TSL/MoEF&CC/BS-01/2023-02/344
May 31, 2023

The Deputy Director General of Forests (C)
Ministry of Environment, Forest and Climate Change,
Integrated Regional Office,
A/3, Chandersekharpur,
Bhubaneswar-751023

Subject: Submission of six-monthly EC compliance reports of 5.6, 3.1 and 1.5 MTPA capacity of integrated steel plant of Tata Steel Limited, Meramandali for the period October 2022 to March 2023.

Reference: I.EC vide file no. J-11011/829/2008-IA-II (I), dated 20.07.2012 of 5.6 MTPA
II.EC vide file no. J-11011/405/2007-IA-II (I), dated 22.09.2008 of 3.1 MTPA
III.EC vide file no. J-11011/8/2005-IA-II (I), dated 29.06.2005 of 1.5 MTPA

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 5.6 MTPA, 3.1 MTPA and 1.5 MTPA integrated steel plant of Tata Steel Ltd., Meramandali for the period from October 2022 to March 2023 along with monitoring data report for your kind consideration.

The copy of above compliance report is also being sent in soft format through email (roez.bsr-mef@nic.in) for your kind perusal. Also copy of 5.6 MTPA, 3.1 MTPA and 1.5 MTPA EC compliance is being uploaded on MoEF&CC website on portal http://environmentalclearence.nic.in.

Hope the above are in line with the statutory requirements.

Thanking you,

Yours faithfully,
For Tata Steel Limited

Anoop Srivastava

Anoop Srivastava
Chief Environment, TSM

Encl: As above

Copy to:

1. The Zonal Officer, Central Pollution Control Board, Southern Conclave Block 502, 5th & 6th Floors, 1582 Rajdanga Main Road, Kolkata - 700107.
2. The Member Secretary, SPCB, Parivesh Bhawan, A/118,Nilakahanta Nagar, Unit- VIII, Odisha,Bhubaneswar-751012
3. The Regional Officer, State Pollution Control Board, Odisha, Angul.

SPECIFIC CONDITION:

SL	CONDITIONS	COMPLIANCE STATUS
i	Compliance to all the specific and general conditions stipulated for the existing plant by the Central / State Government shall be ensured and regular reports submitted to the Ministry's Regional Office at Bhubaneswar / SPCB.	• Compliance to all stipulated specific & general conditions are being ensured. Regular reports including monitoring data are being sent to MOEF&CC, CPCB and SPCB. • The last half yearly compliance report was submitted vide letter no. TSM/MoEF&CC/BS-01/2022-20/265 dated 30.11.2022.
ii	The target dates / schedule given for compliance to the conditions of environmental clearance for 3.1 MTPA Steel Plant to the State Pollution Control Board and to the Ministry shall be adhered to and reports regularly submitted to MoEF Regional Office at Bhubaneswar.	• Six monthly compliance report including monitoring data for the conditions stipulated in EC for 3.1 MTPA capacity integrated steel plant is being sent to MOEF&CC, CPCB and SPCB regularly. • The last half yearly compliance report was submitted vide letter no. TSM/MoEF&CC/BS-01/2022-20/265 dated 30.11.2022.
iii	The 'Consent to Operate' shall be granted by SPCB only after satisfactory compliance of the conditions stipulated in the environmental clearance and Consent granted by the SPCB for the 3.1 MTPA steel plant. A joint visit shall be conducted by MoEF Regional Office at Bhubaneswar and SPCB in this regard. Periodic review of the project regarding compliance to the conditions stipulated shall be undertaken based on the compliance report submitted by the proponent within four months. The compliance status shall be monitored by the Regional Office of the Ministry at Bhubaneswar.	• Consent to Operate for 5.6 MTPA integrated steel plant has been obtained from SPCB vide letter no 4463/IND–I–CON-5440, dated.23.03.2023 and is valid up to 31.03.2025.
iv	Measures shall be undertaken to mitigate particulate matter 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), Gas cleaning plant (GCP), Bag Filter (BF) etc. shall be provided to keep the emission levels below by installing energy efficient technology.	• 55 nos. of bag filters, 27 nos. of ESP have been installed with each operating unit to reduce particulate matter levels in ambient air. Details list of pollution control devices is enclosed as **Annexure-I.** • 09 numbers of Gas Cleaning scrubbers have been installed at Coke Oven I&II, Blast Furnace I&II and BOF. • To monitor the ambient air quality, 7 numbers of Continuous Ambient Air Quality Monitoring Stations (CAAQMS) have been

		installed in the different locations of Tata Steel Limited in consultation with SPCB, Odisha. • Implemented various improvement projects e.g., installation of new technology power supply controller at Sinter plant (HFTR- High frequency transformer rectifier in process ESP & Micropulse in dedusting ESP of sinter plant is the first of its kind technology application in ESP).
v	The bag filter shall be installed at the coal crusher and the screening area. Pneumatic dust handling system shall be provided at ESP hoppers in the sinter plant. The existing bag filters shall be upgraded. Fixed type water sprinklers shall be installed in the internal roads and at the material handling area to control the fugitive emission. Dry fog system shall be installed in the coal handling area. Dry sweeping (vacuum process) shall be carried out prior to water sprinkling on roads.	• Two Bag filters, adequate no. of Dry Fog Dust Suppression System (DFDS) and Single Fluid Dedusting System (SFDS) have been provided at the coal circuit and bag filters have also been provided in the iron ore circuit at crushing and screening points of raw material handling areas. • Pneumatic dust handling system has been provided at ESP hoppers in the Sinter Plant-I. • Chain conveyor dust handling system has been provided at ESP hoppers of sinter plants II and III. • 04 Nos. of Mechanized Road sweepers have been deployed for dry sweeping of roads and shop floors with dust suction facility. • Double lip seals with dual sealing system have been installed in the conveying route of RMHS and in junction houses to minimize material spillage. • 5 Nos. of dust collectors (Potable bag filter) have also been installed in the sinter conveyor line.
vi	The National Ambient Air Quality Standards issued by the Ministry vide G.S.R. No. 826(E) dated 16th November, 2009 shall be followed.	• National Ambient Air Quality Standards (NAAQS) are being followed. Online real-time data is being transmitted from all seven CAAQMS. All monitoring parameters are within the norms except PM10 and PM2.5 in some locations for few days depending on the meteorological conditions and external factors.
vii	Gaseous emission levels including secondary fugitive emissions from all the sources shall be controlled within the latest permissible	• 55 nos.of bag filter, 27 nos. of ESP have been installed with each operating unit to reduce particulate matter levels in ambient

	limits issued by the Ministry and regularly monitored. Guidelines / Code of Practice issued by the CPCB shall be followed.	air. Details list of pollution control devices is enclosed **as Annexure-I.** • 09 numbers of Gas Cleaning scrubbers have been installed at Coke Oven I&II, Blast Furnace I&II and BOF. • Fugitive emission and stack emission monitoring is being carried out as per CPCB guidelines and record is being maintained. Monitoring report for the period Oct'22 to Mar'23 is attached as **Annexure-II** and **Annexure-III** respectively.
viii	Proper PPE shall be provided to all the workers including contract workers.	• Necessary PPEs such as safety helmet, safety shoes, gloves, goggles, ear plugs and ear muffs etc. are being provided to all the workers working in the shop floors including contract workers. This is now a mandatory requirement and one of the conditions of employment in our company & also a part of personal safety action plan for each employee. • The company has institutionalized Safety excellence management system in line with M/s. Du Pont (World benchmark in safety excellence) safety management system.
ix	The natural drain / nallah present on the northern side of the project site shall not be disturbed. The main gate of the plant beyond the nallah shall be shifted and the area should be developed into garden for public use.	• The natural nallah present on the northern side of the plant has not been disturbed. • A drop gate has been provided on the main road beyond nallah to control traffic.
x	Water requirement for expansion from River Brahmani shall not exceed 3,400m^3/hr. All the effluent should be treated and used for ash handling, dust suppression and green belt development. No effluent shall be discharged and 'zero discharge' shall be adopted. Sanitary sewage should be treated in septic tank followed by soak pit for treatment of effluent run-off from the coal washery area, settling pond shall be de-silted regularly and additional settling tank shall be constructed.	• Rate of freshwater consumption during the period Oct'22 to Mar'23 for the Steel plant is approx. 2372 m^3/hr. • All effluents are being treated in primary treatment plants (19 nos.) in steel plant attached with respective units and Effluent Treatment Plants (3 nos.) centrally. • Treated effluent is being reused for dust suppression, ash handling, make up water and for green area development. • Process effluent after treatment is being reused. During the period Oct'22 to Mar'23, 3443796 m3 of water has been recycled. However, we are further improving the efficiency of the water management system

		by technology intervention to increase the utilization. • The sanitary sewage is being treated in 4 nos. of Sewage Treatment Plants and the treated sewage is being used for green belt development and low-end application in plant. • Rainwater harvesting pond of capacity 50000m^3 with HDPE liner has been constructed to store & reuse rainwater. • Zero Effluent Discharge (ZED) project is being implemented and expected to commissioned by March 2024.
xi	Efforts shall be made to make use of rain water harvested. If needed, capacity of the reservoir should be enhanced to meet the maximum water requirement. Only balance water requirement shall be met from other sources.	• Lagoons and HDPE pond have been constructed to harvest rainwater. This water is reused in the operation process when required. During the period Oct'22 to Mar'23, 49518 m^3 of rainwater has been utilized in process. • RWH potential has been studied by engaging an expert agency & the suggested projects are being implemented in phases. In the first phase 50000 m^3 capacity storage pond has been constructed in the year 2021. Also, rainwater collected from DRI & RMHS area are channelized through drains into a series of storage pond (3 nos lagoons are in operation).
xii	Regular monitoring of influent and effluent, surface, sub-surface and ground water (including chromite) should be ensured and treated wastewater should meet the norms prescribed by the State Pollution Control Board or described under the Environment (Protection) 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, SPCB and CPCB.	• Monitoring of influent, effluent, surface and groundwater quality is being carried out regularly in Environment laboratory which has been accredited by NABL vide certificate no. TC-10959 dated 02.09.2022 for 44 nos. Parameters. • The monitoring reports are enclosed as **Annexure- IV.**
xiii	All the blast furnace (BF) slag shall be provided to the cement manufacturers. Scrap shall be used in steel melting shop (SMS) and SMS slag and kiln accretions shall be properly utilized. All the other solid waste	• The entire quantity of blast furnace slag is dispatched to cement manufacturers based on long term MoU with the cement manufacturer.

	including broken refractory mass shall be properly disposed off in environment-friendly manner. Fly ash shall be utilized for the cement manufacturing and filling of mined out area after carrying geo hydrological study to prevent ground water pollution.	• Details of generation and utilization of Blast Furnace slag are given as **Annexure-V.** • The SMS slag (LD slag) is processed in material recovery plant (MRP) for separation of metallic from the non-magnetic part and sized for various applications. Some of the key applications of LD slag product are ➢ recovered metallics used in steel making process as a scrap, ➢ recovered fines used in sinter making process for replacement of lime, ➢ non-metallic utilization in cement manufacturing, road making, and hard sand applications. • Fly ash brick and paver block have been manufactured inside the plant for use in construction activities including road construction etc. This is also helping in maximum utilization of fly ash. During the period Oct'22 to Mar'23, approx. 1 Lakh fly ash brick has been manufactured and utilized, and approx. 4 Lakhs of paver block has been manufactured and used in road construction in the plant. • Fly ash is also being supplied to o nearby fly ash brick manufacturing units, free of cost, for maximum utilization of ash. o Cement plants through rake & bulker. o Construction of national highway (NH-55). Balance if any is being utilised in reclamation of low lying areas & abandoned stone quarries as per guidelines of CPCB/ OSPCB after grant of necessary consents.
xiv	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 should be submitted to the Ministry's Regional Office at Bhubaneswar, SPCB and CPCB.	• Solid waste handling, storage, utilization and disposal are being done scientifically. The toxic metal content and compositional analysis of solid waste are being carried out regularly. The analysis report of solid waste is attached as **Annexure-VI**. • Annual return of hazardous waste is being regularly submitted to SPCB Odisha.

xv	Vehicular pollution due to transportation of raw material 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.	• Vehicles carrying raw materials are being covered with tarpaulin to proact during transportation. • Water sprinkling arrangement has been made by installation of 128 numbers of rotary gun sprinklers at raw material handling areas to control dust emissions during loading and unloading of raw materials at site. • Additionally, dry fog dust suppression system having 242 nos. of nozzles have been installed in entire coal circuit and at the unloading points of raw material handling area to control fugitive dust. • Five Nos. of wheel washing systems have been installed at DRI, RMHS, BFPP1 and BFPP2 and WHRB. • 04 Nos. of mechanized road sweepers have been deployed for dry sweeping of internal roads and shop floors with dust suction facility.
xvi	The raw materials should regularly (six monthly) be monitored for trace metals and management plan shall be submitted to SPCB and MOEF Regional Office at Bhubaneswar.	• The analysis of trace metals in raw materials is being done by CSIR-IMMT, Bhubaneswar. Copy of the same is enclosed as **Annexure-VII.**
xvii	All internal roads shall be black topped. The roads shall be regularly cleaned with mechanical sweepers. A 3-tier avenue plantation using native species shall be developed along the roads.	• 42.8 km of internal roads have been concreted/paved. All internal roads are being cleaned regularly by using mechanical road sweepers. • Avenue plantation using native species has been developed along the roads.
xviii	An action plan for transfer from wet to dry quenching shall be submitted to the SPCB and MOEF Regional Office at Bhubaneswar within three months. The target date shall not be more than six years from the date of environmental clearance accorded for 3.1 MTPA Steel Plant i.e. 22.9.2008. Adequate space shall be provided for the retro fitting the dry coke quenching facility.	• Dry quenching has been commissioned at Coke Oven – II and now in operation. However, commissioning of Dry Quenching at Coke Oven – I is in advance stage of progress.

xix	Risk and tragedy Management Plan along with the mitigation measures shall be prepared and a copy submitted to the Ministry's Regional Office at Bhubaneswar, SPCB and CPCB within three months of issue of environment clearance letter.	• Risk and tragedy Management plan (on-site emergency plan) has been approved by the Directorate of Factories and Boilers, Odisha vide letter no. IV(IH)(3-149/11/3143 dated 19.10.2022. The approval letter is attached as **Annexure-VIII**
xx	As proposed, green belt shall be developed in 33 % of plant area as per the CPCB guidelines in consultation with the DFO.	• Green belt development is under progress in and around the plant complex by planting indigenous species as per CPCB guidelines. Till Mar'23, 33.66% of area (This includes Plant, R&R and CSR) has been covered under green belt. Rapid afforestation using MiyaWaki method in consultation with IIT, Kharagpur has been initiated. • Plantation of saplings are done regularly based on the availability of vacant area. During the period Oct'22 to Mar'23 is 415 nos. has been planted. Proper maintenance of green coverage is being ensured throughout the year by a dedicated horticulture team.
xxi	All the recommendations made in the Charter on Corporate Responsibility for Environment Protection (CREP) for the Steel Plants should be implemented	• Tata Steel Limited has implemented all CREP recommendations.
xxii	All the commitments made to the public during the Public Hearing in Public Consultation meeting held on 28th October, 2010 should be satisfactorily implemented and a separate budget for implementing the same should be allocated and information submitted to the Ministry's Regional Office at Bhubaneswar.	• Compliance to the commitments made to the public during Public Hearing are being complied with.
xxiii	At least 5 % of the total cost of the project should be earmarked towards the Enterprise Social Commitment (ESC) based on Public Hearing issues and item-wise details along with time bound action plan should be prepared and submitted to the Ministry's Regional Office at Bhubaneswar. Implementation of such program should be ensured accordingly in a time bound manner.	• Various CSR activities have been undertaken since the inception of the plant by providing facilities of sanitation, drinking water, education, health care, road, communication etc. Further, CSR activities and its related expenditure has been substantially increased after acquisition of the industry by Tata Steel Limited. • Detail CSR expenditure for the year Oct'22 to Mar'23 is enclosed as **Annexure-IX**.
xxiv	The company shall provide housing for construction labour within the site with all	• All necessary infrastructure and housing facilities were provided for workers during

	necessary infrastructure and facilities such as fuel for cooking, mobile toilets, safe drinking water, medical health care, creche etc. The housing may be in the form of temporary structures to be removed after the completion of the project.	construction phase of the plant within the site.
xxv	The company shall set up State-of-the-art-environment control/monitoring and research lab with R& D facilities for waste utilization studies. The laboratory staff shall be provided with adequate training for use and maintenance of the equipment's. An action plan in this regard shall be submitted to SPCB and MOEF Regional Office at Bhubaneswar within three months.	• Monitoring of influent, effluent, surface and groundwater quality is being carried out regularly in internal Environment laboratory which has been accredited by NABL vide certificate no. TC-10959 dated 02.09.2022. for 44 nos. Parameters. An environment research group is also working for research activity in environment technology.

GENERAL CONDITION:

SL	CONDITIONS	COMPLIANCE STATUS
i	The project authorities must strictly adhere to the stipulations made by the Orissa State Pollution Control Board and the State Government.	• All relevant stipulations made by State Pollution Control Board, Odisha and the State Government are being complied with.
ii	No further expansion or modifications in the plant shall be carried out without prior approval of the Ministry of Environment and Forests.	• As per MoEF&CC notification as per the MoEF& CC Notification No. S.O.980(E) dated: 02.03.2021"no increase in pollution load" (NIPL) was studied by expert agency for the followings and the same were verified by State Pollution Control Board. I. Enhancement of Hot Metal production from 3.919 MTPA to 5.0 MTPA vide OSPCB letter no. 246/IND-II-NOC-NIPL/24 dated 04.01.2022. CTO was granted vide letter No 4463/IND-I-CON-5440 dated 23.03.2023 with validity upto 31.03.2025. II. Installation of one no. of LRF of 190 T/heat and expansion of carrying capacity of two nos. of existing ladle from 180 T/heat to 190 T/heat vide OSPCB letter no.886/IND-II-NOC-NIPL/27 dated 20.01.2022. Trial CTO of LRF 3x190 Ton/heat was also granted by OSPCB.
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\	• 55 nos. of bag filter, 27 nos. of ESP have been installed with each operating unit to reduce particulate matter levels in ambient air. Details list of pollution control devices is enclosed **as Annexure-I.** • 09 numbers of Gas Cleaning scrubbers have been installed at Coke Oven I&II, Blast Furnace I&II and BOF.
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 PM_{10}, SO_2 and NOx are anticipated in consultation with the SPCB. Data on ambient air quality and stack emission shall be regularly submitted to this Ministry including its Regional Office at	• Seven CAAQM stations have been established in consultation with the SPCB in Tata Steel Ltd. Meramandali complex. Half yearly reports are being submitted to the Regional Office of MoEF&CC, SPCB and CPCB at regular intervals. Summary of AAQ monitoring report is attached as **Annexure-X.**

	Bhubaneswar and the SPCB/CPCB once in six months.	The last half yearly compliance report was submitted vide letter no. TSM/MoEF&CC/BS-01/2022-20/265 dated 30.11.2022.
v	Industrial waste water shall be properly collected, treated so as to conform to the standards prescribed under GSR 422 (E) dated 19th May, 1993 and 31st December 1993 or as amended form time to time. The treated waste water shall be utilized for plantation purpose.	• The industrial as well as domestic wastewater is being treated and reused for various purposes like slag quenching, coke quenching, dust suppression and green belt development inside the plant premises. The monitoring reports of Industrial wastewater are being submitted to SPCB/CPCB/MOEF&CC at regular intervals.
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) (nighttime).	• Acoustic hoods, silencers, enclosures etc. on all sources of noise generation have been provided. Work zone noise monitoring is being carried out and records being maintained. • The ambient and work zone noise level monitoring report for the period Oct'22 to Mar'23 is enclosed as **Annexure-XI**.
vii	Occupational health surveillance of the workers should be done on a regular basis and records maintained as per the Factories Act. The workers including the contract workers shall be provided with proper personal protection equipment.	• Occupational health surveillance of the workers is being periodically done. Periodical Medical Examination and Food handler test are being conducted once in a year. • Necessary PPEs are provided to all the employees including the contractual workers.
viii	The company shall develop surface water harvesting structures to harvest the rain water for utilization in the lean season besides recharging the ground water table.	• Lagoons and HDPE pond have been constructed to harvest rainwater. This water is reused in the process when required. During the period Oct'22 to Mar'23, 49518 m3 of rainwater has been utilized in process. • RWH potential has been studied by engaging an expert agency & the suggested projects are being implemented in phases. In the first phase 50000 Cum capacity storage pond has been constructed in the year 2021. Also, rainwater collected from DRI & RMHS area are channelized through drains into a series of storage pond (3 nos. of lagoons are in operation).

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 to all environmental protection measures as recommended in EIA / EMP report is ensured. • Various socio-economic development programs covering education, safe drinking water, sports, health care etc. are undertaken in nearby villages. • Details of breakup of CSR initiatives are enclosed as **Annexure-IX.**
x	The requisite funds shall be earmarked towards capital cost and recurring cost/annum for environment pollution control measures to implement the conditions stipulated by the Ministry of Environment and Forests 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 Bhubaneswar. The funds so provided shall not be diverted for any other purpose.	• Adequate funds are being provided by the management for pollution control and to meet recurring costs. Environmental requirements are given top priority for fund allocation and approval of capital projects. • The funds earmarked for environment pollution control measures are not diverted for any other purpose. • The company has invested adequate capital expenditure to improve mix of clean power & also reduction of carbon emissions.
xi	A copy of clearance letter shall be sent by the 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 web site of the company by the proponent.	• Clearance letter was sent to all concerned and uploaded in our Company web site, which can be viewed at http://www.tatasteel.com.
xii	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 at Bhubaneswar. The respective Zonal Office of CPCB and the SPCB. The criteria pollutant levels namely PM_{10}, SO_2, NO_x (ambient levels as well as stack emissions) or critical sectoral parameters, indicated for the projects, shall be monitored and displayed at a convenient location near the main gate of the Company in the public domain.	• Compliance status is uploaded in the Company's web site at http://www.tatasteel.com. The compliance report including results of monitored data is periodically submitted to the Regional Office of MoEF&CC, CPCB and SPCB, Odisha. • Parameters being monitored in ambient air and stack emission are being displayed near the main gate of the Company.

xiii	The project proponent shall also submit six monthly reports on the status of the compliance of the stipulated environmental conditions including results of monitored data (both in hard copies as well as by e-mail) to the Regional Office of MOEF&CC, the respective Zonal Office of CPCB and the SPCB. The Regional Office of this Ministry at Bhubaneswar / CPCB / SPCB shall monitor the stipulated conditions	• The half yearly compliance report is being submitted to the Regional Office of the MoEF&CC, CPCB and SPCB. • The last half yearly compliance report was submitted vide our letter no. TSM/MoEF&CC/BS-01/2022-20/265 dated 30.11.2022.
xiv	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 Office of the MOEF at Bhubaneswar by e-mail.	• The Environmental Statement in Form-V is being submitted to SPCB/CPCB/MOEF&CC regularly. • The Environment Statement for the FY 2020-21 was submitted vide letter no. TSL/SPCB/BS-03/2022-14/249, dated 29.09.2022.
xv	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 and Forests at http:/envfor.nic.in. This shall be advertised within seven days from the date of issue of the clearance letter, at least in two local newspapers that are widely circulated in the region of which one shall be in the vernacular language of the locality concerned and a copy of the same should be forwarded to the Regional office at Bhubaneswar.	• The advertisement was published in both Odia & English newspapers named “The Sambad” and “The New Indian Express” respectively on dated 24.07.2012. • The same has already been communicated to the Regional Office of MOEF&CC, Bhubaneswar vide our letter no. BSL/MoEF&CC/BS-01/2012-08 dated 24.07.2012.
xvi	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.	• This is an existing plant where project activities are going on. We shall inform the Regional Office as well as the Ministry about the financial closure, when it is completed.

