.8	2.4
	Cyanide (as CN^-)	**mg/L**	0.2	0.2	0.1	0.2	0.2	0.1	0.2	0.2	0.1	0.2	0.2	0.1	0.1	0.2	0.1	0.1	0.2	0.1	0.2
	Biological Oxygen Demand, BOD	**mg/L**	30	26.4	12.8	22.2	26.4	12.8	22.2	26.4	12.8	22.2	18.1	9.0	13.0	26.4	6.6	15.3	26.1	18.1	23.0
	Chemical Oxygen Demand, COD	**mg/L**	250	229.0	196.0	213.0	229.0	196.0	213.0	229.0	196.0	213.0	238.0	180.0	222.6	218.0	118.0	172.5	244.0	173.0	229.2
	Phenol	**mg/L**	1	0.3	0.1	0.2	0.3	0.1	0.2	0.3	0.1	0.2	0.3	0.1	0.2	0.3	0.1	0.2	0.3	0.1	0.2

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	7	-	-
Sinter Plant	8	-	-
Total	98	-	-

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'20 - Mar'21)

- 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 year is 94% including maintenance period.

- Differential pressure of the Bag filters is being monitored regularly to ensure the efficiency.

Status of Wastewater Pollution Control Equipment (Apr'20 - Mar'21)

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

	Apr'20-Mar'21 FY21	Target for FY22
Specific Water Consumption (m^3/TCS)	2.25	2.07
Energy consumption (GCal/ TCS)	5.612	5.566
Steps taken for Resource Conservation	Yes	Yes
Environmental monitoring laboratory provided (Y/N)	Yes	Yes

- 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 rainwater 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	None of our mines are abandoned so far. However, all the coal-fired boilers in Steel Works have been converted to gas firing. Coal

cavities through empty railway wagons while they return back to the mines and its implementation.	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 rainwater 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.

Annexure-V

WBWML/GF/LAB-310

WEST BENGAL WASTE MANAGEMENT LTD.

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LABORATORY

(Recognized by WBPCB)

NABL
Accreditated Laboratory

ULR – TC747119000000658F

IM 570907
EMS 570497
OHS 570500
FS 570487

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 Middya
(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

IM 570907
EMS 570497
OHS 570500
FS 570487

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	**Pentachlorphenol**	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
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.
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Sashwati Paul
Checked by

Tarun Kr. Middya
Tarun Kumar Middya
(Lab. Manager)
Authorized Signatory

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LABORATORY

(Recognized by WBPCB)

NABL
Accreditated Laboratory

ULR – TC747119000000659F

IM 570907
EMS 570497
OHS 570500
FS 570487

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

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

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Sushmita Paul
Checked by

Tarun Kr Middya
Tarun Kumar Middya
(Lab. Manager)
Authorized Signatory

WEST BENGAL WASTE MANAGEMENT LTD.

(A Division of RAMKY Enviro Engineers Ltd.)
J.L. No. : 103, Mouza : Purba Srikrishnapur
P.S. : Sutahata, Haldia - 721635
Dist. : Purba Midnapore, State : West Bengal
T : 03224-278238/39, Fax : 278240
E-mail : laboratorywbwml@ramky.com
CIN : U90002WB2004PLC098219

IM 570907
EMS 570497
OHS 570500
FS 570487

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 ***

towards sustainable growth

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	**Pentachlorphenol**	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
The comprehensive analysis report refers only to the 'as received' sample of waste.
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Sushmita Paul
Checked by

Tarun Kr Middya
Tarun Kumar Middya
(Lab. Manager)
Authorized Signatory

WEST BENGAL WASTE MANAGEMENT LTD.