Annexure-I

DETAILS OF AIR POLLUTION CONTROL DEVICES

SL	Process	Bag filters (Nos.)	ESP (Nos.)	Other Pollution Control Devices
1.	RMHS & RMPP	02	-	Gun Sprinklers-128 nos. DFS Nozzles-242 nos. Auto DFS-24nos.
2.	Coke oven - I	04	-	Scrubber-01 nos.
3.	Coke oven - II	11	-	Scrubber-04 nos.
4.	Sinter Plant-I	01	03	-
5.	Sinter plant – II & III	07	04	-
6.	DRI	03	15	-
7.	Blast Furnace-I	03	-	Scrubber-01 nos.
8.	Blast Furnace-II	04	-	Scrubber-01 nos.
9.	Lime Plant	10	-	-
10.	SMS-II	07	-	-
11.	SMS-III	03	-	Scrubber-02 nos.
12.	Blast Furnace Power Plant-I	-	03	-
13.	Blast Furnace Power Plant-II	-	02	-

Annexure-II

SUMMARY OF FUGITIVE EMISSION RESULTS MONTHLY AVARAGE VALUES Period: October 2022 to March 2023			
TATA STEEL LIMITED			
Name of units	**Location**	**PM 10 in µg/m3**	**Standard in µg/m3**
RMHS			
1.	Near JH-21 Yard-7 (Iron ore conveying)	757	2000
2.	Coal Yard -7 Lucky Mineral Office	595	
3.	Infront of PCI building	580	
RMPP			
4.	Near tertiary Crushing & Screening Building Area	675	2000
5.	Near Iron Crusher Area	735	
B.B. Plant			
6.	Storage building	1167	2000
7.	Flux crushing and screen building	1388	
Coke Oven-I			
8.	Fine crusher station	590	4000
9.	Secondary crusher	540	
Coke Oven-II			
10.	Coke treatment building	662	4000
11.	Coal crushing building	844	
DRI			
12.	Near PSB-1 building	1072	2000
13.	Near PSB-2 building	1498	
14.	Near PSB-3 building	1506	
15.	Near PSB- 4 building	1502	
16.	Near PSB-5 building	1210	
Sinter Plant I			
17.	Near proportionating Building	367	2000
18.	Near SP-1 Mixing House	927	
Sinter Plant II			
19.	Near SP-2 chimney Backside area	770	
20.	Near 7003 conveyor Belt	854	
Sinter Plant III			
21.	Near cooler SP-3 D/15	358	
22.	Near Chiller Plant SP-2,3 & parking area	270	
Blast Furnace-I			
23.	Near Stock House	1600	4000
24.	Near Cast house Area	1478	
Blast Furnace-II			
25.	Near Cast house Entrance	346	3000

Annexure-II

26.	Near Slug pit area	363	
27.	Stock House Near ECR Building	1908	
Lime Plant			
28.	Near Screen Area-1	1283	-
SMS-II			
29.	SMS-2 Furnace area	1106	4000
SMS-III			
30.	BOF Furnace area	585	3000
HSM			
31.	Near Coil Yard area	943	-
CRM			
32.	Near canteen area	272	-
BFPP-2			
33.	Near Ash silo Area	682	3000
BFPP-1			
34.	Near Ash silo Area	1027	4000
110 MW			
35.	Near Ash silo Area	713	-
IBMD			
36.	BOF sludge yard	263	-
37.	Near Scarp dumping yard	398	

---------- End of Report ----------

Annexure - III

SUMMARY OF STACK MONITORING

Period: From October 2022 to March 2023

S.N	Stack Attached to	Average Monthly Result in mg/m3						Standard as per CTO
		Oct'22	Nov'22	Dec'22	Jan'23	Feb'23	Mar'23	
1	AFBC	SD	SD	SD	SD	SD	SD	-
2	Sinter Plant -1 (85 M2 ESP)	14.21	6.38	16.15	12.31	16	18.1	100
3	Blast Furnace –I, Cast House	8.01	8.91	9.05	14.65	21.3	6.48	100
4	Blast Furnace –I, Stock House	4.6	4.1	4.08	5.32	9.4	11.9	100
5	SMS- 1	SD	SD	SD	SD	SD	SD	100
6	SMS 2 (FES 1)	9.61	6.8	8.36	6.93	7.3	8.86	100
7	SMS 2 (FES 2)	11.97	9.73	9.9	9.33	10	12.7	100
8	BFPP ESP 1	23.59	24.29	21.35	15.93	18.2	25.13	50
9	BFPP ESP 2	16.54	18.37	17.4	22.67	8.1	20.69	50
10	BFPP ESP 3	20.98	23.1	11.05	30.29	17.2	SD	50
11	Sinter Plant- 2	38.16	37.03	36.41	34.13	31.9	33.66	50
12	Sinter Plant- 3	39.52	42.06	37.74	34.27	37.7	38.41	50
13	SMS- 3 BOF (secondary chimney)	14.55	15.82	16.24	15.28	16.9	16.55	50
14	BFPP- 2 Boiler- 2	24.98	22.99	14.15	16.45	13.3	20.7	50
15	BFPP- 2 Boiler- 3							50
16	Coke oven (Battery- 1)	36.72	35.91	11.06	11.07	11	14.4	50
17	Coke oven (Battery- 2)	15.19	12.22	11.65	10.95	14.1	19.79	50
18	Coke oven- 2 (Battery- 2)	30.43	30.89	30.8	30.71	29.5	28.68	50
19	Blast Furnace –2, Cast House	13.16	13.09	15.68	17.86	7.2	9.87	50
20	Blast Furnace –2, Stock House	4.6	6.55	6.46	4.55	10.3	7.26	50
21	WHRB-1	49.6	35.69	32.82	25.97	13.5	SD	50
22	WHRB-2	23.72	SD	20.7	5.17	13.8	14.8	50
23	WHRB-3	10.2	20.1	21.87	19.08	22	24.46	50
24	WHRB-4	SD	7.3	13.67	10.91	15.6	8.7	50
25	WHRB-5	39.91	19.27	SD	9.82	13.2	18.91	50
26	WHRB-6	9.36	28.28	16.8	14.69	18.4	18.29	50
27	WHRB-7	32.57	8.28	18.58	28.43	24	29.57	50
28	WHRB-8	6.97	19.27	8.01	22.29	13.1	13.43	50
29	WHRB-9	15.7	34.58	13.85	15.08	13	13.43	50
30	WHRB-10	20.74	24.87	17.04	16.1	SD	5.96	50
31	DRI, Dedusting- 1	9.39	5.49	6.34	10.54	18.5	16.28	100
32	DRI, Dedusting- 2	12.08	15.66	14.11	14.69	16.7	19.2	100
33	DRI, Dedusting- 3	7.03	7.77	6.51	16.16	18.2	15.7	100
34	DRI, Dedusting- 4	15.46	18.39	17.15	32.24	20.1	21.97	100
35	DRI, Dedusting- 5	23.95	10.81	11.07	13.89	11.6	10.43	100

SD- Shut Down (Plant not in Operation)

SUMMARY OF STACK MONITORING

Period: From October 2022 to March 2023

Month		Oct'22		Nov'22		Dec'22		Jan'23		Feb'23		Mar'23	
S.N.	Stack Attached to	Result in mg/m3											
		SO_2	NO_X	SO_2	NO_X	SO_2	NO_X	SO_2	NO_X	SO_2	NO_X	SO_2	NO_X
1	BFPP ESP 1	380.94	67.69	598.82	133.9	868.24	215.45	977.87	247.6	857.02	260.27	1059.06	235.81
2	BFPP ESP 2	865.07	293.81	719.06	271.53	773.67	299.74	825.57	338.22	102.91	114.16	848.92	415.46
3	BFPP ESP 3	441.86	179.41	371.21	177.58	328.71	133.48	691.56	226.23	719.9	310.93	SD	
4	Sinter Plant- 2	296.87	138.76	252.27	104.51	264.9	96.85	162.72	55.78	186.68	95.15	360.31	168.93
5	Sinter Plant- 3	305.02	111.36	377.59	119.99	429.57	134.26	474.15	128	524.67	127.54	530.66	84.93
6	BFPP- 2 Boiler- 2	738.17	30.17	959.95	72.82	1055.77	60.66	843.38	33.38	787.49	28.49	973.91	24.28
7	BFPP- 2 Boiler- 3												
8	Coke oven (Battery- 1)	37.32	208.68	41.04	180.01	134.02	323.13	173.46	328.69	40.36	372.1	40.92	381.35
9	Coke oven (Battery- 2)	58.74	449.81	54.64	377	59.12	407.84	35.48	351.32	8.38	144.57	32.51	19.66
10	Coke oven- 2 (Battery- 2)	149.77	77.04	119.09	91.54	143.41	99.33	193.64	83.43	124.67	86.94	109.09	68.65
11	WHRB-1	852.97	71.66	1093.07	78.96	1087.03	95.71	938.28	86.2	299.64	43.98	SD	
12	WHRB-2	532	67.98	SD		974	102.9	759	97.9	759	97.9	673	99.2
13	WHRB-3	421.79	156.08	501.19	174.34	652	133.1	314.17	139.28	692.44	382.29	851.69	356.1
14	WHRB-4	SD		635	196.93	602.8	140.24	578.79	130.76	149.75	123.6	1167.62	128.1
15	WHRB-5	693.12	55.46	SD		SD		385.31	45.88	139.35	48.64	559.17	72.51
16	WHRB-6	62.19	3.48	740.69	33.63	539.2	181.12	432.15	156.33	230.69	141.5	225.92	142.6
17	WHRB-7	632.2	108.78	706.42	124.45	704.53	146.92	915.41	108.7	757.16	94.83	815.95	38.11
18	WHRB-8	UM		UM		UM		UM		UM		UM	
19	WHRB-9	428.96	111.97	417.2	42.28	580.86	25.73	847.76	311.03	603.2	629.78	933.44	416.31
20	WHRB-10	512.83	71.66	376.88	86.34	492.8	157.47	380.76	97.1	SD		479.29	99.01

SD: Shut Down (Plant not in Operation); UM: Under Maintenance

---------- End of Report ----------

Annexure-IV

Summary of Surface Water Quality Analysis

Period: From October 2022 to March 2023

S.N	Parameter	Unit	Kishinda Nala		Lingra Nala		Brahamani River	
			U/S	D/S	U/S	D/S	U/S	D/S
1	pH Value	-	7.05 - 7.77	6.82 - 8.07	7.9 - 8.04	7.1 - 8.33	6.94 - 7.63	7.49 - 7.67
2	Colour	Hazen	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)
3	Temperature	Deg C	< 31	< 33	< 29	< 24	< 30	< 34
4	Total Suspended Solids	mg/l	3.2 - 20.4	2 - 26.8	2.8 - 14.8	5.1 - 26	2.8 - 32	6.2 - 67.5
5	Arsenic as As	mg/l	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)
6	BOD, 3days at 27°C	mg/l	BDL (DL:2.0)	< 3.1	BDL (DL:2.0)	< 2.7	< 4.7	< 4.5
7	Boron as B	mg/l	BDL (DL:0.25)	BDL (DL:0.25)	BDL (DL:0.25)	BDL (DL:0.25)	BDL (DL:0.25)	BDL (DL:0.25)
8	Cadmium as Cd	mg/l	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)
9	Calcium as Ca	mg/l	48 - 109.76	11.88 - 54.88	32 - 48	28 - 58.8	8 - 24	12 - 20
10	Chlorides as Cl	mg/l	29.99 - 89.97	14.7 - 84.97	19.59 - 49.98	29.6 - 119.96	4.95 - 19.99	9.9 - 29.99
11	COD	mg/l	7.7 - 16.7	7.4 - 15.4	7.4 - 12	8.2 - 16	7.5 - 23.04	11.3 - 20
12	Copper (as Cu)	mg/l	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)
13	Cyanide as CN	mg/l	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)

14	Fluoride as F-	mg/l	0.35 - 4.2	0.22 - 2.4	0.24 - 1.06	0.53 - 2.17	0.24 - 0.74	0.21 - 0.72
15	Hexa Chromium as Cr +6	mg/l	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)
16	Iron as Fe	mg/l	0.09 - 0.56	0.06 - 2.01	< 0.26	< 1.58	0.07 - 4.8	0.06 - 3.9
17	Lead (as Pb)	mg/l	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)
18	Manganese (as Mn)	mg/l	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)
19	Mercury (as Hg)	mg/l	BDL (DL:0.0002)	BDL (DL:0.0002)	BDL (DL:0.0002)	BDL (DL:0.0002)	BDL (DL:0.0002)	BDL (DL:0.0002)
20	Nickel (as Ni)	mg/l	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)
21	O&G	mg/l	BDL (DL:1.4)	BDL (DL:1.4)	BDL (DL:1.4)	BDL (DL:1.4)	BDL (DL:1.4)	BDL (DL:1.4)
22	Phenolic Comp	mg/l	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)
23	Phosphate as P	mg/l	0.09 - 0.46	0.07 - 0.62	0.06 - 0.32	0.08 - 0.16	0.08 - 0.52	0.07 - 0.68
24	RFC	mg/l	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)
25	Selenium (as Se)	mg/l	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)
26	TKN	mg/l	BDL (DL:0.3)	BDL (DL:0.3)	BDL (DL:0.3)	BDL (DL:0.3)	BDL (DL:0.3)	BDL (DL:0.3)
27	Zinc (as Zn)	mg/l	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)

Note: BDL: Below Detectable Limit; DL: Detectable Limit, U/S: Upstream D/S: Downstream

Source: Monitoring/ Analysis report of S.K. Mitra Private Limited and Environment Laboratory of TSM.

Summary of Treated Domestic Effluent Analysis

Period: From October 2022 to March 2023

S.N.	Location	Parameters in Range		
		pH	Suspended Solid in mg/l	BOD (3 days at 27°C) in mg/l
1.	Colony STP	7.18 - 8.44	12 - 35	5.8 - 16.1
2.	AEL STP	6.51 - 8.19	10 - 34	10 - 19
3.	SMS-1 STP	7.83 - 8.05	24 - 40	11.1 - 16
4.	BF-1 STP	7.66 - 8.22	25 - 38	8 - 15.1

Summary of Effluent Treatment Plant Analysis

Period: From October 2022 to March 2023

S.N	Location	Parameters in Range					
		pH	Suspended Solid in mg/l	Chemical Oxygen Demand in mg/l	BOD (3days at 27°C) in mg/l	Oil & Grease	Iron as Fe
1.	ETP-1 (Outlet)	6.92 - 8.25	2.9 - 32	20 - 30.4	4.3 - 8.2	<5	0.07 - 0.17
2.	ETP-2 (Outlet)	6.96 - 7.68	5.6 - 40	25.6 - 36.8	4.7 - 9.2	<5	0.13 - 0.4
3.	ETP-3 (Outlet)	6.93 - 7.83	21 - 38	31.2 - 64	4.7 - 11	<5	0.1 - 0.34
4.	CRM (ETP Outlet)	6.36 - 6.9	16 - 66	100 - 180	19.2 - 28	<5	0.1 - 1.3
5.	BF-1 (Thickener Outlet)	6.59 - 7.12	57 - 82	30.4 - 53	3.7 - 7.6	<5	-
6.	BF-2 (Thickener Outlet)	6.82 - 7.8	22 - 84	26.4 - 80	4.6 - 7.1	<5	-
7.	SMS-3 (Thickener Outlet)	8.98 - 11.38	66 - 86	21.6 - 44	4.4 - 7	<5	-

S.N.	Location	Parameters in Range						
		pH	Suspended Solid in mg/l	Chemical Oxygen Demand in mg/l	BOD (3days at 27°C) in mg/l	Oil & Grease	TCN	Phenol
8.	Coke Oven-1 (BOD-1 Outlet)	7.27 - 8.05	6.8 - 90	28 - 220	7.2 - 28.6	<5	0.1 - 0.12	0.49 - 0.93
9.	Coke Oven-2 (BOD-2 Outlet)	6.74 - 7.66	35 - 78	64 - 184	13 - 29	<5	0.07 - 0.13	0.65 - 0.74

Summary of ground water level monitoring report inside plant premises

Period: From October 2022 to March 2023

S.N.	Location with description	Sample Code	Depth of Monitoring Bore Well	Longitude	Latitude	Ground Water Level (m)
						Mar-23
1	Near CRM	GW-1	163ft	20°47.956'	85°15.076'	2
2	Colony near STP	GW-2	165ft	20°49.045'	85°15.734'	2.14
3	RMHS Near Wagon Tippler	GW-3	300ft	20°47.752'	85°15.993'	3.82
4	Near Blast Furnace-2	GW-4	162ft	20°47.25'	85°15.613'	2.2
5	Near Gate no-10	GW-5	166ft	20°48.653'	85°15.754'	-
6	Near Railway bridge	GW-6	156ft	20°48.920'	85°15.858'	3.24

Ground Water Quality Analysis

S.N.	Parameter	Unit	GW-1	GW-2	GW-3	GW-4	GW-5	GW-6	Standard as per IS-10500-2012
1	p H	-	7.34	7.25	7.33	7.4	7.19	7.36	6.5-8.5
2	Colour	Hazen	Colorless	Colorless	Colorless	Colorless	Colorless	Colorless	15
3	Odour	-	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	-
4	T. Hardness (as CaCO3)	mg/l	236	324	388	292	436	352	300
5	Calcium as Ca	mg/l	56.9	77.7	93.8	70.5	105	84.2	75
6	Magnesium as Mg	mg/l	22.9	31.7	37.6	28.3	42.5	34.7	30
7	Iron as Fe	mg/l	0.12	0.14	0.18	0.13	0.21	0.12	0.3
8	Chlorides as Cl	mg/l	59.6	144.1	154.1	114.3	173.9	154.1	250
9	Fluoride as F-	mg/l	0.82	0.69	0.92	0.36	0.7	0.56	1
10	Dissolved solids	mg/l	328	379	436	380	552	436	500
11	Nitrate as NO3	mg/l	4.6	5.6	6.7	3.8	7.2	6.2	45
12	Chromium as Cr+6	mg/l	0.016	0.018	0.018	0.008	0.02	0.011	0.05
13	Alkalinity as CaCO3	mg/l	62	78	92	40	112	82	200
14	Phosphate as PO4	mg/l	0.36	0.58	0.72	0.48	0.56	0.42	-

Summary of ground water monitoring report outside plant premises

Ground Water Level

Period: November 2022

S.N	Location	Sample Code	Longitude	Latitude	Water Level from GL (m) BGL
					Nov'22
1	Kharagprasad	GW-01	20^0 49.299'	85^0 18.923'	3.41
2	Charadagadia	GW-02	20^0 47.768'	85^0 17.083'	5.9
3	Sibpur	GW-03	20^0 46.941'	85^0 14.394'	5.3
4	Kochilamara	GW-04	20^0 47.541'	85^0 16.802'	5.5
5	Galpada	GW-05	20^0 48.142'	85^0 18.600'	5.9
6	Motonga	GW-06	20^0 48.143'	85^0 18.599'	4.3
7	Asanabania	GW-07	20^0 47.534'	85^0 16.802'	5.2
8	Narendrapur	GW-08	20^0 49.483'	85^0 15.530'	4.5
9	Khaliberena	GW-09	20^0 46.946'	85^0 14.396'	4.9
10	Ganthigadia	GW-10	20^0 48.501'	85^0 15.118'	3.8

Ground Water Quality Analysis Report of surrounding villages

November 2022

S.N.	Parameters	unit	GW-01	GW-02	GW-03	GW-04	GW-05	GW-06	GW-07	GW-08	GW-09	GW-10
1	**pH**	**-**	6.56	7.13	7.5	7.38	7.2	7.55	7.41	7.34	7.19	7.3
2	**Odour**	**-**	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
3	**Colour**	**mg/l**	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)
4	**Turbidity**	**N.T.U**	2.2	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)
5	**Total Dissolved Solids (as TDS)**	**mg/l**	260	860	588	536	126	624	378	370	320	364
6	**Aluminium as Al**	**mg/l**	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)
7	**Anionic Surface Active Agents as (MBAS)**	**mg/l**	BDL (DL:0.05)	BDL (DL:0.05)	BDL (DL:0.05)	BDL (DL:0.05)	BDL (DL:0.05)	BDL (DL:0.05)	BDL (DL:0.05)	BDL (DL:0.05)	BDL (DL:0.05)	BDL (DL:0.05)
8	**Boron as B**	**mg/l**	BDL (DL:0.25)	BDL (DL:0.25)	BDL (DL:0.25)	BDL (DL:0.25)	BDL (DL:0.25)	BDL (DL:0.25)	BDL (DL:0.25)	BDL (DL:0.25)	BDL (DL:0.25)	BDL (DL:0.25)
9	**Calcium as Ca**	**mg/l**	39.6	118.8	47.52	110.88	19.8	106.92	71.28	79.2	39.6	79.2
10	**Chloride as Cl**	**mg/l**	39.19	186.14	19.59	68.58	9.8	97.97	48.98	39.19	19.59	39.19
11	**Copper as Cu**	**mg/l**	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)
12	**Fluoride as F**	**mg/l**	0.24	0.26	0.32	0.28	BDL (DL:0.2)	0.28	0.32	0.26	0.3	0.28
13	**Residual Free Chlorine**	**mg/l**	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)
14	**Iron as Fe**	**mg/l**	0.21	BDL (DL:0.05)	BDL (DL:0.05)	0.08	BDL (DL:0.05)	0.08	BDL (DL:0.05)	BDL (DL:0.05)	BDL (DL:0.05)	BDL (DL:0.05)
15	**Magnesium as Mg**	**mg/l**	19.01	47.52	19.01	33.26	9.5	47.52	33.26	23.76	16.63	28.51
16	**Manganese as Mn**	**mg/l**	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)
17	**Mineral Oil**	**mg/l**	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

			(DL:0.5)	(DL:0.5)	(DL:0.5)	(DL:0.5)	(DL:0.5)	(DL:0.5)	(DL:0.5)	(DL:0.5)	(DL:0.5)	(DL:0.5)
18	**Nitrate as NO3**	**mg/l**	2.66	4.01	2.01	3.02	0.85	2.01	1.85	1.69	2.65	2.88
19	**Phenolic Compounds as C6H5OH**	**mg/l**	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)
20	**Selenium as Se**	**mg/l**	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)
21	**Sulphate as SO4**	**mg/l**	4.21	6.22	3.28	5.62	2.21	5.38	3.28	3.01	2.98	2.98
22	**Total Alkalinity as CaCO3**	**mg/l**	122.4	469.2	183.6	408	81.6	459	306	285.6	163.2	285.6
23	**Total Hardness as CaCO3**	**mg/l**	178.2	495	198	415.8	89.1	465.3	336.6	297	168.3	316.8
24	**Zinc as Zn**	**mg/l**	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)
25	**Cadmium as Cd**	**mg/l**	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)
26	**Cyanide as CN**	**mg/l**	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)
27	**Lead as Pb**	**mg/l**	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)
28	**Mercury as Hg**	**mg/l**	BDL (DL:0.0002)	BDL (DL:0.0002)	BDL (DL:0.0002)	BDL (DL:0.0002)	BDL (DL:0.0002)	BDL (DL:0.0002)	BDL (DL:0.0002)	BDL (DL:0.0002)	BDL (DL:0.0002)	BDL (DL:0.0002)
29	**Nickel (as Ni)**	**mg/l**	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)
30	**Total Arsenic (as As)**	**mg/l**	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)
31	**Potassium as K**	**mg/l**	1.8	3.4	1.2	2.5	2.8	6.5	2.5	2.4	2	2.2
32	**E. coli**	**/100 ml**	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected

February 2023

S.N.	Parameters	unit	GW-01	GW-02	GW-03	GW-04	GW-05	GW-06	GW-07	GW-08	GW-09	GW-10
1	**pH**	**-**	6.54	7.28	7.33	7.44	6.86	6.88	7.34	7.31	7.54	7.42
2	**Odour**	**-**	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
3	**Colour**	**mg/l**	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)
4	**Turbidity**	**N.T.U**	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	4.3	BDL (DL:1.0)	2.5	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)
5	**Total Dissolved Solids (as TDS)**	**mg/l**	312	594	242	422	126	592	368	366	348	140
6	**Aluminium as Al**	**mg/l**	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)
7	**Anionic Surface Active Agents as (MBAS)**	**mg/l**	BDL (DL:0.05)	BDL (DL:0.05)	BDL (DL:0.05)	BDL (DL:0.05)	BDL (DL:0.05)	BDL (DL:0.05)	BDL (DL:0.05)	BDL (DL:0.05)	BDL (DL:0.05)	BDL (DL:0.05)
8	**Boron as B**	**mg/l**	BDL (DL:0.25)	BDL (DL:0.25)	BDL (DL:0.25)	BDL (DL:0.25)	BDL (DL:0.25)	BDL (DL:0.25)	BDL (DL:0.25)	BDL (DL:0.25)	BDL (DL:0.25)	BDL (DL:0.25)
9	**Calcium as Ca**	**mg/l**	72	88	40	80	20	88	80	76	60	20
10	**Chloride as Cl**	**mg/l**	14.85	29.69	9.9	19.79	14.85	19.79	44.54	44.52	49.48	4.95
11	**Copper as Cu**	**mg/l**	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)
12	**Fluoride as F**	**mg/l**	0.28	0.88	0.86	0.92	BDL (DL:0.2)	0.56	0.65	0.96	BDL (DL:0.2)	0.26
13	**Residual Free Chlorine**	**mg/l**	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)
14	**Iron as Fe**	**mg/l**	BDL (DL:0.05)	0.08	0.07	0.3	BDL (DL:0.05)	0.19	BDL (DL:0.05)	0.09	BDL (DL:0.05)	BDL (DL:0.05)
15	**Magnesium as Mg**	**mg/l**	24	48	19.2	38.4	9.6	48.2	24	24	24	9.6
16	**Manganese as Mn**	**mg/l**	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)
17	**Mineral Oil**	**mg/l**	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

			(DL:0.5)	(DL:0.5)	(DL:0.5)	(DL:0.5)	(DL:0.5)	(DL:0.5)	(DL:0.5)	(DL:0.5)	(DL:0.5)	(DL:0.5)
18	**Nitrate as NO3**	**mg/l**	1.02	1.65	1.32	1.05	0.95	2.98	1.42	1.6	1.56	0.89
19	**Phenolic Compounds as C6H5OH**	**mg/l**	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)
20	**Selenium as Se**	**mg/l**	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)
21	**Sulphate as SO4**	**mg/l**	3.22	7.12	2.89	5.76	1.98	6.99	4.58	5.6	5.62	2.1
22	**Total Alkalinity as CaCO3**	**mg/l**	255	387.6	153.2	173.4	81.6	387.6	285.6	265.2	244.8	81.6
23	**Total Hardness as CaCO3**	**mg/l**	280	420	180	360	90	420	300	290	250	90
24	**Zinc as Zn**	**mg/l**	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)
25	**Cadmium as Cd**	**mg/l**	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)
26	**Cyanide as CN**	**mg/l**	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)
27	**Lead as Pb**	**mg/l**	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)
28	**Mercury as Hg**	**mg/l**	BDL (DL:0.0002)	BDL (DL:0.0002)	BDL (DL:0.0002)	BDL (DL:0.0002)	BDL (DL:0.0002)	BDL (DL:0.0002)	BDL (DL:0.0002)	BDL (DL:0.0002)	BDL (DL:0.0002)	BDL (DL:0.0002)
29	**Nickel (as Ni)**	**mg/l**	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)
30	**Total Arsenic (as As)**	**mg/l**	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)
31	**Potassium as K**	**mg/l**	BDL (DL:0.5)	1.2	BDL (DL:0.5)	BDL (DL:0.5)	BDL (DL:0.5)	BDL (DL:0.5)	BDL (DL:0.5)	BDL (DL:0.5)	BDL (DL:0.5)	BDL (DL:0.5)

---------- End of Report ----------

Annexure - V

Details of Slag Generation and Utilization (Blast Furnace – 1 & 2)

Month	Quantity Generated (MT)	Quantity Dispatched (MT)
Oct'22	162122	180738
Nov'22	160541	165881
Dec'22	156283	168216
Jan'23	137559	148405
Feb'23	150219	128115
Mar'23	165052	196022
Total	**931776**	**987377**

सीएसआइआर - खनिज एवं पदार्थ प्रौद्योगिकी संस्थान
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CSIR - INSTITUTE OF MINERALS & MATERIALS TECHNOLOGY
(Council of Scientific & Industrial Research)
Bhubaneswar - 751013, Odisha, INDIA

TEST REPORT

Ref. No. IMMT/CCD/07/2021 **Date: 30.07.2021**

Name & Address of the Party:	Tata Steel BSL Ltd. At-Narendrapur, P.O.-Kusupanga Via-Meramandali, Dist-Dhenkanal
Sample Details:	1. Fly ash, BFPP-1 2. Bed ash, BFPP-1 3. Fly ash, BFPP-2 4. Bed ash, BFPP-2
Date of Receiving:	25.06.2021
Date(s) of Conducting Test:	30.06.2021
Date of Completion of Test:	23.07.2021

Method Adopted: 1. Major element analysis of ash samples through wet chemical route by using Volumetric, gravimetric, photometric, nephelometric, AAS and ICP-OES techniques.
2. TCLP study of ash samples as per US-EPA method 1311 or ASTM-D5233-92. Leaching solution analysis by ICP-OES and AAS

Detail Report: Following data tables are enclosed

Table-1. Chemical composition analysis of fly ash and bed ash samples.
Table-2. Experimental variables for Toxicity Characteristic Leaching Procedure (TCLP) study of Ash samples conducted as per US EPA method 1311.
Table-3. Trace element analysis of TCLP or WET Procedure solutions of Ash samples; leaching studies conducted as per US-EPA method 1311 and Appendix II of section 66261 of Title 22 of California Code Regulations (CCR).

(J. Das)
Principal Technical Officer
Central Characterization Dept.

N.B.:- The samples are not drawn by CSIR-IMMT. Liability, if any, for CSIR/IMMT arising in connection with the testing shall be subject to ceiling of amount received by the institute from the client. The report should not be interpreted in part.

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Bhubaneswar - 751013, Odisha, INDIA

TEST REPORT

Ref. No. IMMT/CCD/07/2021 Date: 30.07.2021

Table-1. Chemical composition analysis of fly ash and bed ash samples.

Sl. No.	Component	Concentration in Test Samples, %			
		Fly Ash, BFPP-1	Bed Ash, BFPP-1	Fly Ash, BFPP-2	Bed Ash, BFPP-2
1	SiO_2	49.85	52.45	56.4	54.9
2	Al_2O_3	25.8	24.6	16.8	17.5
3	Fe_2O_3	2.64	3.66	4.35	5.18
4	TiO_2	1.38	1.41	0.88	0.79
5	MnO_2	0.02	0.04	0.11	0.16
6	CaO	1.66	2.34	4.99	7.67
7	MgO	0.97	1.12	1.10	2.21
8	Na_2O	1.39	1.37	1.21	1.16
9	K_2O	1.18	1.29	1.20	1.14
10	Cr_2O_3	0.018	0.017	0.031	0.027
11	NiO	0.004	0.005	0.005	0.003
12	CuO	0.009	0.009	0.007	0.004
13	ZnO	0.008	0.009	0.017	0.007
14	BaO	0.046	0.049	0.036	0.031
15	P_2O_5	0.38	0.34	0.32	0.21
16	SO_3	0.27	0.10	0.15	0.43
17	Cl	0.38	0.64	0.21	0.43
18	LOI	6.56	2.37	3.34	3.70
19	F, mg/L	0.94	1.23	1.65	1.79

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TEST REPORT

Ref. No. IMMT/CCD/07/2021 **Date: 30.07.2021**

Table 2. Experimental variables for Toxicity Characteristic Leaching Procedure (TCLP) study of Ash samples conducted as per US-EPA method 1311.

Sl. No.	TCLP study Variables	Variable Data			
		Fly Ash, BFPP-1	Bed Ash, BFPP-1	Fly Ash, BFPP-2	Bed Ash, BFPP-2
1	TCLP study method	US EPA Method-1311			
2	Sample type	Dust, Particle size < 100 µm	Dust and Gravels, Particle size < 8 mm	Dust, Particle size < 100 µm	Dust and Gravels, Particle size < 8 mm
3	Sample particle size taken for leaching	Original sample	Original sample	Original sample	Original sample
4	Initial pH of samples	9.11	12.29	10.30	12.41
5	pH after HCl + heat	2.04	10.15	2.37	11.29
6	Extraction fluid used	Extraction fluid -1	Extraction fluid -2	Extraction fluid -1	Extraction fluid -2
7	pH of Extraction fluids	4.94	2.90	4.94	2.90
8	Sample taken for leaching, gm	50			
9	Volume of extraction fluid used, ml	1000			
10	Liquid/solid ratio	20:1			
11	Head space	10 %			
12	Extraction Temperature °C	28			
13	Extraction Time, hour	18			
14	Filter	Glass micro fiber, Whatman GF/C			
15	Washing of filters	With dil. HNO_3 and distilled water			
16	pH of recovered extraction fluid	5.12	4.78	4.95	5.56

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TEST REPORT

Ref. No. IMMT/CCD/07/2021 **Date: 30.07.2021**

Table-3. Trace element analysis of TCLP or WET Procedure solutions of Ash samples; leaching studies conducted as per US-EPA method 1311 and Appendix II of section 66261 of Title 22 of California Code Regulations (CCR).

Sl. No.	Component	Concentrations in TCLP or WET* leaching solutions of Ash test samples (mg/L)				Waste constituents concentration limits of TCLP or STLC, US-EPA and California Code of Regulations (mg/L)
		Fly Ash, BFPP-1	Bed Ash, BFPP-1	Fly Ash, BFPP-2	Bed Ash, BFPP-2	
1	Hg	0.005	0.004	0.004	0.003	0.2
2	As	0.034	0.054	0.041	0.025	5.0
3	Se	0.080	0.044	0.085	0.047	1.0
4	Sb*	0.056	0.049	0.058	0.021	15.0
5	Ba	0.46	0.20	0.38	0.27	100.0
6	Cd	0.001	0.002	0.001	0.002	1.0
7	Cr	0.026	0.021	0.031	0.028	5.0
8	Cr (VI)	0.012	0.009	0.015	0.010	5.0
9	Pb	0.024	0.028	0.024	0.016	5.0
10	Mn	0.42	0.31	0.69	0.27	10.0
11	Ag	0.012	0.009	0.034	0.008	5.0
12	Co*	0.18	0.14	0.16	0.13	80.0
13	Cu*	0.51	0.16	0.55	0.12	25.0
14	Mo*	0.19	0.54	0.29	0.06	350
15	Ni*	0.31	0.19	0.31	0.16	20.0
16	V*	1.23	0.39	1.72	0.31	24.0
17	Zn*	0.64	0.13	1.12	0.09	250

Remark: The TCLP and WET leaching solution analyses of fly ash and bed ash samples reveal that trace element concentrations are much below the Waste constituent concentration limits. Therefore, the ash samples are non-hazardous materials and their use as land filling or mine void dumping will not have any adverse effect on the ground water quality in respect of the analyzed parameters and no separate lining is required for dumping of the tested ash samples.

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TEST REPORT

Ref. No. IMMT/CCD/08/2021 **Date: 03.08.2021**

Name & Address of the Party:	Tata Steel BSL Ltd. At-Narendrapur, P.O.-Kusuparga Via Meramandali, Dist-Dhenkanal
Sample Details:	Solid Waste samples (17 Nos.)
Date of Receiving:	02.06.2021
Date(s) of Conducting Test:	07.06.2021
Date of Completion of Test:	23.07.2021

Method Adopted: 1. Major element analysis of Solid waste samples through wet chemical route by using Volumetric, gravimetric, photometric, nephelometric, AAS and ICP-OES techniques.
2. TCLP study of waste samples as per US-EPA method 1311 or ASTM-D5233-92. Leaching solution analysis by ICP-OES and AAS.

Detail Report: Following data tables are enclosed

Table-1. Physical characteristics analysis of Solid Waste samples of Tata Steel BSL Limited, Meramandali

Table-2. Size (Sieve) analysis of Solid Waste samples of Tata Steel BSL Limited, Meramandali

Table-3. Chemical composition analysis of Solid Waste samples of Tata Steel BSL Limited, Meramandali

Table-4(a) Experimental variables for Toxicity Characteristic Leaching Procedure (TCLP) study of Solid Waste samples (SW1, SW2, SW3, SW4, SW5 & SW8) conducted as per US-EPA method 1311.

Table-4(b) Trace element analysis of TCLP or WET Procedure solutions of Solid waste samples(SW1, SW2, SW3, SW4, SW5 & SW8); Leaching studies conducted as per US-EPA method 1311 and Appendix II of section 66261 of Title 22 of California Code Regulations (CCR).

Table-5(a) Experimental variables for Toxicity Characteristic Leaching Procedure (TCLP) study of Solid Waste samples (SW9, SW10, SW11, SW12, SW13 & SW14) conducted as per US-EPA method 1311.

Table-5(b) Trace element analysis of TCLP or WET Procedure solutions of Solid waste samples(SW9, SW10, SW11, SW12, SW13 & SW14); Leaching studies conducted as per US-EPA method 1311 and Appendix II of section 66261 of Title 22 of California Code Regulations (CCR).

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Table-6(a) Experimental variables for Toxicity Characteristic Leaching Procedure (TCLP) study of Solid Waste samples (SW15, SW17, SW18, SW19 & SW20) conducted as per US-EPA method 1311.

Table-6(b) Trace element analysis of TCLP or WET Procedure solutions of Solid waste samples (SW15, SW17, SW18, SW19 & SW20); Leaching studies conducted as per US-EPA method 1311 and Appendix II of section 66261 of Title 22 of California Code Regulations (CCR).

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N.B.:- The samples are not drawn by CSIR-IMMT. Liability, if any, for CSIR/IMMT arising in connection with the testing shall be subject to ceiling of amount received by the institute from the client. The report should not be interpreted in part.

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Table-1. Physical characteristics analysis of Solid Waste samples of Tata Steel BSL Limited, Meramandali.

Sl. No.	Sample ID.	Concentration in Test Solid waste samples			
		pH	Bulk Density, (g/cc)	Dry Matter, %	Volatile Matter, %
1	SW-1 (ETP-1 Sludge)	7.86	0.62	97.5	14.7
2	SW-2 (ETP-2 Sludge)	8.07	0.69	98.1	12.0
3	SW-3 (ETP-3 Sludge)	8.31	0.71	98.4	18.9
4	SW-4 (CRM ETP Sludge)	8.45	0.65	94.5	37.8
5	SW-5 (BOD -1 Sludge)	6.71	0.75	86.5	47.8
6	SW-8 (BF-1 Flue Dust)	9.08	2.04	99.5	3.18
7	SW-9 (BF-2 Flue Dust)	10.4	1.61	99.6	3.44
8	SW-10 (BOF GCP Dust)	11.2	1.15	99.0	2.75
9	SW-11 (DRI Cold ESP Dust)	10.9	0.76	98.1	4.50
10	SW-12 (DRI Wet Scrapper Dust)	9.57	0.85	97.7	4.67
11	SW-13 (SMS Slag)	12.3	1.86	99.9	0.47
12	SW-14 (BF Granulated Slag)	9.60	1.29	99.8	0.11
13	SW-15 (Lime Plant De-dusting Dust)	12.5	0.78	99.7	14.3
14	SW-17 (Mill Scale)	8.61	2.89	99.9	0.09
15	SW-18 (SMS-II EES Dust)	12.6	1.41	99.8	4.24
16	SW-19 (BF-1 GCP Dust)	9.26	1.32	99.5	4.16
17	SW-20 (BF-2 GCP Dust)	9.47	1.25	99.2	5.17

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Table-2. Size (Sieve) analysis of Solid Waste samples of Tata Steel BSL Limited, Meramandali

Sl. No.	Sample ID	Seive Fractions							
		+2 mm	-2+1 mm	-1+500 micron	-500+250 micron	-250+150 micron	150+75 micron	-75+45 micron	-45 micron
1	SW-1	73.95	9.31	5.62	3.50	0.80	1.32	1.42	4.08
2	SW-2	62.59	16.21	8.68	4.39	0.42	0.38	0.90	6.74
3	SW-3	36.28	11.91	10.09	9.46	5.25	6.67	11.89	7.46
4	SW-4	88.51	6.70	2.84	0.93	0.52	0.50	0	0
5	SW-5	83.54	11.30	3.49	0.42	0.87	0.16	0.10	0.11
6	SW-8	6.05	3.02	3.77	3.95	4.78	11.69	13.44	55.48
7	SW-9	0	0.09	0.25	0.51	1.91	29.37	55.56	11.30
8	SW-10	33.52	15.92	15.29	11.98	5.10	5.67	8.29	3.22
9	SW-11	6.40	7.13	4.61	5.65	3.44	14.30	40.15	18.31
10	SW-12	5.12	4.75	7.91	10.29	11.28	23.15	17.61	19.89
11	SW-13	57.07	9.22	6.74	4.73	3.00	5.22	3.55	9.38
12	SW 14	2.31	12.91	45.91	16.23	4.56	6.40	5.05	8.57
13	SW 15	0.93	0.63	0.96	1.47	2.30	15.93	52.18	26.00
14	SW-17	39.15	13.71	12.83	16.48	8.68	6.29	2.09	0.77
15	SW-18	0.49	1.06	2.55	7.33	47.34	21.76	12.43	7.46
16	SW-19	45.08	3.33	2.7	3.70	7.08	17.02	10.22	10.26
17	SW-20	39.96	12.53	5.32	3.78	7.02	17.35	13.72	0.42

N. B.: SW1-ETP-1 Sludge, SW2-ETP 2 Sludge, SW3-ETP-3 Sludge, SW4-CRM ETP Sludge, SW5-BOD-1 Sludge, SW8-BF-1 Flue Dust, SW9-BF-2 Flue Dust, SW10-BOF GCP Dust, SW11-DRI Cold ESP Dust, SW13-DR. Wet Scrapper Dust, SW13-SMS Slag, SW14-BF Granulated Slag, SW15-Lime Plant De-dusting Dust, SW17-Mill Scale, SW18 SMS-II FES Dust, SW19-BF-1 GCP Dust & SW20-BF-2 GCP Dust

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Table-3. Chemical composition analysis of Solid Waste samples of Tata Steel BSL Limited, Meramandali.

Sl. No.	Sample Ids.	Concentration in Test Solid waste samples. %													
		SiO_2	Al_2O_3	Fe (T)	TiO_2	MnO	CaO	MgO	Na_2O	K_2O	P_2O_5	SO_4	C	Cl	LOI
1	SW-1	39.21	23.52	10.3	0.86	0.049	0.78	1.21	0.41	1.65	0.06	0.28	3.51	0.73	16.28
2	SW-2	37.91	19.30	12.5	0.94	0.08*	5.07	1.40	0.62	1.34	0.16	0.07	6.02	0.29	16.46
3	SW-3	9.07	4.01	5.11	0.21	0.038	3.16	0.94	0.40	0.09	0.031	0.85	36.9	0.16	75.72
4	SW-4	2.70	1.15	3.72	0.03	0.10	21.81	2.54	1.72	0.52	0.45	0.17	17.5	1.13	42.75
5	SW-5	1.29	2.02	10.2	0.09	0.021	0.69	0.62	1.29	0.65	0.001	7.70	30.6	0.48	75.98
6	SW-8	4.17	1.88	59.15	0.10	0.093	2.09	0.58	1.47	1.02	0.001	0.82	2.12	0.40	3.18
7	SW-9	4.18	1.79	57.7	0.09	0.056	2.28	0.74	1.13	1.37	0.001	1.78	10.24	0.13	11.4
8	SW-10	4.32	1.78	53.[illegible]	0.12	0.055	12.44	4.02	1.16	0.97	0.001	0.21	0.85	0.075	3.78
9	SW-11	24.28	12.51	10.98	0.56	0.039	5.35	2.32	1.29	1.16	0.35	2.49	33.[illegible]	0.09	35.57
10	SW-12	12.76	7.96	22.74	0.39	0.025	2.60	0.71	1.19	0.99	0.20	0.42	50.[illegible]	0.05	46.21
11	SW-13	15.42	1.78	26.7	0.84	0.022	45.22	10.80	1.58	0.88	1.20	0.20	0.05	0.27	0.52
12	SW-14	32.99	15.58	1.10	0.7	0.065	21.77	9.14	1.55	1.34	0.001	1.61	0.24	0.14	0.61
13	SW-15	3.41	1.12	2.68	0.10	3.066	45.63	12.8	3.01	0.89	3.09	0.26	5.01	0.58	21.15
14	SW-17	0.09	0.32	66.4	0.01	0.032	0.20	0.99	1.33	0.71	0.00	0.03	0.13	0.03	2.47
15	SW-18	1.94	0.96	54.7	0.08	0.011	11.51	3.38	1.81	1.87	0.00	1.28	1.50	2.68	4.24
16	SW-19	10.84	3.21	32.5	0.17	0.046	2.74	1.31	1.36	0.91	0.001	1.01	27.7	0.31	31.6
17	SW-20	14.65	1.94	29.3	0.[illegible]5	0.039	3.44	1.45	1.33	0.87	0.001	1.46	30.7	0.45	35.71

N. B.. SW1-ETP-1 Sludge, SW2-ETP-2 Sludge, SW3-ETP-3 Sludge, SW4-CRM ETP Sludge, SW5-BOD-[illegible] Sludge, SW8-BF-1 Flue Dust, SW9-BF-2 Flue Dust, SW10-BOF GCP Dust, SW11-DRI Cold FSP Dust, SW12-DRI Wet Scrapper Dust, SW13-SMS Slag, SW14-BF Granulated Slag, SW15-Lime Plant De-dusting Dust, SW17-Mill Scale, SW18-SMS-II FES Dust, SW19-BF-1 GCP Dust & SW20-BF-2 GCP Dust

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Table-4(a). Experimental variables for Toxicity Characteristic Leaching Procedure (TCLP) study of Solid Waste samples conducted as per US-EPA method 1311.

Sl. No.	TCLP study Variables	Variable Data					
		SW 1	SW 2	SW3	SW 4	SW 5	SW 8
1	TCLP study method	US-EPA Method-1311					
2	Sample type	Dust and Gravels, Particle size < 8 mm	Dust and Gravels, Particle size < 8 mm	Dust and Gravels, Particle size < 8 mm	Dust and Gravels, Particle size < 8 mm	Dust and Gravels, Particle size < 8 mm	Dust and Gravels, Particle size < 8 mm
3	Sample particle size taken for leaching	Original sample	Original sample	Original sample	Original sample	Original sample	Original sample
4	Initial pH of samples	7.86	8.07	8.31	8.45	6.71	9.08
5	pH after HCl + heat	3.01	5.69	6.82	7.15	4.16	3.67
6	Extraction fluid used	Extraction fluid -1	Extraction fluid -2	Extraction fluid -2	Extraction fluid -2	Extraction fluid -1	Extraction fluid -1
7	pH of Extraction fluid	4.91	2.88	2.88	2.88	4.9	4.91
8	Sample taken for leaching, gm	50					
9	Volume of extraction fluid used, ml	1000					
10	Liquid/solid ratio	20:1					
11	Head space	10 %					
12	Extraction Temperature °C	28					
13	Extraction Time, hour	18					
14	Filter	Glass micro fiber, Whatman GF/C					
15	Washing of filters	With dil. HNO_3 and distilled water					
16	pH of recovered extraction fluid	4.75	4.47	4.46	4.52	4.65	4.78

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Table-4(b). Trace element analysis of TCLP or WET Procedure solutions of Solid waste samples; leaching studies conducted as per US-EPA method 1311 and Appendix II of section 66261 of Title 22 of California Code Regulations (CCR).

Sl. No.	Component	Concentrations in TCLP or WET* leaching solutions of Solid Waste test samples (mg/L)						Waste constituents concentration limits of TCLP or STLC, US-EPA and Californin Code of Regulations (mg/L)
		SW1	SW2	SW3	SW4	SW5	SW8	
1	Hg	0.002	0.004	0.003	0.003	0.002	0.004	0.2
2	As	0.019	0.037	0.032	0.010	0.015	0.001	5.0
3	Se	0.047	0.067	0.056	0.036	0.169	0.011	1.0
4	Sb*	0.044	0.039	0.045	1.13	0.001	0.11	15.0
5	Ba	0.37	1.39	1.16	0.08	0.13	0.07	100.0
6	Cd	0.002	0.002	0.008	0.001	0.001	0.001	1.0
7	Cr	0.019	0.018	0.026	0.513	0.023	0.025	5.0
8	Pb	0.021	0.027	0.126	0.021	0.025	0.013	5.0
9	Mo	0.09	5.04	3.66	1.72	0.57	2.12	10.0
10	Ag	0.001	0.001	0.001	0.003	0.002	0.003	5.0
11	Co*	0.21	0.18	0.15	0.21	0.19	0.21	80.0
12	Cu*	0.53	0.06	9.6	0.04	12.3	0.05	25.0
13	Mo*	0.071	0.074	0.052	0.175	0.002	0.008	350
14	Ni*	0.37	0.22	0.25	1.04	0.49	0.24	20.0
15	V*	1.07	1.32	0.46	0.23	0.001	0.74	24.0
16	Zn*	3.62	1.05	3.39	2.33	0.73	2.86	250
17	F*	0.67	1.03	1.21	2.69	38.6	19.5	180

Remark: The TCLP and WET leaching solution analyses of Solid Waste samples reveal that trace element concentrations are much below the Waste constituent concentration limits.

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Table-5(a). Experimental variables for Toxicity Characteristic Leaching Procedure (TCLP) study of Solid Waste samples conducted as per US-EPA method 1311.

Sl. No.	TCLP study Variables	Varinble Data					
		SW9	SW10	SW11	SW12	SW13	SW14
1	TCLP study method	US-EPA Method-1311					
2	Sample type	Dust and Gravels, Particle size < 8 mm	Dust and Gravels, Particle size <8 mm	Dust and Gravels, Particle size < 8 mm	Dust and Gravels, Particle size < 8 mm	Dust and Gravels, Particle size < 8 mm	Dust and Gravels, Particle size < 8 mm
3	Sample particle size taken for leaching	Original sample	Original sample	Original sample	Original sample	Original sample	Original sample
4	Initial pH of samples	10.3	11.2	10.9	9.57	12.2	9.69
5	pH after HCl + heat	3.34	5.61	9.64	8.12	11.9	3.81
6	Extraction fluid used	Extraction fluid -1	Extraction fluid -2	Extraction fluid -2	Extraction fluid -2	Extraction fluid -2	Extraction fluid -1
7	pH of Extraction fluid	4.91	2.88	2.88	2.88	2.88	4.91
8	Sample taken for leaching, gm	50					
9	Volume of extraction fluid used, ml	1000					
10	Liquid/solid ratio	20:1					
11	Head space	10 %					
12	Extraction Temperature °C	28					
13	Extraction Time, hour	18					
14	Filter	Glass micro fiber, Whatman GF/C					
15	Washing of filters	With di . HNO3and distilled water					
16	pH of recovered extraction fluid	4.95	5.09	5.04	4.82	4.54	4.55

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Table-5(b). Trace element analysis of TCLP or WET Procedure solutions of Solid waste samples; leaching studies conducted as per US-EPA method 1311 and Appendix II of section 66261 of Title 22 of California Code Regulations (CCR).

Sl. No.	Component	Concentrations in TCLP or WET* leaching solutions of Solid Waste test samples (mg/L)						Waste constituents concentration limits of TCLP or STLC, US EPA and California Code of Regulations (mg/L)
		SW9	SW10	SW11	SW12	SW13	SW14	
1	Hg	0.002	0.004	0.004	0.003	0.005	0.00.	0.2
2	As	0.002	0.006	0.002	0.029	0.003	0.023	5.0
3	Se	0.049	0.011	0.002	0.003	0.032	0.051	1.0
4	Sb*	0.10	0.11	0.07	0.04	0.04	0.05	15.0
5	Ba	0.38	0.06	0.88	1.02	0.05	0.29	100.0
6	Cd	0.001	0.001	0.001	0.001	0.001	0.001	1.0
7	Cr	0.024	0.016	0.027	0.030	0.031	0.023	5.0
8	Pb	1.14	0.011	0.003	0.024	0.015	0.022	5.0
9	Mn	1.96	0.07	2.58	1.66	3.04	0.39	10.0
10	Ag	0.003	0.001	0.003	0.001	0.005	0.001	5.0
11	Co*	0.21	0.13	0.22	0.19	0.16	0.17	80.0
12	Cu*	0.04	0.03	0.05	0.16	0.04	0.02	25.0
13	Mo*	0.024	0.01	0.001	0.01	0.001	0.001	350
14	Ni*	0.18	0.06	0.07	0.21	0.15	0.18	20.0
15	V*	0.79	0.36	0.03	0.14	1.72	0.16	24.0
16	Zn*	4.01	2.54	0.14	0.42	0.05	1.38	350
17	F**	18.0	0.07	2.07	1.33	0.16	7.74	180

Remark: Remark: The TCLP and WET leaching solution analyses of Solid Waste samples reveal that trace element concentrations are much below the Waste constituent concentration limits.

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(वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद)
भुवनेश्वर-751013, ओड़िशा, भारत
CSIR - INSTITUTE OF MINERALS & MATERIALS TECHNOLOGY
(Council of Scientific & Industrial Research)
Bhubaneswar - 751013, Odisha, INDIA

TEST REPORT

Ref. No. IMMT/CCD/08/2021 **Date: 03.08.2021**

Table-6(a). Experimental variables for Toxicity Characteristic Leaching Procedure (TCLP) study of Solid Waste samples conducted as per US-EPA method 1311

Sl. No.	TCLP study Variables	Variable Data				
		SW15	SW17	SW18	SW19	SW20
1	TCLP study method	US-EPA Method 1311				
2	Sample type	Dust and Gravels, Particle size < 8 mm	Dust and Gravels, Particle size < 8 mm	Dust and Gravels, Particle size < 8 mm	Dust and Gravels, Particle size < 8 mm	Dust and Gravels, Particle size < 8 mm
3	Sample particle size taken for leaching	Original sample	Original sample	Original sample	Original sample	Original sample
4	Initial pH of samples	12.5	8.61	12.5	9.26	9.47
5	pH after HCl + heat	12.3	1.71	12.2	2.02	6.32
6	Extraction fluid used	Extraction fluid -2	Extraction fluid -1	Extraction fluid -2	Extraction fluid -1	Extraction fluid -2
7	pH of Extraction fluids	2.88	4.91	2.88	4.91	2.88
8	Sample taken for leaching, gm	50				
9	Volume of extraction fluid used, ml	1000				
10	Liquid/solid ratio	20:1				
11	Head space	10 %				
12	Extraction Temperature °C	28				
13	Extraction Time, hour	18				
14	Filter	Glass micro fiber, Whatman GF/C				
15	Washing of filters	With di. HNO_3 and distilled water				
16	pH of recovered extraction fluid	8.21	4.64	7.85	4.57	4.50

(J. Das)
Principal Technical Officer
Central Characterization Dept.