(A Division of RAMKY Enviro Engineers Ltd.)
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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)

NABL
Accreditated Laboratory

ULR – TC747119000000660F

IM 570907
EMS 570497
OHS 570500
FS 570487

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:

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E-mail : laboratorywbwml@ramky.com
CIN : U90002WB2004PLC098219

IM 570907
EMS 570497
OHS 570500
FS 570487

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 ***

Towards sustainable growth

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	**Pentachlorphenol**	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:
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WLT – Water Leaching Test
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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
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Checked by

Tarun Kumar Middya
(Lab. Manager)
Authorized Signatory

Annexure-VI

Dr. Amit Ranjan Chakraborty
Chief Environment Management

EMD/C-23/408/20
September 18th, 2020

The Member Secretary
Jharkhand State Pollution Control Board
T.A. Division Building, HEC Campus, Dhurwa
RANCHI – 834004

Subject: Environmental Statement 2019-2020 for Tata Steel Limited – Main Steel Works, Jamshedpur

Dear Sir,

This has reference to the captioned subject. Please find enclosed the **"Environmental Statement"** for Tata Steel Limited– Main Steel Works, Jamshedpur including JCAPCPL for the year 2019-2020 duly filled in the prescribed format is enclosed for your kind consideration.

Thanking you

Yours faithfully,
For Tata Steel Limited

Dr. Amit Ranjan Chakraborty
Chief, Environment Management

Encl: As Above

Copy to: Regional Officer, Jharkhand State Pollution Control Board, Adityapur, Jamshedpur – 831 013

TATA STEEL LIMITED
Environment Management Jamshedpur 831 001 India
Tel 91 657 6647572 P&T 9297953299 (O) 9262290348 (M) e-mail amit.chakraborty@tatasteel.com
Registered Office Bombay House 24 Homi Mody Street Fort Mumbai 400 001 India
Tel 91 22 66658282 Fax 91 22 66657724
Corporate Identity Number L27100MH1907PLC000260 Website www.tatasteel.com

ENVIRONMENTAL STATEMENT
FOR THE YEAR 2019-2020

Main Steel Works
TATA STEEL LIMITED

Submitted by:
ENVIRONMENTAL MANAGEMENT DEPARTMENT
TATA STEEL LIMITED
JAMSHEDPUR-831001
JHARKHAND

[Form V]

Environmental Statement for the Financial Year ending 31st March 2020

PART-A

(i)	**Name & address of the owner/occupier of the industry operation or process:**	Mr. T.V. Narendran Managing Director- Tata Steel India & Southeast Asia Tata Steel Limited Jamshedpur-831001 Jharkhand
(ii)	**Industry Code**	3312
	Primary STC Code:	Metallurgical industry
	Secondary SIC Code	Integrated Iron & Steel Industry
(iii)	**Production Capacity**	10.2 Million Tons Crude Steel Production during 2019-20 (Major units are: RMM, Blast Furnaces, Coke ovens, Sinter Plants, Pellet Plant, LD Shops, HSM, CRM, WRM, MM, NBM, CAPL*, Captive Power Plant and Utilities, JAMIPOL**) **CAPL is being owned and operated by M/s Jamshedpur Continuous Annealing and Processing Company (JCAPCPL), a joint venture formed by Tata Steel and Nippon Steel and Sumitomo Metal Corporation (NSSMC) to manufacture and market high-quality, automotive- grade continuous annealed products inside premises of Jamshedpur steel works.* ***Lime Grinding Plant and Bentonite Grinding Plant, JAMIPOL a joint venture of Tata Steel*
(iv)	**Year of Establishment**	1907
(v)	**Date of last Environment Statement submitted**	September 20, 2019 vide letter no. EMD/C-23/209/19

PART-B

WATER & RAW MATERIAL CONSUMPTION

i) Water Consumption (m^3/day)

Water Consumption	During the previous Financial Year (2018-19)	During the current Financial year (2019-20)
Industrial Consumption (inside Works as Makeup water)	91,540	78,212
Domestic Consumption (Inside Works as drinking water)	10,680	10,691

Name of the product	**Process water consumption/unit of product output (m^3/tcs)**	
Crude Steel	During the previous Financial Year (2018-19)	During the current Financial Year (2019-20)
Specific Water Consumption	3.27	2.80

ii) Raw Material Consumption (Works):

Name of raw material	**Name of products**	**Consumption of raw material per unit of output (kg/ton of crude steel)**	
		During the previous Financial Year (2018-19)	During the current Financial year (2019-20)
Iron Ore	Crude Steel	1662.8	1645.8
Coking Coal		612.4	575.0
Lime Stone		301.7	303.3
Non-Coking Coal		210.2	222.7
Dolomite & Pyroxenite		105.0	95.4
Purchase Pellet		34.8	23.8
Purchase Coke		-	-
Middling Coal		0.4	-
Quartzite and Other materials		7.8	8.2
Zinc & Zinc Alloys		1.0	0.9