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TEST REPORT

Ref. No. IMMT/CCD/08/2021 **Date: 03.08.2021**

Table-6(b). Trace element analysis of TCLP or WET Procedure solutions of Solid waste samples, leaching studies conducted as per US-EPA method 1311 and Appendix II of section 66261 of Title 22 of California Code Regulations (CCR).

Sl. No.	Component	Concentrations in TCLP or WET* leaching solutions of Solid Waste test samples (mg/L)					Waste constituents concentration limits of TCLP or STLC, US-EPA and California Code of Regulations (mg/L)
		SW15	SW17	SW18	SW19	SW20	
1	Hg	0.002	0.004	0.002	0.003	0.002	0.2
2	As	0.018	0.018	0.026	0.018	0.003	5.0
3	Se	0.055	0.054	0.181	0.057	0.019	1.0
4	Sb*	0.014	0.079	0.070	0.002	0.015	15.0
5	Ba	0.35	0.16	0.22	0.17	0.59	100.0
6	Cd	0.001	0.001	0.002	0.000	0.000	1.0
7	Cr	0.057	0.021	0.038	0.022	0.027	5.0
8	Pb	0.025	0.019	0.021	21.5	22.4	5.0
9	Mn	0.02	0.27	0.12	0.39	0.97	10.0
10	Ag	0.001	0.001	0.005	0.002	0.001	5.0
11	Co*	0.16	0.17	0.13	0.19	0.19	80.0
12	Cu*	0.07	0.02	0.14	0.19	0.01	25.0
13	Mo*	0.014	0.057	0.067	0.021	0.039	350
14	Ni*	0.08	0.27	0.10	0.18	0.14	20.0
15	V*	0.01	0.06	0.75	0.77	0.59	24.0
16	Zn*	0.03	0.18	2.06	5.87	4.98	250
17	F*	19.7	0.61	18.8	9.57	17.8	180

Remark: Remark: The TCLP and WET leaching solution analyses of Solid Waste samples reveal that trace element concentrations are much below the Waste constituent concentration limits.

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Bhubaneswar - 751013, Odisha, INDIA

TEST REPORT

Ref. No. IMMT/CCD/11/2022 **Date: 18.11.2022**

Name & Address of the Party:	Tata Steel Ltd. At-Narendrapur, P.O.-Kusupanga Via-Meramandali, Dist-Dhenkanal Pin-759121, Odisha.
Your Ref. No.:	Work Order No.: 3000145884/A06, Date: 30.06.2022
Sample Details:	1. Indian Coal (01 No.) 2. Imported Coal (01 No.) 3. Iron Ore (01 No.) 4. Lime stone (01 No.) 5. Dolomite (01 No.)
Date of Receiving:	14.09.2022
Date(s) of Conducting Test:	10.10.2022
Date of Completion of Test:	28.10.2022

Method Adopted:

1. Proximate analysis of coal samples by classical methods.
2. Major and trace element analysis of Coal, Iron ore, lime stone and Dolomite samples through wet chemical route by gravimetric, nephelometric, AAS and ICP-OES techniques.
3. Coal samples were leached with distilled water at a solid:liquid ratio of 1:20 for fluoride analysis.

Detail Report: Following data tables are enclosed:

Table-1. Proximate analysis of coal samples.
Table-2. Chemical composition analysis of coal samples.
Table-3. Trace element analysis of coal samples.
Table-4. Chemical composition analysis of Iron ore, Lime stone and Dolomite samples.
Table-5. Trace element analysis of Iron ore, Lime stone and Dolomite samples.

18/11/2022
(J. Das)
Pr. Technical Officer
Central Characterization Dept.

for Chief Scientist & Head CCD
18/11/2022
(Dr. B. Nayak)
Chief Scientist
PL & Head, CCD

N.B.: The samples are not drawn by CSIR-IMMT. Liability, if any, for the institute arising in connection with the testing shall be subject to ceiling of amount received by the institute from the client. The report should not be interpreted in part.

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TEST REPORT

Ref. No. IMMT/CCD/11/2022 **Date: 18.11.2022**

Table-1. Proximate analysis of coal samples.

Sample ID	Moisture (%)	Volatile Matter (%)	Ash (%)	Fixed Carbon (%)
Indian coal	3.16	32.27	32.95	31.62
Imported coal	3.30	24.05	19.39	53.26

Table-2. Chemical composition analysis of coal samples.

Sl. No.	Component	Concentration in Test Samples, %	
		Indian Coal	Imported Coal
1	SiO_2	19.64	11.02
2	Al_2O_3	7.37	6.75
3	Fe_2O_3	1.48	0.284
4	TiO_2	0.55	0.365
5	MnO	0.025	0.003
6	CaO	0.28	0.039
7	MgO	0.14	0.057
8	Na_2O	0.11	0.048/
9	K_2O	0.40	0.17
10	P_2O_5	0.31	0.06
11	S/SO_3	0.36/0.89	0.49/1.22
12	LOI	67.05	78.80

18/11/2022
(J. Das)
Pr. Technical Officer
Central Characterization Dept.

18/11/2022
(Dr. B. Nayak)
Chief Scientist
PL & Head, CCD

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TEST REPORT

Ref. No. IMMT/CCD/11/2022 **Date: 18.11.2022**

Table-3. Trace element analysis of coal samples

Sl. No.	Parameters	Trace element concentrations in test samples		
		Unit	Indian coal	Imported coal
1	**Pb**	mg/kg	23.75	0.62
2	**Cd**	mg/kg	0.14	0.006
3	**Cu**	mg/kg	32.21	4.52
4	**Ni**	mg/kg	26.89	8.47
5	**Co**	mg/kg	33.15	4.93
6	**Cr**	mg/kg	40.25	22.20
7	**Zn**	mg/kg	15.18	7.80
8	**Ag**	mg/kg	0.56	0.36
9	**Sb**	mg/kg	3.68	0.75
10	**Mo**	mg/kg	2.73	0.24
11	**V**	mg/kg	38.86	3.01
12	**Se**	mg/kg	0.89	0.24
13	**Ba**	mg/kg	127.2	20.72
14	**As**	mg/kg	32.45	3.08
15	**Hg**	mg/kg	1.48	0.65
16	**B**	%	0.15	0.08
17	**F^- in water leaching (1:20) solutions.**	mg/L	0.08	0.04

18/11/2022
(J. Das)
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for 18/11/2022
(Dr. B. Nayak)
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TEST REPORT

Ref. No. IMMT/CCD/11/2022 **Date: 18.11.2022**

Table-4. Chemical composition analysis of Iron ore, Lime stone and Dolomite samples.

Sl. No.	Component	Concentration in Test Samples, %		
		Iron Ore	Lime Stone	Dolomite
1	SiO_2	0.72	0.40	15.22
2	Al_2O_3	1.52	0.70	2.66
3	Fe_2O_3	93.45	0.14	2.71
4	TiO_2	0.05	0.008	0.167
5	MnO	0.016	0.004	0.07
6	CaO	0.04	49.85	34.0
7	MgO	0.01	6.71	7.24
8	Na_2O	0.37	1.17	1.24
9	K_2O	0.017	0.23	0.37
10	P_2O_5	0.09	0.012	0.017
11	S/SO_3	0.05/0.13	0.07/0.17	0.15/0.38
12	LOI	1.65	38.43	33.87

18/11/2022

(J. Das)
Pr. Technical Officer
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for 18/11/2022

(Dr. B. Nayak)
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Bhubaneswar - 751013, Odisha, INDIA

TEST REPORT

Ref. No. IMMT/CCD/11/2022 **Date: 18.11.2022**

Table-5. Trace element analysis of Iron ore, Lime stone and Dolomite samples.

Sl. No.	Parameters	Trace element concentrations in test samples			
		Unit	Iron Ore	Lime Stone	Dolomite
1	Pb	mg/kg	4.28	0.46	1.25
2	Cd	mg/kg	0.09	0.08	0.11
3	Cu	mg/kg	4.77	0.67	4.92
4	Ni	mg/kg	0.83	13.65	17.76
5	Co	mg/kg	18.07	21.34	16.57
6	Cr	mg/kg	65.24	41.0	53.64
7	Zn	mg/kg	16.34	3.68	27.41
8	Ag	mg/kg	0.14	0.25	0.29
9	Sb	mg/kg	0.68	0.29	0.20
10	Mo	mg/kg	0.08	0.18	0.06
11	V	mg/kg	12.88	2.47	16.85
12	Se	mg/kg	0.1	0.06	0.04
13	Ba	mg/kg	45.87	8.29	11.25
14	As	mg/kg	7.39	9.84	12.25
15	Hg	mg/kg	0.36	0.26	0.38
16	B	%	0.43	0.72	0.64

18/11/2022

(J. Das)
Pr. Technical Officer
Central Characterization Dept.

for

18/11/2022

(Dr. B. Nayak)
Chief Scientist
PL & Head, CCD

Government of Odisha
DIRECTORATE OF FACTORIES AND BOILERS, ODISHA.
KHARAVEL NAGAR, UNIT-3, BHUBANESWAR-751001, PH. NO. 2396070.
****

Letter No. IV (IH) (3)-149/11/ 3143 / Dated, the 19/10/2022

To

The Occupier,
M/s. TATA Steel Meramundali,
At- Narendrapur, PO- Kusupanga, Meramundali,
Dist. - Dhenkanal.

Sub: Acceptance of Updated On-Site Emergency Plan

Ref: Your letter Your L. No. TSM/DFBC/22/62 dated 12.08.2022.

Sir,

In inviting the reference on the subject cited above & in pursuance of provision under Rule 12 of the Odisha Factories (Control of Major Accident Hazard) Rules, 2001, the updated On-Site Emergency Plan of your MAH factory having identified **Hazardous substances LDO,HSD,LPG, LIQUID OXYGEN, HYDROGEN, NaOH, H_2SO_4 & TRANSFORMER OIL** bearing Sl.No. **176/22** is hereby provisionally accepted, subject to conditions as mentioned hereunder:-

01. Consequent upon any modification / alteration in future the On-Site Emergency plan shall be prepared and submitted for acceptance.
02. The **possible hazards** associated with the factory and ***'Dos' and 'Don'ts'*** shall be displayed in prominent pace adjacent to main gate & conspicuous places inside the factory with the measures to be taken in case of such incident.
03. Each key personnel of the command structure shall be provided with a **worksheet** containing their duties and responsibilities.
04. **Mock Drill** shall be scheduled through PAReSHRAM portal at least once in every six months involving zonal Asst. Director of Factories and Boilers / Divisional Dy. Directors of Factories and Boilers concerned & DCG members.
05. Annual report on hold of Mock Drills shall be submitted to the authorities of District Administration under intimation to Assistant Director of Factories & Boilers/Deputy Director of Factories & Boilers/Director of Factories & Boilers
06. Awareness programmes on hazard & mitigation shall be made amongst workers and people living in the vicinity

The accepted copy of the updated On-Site Plan is sent herewith, the receipt of which may please be acknowledged and photocopy of the same be provided to the following authorities.

- Addl. Secretary to Govt. of Odisha, Home (Special Section) Department, Bhubaneswar.
- Principal Secretary to Govt. of Odisha, Labour & ESI Department, Bhubaneswar
- Collector & District Magistrate, Dhenkanal.
- Superintendent of Police, Dhenkanal.

P.T.O.

- District Fire Office, Dhenkanal.
- Chief Medical Officer, Dhenkanal.
- Asst. Director of Factories & Boilers, Dhenkanal Zone.
- Dy. Director of Factories & Boilers, Angul Division.

Yours faithfully,

Director of Factories and Boilers, Odisha

Memo No. 3144 / Dated, the 19/10/2022

Copy to the Asst. Director of Factories and Boilers Dhenkanal Zone / Dy. Director of Factories and Boilers, Angul Division for information and necessary action.

Dy. Director of Factories and Boilers, Safety

(-) copy to renewal file

Annexure-IX

CSR EXPENDITURE AND ACTIVITY HIGHLIGHTS (Around Tata Steel Limited, Meramandali) For Period October 2022 to March 2023		
PROGRAM HEAD	**Expenditure in Lakhs**	**MAJOR INTERVENTIONS/REMARKS**
Health	77.44	Mobile Medical Unit; Adolescent empowerment; Dengue/Malaria control
Drinking Water	35.29	Installation of tubewells; deep bore wells with overhead tank and pipeline system
Education	276.33	School infrastructure; Education project: QUEST
Livelihood	140.00	WEE Project; Other livelihood activities- Pisciculture; Vegetable production
Community Infrastructure	544.21	Construction & repair of road; Installation of solar lights
Sports	48.45	Volleyball coaching; Sports tournaments; Outdoor leadership camps
Ethnicity	1.14	Support to dist. administration to organize program for Juang tribe on awareness on Govt. schemes
TOTAL	**1122.86**	**Rs.11.23 Crores**

SUMMARY OF AMBIENT AIR QUALITY
MONTHLY AVERAGE VALUES

Month	Locations of Monitoring	Monthly Average				
		Unit in μg/m^3				Unit in mg/m^3
	Pollutant	PM_{10}	$PM_{2.5}$	SO_2	NO_2	CO
	Standard	100	60	80	80	2
Oct'22	CAAQMS-1	77.9	41.1	12.7	14.5	0.6
	CAAQMS-2	105.3	51.6	13	9.6	0.5
	CAAQMS-3	77.6	50.8	13.1	16.9	0.3
	CAAQMS-4	92.7	34.6	5.6	22.9	0.5
	CAAQMS-5	69.1	40.8	11.7	22.9	0.9
	CAAQMS-6	105.7	22.1	16.7	21.4	0.9
	CAAQMS-7	149.3	48.1	16.4	32.3	1.1
Nov'22	CAAQMS-1	113.34	72.24	12.83	14.2	0.71
	CAAQMS-2	147	87.63	17.27	12.65	0.26
	CAAQMS-3	93.96	58.71	12.52	17.37	0.3
	CAAQMS-4	124.01	59.96	6.48	24.36	0.21
	CAAQMS-5	136.07	83.75	12.71	24.26	0.51
	CAAQMS-6	199.58	56.73	17.81	22.92	0.37
	CAAQMS-7	258.7	102.81	16.84	32.23	1.13
Dec'22	CAAQMS-1	113.34	72.24	12.83	14.2	0.71
	CAAQMS-2	147	87.63	17.27	12.65	0.26
	CAAQMS-3	93.96	58.71	12.52	17.37	0.3
	CAAQMS-4	124.01	59.96	6.48	24.36	0.21
	CAAQMS-5	136.07	83.75	12.71	24.26	0.51
	CAAQMS-6	199.58	56.73	17.81	22.92	0.37
	CAAQMS-7	258.7	102.81	16.84	32.23	1.13
Jan'23	CAAQMS-1	128.49	78.23	12.51	14.12	0.71
	CAAQMS-2	157.15	72.44	14.36	9.66	0.79
	CAAQMS-3	143.43	28.31	11.76	18.13	0.42
	CAAQMS-4	192.84	78.89	7.75	8.85	0.21
	CAAQMS-5	152.99	118.38	13.89	24.93	0.52
	CAAQMS-6	207.54	106.82	18.38	13.73	0.46
	CAAQMS-7	147.82	63.86	14.38	32.62	1.18

Feb'23	CAAQMS-1	126.41	61.24	12.87	8.27	0.67
	CAAQMS-2	135.53	52.71	12.98	9.71	0.73
	CAAQMS-3	69.01	20.91	12.88	23.73	0.4
	CAAQMS-4	103.84	51.22	10.09	UM	0.62
	CAAQMS-5	142.82	84.11	22.16	15.06	0.55
	CAAQMS-6	187.33	81.54	11.82	24.77	0.7
	CAAQMS-7	182.35	60.6	22.52	33.1	1.12
Mar'23	CAAQMS-1	85.3	54.93	12.72	5.52	0.7
	CAAQMS-2	118.08	37.91	14.67	9.62	0.78
	CAAQMS-3	72.29	34.07	13.7	18.9	0.42
	CAAQMS-4	126.1	74.23	7.48	UM	0.25
	CAAQMS-5	105.54	61.58	16.71	10.02	0.52
	CAAQMS-6	106.02	45.45	6.04	20.95	0.79
	CAAQMS-7	103.03	40.9	24.13	24.33	1.23

All values are in $\mu g/m^3$ except CO values are in mg/m^3. All Values are derived from 24 hourly average data except CO values which are derived from 8 hourly average data.

CAAQMS 1: Near Township; CAAQMS 2: Near Utility Department; CAAQMS 3: Near CRM; CAAQMS 4: Near Water Complex; CAAQMS 5: Near Coke Oven 2; CAAQMS 6: Near Wagon Tippler; CAAQMS 7: Near Material Gate, UM: Under Maintenance.

Environment Laboratory
TATA Steel Meramandali, Odisha

Ref.No. EMD/LAB/2022-23/81
Dt.04.11.2022

AMBIENT NOISE MONITORING
TATA STEEL Ltd. (Oct '22)

S.N	Location	Monitoring Date	Noise Level dB(A) Leq (day time)	Standard dB(A) Leq(Day Time)	Noise Level dB(A) Leq (Night time)	Standard dB(A) Leq(Night Time)
1	Colony	27.09.2022	54.1	55.0	44.6	44.5
2	AEL	28.10.2022	56.7	75.0	69.0	70.0
3	Coke Oven-2	25.10.2022	62.2		69.3	

Section (I/C) Manager (Lab) Sr.Manager (Lab I/C)

...End Report...

Works: At- Narendrapur, P.O- Kusupanga, Via- Meramandali, Dhenkanal, Odisha-759121, Tel: 6764-229800

Environment Laboratory
TATA Steel Meramandali, Odisha

Ref.No. EMD/LAB/2022-23/86
Dt.07.12.2022

AMBIENT NOISE MONITORING
TATA STEEL Ltd. (NOV'22)

S.N	Location	Monitoring Data	Noise Level dB(A) Leq (day time)	Standard dB(A) Leq(Day Time)	Noise Level dB(A) Leq (Night time)	Standard dB(A) Leq(Night Time)
1	Colony	10.11.2022	52.5	55.0	43.6	45.0
2	Coke Oven-2	14.11.2022	57.1	75.0	50.0	70.0
3	AEL	16.11.2022	61.4	75.0	59.4	70.0

A.K Pradhan
Section (I/C)

Manager (Lab)

Sr.Manager (Lab I/C)

...End Report...

Works: At- Narendrapur,P.O- Kusupanga,Via-Meramandali,Dhenkanal,Odisha-759121,Tel: 6764-229800

Environment Laboratory
TATA Steel Meramandali, Odisha

Ref.No. EMD/LAB/2022-23/95
Dt.04.01.2023

AMBIENT NOISE MONITORING
TATA STEEL Ltd. (DEC'22)

S.N	Location	Monitoring Date	Noise Level dB(A) Leq (day time)	Standard dB(A) Leq(Day Time)	Noise Level dB(A) Leq (Night time)	Standard dB(A) Leq(Night Time)
1	Colony	22.12.2022	53.5	55.0	44.2	45.0
2	Coke Oven-2	12.12.2022	66.9	75.0	60.2	70.0
3	AEL	07.12.2022	57.8	75.0'	63.9	70.0

Section (I/C) Manager (Lab) Sr.Manager (Lab I/C)

...End Report...

Works: At- Narendrapur,P.O- Kusupanga,Via- Meramandali,Dhenkanal,Odisha 759121,Tel: 6764-220800

Environment Laboratory
TATA Steel Meramandali, Odisha

Ref.No. EMD/LAB/2022-23/102
Dt.06.02.2023

AMBIENT NOISE MONITORING (Day)
TATA STEEL Ltd. (JAN' 23)

S.N	Location	Monitoring Date	Noise Level dB(A) Leq (day time)	Standard dB(A) Leq (day Time)
1	Colony	24.01.2023	53.7	55.0
2	Coke Oven-2	03.01.2023	70.6	75.0
3	AEL	10.01.2023	71.4	75.0

Section (I/C)

Manager (Lab)

Sr.Manager (Lab I/C)

...End Report...

Works: At- Narendrapur, P.O- Kusupanga, Via- Meramandali, Dhenkanal, Odisha-759121, Tel: 6764-229800

Environment Laboratory
TATA Steel Meramandali, Odisha

Ref.No. EMD/LAB/2022-23/106
Dt.02.03.2023

AMBIENT NOISE MONITORING
TATA STEEL Ltd. (FEB' 23)

S.N	Location	Monitoring Date	Noise Level dB(A) Leq (day time)	Standard dB(A) Leq(Day Time)	Noise Level dB(A) Leq (Night time)	Standard dB(A) Leq(Night Time)
1	Colony	21.02.2023	53.5	55.0	44.8	45.0
2	Coke Oven-2	07.02.2023	60.8	75.0	58.5	70.0
3	AEL	02.02.2023	72.4	75.0	68.8	70.0

A. K. Pradhan.
Section (I/C)

Manager (Lab)

Sr.Manager (Lab I/C)

...End Report...

Works: At- Narendrapur,P.O- Kusupanga,Via- Meramandali,Dhenkanal,Odisha-759121,Tel: 6764-229600

Environment Laboratory
TATA Steel Meramandali, Odisha

Ref.No. EMD/LAB/2022-23/116
Dt.05.04.2023

AMBIENT NOISE MONITORING
TATA STEEL Ltd. (MARCH' 23)

S.N	Location	Monitoring Date	Noise Level dB(A) Leq (day time)	Standard dB(A) Leq(Day Time)	Noise Level dB(A) Leq (Night time)	Standard dB(A) Leq(Night Time)
1	Colony	21.03.2023	53.2	55.0	44.5	45.0
2	Coke Oven-2	14.03.2023	60.3	75.0	57.3	70.0
3	AEL	30.03.2023	62.9	75.0	59.5	70.0

Section (I/C)

Manager (Lab)

Sr.Manager (Lab I/C)

...End Report...

Works: At- Narendrapur,P.O- Kusupanga,Via-Meramandali,Dhenkanal,Odisha-759121,Tel: 6764-229800

Environment Laboratory
TATA Steel Meramandali, Odisha

Ref.No. EMD/LAB/2022-23/88
Dt.07.12.2022

NOISE MONITORING REPORT
TATA STEEL Ltd. (NOV'2022)

Work Zone Noise Monitoring Report Nov 2022					
S.N	Name of the unit	Location	Noise level in dB(A) at 1 mtr		
			Min	Max	Leq
1	BF-2 cast House	Control room	60.3	77.3	66.1
2	BF-2 cast House	Near B F-2 Furnace area	74.3	76.4	75.5
3	BF-2 Stock House	Control room office	56.1	75.4	66.6
4	Lime Plant	Inside office building	56.1	781.9	65.3
5	BFPP 01- Boiler 3	Near Control room office	53.9	75.0	67.2
6	Gas fired boiler 250 TPH Area	Office and Control Room	53.3	57.7	54.5
7	DRI-KILN NO-1	Near 1& 2 control room office	57.1	75.8	63.4
8	DRI-KILN NO-3	Near 3& 4control room office	60.5	74.2	65.3
8	DRI-KILN NO-5	Near 5& 6 control room office	64.8	66.7	65.5
10	DRI-KILN NO-7	Near 7& 8 control room office	59	67.7	63.8
11	DRI-KILN NO-9	Near 9&10 control room office	57.6	60.8	58.3
12	110 MW- Boiler-01	Near Boiler area	82.1	87.8	83.6
13	110 MW- Boiler-03	Near Boiler area	82.2	86.2	81
14	110 MW- Boiler-06	Near Boiler area	80.4	80.5	80.2
15	110 MW- Boiler-07	Near Boiler area	83.6	84.3	84.0
16	110 MW- Boiler-08	Near Boiler area	77.7	78.2	78.0
17	110 MW- Boiler-09	Near Boiler area	77.6	86.5	79.6
18	110 MW- Boiler-10	Near Boiler area	76.2	77.6	77.0
19	BF-1 Cast House	Near B F-1 Furnace	74.1	76.2	74.7
20	BF-1 Stock House	BF-1 Office	59	72.6	63.6
21	CRM	Near CRM Mill Complex Area	66.4	79.2	71.8
22	CRM	Near ETP area	84.4	88.4	84.9
23	CRM	Near GP-1 Zinc Pot	83.6	91.9	86.9
24	CRM	Near GP-2 Zinc Pot	83.5	94.5	89.3
25	CRM	Near GP-3 Zinc Pot	92.4	93.4	92.9
26	CRM	Mill-1	86.9	92.2	88.6
27	CRM	Mill-2	91.2	101.7	94.5
28	CRM	Mill-3	88.3	94.7	90.6
29	CRM	CRM Plant Office	47.8	60.2	54.4
30	CRM	ECL	91.0	92.3	91.9
31	CRM	CRCA	88.4	90.5	89.1
32	CRM	RGM	85.7	89.1	86.5
33	SP-1	9 m office room	63	75.5	65.9
34	SP-1	15 m office	83.1	84.9	84.2
35	SP-1	19 m office	63.6	86.6	84.1
36	SP-1	Store area	56.4	68.7	61.8
37	SP-1	Electrical office	56.3	66.3	60.5
38	CO-1	Control room office	66.8	81	75.2
39	CO-1	Laboratory	60.0	66.5	61.1
40	SP-02	Control Room Area	52.7	59.3	55.7
41	BOF	BOF office area	59.2	75.5	63.8

Environment Laboratory
TATA Steel Meramandali, Odisha

Work Zone Noise Monitoring Report Nov 2022					
S.N	Name of the unit	Location	Noise level in dB(A) at 1 mtr		
			Min	Max	Leq
42	BOF	Near Wage bridge area	65.4	78.2	70.7
43	SMS-2, FES-1 &2	Booster House	79.5	84	80.9
44	SMS-2, FES-1 &2	Near Control room Area	70.1	84.2	81.2
45	SMS-2, FES-1 &2	Near RHF Office area (Pulpit)	67.1	79.8	73.7
46	HSM	Near Roll Shop area	74.6	89.5	82.1
47	HSM	Near HSM Quality Lab area	68.7	73.2	69.7
48	HSM	DC pulpit office area	66.5	76.7	71.1
49	HSM	FM area	86.1	95.3	88.7
50	HSM	Near DC sampling Station	82.2	92.4	84.3
51	CO-2	Control Room Office	54.6	62.6	57.3
52	BFPP 2 Boiler-3	Control room office	69.1	71.6	69.7
53	Oxygen Plant	Control Room Office	65.9	72.5	69.1
54	BB Plant	BB Plant Office	57.3	70.4	62.8
55	RMPP	Control Room Office	56.2	86.7	70.8
56	Coa Washary	Lab & Office Area	53.1	75.4	66.4
57	RMHS	RMHS Office	54.8	75.4	63.9

Employees have been provided with ear plugs so that they use these when they go to noisy area for Work. It can be noted that in noisy area employees are not at all deployed for continuously 8 hrs.