Ferro Manganese - High Carbon Lumps		0.9	0.7
Ferro Manganese - Medium Carbon		1.5	1.6

PART-C

Pollution Discharged to Environment/Unit of Output
(Parameter As Specified in the Consent Issued)

(i) Works:

Pollutants	**Quantity of pollutants discharged (mass/day)**		**Concentrations of pollutants discharged (mass / volume)**		**% of variation from prescribed standards**
	(Tons/day)		**(mg/L)**		
(a) Water	**2018-19**	**2019-20**	**2018-19**	**2019-20**	**2019-20**
TSS	1.069	0.942	36.24	39.47	-
COD	2.046	1.580	94.83	64.57	-
Ammonia as N	0.201	0.093	15.88	4.22	-
BOD	0.281	0.193	12.3	8.26	-
Oil & grease	0.074	0.104	2.75	4.33	-
Phenols	0.005	0.005	0.21	0.20	-
Cyanide as CN^-	0.003	0.003	0.15	0.14	-
(b) Air	**2018-19**	**2019-20**	**2018-19**	**2019-20**	**2019-20**
	(Tons/day)		**(mg/Nm^3)**		
PM	10.35	9.12	19.9	15.64	-
SO_2	18.02	20.78	106.4	105.90	-
NOx	19.72	20.16	114.7	102.43	-

(c) Effluent Quality (2019-20)

Parameter	UoM	Norms	Susungaria Drain			HSM Drain		
			Max	Min	Avg	Max	Min	Avg
Ammoniacal Nitrogen (as N)	mg/L	50	24.26	0.16	3.11	39.82	0.7	5.33
Free Cyanide (as CN^-)	mg/L	0.2	0.17	0.01	0.15	0.16	0.03	0.13
Phenolic compounds (as C_6H_5OH)	mg/L	1	0.89	0.01	0.26	0.5	0.01	0.15
Oil & Grease	mg/L	10	6.8	1.2	4.4	7	1.2	4.26
Total Suspended solids	mg/L	100	96	4	39.4	94	6	39.5
Chemical Oxygen Demand, COD	mg/L	250	240	28	67.4	176	22	66
Biological Oxygen Demand, BOD	mg/L	30	24.2	3.1	8.3	25.6	3.1	8.1
pH	-	6.0-8.5	8.47	7	7.78	8.48	6.72	7.98

Parameter	UoM	Norms	BOT Plant Treated Effluent		
			Max	Min	Avg
Ammoniacal Nitrogen (as N)	mg/L	50	19.68	0.16	1.91
Free Cyanide (as CN^-)	mg/L	0.2	0.18	0.07	0.15
Phenolic compounds (as C_6H_5OH)	mg/L	1	0.49	0.01	0.15
Oil & Grease	mg/L	10	8	1.2	4.27
Total Suspended solids	mg/L	100	95	11	45.7
Chemical Oxygen Demand, COD	mg/L	250	246	101	188.2
Biological Oxygen Demand, BOD	mg/L	30	25.8	6.4	20.2
pH	-	6.0-8.5	8.45	6.56	7.32

(d) Ambient Air Quality (2019-20)