A K Pradhan
Section (I/C)

Manager (Lab)

Sr. Manager (Lab I/C)

...End Report...

Environment Laboratory
TATA Steel Meramandali, Odisha

Ref.No. EMD/LAB/2022-23/93
Dt.04.01.2023

NOISE MONITORING REPORT
TATA STEEL Ltd. (DEC'2022)

Work Zone Noise Monitoring Report Dec 2022					
S.N	Name of the unit	Location	Noise level in dB(A)		
			Min	Max	Leq
1	BF-2 Cast House	Control room	49.5	61.9	53.7
	BF-2 Cast House	Near B F-2 Furnance area	72.6	78.4	76.4
2	BF-2 Stock House	Control room office	49.5	70	55.4
3	Lime Plant	Inside office building	53.7	78.2	62.2
4	BF PP-1 Boiler-C3	Near Control room office	60.7	69.8	64.9
5	Gas fired boiler 250 TPH Area	Office and Control Room	57.9	83.6	64.6
6	DRI	KILN NO 1			
	DRI	Near 1& 2 control room office	54.2	66.3	59.2
	DRI	KILN NO-3			
	DRI	Near 3& 4control room office	55.2	92.5	69.5
	DRI	KILN NO-5			
	DRI	Near 5& 6 control room office	56.2	76.1	60
	DRI	KILN NO-7			
	DRI	Near 7& 8 control room office	58.2	75.0	61.3
	DRI	KILN NO-9			
	DRI	Near 9&10 control room office	57	78.2	64.3
7	110 MW Power Plant	Boiler-01			
	110 MW Power Plant	Near Boiler area	79.7	96.7	82.4
	110 MW Power Plant	Boiler-03			
	110 MW Power Plant	Near Boiler area	82.3	84.1	82.8
	110 MW Power Plant	Boiler-04			
	110 MW Power Plant	Near Boiler area	79.4	83.1	81.5
	110 MW Power Plant	Boiler-5			
	110 MW Power Plant	Near Boiler area	80.6	85.5	83.6
	110 MW Power Plant	Boiler-7			
	110 MW Power Plant	Near Boiler area	80	84.2	82.9
	110 MW Power Plant	Boiler-8			
	110 MW Power Plant	Near Boiler area	79.5	86.1	81.9
	110 MW Power Plant	Boiler-9			
	110 MW Power Plant	Near Boiler area	80.8	86.7	82.2
	110 MW Power Plant	Boiler-10			
	110 MW Power Plant	Near Boiler area	78.6	86.8	80.8
	110 MW Power Plant	At BC Boiler Area			
	110 MW Power Plant	Near 33 TG MW	88.3	91	90.3
	110 MW Power Plant	Near 77 TG MW	93.5	95.1	94.5
8	BF-1 Cast House	Near B F-1 Furnance	72.5	81.8	80.1
9	BF-1 Stock House	BF-1 Office	60.1	83.3	69

Works: At Narendrapur,P.O Kusupanga,Via-Meramandali,Dhenkanal,Odisha-759121,Tel: 6761-229800

Work Zone Noise Monitoring Report Dec 2022					
S.N	Name of the unit	Location	Noise level in dB(A)		
			Min	Max	Leq
10	CRM	Near CRM Mill Complex Area	79.3	82.4	80.5
	CRM	Near T.L.L	84.3	87.3	86
	CRM	Near ETP area	83.7	86.8	84.4
	CRM	Near GP-1 Zinc Pot	86.4	89.2	87.5
	CRM	Near GP-2 Zinc Pot	85.9	91.2	88.4
	CRM	Colour Coating Line	81.7	83.8	82.4
	CRM	Mill-1	84.8	87.5	86.2
	CRM	Mill-2	85.4	90.1	86.4
	CRM	Mill-3	88.9	91.2	90.1
	CRM	CRM Plant Office	52.1	59.2	56.4
	CRM	ECL	89.2	91.5	90.3
	CRM	CRCA	85.6	89.2	86.7
	CRM	SPM	82.4	85.4	84.1
	CRM	RGM	84.7	87.5	85.5
11	Sinter Plant-1	9 m office room	53.8	60.1	57.1
	Sinter Plant-1	15 m office	66.8	78.2	70.5
	Sinter Plant-1	19 m office	63.7	69.1	66
	Sinter Plant 1	Store area	71.1	85.3	74.1
	Sinter Plant 1	Electrical office	55.5	61.1	59.9
12	Coke Oven-1	Control room office	59.3	76.4	66.3
	Coke Oven-1	Laboratory	85.6	90.3	89.5
13	Sinter Plant-02	Control Room Area	57.7	86.7	63.5
14	Sinter Plant 03	Control Room Area	57.7	81.6	65
15	BOF Shop	BOF office area	59	75.3	61
	BOF Shop	Near Wage bridge area	67.5	94.2	74
16	SMS-2-FES-1&2	Booster House (ID Fan)	80.8	91.7	85.4
	SMS-2-FES-1&2	Near Control room Area	56.3	90.4	59.6
17	HSM	Near RMF Office area (Pulpit)	63.7	81.6	69.8
	HSM	Near Roll Shop area	75.4	88.6	81.2
	HSM	Near HSM Quality Lab area	67.4	75.9	69.1
	HSM	DC pulpit office area	60.4	78.2	67.5
	HSM	FM area	79.2	98.2	88.2
	HSM	Near DC sampling Station	80.4	92.2	81.5
18	Coke Oven-2	Control Room Office	48.7	76.9	61
19	BFPP-2 Boiler-3	Control room office	56.7	59.3	57.1
20	Oxygen Plant 02	Control Room Office	56.6	60.9	57.4
21	BB Plant	BB Plant Office	49	90.6	88.7
22	RMPP	Control Room Office	53.6	94.5	70.7
23	Coal Washery	Lab & Office Area	51.9	59	52.3
24	RMHS	RMHS Office	49.6	54.9	53.4

N: B- All employees are provided ear plug / earmuff in noise prone areas. Rotation of employees are being done to ensure less than 8 hrs. exposure in high noise area.

Tusarakanta Samal
Section (I/C)

Manager (Lab)

Maitreyee Das
Sr. Manager (Lab I/C)

...End Report...

Works: At- Narendrapur, P.O- Kusuranga, Via- Meramandali, Dhenkanal, Odisha-759121, Tel: 0764-229800

Environment Laboratory
TATA Steel Meramandali, Odisha

Ref.No. EMD/LAB/2022-23/99
Dt.06.02.2023

NOISE MONITORING REPORT
TATA STEEL Ltd. (JAN' 2023)

Work Zone Noise Monitoring Report for the month of Jan 2023

S.N	Name of the unit	Location	Noise level in dB(A)		
			Min	Max	Leq
1	BF-2 Cast House	Control room	60.8	75	63.8
		Near B F-2 Furnance area	72.6	82.4	76.5
2	BF 2 Stock House	Control room office	62.4	72.7	67.4
3	Lime Plant	Inside office building	50.3	58.7	54.2
4	BF PP-1 Boiler-03	Near Control room office	53.7	64.6	58.6
5	Gas fired boiler 250 TPH Area	Office and Control Room	58.4	68.4	62.2
6	DRI	KILN NO-1 (Near 1& 2 control room office)	61.7	67.7	61.1
		KILN NO-3 (Near 3& 4control room office)	51.9	79.1	62.2
		KILN NO 5 (Near 5& 6 control room office)	53.9	73.8	63.8
		KILN NO-7 (Near 7& 8 control room office)	61	76.7	62.3
		KILN NO 9 (Near 9&10 control room office)	49.7	62.1	53.8
7	110 MW Power Plant	Boiler-02 (Near Boiler area)	82.9	86.9	84.6
		Boiler-03 (Near Boiler area)	83.4	85.3	84.2
		Boiler-04 (Near Boiler area)	81.7	83.1	82.3
		Boiler-5 (Near Boiler area)	82.6	85.4	84.1
		Boiler-6 (Near Boiler area)	82.3	85.7	83.5
		Boiler-7 (Near Boiler area)	80.9	86	82.9
		Boiler 8 (Near Boiler area)	78.7	81.8	80.8
		Boiler 9 (Near Boiler area)	77.7	79.1	78
8	BF-1 Cast House	Near B F-1 Furnance	86.3	91.1	88.7
9	BF 1 Stock House	BF-1 Office	61	80.5	67
10	CRM	Near CRM Mill Complex Area	69.7	83.2	75.7
		Near ETF area	82.1	86.8	84
		Near GP 2 Zinc Pot	87.1	91.8	86.6
		Near GP-3 Zinc Pot	78.7	87.7	85.7
		Colour Coating Line	80.6	86.7	83.9
		Mill-1	76.9	90.9	84.9
		Mill-2	82.2	88.7	84.1
		Mill-3	79.4	86.6	83.5
		CRM Plant Office	50.1	71	56.5
		ECL	86.1	91.7	88.2
		CRCA	82	96.1	86.9
		RGM	83.7	90	86.4

Works: At- Narendrapur, P.O- Kusupanga,Via-Meramandali,Dhenkanal,Odisha-759121,Tel: 6764-229800

Environment Laboratory
TATA Steel Meramandali, Odisha

Work Zone Noise Monitoring Report for the month of Jan 2023					
S.N	Name of the unit	Location	Noise level in dB(A)		
			Min	Max	Leq
11	Sinter Plant-1	9 m office room	60.3	75.3	72.4
		15 m office	58.7	79.7	65.4
		18 m office	59.9	66.4	61.6
		Store area	59.8	73	62.7
		Electrical office	59.8	60.3	58.4
12	Coke Oven-1	Control room office	54.2	59.6	59.5
		Laboratory	52.1	75.3	70.1
13	Sinter Plant-02	Control Room Area	51	67.4	64.1
14	Sinter Plant-03	Control Room Area	60.8	73.1	63.4
15	BOF Shop	BOF office area	48.9	64.4	55.9
		Near Wage bridge area	69.1	80.1	73.4
16	SMS-2-FES-1&2	Booster House (ID Fan)	81.6	90.4	87.6
		Near Control room Area	58.3	62.4	59.1
17	HSM	Near RHF Office area (Pulpit)	68.6	72.2	69.9
		Near Roll Shop area	74.6	84.6	78.3
		Near HSM Quality Lab area	68.6	78.3	64.3
		DC pulpit office area	61.2	81.9	71
		FM area	79.9	84.1	83
		Near DC sampling Station	75	87.1	80.2
18	Coke Oven 2	Control Room Office	68.1	80.2	67.8
19	BPP-2 Boiler-3	Control room office	64.5	80.6	72.1
20	Oxygen Plant 02	Control Room Office	68.5	82.6	80.4
21	BB Plant	BB Plant Office	60.5	75.4	66.7
22	RMPP	Control Room Office	58.5	77.6	70.1
23	Coal Washary	Lab & Office Area	55.6	60.1	57.3
24	RMHS	RMHS Office	53.9	73.6	59.8
25	IBMD	New Sarpa MRP-I (Operator Cabin)	82.8	76.1	63.9

N: B- All employees are provided ear plug / earmuff in noise prone areas. Rotation of employees are being done to ensure less than 8 hrs. exposure in high noise area.

Section (I/C)

for Manager (Lab)

Sr. Manager (Lab I/C)

...End Report...

Works: At- Narendrapur,P.O- Kusuparga,Via-Meramandal ,Dhenkanal,Odisha-759121,Tel: 6764-229800

Environment Laboratory
TATA Steel Meramandali, Odisha

Ref.No. EMD/LAB/2022-23/106
Dt.02.03.2023

NOISE MONITORING REPORT
TATA STEEL Ltd. (FEB' 2023)

Work Zone Noise Monitoring Report for the month of Feb 2023					
S.N	Name of the unit	Location	Noise level in dB(A)		
			Min	Max	Leq
1	BF-2 Cast House	Control room	60	82	61.5
	BF-2 Cast House	Near B F-2 Furnance area	79.7	82.6	81.1
2	BF-2 Stock House	Control room office	53.7	61.4	61.2
3	Lime Plant	Inside office building	56.4	68.8	59.7
4	BF PP-1 Boiler-03	Near Control room office	60.7	68.8	64.6
5	Gas fired boiler 250 TPH Area	Office and Control Room	58.4	66.3	62.6
6	DRI	KILN NO-1(Near 1& 2 control room office)	55.8	65.5	63.3
	DRI	KILN NO-3(Near 3& 4control room office)	58.3	65.4	62.4
	DRI	KILN NO-5(Near 5& 6 control room office)	55.4	62.5	59.5
	DRI	KILN NO-7(Near 7& 8 control room office)	53.6	68.4	60.4
	DRI	KILN NO-9 (Near 9&10 control room office)	52.9	70.4	58.1
7	110 MW Power Plant	Boiler-01 (Near Boiler area)	82.7	85.5	84.3
	110 MW Power Plant	Boiler-02 (Near Boiler area)	83.7	88	84.4
	110 MW Power Plant	Boiler-03 (Near Boiler area)	81	83.1	82
	110 MW Power Plant	Boiler-04(Near Boiler area)	94.3	80.6	77.3
	110 MW Power Plant	Boiler-5 (Near Boiler area)	78.8	86.3	81.3
	110 MW Power Plant	Boiler-6 (Near Boiler area)	79.5	86.8	81.8
	110 MW Power Plant	Boiler-7(Near Boiler area)	78.1	81.2	80.8
	110 MW Power Plant	Boiler-8 (Near Boiler area)	74.6	88.2	81.4
	110 MW Power Plant	Boiler-9 (Near Boiler area)	80.7	85	84
8	BF-1 Cast House	Near B F-1 Furnance	75.4	79.2	77.2
9	BF-1 Stock House	BF-1 Office	62.4	71.9	65.9
10	Coal Washary	Lab & Office Area	62.4	74.4	65.3
11	RMHS	RMHS Office	53.2	63	61.2
12	IBMD	New Sarpa MRP-II (Operator Cabin)	50.8	71.4	57.7
		Office & Operator Cabin (Old MRP)	52.3	71.7	59.9
13	CRM	Near CRM Mill Complex Area	70.5	80.1	74.5
	CRM	Near ETP area	68.7	92	80.4
	CRM	Near GP-3 Zinc Pot	82.5	87	84.3
	CRM	Colour Coating Line	80.9	88.3	83.4

Works: At- Narendrapur,P.O- Kusupanga,Via-Meramandali,Dhenkanal,Odisha 759121,Tel: 6764-229800

Environment Laboratory
TATA Steel Meramandali, Odisha

Work Zone Noise Monitoring Report for the month of Feb 2023					
S.N	Name of the unit	Location	Noise level in dB(A)		
			Min	Max	Leq
	CRM	Mill-1	81.2	87.4	82.6
	CRM	Mill-2	86.3	97.1	89
	CRM	Mill-3	83	97.5	88.3
	CRM	CRM Plant Office	58	61.2	61
	CRM	ECL	84.3	85.8	85
	CRM	CRCA	84.3	86.7	85.2
	CRM	SPM	80	87	83.5
	CRM	RGM	76.6	84.5	81.7
14	Sinter Plant-1	9 m office room	56.2	75	62.9
	Sinter Plant-1	15 m office	67.4	76.4	69.2
	Sinter Plant-1	19 m office	58.2	66.4	63.8
	Sinter Plant-1	Store area	58.5	80.2	79.2
	Sinter Plant-1	Electrical office	57.8	80	66.4
15	Coke Oven-1	Control room office	60.8	70.8	65.7
	Coke Oven-1	Laboratory	60.4	67.2	63.1
16	Sinter Plant-02	Control Room Area	80	75.2	61.2
17	Sinter Plant-03	Control Room Area	63.6	76.2	65.4
18	BOF Shop	BOF office area	52.8	87.3	58.7
	BOF Shop	Near Wage bridge area	64.4	81.9	72.5
19	SMS-2-FES-1&2	Booster House (ID Fan)	78.3	86.7	83.3
	SMS-2-FES-1&2	Near Controlroom Area	59.3	68.7	61.4
20	HSM	Near RHF Office area (Pulpit)	68.2	81.3	72.4
	HSM	Near Roll Shop area	71.5	86.2	77.8
	HSM	Near HSM Quality Lab area	67.2	77.3	68
	HSM	DC pulpit office area	65.6	77.6	69.3
	HSM	FM area	81.1	91.3	84.3
	HSM	Near DC sampling Station	82	84.7	83.1
21	Coke Oven-2	Control Room Office	59.9	62	61.3
22	BFPP-2 Boiler-3	Control room office	66	78.6	69.9
23	Oxygen Plant-02	Control Room Office	62.1	72.3	63.6
24	BB Plant	BB Plant Office	61.5	79.3	63.6
25	RMPP	Control Room Office	62.7	83.6	64.4

N: B- All employees are provided ear plug / earmuff in noise prone areas. Rotation of employees are being done to ensure less than 8 hrs. exposure in high noise area.

A.K. Pradhan
Section (I/C)

Manager (Lab)

Maipanpal Das
Sr. Manager (Lab I/C)

...End Report...

Works: At- Narendrapur,P.O- Kusupanga,Via Meramandali,Dhenkanal,Odisha-759121,Tel: 6761-229800

Environment Laboratory
TATA Steel Meramandali, Odisha

Ref.No. EMD/LAB/2022-23/114
Dt.05.04.2023

NOISE MONITORING REPORT
TATA STEEL Ltd. (MARCH' 2023)

Work Zone Noise Monitoring Report for the month of MARCH 2023

S.N.	Name of the unit	Location	Noise level in dB(A)		
			Min.	Max.	Leq
1	BF-2 Cast House	Control room	61.2	73.3	84.5
		Near B F-2 Furnace area	70.7	79.6	76.3
2	BF-2 Stock House	Control room office	60.3	66.4	83.7
3	Lime Plant	Inside office building	58.1	72.9	63.4
4	BF PP-1 Boiler-03	Near Control room office	63.8	80.8	68.3
5	Gas fired boiler 250 TPH Area	Office and Control Room	66.5	75.1	66.9
6	DRI	KILN NO-1(Near 1& 2 control room office)	66.9	67.7	84.5
		KILN NO-3(Near 3& 4control room office)	67.9	68.9	81.4
		KILN NO-5(Near 5& 6 control room office)	60.0	71.6	82.8
		KILN NO-7(Near 7& 8 control room office)	62.4	67.8	84.8
		KILN NO 9 (Near 9&10 control room office)	59.8	81.4	66.5
7	110 MW Power Plant	Boiler-03 (Near Boiler area)	81.8	83.7	82.7
		Boiler-6 (Near Boiler area)	84.0	86.0	84.9
		Boiler-7(Near Boiler area)	82.2	85.0	83.3
		Boiler-8 (Near Boiler area)	83.4	86.3	84.8
		Boiler-9 (Near Boiler area)	84.2	84.1	83.0
8	BF-1 Cast House	Near B F-1 Furnance	70.9	85.6	77.5
9	BF-1 Stock House	BF-1 Office	58.9	78.5	65
10	Coal Washary	Lab & Office Area	61.0	80.0	70.8
11	RMHS	RMHS Office	52.4	52.7	79.9
12	IBMD	New Sarpa MRP-II (Operator Cabin)	55.7	84.5	67.9
		Office & Operator Cabin (Old MRP)	58.3	69.8	61.7
13	CRM	Near CRM Mill Complex Area	71.9	82.5	74.3
		Near T.L.L	82.2	86.2	82.9
		Near ETP area	85.8	86.5	85.7
		Near GP-1 Zinc Pot	82.2	89.6	86.4
		Near GP-2 Zinc Pot	83.2	93.6	86.8

Works: At- Narendrapur, P.O- Kusupanga, Via-Meramandali, Dhenkanal, Odisha-759121, Tel: 6764-229800

Work Zone Noise Monitoring Report for the month of MARCH 2023					
S.N	Name of the unit	Location	Noise level in dB(A)		
			Min	Max	Leq
	CRM	Near GP-3 Zinc Pot	84.7	87.4	85.5
		Colour Coating Line	80.8	88.8	83.0
		CRM Plant Office	60.4	63.9	62.3
		CRCA	84.3	86.2	85.0
		SPM	83.9	92.4	85.8
		RGM	81.2	85.3	82.4
14	Sinter Plant-1	9 m office room	67.4	70.4	68.7
		15 m office	67.6	70.5	68.3
		18 m office	67.7	72.1	70.1
		Store area	64.1	78.4	68.2
		Electrical office	61.0	67.3	63.6
15	Coke Oven-1	Control room office	57.7	80.8	70.4
		Laboratory	66.5	70.7	69.6
16	Sinter Plant-02	Control Room Area	66.9	73.0	69.3
17	Sinter Plant-03	Control Room Area	66.7	69.5	67.4
18	BOF Shop	BOF office area	61.2	69.0	67.3
		Near Weigh bridge area	69.9	86.7	75.8
19	SMS-2-FES-1&2	Booster House (ID Fan)	79.4	87.9	82.3
		Near Control room Area	65.4	73.8	70.0
20	HSM	Near RHF Office area (Pulpit)	51.8	84.5	82.9
		Near Roll Shop area	79.8	85.0	81.7
		Near HSM Quality Lab area	51.7	57.2	54.6
		DC pulpit office area	60.9	79.1	67.4
		FM area	85.6	97.5	89.6
		Near DC sampling Station	83.8	88.4	84.1
21	Coke Oven-2	Control Room Office	51.5	69.0	58.4
22	BFPP-2 Boiler-3	Control room office	59.2	61.4	60.7
23	Oxygen Plant-02	Control Room Office	63.8	84.9	73.7
24	BB Plant	BB Plant Office	80.6	82.6	81.6
25	RMPP	Control Room Office	61.9	87.8	72.3

N: B- All employees are provided ear plug / earmuff in noise prone areas. Rotation of employees are being done to ensure less than 8 hrs. exposure in high noise area.

A.K. Pradhan
Section (I/C)

Manager (Lab)

Maiti
Sr. Manager (Lab I/C)

...End Report...