Parameter	UoM	Norm	WEST PLANT FIRST AID STATION (WPFA)			COLD ROLL MILL (CRM)			POWER HOUSE # 3 GATE			POWER HOUSE # 6 GATE		
			Max.	Min.	Avge	Max.	Min.	Avge	Max.	Min.	Avge	Max.	Min.	Avge
Particulate Matter, PM_{10}	µg/m³	100	260.5	61	142	294.1	61	175.8	385.1	80	223	274.5	88	174.4
Particulate Matter, $PM_{2.5}$	µg/m³	60	115.9	30	61.3	128.9	28	74.1	155.4	31	88.7	124	36	69.4
Sulphur Dioxide (SO_2)	µg/m³	80	23	9	14.9	19.9	8	14.8	19	11	14.6	23.4	10.3	17.8
Nitrogen Dioxide, (NO_x)	µg/m³	80	49	19	31.4	53	17.4	31.8	52	19.7	33.2	69	15.1	33.2
Carbon Monoxide(CO)	µg/m³	2000	0.4	0.1	0.3	1.4	0.3	0.7	0.7	0.5	0.6	0.9	0.5	0.6
Ammonia (NH_3)	µg/m³	400	148.2	43.4	73.3	140	41.1	82.6	95	44.2	66	214	35	103.2
Ozone (O_3)	µg/m³	100	29.7	12	16.5	29.7	13.8	17.9	23	11	16.4	24	9	16.1
Lead (Pb)	µg/m³	1.0	1.3	0	0.3	0.6	0	0.2	0.7	0	0.2	0.6	0	0.2
Arsenic (As)	ng/m³	6.0	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Nickel (Ni)	ng/m3	20.0	18.8	0.2	11.6	30.4	0.3	12.5	14.6	0.2	9	18.2	0.3	10.9
Benzene (C6H6)	µg/m3	5.0	< 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	1.0	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1

PART-D

Hazardous Waste
[As Specified under Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016]

Hazardous Waste	Total Quantity (Tonnes)	
	During the previous Financial Year (2018-19)	During the current Financial year (2019-20)
(a) From Process		
Waste Oil	2543	3232
Tar Sludge	3435	6295
Zinc dust Ash	39.98	208
Iron Oxide	6792	12117
Iron Hydroxide Sludge	345	419.5
Chrome Sludge	1.4	2.0
Waste Grease	117	158.7
(b) From Pollution Control Facilities		
GCP Sludge*	5,08,966	5,35,499
BOT Sludge	821	288
*GCP Sludge includes Sludges from LD Shops and Blast Furnaces		

PART-E

Solid Waste

Total Quantity Generated

Name of the Waste	**Total Quantity Generated (tonnes)**	
(a) From Process	During the previous Financial Year (2018-19)	During the current Financial year (2019-20)
BF Slag	41,24,476	41,55,373
LD Slag	17,42,810	17,04,502
Mill Scale & Mill Sludge	1,02,652	1,04,081
Lime Fines	2,12,283	2,13,417
Dolo & Kiln Dust	18,315	18,364
Bottom Ash	322	0
(b) From Pollution Control Equipment		
Process Dust	1,57,125	1,76,079
Fly Ash	1289	0

(c)(1). Total Quantity Recycled/ Reutilized within the unit

Name of the Waste	**Total Quantity Recycled/ Re utilized within the unit (tonnes)**	
	During the previous Financial Year (2018-19)	During the current Financial year (2019-20)
BF Slag	-	8,019
LD Slag	6,81,804	7,56,932
Mill Scale	99,855	1,01,204
Lime Fines	2,09,706	1,95,522
Dolo & Kiln Dust	18,431	18,407
Flue Dust	1,12,196	1,28,050
GCP Sludge	3,61,955	4,19,444
Mill Sludge	2,968	2,478

(c)(2) Total Quantity Sold

Name of the Waste	**Total Quantity Sold (tonnes)**	
	During the previous Financial Year (2018-19)	During the current Financial year (2019-20)
BF Slag	40,72,885	40,16,057
Lime Fines	12,075	18,250
GCP Sludge	93,741	19,390

(c)(3) Total Quantity Disposed

Name of the Waste	**Total Quantity Disposed (tonnes)**	
	During the previous Financial Year (2018-19)	During the current Financial year (2019-20)
BF Slag	-	96,800
Fly Ash + Bottom Ash	1,612	0
LD Slag	5,47,363	93,687

PART-F

Chemical Composition of majority of waste as produced in process of Tata Steel's operation is given below:

Name of Wastes	Chemical Composition (%)	Disposal Method
Coal Tar Sludge	C – 90-95; Moisture – 1.3 S – 0.3-0.7; CV – 8800 KCal/kg Sp. Gr. – 1.2; Ash – 0.04-0.05	Mixed with coal & used in Coke Plant
BOD Sludge	VM – 50; Ash – 26 Moist. – 20; CV – 5800 KCal/kg	Mixed with coal & used in Coke Plant
B F Slag	CaO – 32; MgO – 9 SiO_2 – 34.5; MnO – 0.25 P_2O_3 – Nil; Al_2O_3 – 1.2 S – 1.4; TiO_2 – 1.2; FeO – 0.33	• Sold to cement plant • Used in construction
GCP Sludge from Blast Furnace	Fe(T) – 33.65; MnO – 0.14 CaO – 3.45; Al_2O_3 – 3.64 SiO_2 – 6.40; S – 0.230; P_2O_5 – 0.307 TiO_2 – 0.30; MgO – 1.40 Alkali – 0.5 to 0.7; C – 21-24	• Sold to Outside Parties • Used in Sinter Plant • Used in Pellet Plant
L D Slag	Fe(T) – 18-25; MgO – 1-2 CaO – 45-55; MnO – 0.5-1.0 SiO_2 – 10-12; Al_2O_3 – 0.8-1.0 P_2O_5 – 3.5-4.0; S – 0.2 TiO_2 – 0.8-1; Alkali – 0.18	• Used in construction • Used in Sinter Plant
GCP Sludge from LD Shops	Fe(T) – 55 to 60; MgO - <1.0 CaO – 10-15; MnO - <0.5 SiO_2 – 1.5-2.0; Al_2O_3 - <0.5 P_2O_5 – 0.29; TiO_2 - <0.1	• Land Filling • Used in Sinter Plant
Mill Scale	Fe(T) – 72-75; MnO - <0.5 SiO_2 - <0.5; Al_2O_3 - <0.5 MgO – 0.1; Oil – 10-12	Used in Sinter Plant
Mill Sludge	Fe(T) – 42.76; MgO – 0.35 CaO – 0.65; MnO – 0.27 SiO_2 – 1.12; Al_2O_3 – 0.50 P_2O_5 – 0.089; TiO_2 – 0.03 Cr_2O_3 – 0.03; Oil – 10-12	Used in Sinter Plant
Lime Fines	CaO – 66.5; Al_2O_3 – 0.26 SiO_2 – 1.53; MgO – 5.68	• Sold • Used in Sinter Plant

PART-G

Sl. No.	Pollution abatement Measures taken in 2019-20	Impact on conservation of natural resources & others
1	Effluent recycling facility	Reduction of specific water consumption to be continued
2	Green Belt Development	We have planted approx. 1,06,927 nos. saplings during April 2019 to March 2020 inside the works, Township and Jugsalai Muck Dump area. 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.

Details of Plantation (nos.) done during April 2019 – March 2020

Month	Plantation in Town and JMD	Plantation in Works	Species
Apr-19	1692	510	*Bakul, Ashoka, Arica, Palm*
May-19	2406	405	*Karanj, Mahogany, Tabbia, Karbi*
Jun-19	8916	750	*Bakul ,Sita Ashoka , Arica Palm, Techoma , Karanj ,Putranjiva Alstonia*
Jul-19	15777	627	*Mahogany, Tababia, Ticoma, Bottel palm, Cicilipinia, Harsingar, calendra, Karbi*
Aug-19	7191	506	*Kanchan, Calendra, Ashoka, Karbi, Hemelia, Ticoma, Aricapalm, Palm*
Sep-19	8052	645	*Cicilipania ,Bakul ,Putranjiva,Karanj,Tababia ,Spathodia*

Oct-19	5088	410	*Bakul , Ashoka , Arica Palm, Techoma , Karanj ,Putranjiva, Bakul*
Nov-19	10928	410	*Bakul, Arica palm, Plumeria*
Dec-19	10005	510	*Bakul, Arica palm, foxtail palm*
Jan-20	21000	512	*Foxtail Palm, Bakul, Ashoka, Concorpous.*
Feb-20	5045	273	*Conocarpus, Ashoka, foxtail Palm, Arica Palm, Tacoma, Cicilipania*
Mar-20	4995	274	*Cezium, Thuja, golden juniperious Techoma , conocarpous*
Total	**1,01,095**	**5,832**	**Total= 1,06,927**

PART-H

Additional Measures Investment Proposal of Environmental Protection Including Abatement of Pollution

- Upgradation of the existing pollution control equipment to bring down dust level
- New pollution control equipment is with more stringent design emission value
- Improvement in water recycling facility for reducing the waste water discharge
- Commissioning of Central (Integrated) Effluent Treatment Plant for effluent treatment