Works: At- Narendrapur,P.O- Kusupanga,Via-Meramandali,Dhenkanal,Odisha-759121,Tel: 6764-229800

SPECIFIC CONDITION:

SL	CONDITIONS	COMPLIANCE STATUS
i	Efforts shall be made to reduce RSPM levels in the ambient air and a time bound action plan shall be submitted. Online ambient air quality monitoring and continuous stack monitoring facilities for all the stacks and sufficient air pollution control devices like ESP and Bag house etc. shall be provided to keep the emission levels below 100 mg/Nm^3. Bag filters should be provided to the induction furnace to control the particulate emission below 100 mg/Nm^3. Inter-locking system shall be provide to ESP's. Monitoring reports shall be submitted to the Ministry's Regional office at BBSR, CPCB, and OPCB on six monthly basis.	• 55 nos. of bag filter,27 nos. of ESP have been installed with each operating unit to reduce particulate matter levels in ambient air. Details list of pollution control devices is enclosed **as Annexure-I.** • 20 nos. online CEMS w.r.t gas and 37 nos. online CEMS w.r.t dust have been installed and operated continuously. • To monitor the ambient air quality, we have installed 7 numbers of Continuous Ambient Air Quality Monitoring Stations (CAAQMS) in the entire complex of Tata Steel Limited in consultation with SPCB, Odisha. • Six monthly monitoring report is being submitted regularly to MoEF&CC, CPCB and SPCB. • During FY21, detail analysis was done on the various point sources, line sources & area sources & implemented various improvement project e.g. installation of new technology power supply controller at Sinter plant (HFTR- High frequency transformer rectifier in process ESP & Micro pulse in dedusting ESP of sinter plant is the first of its kind technology application in ESP).
ii	Electrostatic precipitators (ESP's) to DRI plant, waste heat recovery boiler (WHRB) and fluidized bed boiler (FBB) and bag house to blast furnace (BF) shall be provided to control gaseous emission within 100 mg/Nm$^{3.}$ The gases from the DRI Kilns and BF after recovery of heat in WHRB shall be passed through ESP to control gaseous emissions. Smoke hood and fume extraction system with cyclone and bag filters should provided to IF, LRF and CCM to keep the dust in work zone environment within the permissible limit. Cyclone and bag filters shall be provided to SMS.	Following facilities have been installed to control dust emissions: **DRI & WHRB:** • The Plant has installed 10 nos. of DRI Kiln of 500 TPD each with WHRB system connected to 10 nos. of ESP at the hot end of the DRI Kiln and 5 nos. of De-dusting system at the cold end of the DRI kiln. **BLAST FURNACE:** • Two nos. of bag filter have been installed in Cast House and stock house. To keep the emission well within the norms. **IF, LRF & CCM:**

		• Smoke hood and fume extraction system of adequate capacity have been provided to IF, LRF & CCM to keep the dust in work zone environment within the permissible limit. **SMS II:** • Two nos. of fume extraction system along with cyclonic system and bag filters have been installed to take care of the fugitive emissions in the Steel Making Shop.
iii	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 waste heat recovery steam generators shall be ensured and no flue gases should discharged into the air.	• All efforts are being taken to comply with the prescribed standards and guidelines for the coke oven facility, for which 4 and 11 nos. of bag filter installed in coke oven-1 and coke oven-2 respectively. Also, wastewater treatment plant (BOD plant) has been installed at both coke oven plant. • The cleaned Coke Oven Gas (COG) is utilized in HSM, CO battery heating, Lime Plant, BF power plant and gas fired boiler for power generation. • Provisions have also been made for storage of COG in gas holder tank of capacity 50,000 m3.
iv	Dry coke quenching method shall be adopted in the proposed recovery type of the coke oven within 5 years of grant of environmental clearance.	• Dry quenching has been commissioned at Coke Oven – II and now in operation. However, commissioning of Dry Quenching at Coke Oven – I is in advance stage of progress.
v	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.	• 55 nos. of bag filter, 27 nos. of ESP have been installed with each operating unit to reduce particulate matter levels in ambient air. Details list of pollution control devices is enclosed **as Annexure-I.** • Fugitive emission and stack emission monitoring is being carried out as per CPCB guidelines and record is being maintained. Monitoring report for the period Oct'22 to

		Mar'23 is attached as **Annexure-II** and **Annexure-III** respectively.
vi	Bag filters, dust suppression system and extraction system shall be provided to raw materials handling areas, crusher house, junction towers, feed points, etc. to control fugitive emissions. Water sprinkling shall be done at loading and unloading points.	• Two bag filters, and adequate no. of DFDS and SFDS have been provided at coal circuit, and bag filters have also been provided in the iron ore circuit at crushing and screening points of raw material handling areas. • Pneumatic dust handling system has been provided at ESP hoppers in the Sinter Plant-I. • Chain conveyor dust handling system has been provided at ESP hoppers of sinter plants II and III. • 242 numbers of nozzles in dry fog dust suppression system have been provided at 46 numbers of junction houses of raw material handling area to control dust emissions during loading and unloading of raw materials at site. • Further, 128 nos. of rotary gun sprinklers have been installed throughout the raw material handling yards. • 4 Nos. of mechanized road sweepers have been deployed for dry sweeping of roads and shop floors with dust suction facility.
vii	Vehicular pollution due to transportation of raw material 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.	• Vehicles carrying raw materials are being covered with tarpaulin. • Water sprinkling arrangement has been made by installation of 128 numbers of rotary gun sprinklers at raw material handling areas to control dust emissions during loading and unloading of raw materials at site. • Additionally, dry fog dust suppression system having 266 nos. of nozzles have been installed in entire coal circuit and at the unloading points of raw material handling area to control fugitive dust. • Five Nos. of wheel washing systems have been installed at WHRB, RMHS, BFPP1, BFPP2 and DRI.

viii	Total water requirement should not exceed 1, 29,600 m^3/day. Permission for drawl of 2,40,000 m^3/day is obtained from Department of water resources, Govt. of Orissa, vide letter dated 4th December, 2003. No ground water shall be used. Closed circuit circulating/ cooling water shall be provided to reduce the water consumption. The wastewater from the de-mineralized (DM) plant shall be neutralized in neutralization pit. The wastewater from BF-GCP and coal washery shall be treated in thickener and used in the pig casting machine. Acidic and alkaline effluent from DM water plant shall be neutralized and reused in the plant through ash pond. Blow down from boilers and cooling tower shall be reused in the plant itself. All the other effluent shall be treated in effluent treated plant (ETP) and all the treated wastewater from process or for dust suppression, green belt development and various other activities at the sites. No wastewater shall be discharged outside the premises and zero effluent discharge shall be ensured. Domestic effluent shall be treated in existing sewage treatment plant (ETP) and used for green belt development.	• Rate of freshwater consumption during the period Oct'22 to Mar'23 for the Steel plant is approx. 2372 m^3/hr. • All effluents are being treated in primary treatment plants (19 nos.) in steel plant attached with respective units and Effluent Treatment Plants (3 nos.) centrally. • Treated effluent is being reused for dust suppression, ash handling, make up for DRI & cooling towers and for green area development. • Process effluent after treatment is being reused. During the period Oct'22 to Mar'23, 3443796 m3 of water has been recycled. However, we are further improving the efficiency of the water management system by technology intervention to increase the utilization. • The sanitary sewage is being treated in 4 Sewage Treatment Plants and used for green belt development and low-end application in plant. • Rainwater harvesting pond of capacity 50000m^3 with HDPE liner has been constructed to store & reuse rainwater. • Zero Effluent Discharge (ZED) project is being implemented and expected to commissioned by March 2024.
ix	Phenolic effluent shall be treated in BOD plant and used for quenching of hot coke. Continuous monitoring of total organic compounds shall be done at the outlet of ETP (BOD plant).	• The Phenolic effluent is being treated in the BOD plant and treated effluent is being reused for quenching of hot Coke at Coke Oven-I. • Online analyzer has been installed to have a check on the treated water quality of the effluent generated from the BOD Plant.

x	DRI fines, coke breeze, sinter dust, GCP dust, SMS dust, Scale, Iron ore fines shall be used in sinter plant. The coal washery rejects and middling shall be used in AFBC based power plant and shall not be disposed off anywhere else. All the blast furnace slag shall be granulated and provided to cement manufactures for further utilization.	• DRI fines are being used in SMS and Sinter Dust, GCP dust, SMS dust, Scales, Iron Ore Fines are used in Sinter plant. • The entire quantity of blast furnace slag is dispatched to cement manufacturers based on long term MoU with the cement manufacturer. • Details of generation and utilization of Blast Furnace slag is given as **Annexure-IV.** • SMS slag is being used in sinter plant after processing in metal recovery plant. • Balance slag is being used for the soling of roads.
xi	AFBC plant shall be installed before installation of sponge iron plant so that utilization of char in the AFBC boiler is ensured. All the char from DRI plant shall be utilized in AFBC boiler of power plant and no char shall be disposed off anywhere else. Unusable scrap, coal and iron ore fines will be used in SMS. All the other solid wastes including broken refractory mass and kiln accretions shall be properly disposed off in environment- friendly manner.	• AFBC plant is not in operation. • Char is being stored in demarcated places and utilized in CFBC boiler. • All unusable scrap, coal and iron ore fines are being utilized in SMS. • Refractory mass and kiln accretions are being properly disposed off.
xii	All the slag from SMS, EAF, LRF and IF shall be used for land filling and road making only after passing through Toxic Chemical Leachability Potential (TCLP) test. Otherwise, slag shall be disposed in secured landfill as per CPCB guidelines. Used oil shall be sold to authorized recyclers/ re-processors only.	• The SMS slag (LD slag) is processed in material recovery plant (MRP) for separation of metallic from the non-magnetic part and sized for various applications. Some of the key applications of LD slag product are ➢ recovered metallics used in steel making process as a scrap, ➢ recovered fines used in sinter making process for replacement of lime, ➢ non-metallic utilization in cement manufacturing, road making, and hard sand applications. • Used oil is being sold to authorised recyclers/re-processors.

xiii	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 Ministry's Regional office at BBSR, CPCB and OPCB.	• Solid waste handling, storage, utilization and disposal are being done scientifically. The toxic metal content and compositional analysis of solid waste are being carried out regularly. The analysis report of solid waste is attached as **Annexure-V**. • Annual return of hazardous waste is being regularly submitted to SPCB Odisha.
xiv	A time bound action plan shall be submitted to reduce solid waste its proper utilization and disposal.	• The solid wastes generated from various plant units are being efficiently recycled back within the plant processes. During FY23 overall solid utilization was 104%. Necessary steps are being taken for maximum utilization of solid waste.
xv	Proper utilization of fly ash shall be ensured as per Fly Ash Notification 1999 as amendment in 2003.	• The entire quantity of blast furnace slag is dispatched to cement manufacturers based on long term MoU with the cement manufacturer. • Details of generation and utilization of Blast Furnace slag are given as **Annexure-IV.** • The SMS slag (LD slag) is processed in material recovery plant (MRP) for separation of metallic from the non-magnetic part and sized for various applications. Some of the key applications of LD slag product are ➢ recovered metallics used in steel making process as a scrap, ➢ recovered fines used in sinter making process for replacement of lime, ➢ non-mag utilization in cement manufacturing, road making, and hard sand applications. • Fly ash brick and paver block have been manufactured inside the plant for use in construction activities including road construction etc. This is also helping in maximum utilization of fly ash. During the period Oct'22 to Mar'23, approx. 1 Lakh fly ash brick has been manufactured and utilized, and approx. 4 Lakhs of paver block

		has been manufactured and used in road construction in the plant. • Fly ash is also being supplied to o nearby fly ash brick manufacturing units, free of cost, for maximum utilization of ash. o Cement plants through rake & bulker. o Construction of national highway (NH-55). Balance if any is being utilised in reclamation of low lying areas & abandoned stone quarries as per guidelines of CPCB/ OSPCB after grant of necessary consents.
xvi	As proposed, green belt shall be developed in 550 acres (33%) out of total 1, 664.5 acres in and around the plant as per the CPCB guidelines in consultation with DFO.	• Green belt development is under progress in and around the plant complex by planting indigenous species as per CPCB guidelines. Till Mar'22, 33.66% of area (This includes Plant, R&R and CSR) has been covered under green belt. Rapid afforestation using MiyaWaki method in consultation with IIT, Kharagpur has been initiated. • Plantation of saplings are done regularly based on the availability of vacant area. During the period Oct'22 to Mar'23 is 415 nos. has been planted. • Proper maintenance of green coverage is being ensured throughout the year by a dedicated horticulture team.
xvii	All the recommendations made in the Charter on Corporate Responsibility for Environment Protection (CREP) for the steel plants shall be implemented.	• Tata Steel Limited has implemented all CREP recommendations.

GENERAL CONDITIONS:

SL	CONDITIONS	COMPLIANCE STATUS
i	The project authorities must strictly adhere to the stipulations made by the Orissa State Pollution Control Board and the State Government.	All relevant stipulations made by SPCB and the State Government are being complied with.
ii	No further expansion or modifications in the plant shall be carried out without prior approval of the Ministry of Environment and Forests.	• As per MoEF&CC notification as per the MoEF& CC Notification No. S.O.980(E) dated: 02.03.2021"no increase in pollution load" (NIPL) was studied by expert agency for the followings and the same were verified by State Pollution Control Board. I. Enhancement of Hot Metal production from 3.919 MTPA to 5.0 MTPA vide OSPCB letter no. 246/IND-II-NOC-NIPL/24 dated 04.01.2022. CTO was granted vide letter No 4463/IND-I-CON-5440 dated 23.03.2023 with validity upto 31.03.2025. II. Installation of one no. of LRF of 190 T/heat and expansion of carrying capacity of two nos. of existing ladle from 180 T/heat to 190 T/heat vide OSPCB letter no.886/IND-II-NOC-NIPL/27 dated 20.01.2022. Trial CTO of LRF 3x190 Ton/heat was also granted by OSPCB.
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. At no time the emission level shall go beyond the prescribed standards. Interlocking facility shall be provided so that process can be automatically stopped in case emission level exceeds the limit.	• All the existing units have been provided with adequate air pollution control devices to keep the emission within the stipulated standards. • Results of gaseous emission levels from various stacks conform to the standards and a detailed monitoring report is enclosed as **Annexure-III.**

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, SO2 and NOx are anticipated in consultation with the SPCB. Data on ambient air quality and stack emission shall be regularly submitted to this Ministry including its Regional Office at Bhubaneswar and the SPCB/CPCB once in six months.	• Seven CAAQM stations have been established in consultation with the SPCB in Tata Steel Meramandali complex. Half yearly reports are being submitted to the Regional Office of MoEF&CC, SPCB and CPCB at regular intervals. Summary of AAQ monitoring report is attached as **Annexure-VI.** • The last half yearly compliance report was submitted vide letter no. TSM/MoEF&CC/BS-01/2022-20/265 dated 30.11.2022.
v	In-plant control measures for checking fugitive emissions from all the vulnerable sources shall be provided. Further, specific measures like water sprinkling around the coal stock piles and asphalting or concreting of the roads shall be done to control fugitive emission.	To have a control on fugitive emissions, following measures have taken: • Installation of 10 nos. of bag filters at various junction houses. • Continuous sprinkling of water is being done around the coal stockpiles. • Water sprinkling arrangement has been made by installation of 128 numbers of rotary gun sprinklers at raw material handling areas to control dust emissions during loading and unloading of raw materials at site. • Construction of Paved Quality Concrete (PQC) roads are being made within the plant premises and is being cleaned and maintained through mechanized housekeeping systems. • Periodical water sprinkling on all the internal roads within the plant premises is being done as per the planned schedule. • Double lip seals with dual sealing system have been installed. • Installed dust collector system in conveyor line.
vi	Industrial waste water shall be properly collected, treated so as to conform to the standards prescribed under GSR 422 (E) dated 19th May, 1993 and 31st December, 1993 or as amended form time to time. The treated waste water shall be utilized for plantation purpose.	• The industrial as well as domestic wastewater is being treated and utilized for various purposes like slag quenching, coke quenching, dust suppression and green belt development inside the plant premises. • The monitoring reports of Industrial wastewater are being submitted to

		SPCB/CPCB/MOEF&CC at regular intervals.
vii	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).	• Acoustic hoods, silencers, enclosures etc. on all sources of noise generation have been provided. Work zone noise monitoring is being carried out and record is being maintained. • A report of ambient noise levels recorded within the premises is enclosed as **Annexure-VII**.
viii	Occupational health surveillance of the workers should be done on a regular basis and records maintained as per the Factories Act.	• Occupational health surveillance of the workers is being periodically done. Periodical Medical Examination and Food handler test are being conducted once in a year. • Necessary PPEs are provided to all the employees including the contractual workers.
ix	The company shall develop surface rain water harvesting structures to harvest the rain water for utilization in the lean season besides recharging the ground water table.	• Lagoons and HDPE pond have been constructed to harvest rainwater. This water is reused in the process when required. During the period Oct'22 to Mar'23, 49518 m3 of rainwater has been utilized in process. • RWH potential has been studied by engaging an expert agency & the suggested projects are being implemented in phases. In the first phase 50000 Cum capacity storage pond has been constructed in the year 2021. Also, rainwater collected from DRI & RMHS area are channelized through drains into a series of storage pond (3 nos lagoons are in operation).
x	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 with all environmental protection measures as recommended in EIA / EMP report is ensured. • Various socio-economic development programs covering education, safe drinking water, sports and health care etc are undertaken in nearby villages. • A detailed breakup of CSR initiatives is enclosed as **Annexure- VIII.**

xi	The adequate funds shall be earmarked towards capital cost and recurring cost / annum for environment pollution control measures 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.	• Adequate funds are being provided by the management for pollution control and to meet recurring costs. Environmental requirements are given top priority for fund allocation and approval of capital projects. • The funds earmarked for environment pollution control measures are not diverted for any other purpose. • The company has invested adequate capital expenditure to improve mix of clean power & also reduction of carbon emissions.
xii	The Regional Office of this Ministry at Bhubaneswar / CPCB/ OPCB shall monitor the stipulated conditions. A six monthly compliance report and the monitored data along with statistical interpretation shall be submitted to them regularly.	• The half yearly compliance report is being submitted to the Regional Office of the MoEF&CC, CPCB and SPCB. • The last half yearly compliance report was submitted vide letter no. TSM/MoEF&CC/BS-01/2022-20/265 dated 30.11.2022.
xiii	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 and Forests at http:/envfor.nic.in. This shall be advertised within seven days from the date of issue of the clearance letter, at least in two local newspapers that are widely circulated in the region of which one shall be in the vernacular language of the locality concerned and a copy of the same should be forwarded to the Regional office at Bhubaneswar.	• The advertisement was published in both Odia & English newspapers named “The Sambad” and “The New Indian Express” respectively. • The same has already been communicated to the Regional Office of MOEF&CC, Bhubaneswar vide letter no. BSL/ENV/10/08 dated 17.10.2008.
xiv	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.	• Project was completed and in operation. Consent to Operate was granted vide letter no. 302/IND-I-CON-5440(Vol-VIII) dated 07.01.2014.

Annexure-I

DETAILS OF AIR POLLUTION CONTROL DEVICES

SL	Process	Bag filters (Nos.)	ESP (Nos.)	Other Pollution Control Devices
1.	RMHS & RMPP	02	-	Gun Sprinklers-128 nos. DFS Nozzles-242 nos. Auto DFS-24nos.
2.	Coke oven - I	04	-	Scrubber-01 nos.
3.	Coke oven - II	11	-	Scrubber-04 nos.
4.	Sinter Plant-I	01	03	-
5.	Sinter plant – II & III	07	04	-
6.	DRI	03	15	-
7.	Blast Furnace-I	03	-	Scrubber-01 nos.
8.	Blast Furnace-II	04	-	Scrubber-01 nos.
9.	Lime Plant	10	-	-
10.	SMS-II	07	-	-
11.	SMS-III	03	-	Scrubber-02 nos.
12.	Blast Furnace Power Plant-I	-	03	-
13.	Blast Furnace Power Plant-II	-	02	-

Annexure-II

SUMMARY OF FUGITIVE EMISSION RESULTS MONTHLY AVARAGE VALUES Period: October 2022 to March 2023			
TATA STEEL LIMITED			
Name of units	**Location**	**PM 10 in µg/m3**	**Standard in µg/m3**
RMHS			
1.	Near JH-21 Yard-7 (Iron ore conveying)	757	2000
2.	Coal Yard -7 Lucky Mineral Office	595	
3.	Infront of PCI building	580	
RMPP			
4.	Near tertiary Crushing & Screening Building Area	675	2000
5.	Near Iron Crusher Area	735	
B.B. Plant			
6.	Storage building	1167	2000
7.	Flux crushing and screen building	1388	
Coke Oven-I			
8.	Fine crusher station	590	4000
9.	Secondary crusher	540	
Coke Oven-II			
10.	Coke treatment building	662	4000
11.	Coal crushing building	844	
DRI			
12.	Near PSB-1 building	1072	2000
13.	Near PSB-2 building	1498	
14.	Near PSB-3 building	1506	
15.	Near PSB- 4 building	1502	
16.	Near PSB-5 building	1210	
Sinter Plant I			
17.	Near proportionating Building	367	2000
18.	Near SP-1 Mixing House	927	
Sinter Plant II			
19.	Near SP-2 chimney Backside area	770	
20.	Near 7003 conveyor Belt	854	
Sinter Plant III			
21.	Near cooler SP-3 D/15	358	
22.	Near Chiller Plant SP-2,3 & parking area	270	
Blast Furnace-I			
23.	Near Stock House	1600	4000
24.	Near Cast house Area	1478	
Blast Furnace-II			
25.	Near Cast house Entrance	346	3000

Annexure-II

26.	Near Slug pit area	363	
27.	Stock House Near ECR Building	1908	
Lime Plant			
28.	Near Screen Area-1	1283	-
SMS-II			
29.	SMS-2 Furnace area	1106	4000
SMS-III			
30.	BOF Furnace area	585	3000
HSM			
31.	Near Coil Yard area	943	-
CRM			
32.	Near canteen area	272	-
BFPP-2			
33.	Near Ash silo Area	682	3000
BFPP-1			
34.	Near Ash silo Area	1027	4000
110 MW			
35.	Near Ash silo Area	713	-
IBMD			
36.	BOF sludge yard	263	-
37.	Near Scarp dumping yard	398	

---------- End of Report ----------

Annexure - III

SUMMARY OF STACK MONITORING

Period: From October 2022 to March 2023

S.N	Stack Attached to	Average Monthly Result in mg/m3						Standard as per CTO
		Oct'22	Nov'22	Dec'22	Jan'23	Feb'23	Mar'23	
1	AFBC	SD	SD	SD	SD	SD	SD	-
2	Sinter Plant -1 (85 M2 ESP)	14.21	6.38	16.15	12.31	16	18.1	100
3	Blast Furnace –I, Cast House	8.01	8.91	9.05	14.65	21.3	6.48	100
4	Blast Furnace –I, Stock House	4.6	4.1	4.08	5.32	9.4	11.9	100
5	SMS- 1	SD	SD	SD	SD	SD	SD	100
6	SMS 2 (FES 1)	9.61	6.8	8.36	6.93	7.3	8.86	100
7	SMS 2 (FES 2)	11.97	9.73	9.9	9.33	10	12.7	100
8	BFPP ESP 1	23.59	24.29	21.35	15.93	18.2	25.13	50
9	BFPP ESP 2	16.54	18.37	17.4	22.67	8.1	20.69	50
10	BFPP ESP 3	20.98	23.1	11.05	30.29	17.2	SD	50
11	Sinter Plant- 2	38.16	37.03	36.41	34.13	31.9	33.66	50
12	Sinter Plant- 3	39.52	42.06	37.74	34.27	37.7	38.41	50
13	SMS- 3 BOF (secondary chimney)	14.55	15.82	16.24	15.28	16.9	16.55	50
14	BFPP- 2 Boiler- 2	24.98	22.99	14.15	16.45	13.3	20.7	50
15	BFPP- 2 Boiler- 3							50
16	Coke oven (Battery- 1)	36.72	35.91	11.06	11.07	11	14.4	50
17	Coke oven (Battery- 2)	15.19	12.22	11.65	10.95	14.1	19.79	50
18	Coke oven- 2 (Battery- 2)	30.43	30.89	30.8	30.71	29.5	28.68	50
19	Blast Furnace –2, Cast House	13.16	13.09	15.68	17.86	7.2	9.87	50
20	Blast Furnace –2, Stock House	4.6	6.55	6.46	4.55	10.3	7.26	50
21	WHRB-1	49.6	35.69	32.82	25.97	13.5	SD	50
22	WHRB-2	23.72	SD	20.7	5.17	13.8	14.8	50
23	WHRB-3	10.2	20.1	21.87	19.08	22	24.46	50
24	WHRB-4	SD	7.3	13.67	10.91	15.6	8.7	50
25	WHRB-5	39.91	19.27	SD	9.82	13.2	18.91	50
26	WHRB-6	9.36	28.28	16.8	14.69	18.4	18.29	50
27	WHRB-7	32.57	8.28	18.58	28.43	24	29.57	50
28	WHRB-8	6.97	19.27	8.01	22.29	13.1	13.43	50
29	WHRB-9	15.7	34.58	13.85	15.08	13	13.43	50
30	WHRB-10	20.74	24.87	17.04	16.1	SD	5.96	50
31	DRI, Dedusting- 1	9.39	5.49	6.34	10.54	18.5	16.28	100
32	DRI, Dedusting- 2	12.08	15.66	14.11	14.69	16.7	19.2	100
33	DRI, Dedusting- 3	7.03	7.77	6.51	16.16	18.2	15.7	100
34	DRI, Dedusting- 4	15.46	18.39	17.15	32.24	20.1	21.97	100
35	DRI, Dedusting- 5	23.95	10.81	11.07	13.89	11.6	10.43	100

SD- Shut Down (Plant not in Operation)

SUMMARY OF STACK MONITORING

Period: From October 2022 to March 2023

Month		Oct'22		Nov'22		Dec'22		Jan'23		Feb'23		Mar'23	
S.N.	Stack Attached to	Result in mg/m3											
		SO_2	NO_X	SO_2	NO_X	SO_2	NO_X	SO_2	NO_X	SO_2	NO_X	SO_2	NO_X
1	BFPP ESP 1	380.94	67.69	598.82	133.9	868.24	215.45	977.87	247.6	857.02	260.27	1059.06	235.81
2	BFPP ESP 2	865.07	293.81	719.06	271.53	773.67	299.74	825.57	338.22	102.91	114.16	848.92	415.46
3	BFPP ESP 3	441.86	179.41	371.21	177.58	328.71	133.48	691.56	226.23	719.9	310.93	SD	
4	Sinter Plant- 2	296.87	138.76	252.27	104.51	264.9	96.85	162.72	55.78	186.68	95.15	360.31	168.93
5	Sinter Plant- 3	305.02	111.36	377.59	119.99	429.57	134.26	474.15	128	524.67	127.54	530.66	84.93
6	BFPP- 2 Boiler- 2	738.17	30.17	959.95	72.82	1055.77	60.66	843.38	33.38	787.49	28.49	973.91	24.28
7	BFPP- 2 Boiler- 3												
8	Coke oven (Battery- 1)	37.32	208.68	41.04	180.01	134.02	323.13	173.46	328.69	40.36	372.1	40.92	381.35
9	Coke oven (Battery- 2)	58.74	449.81	54.64	377	59.12	407.84	35.48	351.32	8.38	144.57	32.51	19.66
10	Coke oven- 2 (Battery- 2)	149.77	77.04	119.09	91.54	143.41	99.33	193.64	83.43	124.67	86.94	109.09	68.65
11	WHRB-1	852.97	71.66	1093.07	78.96	1087.03	95.71	938.28	86.2	299.64	43.98	SD	
12	WHRB-2	532	67.98	SD		974	102.9	759	97.9	759	97.9	673	99.2
13	WHRB-3	421.79	156.08	501.19	174.34	652	133.1	314.17	139.28	692.44	382.29	851.69	356.1
14	WHRB-4	SD		635	196.93	602.8	140.24	578.79	130.76	149.75	123.6	1167.62	128.1
15	WHRB-5	693.12	55.46	SD		SD		385.31	45.88	139.35	48.64	559.17	72.51
16	WHRB-6	62.19	3.48	740.69	33.63	539.2	181.12	432.15	156.33	230.69	141.5	225.92	142.6
17	WHRB-7	632.2	108.78	706.42	124.45	704.53	146.92	915.41	108.7	757.16	94.83	815.95	38.11
18	WHRB-8	UM		UM		UM		UM		UM		UM	
19	WHRB-9	428.96	111.97	417.2	42.28	580.86	25.73	847.76	311.03	603.2	629.78	933.44	416.31
20	WHRB-10	512.83	71.66	376.88	86.34	492.8	157.47	380.76	97.1	SD		479.29	99.01

SD: Shut Down (Plant not in Operation); UM: Under Maintenance

---------- End of Report ----------

Annexure - IV

Details of Slag Generation and Utilization
(Blast Furnace – 1 & 2)

Month	Quantity Generated (MT)	Quantity Dispatched (MT)
Oct'22	162122	180738
Nov'22	160541	165881
Dec'22	156283	168216
Jan'23	137559	148405
Feb'23	150219	128115
Mar'23	165052	196022
Total	**931776**	**987377**

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Bhubaneswar - 751013, Odisha, INDIA

TEST REPORT

Ref. No. IMMT/CCD/07/2021 **Date: 30.07.2021**

Name & Address of the Party:	Tata Steel BSL Ltd. At-Narendrapur, P.O.-Kusupanga Via-Meramandali, Dist-Dhenkanal
Sample Details:	1. Fly ash, BFPP-1 2. Bed ash, BFPP-1 3. Fly ash, BFPP-2 4. Bed ash, BFPP-2
Date of Receiving:	25.06.2021
Date(s) of Conducting Test:	30.06.2021
Date of Completion of Test:	23.07.2021

Method Adopted: **1.** Major element analysis of ash samples through wet chemical route by using Volumetric, gravimetric, photometric, nephelometric, AAS and ICP-OES techniques.
2. TCLP study of ash samples as per US-EPA method 1311 or ASTM-D5233-92. Leaching solution analysis by ICP-OES and AAS.

Detail Report: Following data tables are enclosed

Table-1. Chemical composition analysis of fly ash and bed ash samples.
Table-2. Experimental variables for Toxicity Characteristic Leaching Procedure (TCLP) study of Ash samples conducted as per US-EPA method 1311.
Table-3. Trace element analysis of TCLP or WET Procedure solutions of Ash samples; leaching studies conducted as per US-EPA method 1311 and Appendix II of section 66261 of Title 22 of California Code Regulations (CCR).

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Principal Technical Officer
Central Characterization Dept.

N.B.:- The samples are not drawn by CSIR-IMMT. Liability, if any, for CSIR/IMMT arising in connection with the testing shall be subject to ceiling of amount received by the institute from the client. The report should not be interpreted in part.

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TEST REPORT

Ref. No. IMMT/CCD/07/2021 **Date: 30.07.2021**

Table-1. Chemical composition analysis of fly ash and bed ash samples.

Sl. No.	Component	Concentration in Test Samples, %			
		Fly Ash, BFPP-1	Bed Ash, BFPP-1	Fly Ash, BFPP-2	Bed Ash, BFPP-2
1	SiO_2	49.85	52.45	56.4	54.9
2	Al_2O_3	25.8	24.6	16.8	17.5
3	Fe_2O_3	2.64	3.66	4.35	5.18
4	TiO_2	1.38	1.41	0.88	0.79
5	MnO_2	0.02	0.04	0.11	0.16
6	CaO	1.66	2.34	4.99	7.67
7	MgO	0.97	1.12	1.10	2.21
8	Na_2O	1.39	1.37	1.21	1.16
9	K_2O	1.18	1.29	1.20	1.14
10	Cr_2O_3	0.018	0.017	0.031	0.027
11	NiO	0.004	0.005	0.005	0.003
12	CuO	0.009	0.009	0.007	0.004
13	ZnO	0.008	0.009	0.017	0.007
14	BaO	0.046	0.049	0.036	0.031
15	P_2O_5	0.38	0.34	0.32	0.21
16	SO_3	0.27	0.10	0.15	0.43
17	Cl^-	0.38	0.64	0.21	0.42
18	LOI	6.56	2.37	3.34	3.70
19	F^-, mg/L	0.94	1.23	1.65	1.79

30/07/21

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TEST REPORT

Ref. No. IMMT/CCD/07/2021 **Date: 30.07.2021**

Table-2. Experimental variables for Toxicity Characteristic Leaching Procedure (TCLP) study of Ash samples conducted as per US-EPA method 1311.

Sl. No.	TCLP study Variables	Variable Data			
		Fly Ash, BFPP-1	Bed Ash, BFPP-1	Fly Ash, BFPP-2	Bed Ash, BFPP-2
1	TCLP study method	US-EPA Method-1311			
2	Sample type	Dust, Particle size < 100 µm	Dust and Gravels, Particle size < 8 mm	Dust, Particle size < 100 µm	Dust and Gravels, Particle size < 8 mm
3	Sample particle size taken for leaching	Original sample	Original sample	Original sample	Original sample
4	Initial pH of samples	9.11	12.29	10.30	12.41
5	pH after HCl + heat	2.04	10.13	2.37	11.29
6	Extraction fluid used	Extraction fluid -1	Extraction fluid -2	Extraction fluid -1	Extraction fluid -2
7	pH of Extraction fluids	4.94	2.90	4.94	2.90
8	Sample taken for leaching, gm	50			
9	Volume of extraction fluid used, ml	1000			
10	Liquid/solid ratio	20:1			
11	Head space	10 %			
12	Extraction Temperature °C	28			
13	Extraction Time, hour	18			
14	Filter	Glass micro fiber, Whatman GF/C			
15	Washing of filters	With dil. HNO_3 and distilled water			
16	pH of recovered extraction fluid	5.12	4.78	4.95	5.66

30/07/21

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TEST REPORT

Ref. No. IMMT/CCD/07/2021 **Date: 30.07.2021**

Table-3. Trace element analysis of TCLP or WET Procedure solutions of Ash samples; leaching studies conducted as per US-EPA method 1311 and Appendix II of section 66261 of Title 22 of California Code Regulations (CCR).

Sl. No.	Component	Concentrations in TCLP or WET* leaching solutions of Ash test samples (mg/L)				Waste constituents concentration limits of TCLP or STLC. US-EPA and California Code of Regulations (mg/L)
		Fly Ash, BFPP-1	Bed Ash, BFPP-1	Fly Ash, BFPP-2	Bed Ash, BFPP-2	
1	Hg	0.005	0.004	0.004	0.003	0.2
2	As	0.034	0.054	0.041	0.025	5.0
3	Se	0.080	0.044	0.085	0.047	1.0
4	Sb*	0.056	0.049	0.038	0.021	15.0
5	Ba	0.46	0.20	0.38	0.27	100.0
6	Cd	0.001	0.002	0.001	0.002	1.0
7	Cr	0.026	0.021	0.031	0.025	5.0
8	Cr (VI)	0.012	0.009	0.015	0.010	5.0
9	Pb	0.024	0.028	0.024	0.016	5.0
10	Mn	0.42	0.31	0.69	0.27	10.0
11	Ag	0.012	0.009	0.034	0.008	5.0
12	Co*	0.18	0.14	0.16	0.13	80.0
13	Cu*	0.51	0.16	0.55	0.12	25.0
14	Mo*	0.19	0.54	0.29	0.06	350
15	Ni*	0.31	0.19	0.31	0.16	20.0
16	V*	1.23	0.39	1.72	0.31	24.0
17	Zn*	0.64	0.13	1.12	0.09	250

Remark: The TCLP and WET leaching solution analyses of fly ash and bed ash samples reveal that trace element concentrations are much below the Waste constituent concentration limits. Therefore, the ash samples are non-hazardous materials and their use as land filling or mine void dumping will not have any adverse effect on the ground water quality in respect of the analyzed parameters and no separate lining is required for dumping of the tested ash samples.

30/07/21

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TEST REPORT

Ref. No. IMMT/CCD/08/2021 **Date: 03.08.2021**

Name & Address of the Party:	Tata Steel BSL Ltd. At-Narendrapur, P.O.-Kusupanga Via-Meramandali, Dist-Dhenkanal
Sample Details:	Solid Waste samples (17 Nos.)
Date of Receiving:	02.06.2021
Date(s) of Conducting Test:	07.06.2021
Date of Completion of Test:	23.07.2021

Method Adopted: **1.** Major element analysis of Solid waste samples through wet chemical route by using Volumetric, gravimetric, photometric, nephelometric, AAS and ICP-OES techniques.
2. TCLP study of waste samples as per US-EPA method 1311 or ASTM-D5233-92. Leaching solution analysis by ICP-OES and AAS.

Detail Report: Following data tables are enclosed

Table-1. Physical characteristics analysis of Solid Waste samples of Tata Steel BSL Limited, Meramandali

Table-2. Size (Sieve) analysis of Solid Waste samples of Tata Steel BSL Limited, Meramandali

Table-3. Chemical composition analysis of Solid Waste samples of Tata Steel BSL Limited, Meramandali

Table-4(a) Experimental variables for Toxicity Characteristic Leaching Procedure (TCLP) study of Solid Waste samples (SW1, SW2, SW3, SW4, SW5 & SW8) conducted as per US-EPA method 1311.

Table-4(b) Trace element analysis of TCLP or WET Procedure solutions of Solid waste samples(SW1, SW2, SW3, SW4, SW5 & SW8); Leaching studies conducted as per US-EPA method 1311 and Appendix II of section 66261 of Title 22 of California Code Regulations (CCR).

Table-5(a) Experimental variables for Toxicity Characteristic Leaching Procedure (TCLP) study of Solid Waste samples (SW9, SW10, SW11, SW12, SW13 & SW14) conducted as per US-EPA method 1311.

Table-5(b) Trace element analysis of TCLP or WET Procedure solutions of Solid waste samples(SW9, SW10, SW11, SW12, SW13 & SW14); Leaching studies conducted as per US-EPA method 1311 and Appendix II of section 66261 of Title 22 of California Code Regulations (CCR).

Contd....

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Table-6(a) Experimental variables for Toxicity Characteristic Leaching Procedure (TCLP) study of Solid Waste samples (SW15, SW17, SW18, SW19 & SW20) conducted as per US-EPA method 1311.

Table-6(b) Trace element analysis of TCLP or WET Procedure solutions of Solid waste samples (SW15, SW17, SW18, SW19 & SW20); Leaching studies conducted as per US-EPA method 1311 and Appendix II of section 66261 of Title 22 of California Code Regulations (CCR).

03/08/21

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Principal Technical Officer
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N.B.:- The samples are not drawn by CSIR-IMMT. Liability, if any, for CSIR/IMMT arising in connection with the testing shall be subject to ceiling of amount received by the institute from the client. The report should not be interpreted in part.

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TEST REPORT

Ref. No. IMMT/CCD/08/2021 **Date: 03.08.2021**

Table-1. Physical characteristics analysis of Solid Waste samples of Tata Steel BSL Limited, Meramandali.

Sl. No.	Sample ID.	Concentration in Test Solid waste samples			
		pH	Bulk Density, (g/cc)	Dry Matter, %	Volatile Matter, %
1	SW-1 (ETP-1 Sludge)	7.86	0.62	97.5	14.7
2	SW-2 (ETP-2 Sludge)	8.07	0.69	98.1	12.0
3	SW-3 (ETP-3 Sludge)	8.31	0.71	98.4	18.9
4	SW-4 (CRM ETP Sludge)	8.45	0.65	94.5	37.8
5	SW-5 (BOD -1 Sludge)	6.71	0.75	86.5	47.8
6	SW-8 (BF-1 Flue Dust)	9.08	2.04	99.5	3.18
7	SW-9 (BF-2 Flue Dust)	10.4	1.61	99.6	3.44
8	SW-10 (BOF GCP Dust)	11.2	1.15	99.0	2.75
9	SW-11 (DRI Cold ESP Dust)	10.9	0.76	98.1	4.50
10	SW-12 ((DRI Wet Scrapper Dust)	9.57	0.85	97.7	4.67
11	SW-13 (SMS Slag)	12.2	1.86	99.9	0.47
12	SW-14 (BF Granulated Slag)	9.60	1.29	99.8	0.41
13	SW-15 (Lime Plant De-dusting Dust)	12.5	0.78	99.7	14.3
14	SW-17 (Mill Scale)	8.61	2.89	99.9	0.09
15	SW-18 (SMS-II FES Dust)	12.6	1.41	99.8	4.24
16	SW-19 (BF-1 GCP Dust)	9.26	1.02	99.5	4.16
17	SW-20 (BF-2 GCP Dust)	9.47	1.25	99.2	5.17

03/08/21

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TEST REPORT

Ref. No. IMMT/CCD/08/2021 **Date: 03.08.2021**

Table-2. Size (Sieve) analysis of Solid Waste samples of Tata Steel BSL Limited, Meramandali

Sl. No.	Sample ID	Seive Fractions							
		+2 mm	-2+1 mm	-1+500 micron	-500+250 micron	-250+150 micron	-150+75 micron	-75+45 micron	-45 micron
1	SW-1	73.95	9.31	5.62	3.50	0.80	1.32	1.42	4.08
2	SW-2	62.59	16.21	8.68	4.09	0.42	0.38	0.90	6.74
3	SW-3	36.28	11.91	10.09	9.46	6.25	6.67	11.89	7.46
4	SW-4	88.51	6.70	2.84	0.93	0.52	0.50	0	0
5	SW-5	83.54	11.30	3.49	0.42	0.87	0.16	0.10	0.11
6	SW-8	6.05	3.02	3.77	3.75	4.78	11.69	13.44	53.48
7	SW-9	0	0.09	0.25	0.51	1.91	29.37	56.56	11.30
8	SW-10	33.52	15.92	15.29	11.98	5.10	6.67	8.29	3.22
9	SW-11	6.40	7.13	4.61	5.65	3.44	14.33	40.13	18.31
10	SW-12	5.12	4.75	7.91	10.29	11.28	23.15	17.61	19.89
11	SW-13	57.97	9.22	6.74	4.73	3.00	5.44	3.53	9.38
12	SW-14	2.31	12.91	43.91	16.23	4.56	6.46	5.05	8.57
13	SW 15	0.93	0.63	0.96	1.47	2.50	15.33	52.18	26.00
14	SW-17	39.15	13.71	12.83	16.48	8.68	6.29	2.09	0.77
15	SW-18	0.49	1.06	2.55	7.33	47.34	21.35	12.43	7.46
16	SW-19	45.08	3.33	2.71	3.70	7.08	17.62	10.22	10.26
17	SW-20	29.96	12.53	5.22	3.78	7.02	17.35	13.72	10.42

N. B.: SW1-ETP-1 Sludge, SW2-ETP-2 Sludge, SW3-ETP-3 Sludge, SW4-CRM ETP Sludge, SW5-BOD-1 Sludge, SW8-BF-1 Flue Dust, SW9-BF-2 Flue Dust, SW10-BOF GCP Dust, SW11-DRI Cold ESP Dust, SW12-DRI Wet Scrapper Dust, SW13-SMS Slag, SW14-BF Granulated Slag, SW15-Lime Plant De-dusting Dust, SW17-Mill Scale, SW18-SMS-II FES Dust, SW19-BF-1 GCP Dust & SW20-BF-2 GCP Dust

03/08/21

(J. Das)
Principal Technical Officer
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सीएसआइआर - खनिज एवं पदार्थ प्रौद्योगिकी संस्थान
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TEST REPORT

Ref. No. IMMT/CCD/08/2021 **Date: 03.08.2021**

Table-3. Chemical composition analysis of Solid Waste samples of Tata Steel BSL Limited, Meramandali.

Sl. No.	Sample Ids.	Concentration in Test Solid waste samples, %													
		SiO_2	Al_2O_3	Fe (T)	TiO_2	MnO	CaO	MgO	Na_2O	K_2O	P_2O_5	SO_3	C	Cl^-	LOI
1	SW-1	39.21	23.32	10.3	0.36	0.049	0.78	1.21	0.41	1.65	0.06	0.28	3.51	0.23	16.28
2	SW-2	37.91	19.30	12.5	0.94	0.085	5.07	1.40	0.65	1.24	0.16	0.07	6.02	0.29	16.46
3	SW-3	9.07	4.01	5.11	0.21	0.038	3.16	0.94	0.40	0.69	0.001	0.85	56.0	0.16	73.22
4	SW-4	2.40	1.15	3.72	0.03	0.10	21.81	2.54	1.22	0.52	0.45	0.17	17.5	1.13	42.75
5	SW-5	1.29	2.02	16.2	0.19	0.021	0.69	0.62	1.29	0.65	0.001	7.70	30.6	0.48	75.98
6	SW-8	4.17	1.88	59.15	0.10	0.093	2.09	0.58	1.47	1.02	0.001	0.82	2.12	0.40	3.18
7	SW-9	4.18	1.79	57.7	0.09	0.056	2.28	0.74	1.13	1.37	0.001	1.78	10.24	0.13	11.4
8	SW-10	4.32	1.78	53.1	0.12	0.095	12.45	4.02	1.16	0.97	0.001	0.31	0.85	0.075	2.75
9	SW-11	24.28	12.61	10.98	0.56	0.039	5.36	2.32	1.29	1.16	0.35	2.49	33.4	0.09	35.57
10	SW-12	12.76	7.96	22.74	0.39	0.025	2.60	0.71	1.19	0.99	0.20	0.42	30.3	0.03	46.21
11	SW-13	13.42	1.78	26.7	0.84	0.022	45.22	10.80	1.58	0.88	1.20	0.20	0.07	0.27	0.52
12	SW-14	32.99	15.58	1.10	0.71	0.065	31.77	9.14	1.55	1.34	0.001	1.61	0.24	0.14	0.61
13	SW 15	2.41	1.12	2.68	0.10	0.066	45.63	12.8	3.01	0.89	0.03	0.26	5.01	0.58	23.15
14	SW-17	0.09	0.32	65.4	0.01	0.012	0.20	0.99	1.33	0.74	0.001	0.03	0.13	0.05	2.47
15	SW-18	1.94	0.96	54.7	0.08	0.011	11.51	3.38	1.81	1.87	0.001	1.28	1.50	2.68	4.24
16	SW-19	10.84	3.21	32.9	0.17	0.046	2.74	1.31	1.36	0.93	0.001	1.01	27.7	0.31	31.6
17	SW-20	14.65	1.94	29.3	0.15	0.049	3.44	1.45	1.33	0.87	0.001	1.46	30.7	0.45	35.71

N. B.: SW1-ETP-1 Sludge, SW2-ETP-2 Sludge, SW3-ETP-3 Sludge, SW4-CRM ETP Sludge, SW5-BOD-1 Sludge, SW8-BF-1 Flue Dust, SW9-BF-2 Flue Dust, SW10-BOF GCP Dust, SW11-DRI Cold ESP Dust, SW12-DRI Wet Scrapper Dust, SW13-SMS Slag, SW14-BF Granulated Slag, SW15-Lime Plant De-dusting Dust, SW17-Mill Scale, SW18-SMS-II FES Dust, SW19-BF-1 GCP Dust & SW20-BF-2 GCP Dust

03/08/21

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TEST REPORT

Ref. No. IMMT/CCD/08/2021 **Date: 03.08.2021**

Table-4(a). Experimental variables for Toxicity Characteristic Leaching Procedure (TCLP) study of Solid Waste samples conducted as per US-EPA method 1311.

Sl. No.	TCLP study Variables	Variable Data					
		SW 1	SW 2	SW3	SW 4	SW 5	SW 8
1	TCLP study method	US-EPA Method-1311					
2	Sample type	Dust and Gravels, Particle size < 8 mm	Dust and Gravels, Particle size < 8 mm	Dust and Gravels, Particle size < 8 mm	Dust and Gravels, Particle size < 8 mm	Dust and Gravels, Particle size < 8 mm	Dust and Gravels, Particle size < 8 mm
3	Sample particle size taken for leaching	Original sample	Original sample	Original sample	Original sample	Original sample	Original sample
4	Initial pH of samples	7.86	8.07	8.31	8.45	6.71	9.08
5	pH after HCl + heat	3.01	5.69	6.82	7.15	4.16	3.67
6	Extraction fluid used	Extraction fluid -1	Extraction fluid -2	Extraction fluid -2	Extraction fluid -2	Extraction fluid -1	Extraction fluid -1
7	pH of Extraction fluid	4.91	2.88	2.88	2.88	4.91	4.91
8	Sample taken for leaching, gm	50					
9	Volume of extraction fluid used, ml	1000					
10	Liquid/solid ratio	20:1					
11	Head space	10 %					
12	Extraction Temperature °C	28					
13	Extraction Time, hour	18					
14	Filter	Glass micro fiber, Whatman GF/C					
15	Washing of filters	With dil. $HNO_3$and distilled water					
16	pH of recovered extraction fluid	4.75	4.47	4.46	4.52	4.65	4.78

03/08/21

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TEST REPORT

Ref. No. IMMT/CCD/08/2021 **Date: 03.08.2021**

Table-4(b). Trace element analysis of TCLP or WET Procedure solutions of Solid waste samples; leaching studies conducted as per US-EPA method 1311 and Appendix II of section 66261 of Title 22 of California Code Regulations (CCR).

Sl. No.	Component	Concentrations in TCLP or WET* leaching solutions of Solid Waste test samples (mg/L)						Waste constituents concentration limits of TCLP or STLC. US-EPA and California Code of Regulations (mg/L)
		SW1	SW2	SW3	SW4	SW5	SW8	
1	Hg	0.002	0.004	0.003	0.002	0.002	0.004	0.2
2	As	0.019	0.037	0.032	0.010	0.015	0.001	5.0
3	Se	0.047	0.067	0.056	0.036	0.169	0.011	1.0
4	Sb*	0.044	0.039	0.045	1.13	0.001	0.11	15.0
5	Ba	0.37	1.39	1.16	0.08	0.13	0.07	100.0
6	Cd	0.002	0.002	0.008	0.001	0.001	0.001	1.0
7	Cr	0.019	0.018	0.026	0.513	0.023	0.025	5.0
8	Pb	0.021	0.027	0.126	0.021	0.025	0.013	5.0
9	Mn	0.29	5.04	3.66	1.72	0.57	2.12	10.0
10	Ag	0.001	0.001	0.001	0.003	0.002	0.003	5.0
11	Co*	0.21	0.18	0.15	0.21	0.19	0.21	80.0
12	Cu*	0.53	0.02	9.6	0.04	12.3	0.05	25.0
13	Mo*	0.071	0.074	0.052	0.175	0.002	0.008	350
14	Ni*	0.27	0.22	0.25	1.04	0.49	0.24	20.0
15	V*	1.07	1.32	0.46	0.23	0.001	0.74	24.0
16	Zn*	2.62	1.05	3.39	2.33	0.73	2.86	250
17	F-*	0.67	1.03	1.21	2.69	38.6	19.5	180

Remark: The TCLP and WET leaching solution analyses of Solid Waste samples reveal that trace element concentrations are much below the Waste constituent concentration limits.

03/08/21

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TEST REPORT

Ref. No. IMMT/CCD/08/2021 **Date: 03.08.2021**

Table-5(a). Experimental variables for Toxicity Characteristic Leaching Procedure (TCLP) study of Solid Waste samples conducted as per US-EPA method 1311.

Sl. No.	TCLP study Variables	Variable Data					
		SW9	SW10	SW11	SW12	SW13	SW14
1	TCLP study method	US-EPA Method-1311					
2	Sample type	Dust and Gravels, Particle size < 8 mm	Dust and Gravels, Particle size < 8 mm	Dust and Gravels, Particle size < 8 mm	Dust and Gravels, Particle size < 8 mm	Dust and Gravels, Particle size < 8 mm	Dust and Gravels, Particle size < 8 mm
3	Sample particle size taken for leaching	Original sample	Original sample	Original sample	Original sample	Original sample	Original sample
4	Initial pH of samples	10.3	11.2	10.9	9.57	12.2	9.60
5	pH after HCl + heat	3.34	5.61	9.64	8.13	11.9	3.81
6	Extraction fluid used	Extraction fluid -1	Extraction fluid -2	Extraction fluid -2	Extraction fluid -2	Extraction fluid -2	Extraction fluid -1
7	pH of Extraction fluid	4.91	2.88	2.88	2.88	2.88	4.91
8	Sample taken for leaching, gm	50					
9	Volume of extraction fluid used, ml	1000					
10	Liquid/solid ratio	20:1					
11	Head space	10 %					
12	Extraction Temperature °C	28					
13	Extraction Time, hour	18					
14	Filter	Glass micro fiber, Whatman GF/C					
15	Washing of filters	With dil. $HNO_3$and distilled water					
16	pH of recovered extraction fluid	4.95	5.09	5.04	4.82	4.54	4.55

03/08/21

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TEST REPORT

Ref. No. IMMT/CCD/08/2021 **Date: 03.08.2021**

Table-5(b). Trace element analysis of TCLP or WET Procedure solutions of Solid waste samples; leaching studies conducted as per US-EPA method 1311 and Appendix II of section 66261 of Title 22 of California Code Regulations (CCR).

Sl. No.	Component	Concentrations in TCLP or WET* leaching solutions of Solid Waste test samples (mg/L)						Waste constituents concentration limits of TCLP or STLC. US-EPA and California Code of Regulations (mg/L)
		SW9	SW10	SW11	SW12	SW13	SW14	
1	Hg	0.002	0.004	0.004	0.003	0.005	0.001	0.2
2	As	0.002	0.006	0.002	0.029	0.003	0.023	5.0
3	Se	0.049	0.011	0.002	0.063	0.052	0.051	1.0
4	Sb*	0.10	0.11	0.07	0.04	0.04	0.05	15.0
5	Ba	0.38	0.06	0.88	1.02	0.05	0.29	100.0
6	Cd	0.001	0.001	0.001	0.001	0.001	0.001	1.0
7	Cr	0.024	0.016	0.027	0.030	0.031	0.023	5.0
8	Pb	1.14	0.011	0.003	0.024	0.015	0.022	5.0
9	Mn	1.96	0.07	2.58	1.66	3.04	0.39	10.0
10	Ag	0.003	0.001	0.003	0.001	0.002	0.001	5.0
11	Co*	0.21	0.13	0.22	0.19	0.16	0.17	80.0
12	Cu*	0.04	0.03	0.03	0.16	0.04	0.02	25.0
13	Mo*	0.024	0.01	0.001	0.01	0.001	0.001	350
14	Ni*	0.18	0.06	0.07	0.21	0.15	0.18	20.0
15	V*	0.79	0.36	0.23	0.14	1.72	0.16	24.0
16	Zn*	4.01	2.54	0.14	0.42	0.05	1.38	250
17	F-*	18.0	0.07	2.07	1.33	0.16	7.74	180

Remark: Remark: The TCLP and WET leaching solution analyses of Solid Waste samples reveal that trace element concentrations are much below the Waste constituent concentration limits.

03/08/21
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TEST REPORT

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Table-6(a). Experimental variables for Toxicity Characteristic Leaching Procedure (TCLP) study of Solid Waste samples conducted as per US-EPA method 1311.