PART-I

Any other particulars for improving the quality of environment

Clean technologies to be implemented	**Current Status**
Energy recovery of top Blast Furnace (BF) gas	TRT has been commissioned in G, H & I Blast Furnace.
De-dusting of Cast House at tap holes, runners, skimmers, ladle and charging points.	De-dusting facility in the cast house has been provided in Sinter Plant, G Blast Furnace.
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.
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, new bar mill ECR, R&D and ITS Building) within Works.
Coke Dry Quenching at Coke Oven Battery 10 & 11	Coke Dry quenching (CDQ) facility is commissioned in the new Coke Oven Battery #10 and 11. The project is completed in FY'19.

Annexure -VII

Status of solid and Other Waste Generation and Utilization

(April 2020 to March 2021)

(All data in tonnes)

Sl.	Particulars	Generation	Internal	External Cons. & Sales	Total Utilisation	Utilization
1	Flue Dust	89,613	84,902	-	84,902	95%
2	GCP Sludge	1,06,703	1,06,703	-	1,06,703	100%
3	Lime Fines	1,99,282	1,79,804	15,993	1,95,798	98%
4	LD Sludge	4,03,619	4,05,954	-	4,05,954	101%
5	Kiln Dust	17,196	16,913	-	16,913	98%
6	Mill Scale	91,208	90,301	-	90,301	99%
7	Mill Sludge	2,147	2,147	-	2,147	100%
8	Iron Oxide	8,482	259	8,581	8,840	104%
9	Fe bearing muck	14,397	14,235	-	14,235	99%
10	ESP/DE Dust	56,679	56,207	-	56,207	99%
A	**Process Solid Waste**	**9,89,326**	**9,57,425**	**24,574**	**9,81,999**	**99%**
1	LD Slag Metallic	15,04,717	3,43,884	-	3,43,884	107%
2	LD Slag Non-Metallic		2,20,844	10,42,293	12,63,136	
B	**LD Slag**	**15,04,717**	**5,64,728**	**10,42,293**	**16,07,020**	**107%**
1	Granulated BF Slag	36,86,142	-	37,03,940	37,03,940	100%
2	Air Cooled BF Slag	2,07,438	288	3,52,544	3,52,832	170%
C	**Blast Furnace Slag**	**38,93,580**	**288**	**40,56,484**	**40,56,772**	**104%**
D	**Total**	**63,87,623**	**15,22,441**	**51,23,351**	**66,45,792**	**104%**

Tata Steel Limited, Bistupur, Jamshedpur – 831 001
Ph - 0657 2426992 Email id: chiefenvironment.management@tatasteel.com
Contact Person: Dr. Amit Ranjan Chakraborty, Chief Environment Management

Annexure-VIII

LETTER NO.- 615

OFFICE OF THE CHIEF INSPECTOR OF FACTORIES, JHARKHAND

SHRAM BHAWAN, DORANDA, RANCHI-2
(Tel:- 0651-2480454 E-mail Id- cifoffice123@gmail.com)

From,

Chief Inspector of Factories, Jharkhand,
Ranchi.

To,

The Occupier,
M/s Tata Steel Limited,
Jamshedpur.

Ranchi Dated: 29-05-2020

Subject: Recommendation of On Site Emergency Plan & Disaster Control of M/s Tata Steel Limited, Jamshedpur.

Sir,

The On Site Emergency Plan & Disaster Control submitted by you has been examined and the same is recommended subject to the following conditions: -

1. Regular Mock- drill shall be carried out in the factory as per the provisions and a detailed report should be made available to the Inspector of Factories and Chief Inspector of Factories.
2. A detailed safety audit report conducted by an experienced outside agency shall be submitted along with details of health & safety policy of your factory.
3. The Emergency Reponses plan will be up-dated and revised if there is any modification in the plant, process or industrial activity.
4. Adequate arrangement of medical/ relief facilities (first aid equipments etc.) should be provided and maintained in the emergency control room.
5. Telephone number of key persons to be noted and displayed in the central control room.

A copy of the recommended plan is enclosed herewith.

Yours faithfully,

29/5/2020

Chief Inspector of Factories, Jharkhand,
Ranchi.