Sl. No.	TCLP study Variables	Variable Data				
		SW15	SW17	SW18	SW19	SW20
1	TCLP study method	US-EPA Method-1311				
2	Sample type	Dust and Gravels, Particle size < 8 mm	Dust and Gravels, Particle size < 8 mm	Dust and Gravels, Particle size < 8 mm	Dust and Gravels, Particle size < 8 mm	Dust and Gravels, Particle size < 8 mm
3	Sample particle size taken for leaching	Original sample	Original sample	Original sample	Original sample	Original sample
4	Initial pH of samples	12.5	8.61	12.5	9.26	9.47
5	pH after HCl + heat	12.3	1.71	12.2	3.02	6.32
6	Extraction fluid used	Extraction fluid -2	Extraction fluid -1	Extraction fluid -2	Extraction fluid -1	Extraction fluid -2
7	pH of Extraction fluids	2.88	4.91	2.88	4.91	2.88
8	Sample taken for leaching, gm	50				
9	Volume of extraction fluid used, ml	1000				
10	Liquid/solid ratio	20:1				
11	Head space	10 %				
12	Extraction Temperature °C	28				
13	Extraction Time, hour	18				
14	Filter	Glass micro fiber, Whatman GF/C				
15	Washing of filters	With dil. HNO_3 and distilled water				
16	pH of recovered extraction fluid	8.21	4.64	7.85	4.57	4.60

03/08/21

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TEST REPORT

Ref. No. IMMT/CCD/08/2021 **Date: 03.08.2021**

Table-6(b). Trace element analysis of TCLP or WET Procedure solutions of Solid waste samples; leaching studies conducted as per US-EPA method 1311 and Appendix II of section 66261 of Title 22 of California Code Regulations (CCR).

Sl. No.	Component	Concentrations in TCLP or WET* leaching solutions of Solid Waste test samples (mg/L)					Waste constituents concentration limits of TCLP or STLC. US-EPA and California Code of Regulations (mg/L)
		SW15	SW17	SW18	SW19	SW20	
1	Hg	0.002	0.004	0.002	0.003	0.002	0.2
2	As	0.018	0.018	0.026	0.018	0.003	5.0
3	Se	0.055	0.054	0.181	0.057	0.019	1.0
4	Sb*	0.014	0.079	0.070	0.063	0.015	15.0
5	Ba	0.35	0.16	0.22	0.17	0.59	100.0
6	Cd	0.001	0.001	0.002	0.080	0.030	1.0
7	Cr	0.057	0.021	0.038	0.022	0.027	5.0
8	Pb	0.025	0.019	0.021	21.5	22.4	5.0
9	Mn	0.02	0.27	0.12	0.39	0.97	10.0
10	Ag	0.001	0.001	0.005	0.002	0.001	5.0
11	Co*	0.16	0.17	0.17	0.19	0.19	80.0
12	Cu*	0.07	0.02	0.14	0.19	0.01	25.0
13	Mo*	0.014	0.057	0.067	0.021	0.039	350
14	Ni*	0.08	0.27	0.10	0.18	0.14	20.0
15	V*	0.01	0.06	0.75	0.77	0.59	24.0
16	Zn*	0.03	0.18	2.06	3.87	4.98	250
17	F-*	19.7	0.61	18.8	9.57	17.8	180

Remark: Remark: The TCLP and WET leaching solution analyses of Solid Waste samples reveal that trace element concentrations are much below the Waste constituent concentration limits.

03/08/21

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Environment Laboratory
TATA Steel Meramandali, Odisha

Ref.No. EMD/LAB/2022-23/81
Dt.04.11.2022

AMBIENT NOISE MONITORING
TATA STEEL Ltd. (Oct '22)

S.N	Location	Monitoring Date	Noise Level dB(A) Leq (day time)	Standard dB(A) Leq(Day Time)	Noise Level dB(A) Leq (Night time)	Standard dB(A) Leq(Night Time)
1	Colony	27.09.2022	54.1	55.0	44.6	44.5
2	AEL	28.10.2022	56.7	75.0	69.0	70.0
3	Coke Oven-2	25.10.2022	62.2		69.3	

Section (I/C) | Manager (Lab) | Sr.Manager (Lab I/C)

...End Report...

Works: At- Narendrapur,P.O- Kusupanga,Via-Meramandali,Dhenkanal,Odisha-759121,Tel: 6764-229800

Environment Laboratory
TATA Steel Meramandali, Odisha

Ref.No. EMD/LAB/2022-23/88
Dt.07.12.2022

AMBIENT NOISE MONITORING
TATA STEEL Ltd. (NOV'22)

S.N	Location	Monitoring Date	Noise Level dB(A) Leq (day time)	Standard dB(A) Leq(Day Time)	Noise Level dB(A) Leq (Night time)	Standard dB(A) Leq(Night Time)
1	Colony	10.11.2022	52.5	55.0	43.6	45.0
2	Coke Oven-2	14.11.2022	57.1	75.0	50.0	70.0
3	AEL	16.11.2022	61.4	75.0	59.4	70.0

A.K. Pradhan
Section (I/C)

Manager (Lab)

Sr.Manager (Lab I/C)

...End Report...

Works: At- Narendrapur,P.O- Kusupanga,Via-Meramandali,Dhenkanal,Odisha-759121,Tel: 6764-229800

Environment Laboratory
TATA Steel Meramandali, Odisha

Ref.No. EMD/LAB/2022-23/95
Dt.04.01.2023

AMBIENT NOISE MONITORING
TATA STEEL Ltd. (DEC'22)

S.N	Location	Monitoring Date	Noise Level dB(A) Leq (day time)	Standard dB(A) Leq(Day Time)	Noise Level dB(A) Leq (Night time)	Standard dB(A) Leq(Night Time)
1	Colony	22.12.2022	53.5	55.0	44.2	45.0
2	Coke Oven-2	12.12.2022	66.9	75.0	60.2	70.0
3	AEL	07.12.2022	57.8	75.0	63.9	70.0

Section (I/C) | Manager (Lab) | Sr.Manager (Lab I/C)

...End Report...

Works: At- Narendrapur,P.O- Kusupanga,Via-Meramandali,Dhenkanal,Odisha-759121,Tel: 6764-229800

Environment Laboratory
TATA Steel Meramandali, Odisha

Ref.No. EMD/LAB/2022-23/102
Dt.06.02.2023

AMBIENT NOISE MONITORING (Day)
TATA STEEL Ltd. (JAN' 23)

S.N	Location	Monitoring Date	Noise Level dB(A) Leq (day time)	Standard dB(A) Leq (day Time)
1	Colony	24.01.2023	53.7	55.0
2	Coke Oven-2	03.01.2023	70.6	75.0
3	AEL	10.01.2023	71.4	75.0

Section (I/C)

Manager (Lab)

Sr.Manager (Lab I/C)

...End Report...

Works: At- Narendrapur,P.O- Kusupanga,Via-Meramandali,Dhenkanal,Odisha-759121,Tel: 6764-229800

Environment Laboratory
TATA Steel Meramandali, Odisha

Ref.No. EMD/LAB/2022-23/108
Dt.02.03.2023

AMBIENT NOISE MONITORING
TATA STEEL Ltd. (FEB' 23)

S.N	Location	Monitoring Date	Noise Level dB(A) Leq (day time)	Standard dB(A) Leq(Day Time)	Noise Level dB(A) Leq (Night time)	Standard dB(A) Leq(Night Time)
1	Colony	21.02.2023	53.5	55.0	44.8	45.0
2	Coke Oven-2	07.02.2023	60.8	75.0	58.5	70.0
3	AEL	02.02.2023	72.4	75.0	68.8	70.0

A.K. Pradhan.
Section (I/C)

Manager (Lab)

Maitreyee Dey
Sr.Manager (Lab I/C)

...End Report...

Works: At- Narendrapur,P.O- Kusupanga,Via-Meramandali,Dhenkanal,Odisha-759121,Tel: 6764-229800

Environment Laboratory
TATA Steel Meramandali, Odisha

Ref.No. EMD/LAB/2022-23/116
Dt.05.04.2023

AMBIENT NOISE MONITORING
TATA STEEL Ltd. (MARCH' 23)

S.N	Location	Monitoring Date	Noise Level dB(A) Leq (day time)	Standard dB(A) Leq(Day Time)	Noise Level dB(A) Leq (Night time)	Standard dB(A) Leq(Night Time)
1	Colony	21.03.2023	53.2	55.0	44.5	45.0
2	Coke Oven-2	14.03.2023	60.3	75.0	57.3	70.0
3	AEL	30.03.2023	62.9	75.0	69.5	70.0

A.K. Pradhan
Section (I/C)

Manager (Lab)

Maj. Reddy
Sr.Manager (Lab I/C)

...End Report...

Works: At- Narendrapur,P.O- Kusupanga,Via-Meramandali,Dhenkanal,Odisha-759121,Tel: 6764-229800

Annexure-VIII

CSR EXPENDITURE AND ACTIVITY HIGHLIGHTS (Around Tata Steel Limited, Meramandali) For Period October 2022 to March 2023		
PROGRAM HEAD	**Expenditure in Lakhs**	**MAJOR INTERVENTIONS/REMARKS**
Health	77.44	Mobile Medical Unit; Adolescent empowerment; Dengue/Malaria control
Drinking Water	35.29	Installation of tubewells; deep bore wells with overhead tank and pipeline system
Education	276.33	School infrastructure; Education project: QUEST
Livelihood	140.00	WEE Project; Other livelihood activities- Pisciculture; Vegetable production
Community Infrastructure	544.21	Construction & repair of road; Installation of solar lights
Sports	48.45	Volleyball coaching; Sports tournaments; Outdoor leadership camps
Ethnicity	1.14	Support to dist. administration to organize program for Juang tribe on awareness on Govt. schemes
TOTAL	**1122.86**	**Rs.11.23 Crores**

SUMMARY OF AMBIENT AIR QUALITY
MONTHLY AVERAGE VALUES

Month	Locations of Monitoring	Monthly Average				
		Unit in µg/m^3				Unit in mg/m^3
	Pollutant	PM_{10}	$PM_{2.5}$	SO_2	NO_2	CO
	Standard	100	60	80	80	2
Oct'22	CAAQMS-1	77.9	41.1	12.7	14.5	0.6
	CAAQMS-2	105.3	51.6	13	9.6	0.5
	CAAQMS-3	77.6	50.8	13.1	16.9	0.3
	CAAQMS-4	92.7	34.6	5.6	22.9	0.5
	CAAQMS-5	69.1	40.8	11.7	22.9	0.9
	CAAQMS-6	105.7	22.1	16.7	21.4	0.9
	CAAQMS-7	149.3	48.1	16.4	32.3	1.1
Nov'22	CAAQMS-1	113.34	72.24	12.83	14.2	0.71
	CAAQMS-2	147	87.63	17.27	12.65	0.26
	CAAQMS-3	93.96	58.71	12.52	17.37	0.3
	CAAQMS-4	124.01	59.96	6.48	24.36	0.21
	CAAQMS-5	136.07	83.75	12.71	24.26	0.51
	CAAQMS-6	199.58	56.73	17.81	22.92	0.37
	CAAQMS-7	258.7	102.81	16.84	32.23	1.13
Dec'22	CAAQMS-1	113.34	72.24	12.83	14.2	0.71
	CAAQMS-2	147	87.63	17.27	12.65	0.26
	CAAQMS-3	93.96	58.71	12.52	17.37	0.3
	CAAQMS-4	124.01	59.96	6.48	24.36	0.21
	CAAQMS-5	136.07	83.75	12.71	24.26	0.51
	CAAQMS-6	199.58	56.73	17.81	22.92	0.37
	CAAQMS-7	258.7	102.81	16.84	32.23	1.13
Jan'23	CAAQMS-1	128.49	78.23	12.51	14.12	0.71
	CAAQMS-2	157.15	72.44	14.36	9.66	0.79
	CAAQMS-3	143.43	28.31	11.76	18.13	0.42
	CAAQMS-4	192.84	78.89	7.75	8.85	0.21
	CAAQMS-5	152.99	118.38	13.89	24.93	0.52
	CAAQMS-6	207.54	106.82	18.38	13.73	0.46
	CAAQMS-7	147.82	63.86	14.38	32.62	1.18

Feb'23	CAAQMS-1	126.41	61.24	12.87	8.27	0.67
	CAAQMS-2	135.53	52.71	12.98	9.71	0.73
	CAAQMS-3	69.01	20.91	12.88	23.73	0.4
	CAAQMS-4	103.84	51.22	10.09	UM	0.62
	CAAQMS-5	142.82	84.11	22.16	15.06	0.55
	CAAQMS-6	187.33	81.54	11.82	24.77	0.7
	CAAQMS-7	182.35	60.6	22.52	33.1	1.12
Mar'23	CAAQMS-1	85.3	54.93	12.72	5.52	0.7
	CAAQMS-2	118.08	37.91	14.67	9.62	0.78
	CAAQMS-3	72.29	34.07	13.7	18.9	0.42
	CAAQMS-4	126.1	74.23	7.48	UM	0.25
	CAAQMS-5	105.54	61.58	16.71	10.02	0.52
	CAAQMS-6	106.02	45.45	6.04	20.95	0.79
	CAAQMS-7	103.03	40.9	24.13	24.33	1.23

All values are in $\mu g/m^3$ except CO values are in mg/m^3. All Values are derived from 24 hourly average data except CO values which are derived from 8 hourly average data.

CAAQMS 1: Near Township; CAAQMS 2: Near Utility Department; CAAQMS 3: Near CRM; CAAQMS 4: Near Water Complex; CAAQMS 5: Near Coke Oven 2; CAAQMS 6: Near Wagon Tippler; CAAQMS 7: Near Material Gate, UM: Under Maintenance.

SPECIFIC CONDITION:

SL	CONDITIONS	COMPLIANCE STATUS
i	The gaseous emissions from various process units shall conform to the load/mass based standards notified by the Ministry on 19th May, 1993 and standards prescribed from time to time. The state board may specify more stringent standards for the parameters keeping in the view the nature of the industry and its size and location. At no time the emission level should go beyond the prescribed standards. In the event of failure of any pollution control system adopted by the unit, the respective unit should not be restarted until the control measures are rectified to achieve the desired efficiency.	• 55 nos. of bag filter, 27 nos. of ESP have been installed with each operating unit to reduce particulate matter levels in ambient air. Details list of pollution control devices is enclosed **as Annexure-I.** • Results of gaseous emission levels from various stacks conform to the standards and details are enclosed as **Annexure-II.** • 4 Nos. mechanized road sweepers have been deployed to clean all concrete roads, and shop floors of individual units. • Water tankers have been deployed for water sprinkling whenever it is required. • Due to all these latest and most efficient air pollution control measures, ambient air quality in the complex is as per the AAQ standard. • 20 numbers of online gas analyzers for gaseous parameters have been provided on stacks. • 37 numbers of online dust monitors have also been installed and commissioned at the stacks. • To monitor the ambient air quality, we have installed 7 numbers of Continuous Ambient Air Quality Monitoring Stations (CAAQMS) in the entire complex of Tata Steel Limited in consultation with SPCB, Odisha.
ii	There shall be no discharge of process effluent. As reflected in the EIA/EMP report, the company shall undertake water conservation measures by recycling the water from the gas cleaning plant and cooling tower blow down. The plant design shall be base on 100% recirculation system to achieve zero discharge. The domestic waste water after treatment in STP shall be used for green belt development.	• Rate of freshwater consumption during the period Oct'22 to Mar'23 for the Steel plant is approx. 2372 m^3/hr. • All effluents are being treated in primary treatment plants (19 nos.) in steel plant attached with respective units and Effluent Treatment Plants (3 nos.) centrally. • Treated water is being reused for dust suppression, ash handling, make up for DRI & cooling towers and for green area development.

		• Process effluent after treatment is being reused. During the period Oct'22 to Mar'23, 3443796 m3 of water has been recycled. However, we are further improving the efficiency of the water management system by technology intervention to increase the utilization. • The sanitary sewage is being treated in 4 Sewage Treatment Plants and used for green belt development and low-end application in plant. • Rain water harvesting of capacity 50000m3 with HDPE liner has been constructed to store & reuse rainwater. • Zero Effluent Discharge (ZED) project will be implemented by March 2024.
iii	In plant control measures for checking fugitive emissions from spillage/raw materials handling shall be provided. Further specific measures like provisions of dust extraction & dust suppression system for product & raw materials handling, conveyor transfer points, water sprinkling system at waste disposal area to control the fugitive emissions shall be provided. Data on fugitive emission shall be regularly monitored & records maintained.	• Two Bag filter, adequate no. of Dry Fog Dust Suppression System (DFDS) and Single Fluid Dedusting System (SFDS) have been provided at the coal circuit.and bag filters have also been provided in the iron ore circuit at crushing and screening points of raw material handling areas. • Pneumatic dust handling system has been provided at ESP hoppers in the Sinter Plant-I. • Chain conveyor dust handling system has been provided at ESP hoppers of sinter plants II and III. • 242 numbers of nozzles in dry fog dust suppression system have been provided at 46 numbers of junction houses of raw material handling area. • Further, 128 nos. of rotary gun sprinklers have been installed throughout the raw material handling yards. • Mechanized road sweepers have been deployed for dry sweeping on roads and shop floors. • Regular monitoring of fugitive emission is carried out and report being submitted. • To improve AQI further, the company is analyzing the various point sources, line

		sources & area sources & continuously working to reduce work place emission by standardizing maintenance practices, adopting new technology (HFTR, MFTR. Mist Gun water sprinklers, Portable Donaldson Dust extraction system) & also installation new dust extraction system wherever required.
iv	The company shall use gas from the DRI for power generation & blast furnace gas for BF Stoves, sinter plant & furnace heating. The exhaust gas from the kiln shall be cleaned by dry gas cleaning system. The waste gas shall be passed through dust settling chamber to settle the coarse dust particulate & post combustion chamber to burn the CO in the flue gas. The boiler shall utilize the waste heat for steam generation. The particulate emissions shall be controlled by installation of ESP & the particulate emissions shall not exceed 100 mg/Nm3.	• The Plant has installed 10 nos. of DRI Kiln of 500 TPD each with WHRB system connected to 10 nos. of ESP at the hot end of the DRI Kiln and 5 nos. of De-dusting system at the cold end of the DRI kiln. • The particulate emission from the Stack is well within the limit. The monitoring data are enclosed as **Annexure-II**.
v	The company shall install centralized de-dusting system to control the primary emissions from the induction furnace top as canopy hood at the top of furnace to capture secondary emissions.	• The centralized de-dusting system has been established to control primary emissions from the induction furnace top as canopy hood to capture secondary emissions.
vi	The company shall take measures for installation of continuous ambient air quality monitoring stations and data sent electronically to SPCB/CPCB.	• 07Nos. CAAQM stations have been established in consultation with the SPCB in Tata Steel Meramandali complex. Half yearly reports are being submitted to the Regional Office of MoEF&CC, SPCB and CPCB at regular intervals. Summary of AAQ monitoring report is enclosed as **Annexure-III.** • The last half yearly compliance report was submitted vide letter no. TSM/MoEF&CC/BS-01/2022-20/265 dated 30.11.2022.

vii	SMS slag from induction furnace, EAF & LF shall be used for road making and railway blast. Coal washery middling and char from DRI shall be used for power generation. BF Slag should be granulated & sold to cement manufacturers. Scrap, coal & iron ore fines shall be reused. Fly ash shall be used for bricks manufacturing.	• The entire quantity of blast furnace slag is dispatched to cement manufacturers based on long term MoU with the cement manufacturer. • Details of generation and utilization of Blast Furnace slag are given as **Annexure-IV.** • The SMS slag (LD slag) is processed in material recovery plant (MRP) for separation of metallic from the non-magnetic part and sized for various applications. Some of the key applications of LD slag product are ➢ recovered metallics used in steel making process as a scrap, ➢ recovered fines used in sinter making process for replacement of lime, ➢ non-mag utilization in cement manufacturing, road making, and hard sand applications. • Fly ash brick and paver block have been manufactured inside the plant for use in construction activities including road construction etc. This is also helping in maximum utilization of fly ash. During the period Oct'22 to Mar'23, approx. 1 Lakh fly ash brick has been manufactured and utilized, and approx. 4 Lakhs of paver block has been manufactured and used in road construction in the plant. • Fly ash is also being supplied to o nearby fly ash brick manufacturing units, free of cost, for maximum utilization of ash. o Cement plants through rake & bulker. o Construction of national highway (NH-55). Balance if any is being utilised in reclamation of low lying areas & abandoned stone quarries as per guidelines of CPCB/ OSPCB after grant of necessary consents.

viii	Resettlement & Rehabilitation plan for displacement of families shall be as per the land acquisition Act & state government guidelines.	• The Resettlement & Rehabilitation plan for displacement of families has already made as per the Land Acquisition Act & State Government guidelines.
ix	A green belt of adequate width density shall be developed in 195 acres of plant area. Selection of plant species as per the CPCB guidelines.	• Green belt development is under progress in and around the plant complex by planting indigenous species as per CPCB guidelines. Till Mar'22, 33.66% of area (This includes Plant, R&R and CSR) has been covered under green belt. Rapid afforestation using MiyaWaki method in consultation with IIT, Kharagpur has been initiated. • Plantation of saplings are done regularly based on the availability of vacant area. During the period Oct'22 to Mar'23, 415 nos. has been planted. • Proper maintenance of green coverage is being ensured throughout the year by a dedicated horticulture team.
x	The company shall undertake community welfare measures for the local villagers & earmark separate funds for construction of schools, hospitals, community hall for peripheral development of all the villagers located around the plant site.	• The following community welfare measures are being undertaken. a. Education: School Infrastructure, drinking water at schools b. Drinking Water in the village (Through pipeline, tube well and deep bore well). c. Health: Primary Health Service through mobile medical unit and control of Dengue & Malaria are being under taken.
xi	The company shall obtain forest clearance for diversion of 151.92 acres of village forest land under forest (conservation) act, 1980 before undertaking construction activity.	• Necessary forest clearances have already been obtained vide file no. 8-84/2005-FC dated 13.11.2006.

xii	Occupational health surveillance of the workers shall be done on a regular basis and records maintained as per the factories act.	• Occupational health surveillance of the workers is being periodically done. Periodical Medical Examination and Food

		handler test are being conducted once in a year. • Necessary PPEs are provided to all the employees including the contractual workers.
xiii	Recommendations made in the CREP shall be implemented	• Tata Steel Limited has implemented all CREP recommendations.
xiv	Company shall keep proper housekeeping within the plant premises.	• Various initiatives are being taken for proper housekeeping within the Plant premises. Mechanized Road Sweepers, truck mounted mist canon have also been deployed to clean up roads periodically.
xv	The company shall undertake rainwater harvesting measures to harvest the rainwater for utilization in the lean season as well as to recharge the ground water table.	• Lagoons and HDPE pond have been constructed to harvest rainwater. This water is reused in the operation process when required. During the period Oct'22 to Mar'23, 49518 m3 of rainwater has been utilized in process. • RWH potential has been studied by engaging an expert agency & the suggested projects are being implemented in phases. In the first phase 50000 Cum capacity storage pond has been constructed in the year 2021. Also, rainwater collected from DRI & RMHS area are channelized through drains into a series of storage pond (3 nos. lagoons are in operation).

GENERAL CONDITION:

SL	CONDITIONS	COMPLIANCE STATUS
i	The project authorities must strictly adhere to the stipulations made by the Orissa State Pollution Control Board and the State Government.	• All relevant stipulations made by SPCB and the State Government are being complied.
ii	No further expansion or modifications in the plant shall be carried out without prior approval of the Ministry of Environment and Forests.	• As per MoEF&CC notification as per the MoEF& CC Notification No. S.O.980(E) dated: 02.03.2021"no increase in pollution load" (NIPL) was studied by expert agency for the followings and the same were verified by State Pollution Control Board. I. Enhancement of Hot Metal production from 3.919 MTPA to 5.0 MTPA vide OSPCB letter no. 246/IND-II-NOC-NIPL/24 dated 04.01.2022. CTO was granted vide letter No 4463/IND-I-CON-5440 dated 23.03.2023 with validity upto 31.03.2025. ~~II.~~ Installation of one no. of LRF of 190 T/heat and expansion of carrying capacity of two nos. of existing ladle from 180 T/heat to 190 T/heat vide OSPCB letter no.886/IND-II-NOC-NIPL/27 dated 20.01.2022. Trial CTO of LRF 3x190 Ton/heat was also granted by OSPCB.
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 PM_{10}, SO_2 and NOx are anticipated in consultation with the SPCB. Data on ambient air quality and stack emission shall be regularly submitted to this Ministry including its Regional Office at Bhubaneswar and the SPCB/CPCB once in six months.	• Seven CAAQM stations have been established in consultation with the SPCB in Tata Steel Meramandali integrated complex. Half yearly reports are being submitted to the Regional Office of MoEF&CC, SPCB and CPCB at regular intervals. Summary of AAQ monitoring report is attached as **Annexure-III.** • The last half yearly compliance report was submitted vide letter no. TSM/MoEF&CC/BS-01/2022-20/265 dated 30.11.2022.

iv	Industrial wastewater shall be properly collected, treated so as to conform to the standards prescribed under GSR 422 (E) dated 19th May, 1993 and 31st December, 1993 or as amended form time to time. The treated wastewater shall be utilized for plantation purpose.	The industrial as well as domestic wastewater is being treated and reused in various purposes like slag quenching, coke quenching, dust suppression and green belt development inside the plant premises. The monitoring reports of Industrial wastewater are being submitted to SPCB/CPCB/MOEF&CC at regular intervals.
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) (nighttime).	• Acoustic hoods, silencers, enclosures etc. on all sources of noise generation have been provided. Work zone noise monitoring is being carried out and maintained record. • A report of ambient noise levels recorded within the premises is enclosed as **Annexure-V**.
vi	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 to all environmental protection measures as recommended in EIA / EMP report is ensured. • Various socio-economic development programs covering education, safe drinking water, sports and health care etc. are undertaken in nearby villages. • A detailed breakup of CSR initiatives is enclosed as **Annexure- VI.**
vii	The project authority will provide separate fund both recurring and non-recurring to implement the conditions stipulated by the MoEF as well as the State Govt. along with the implementation schedule for all the conditions stipulated therein. The funds so provided should not be diverted for any other purposes.	• Adequate funds are being provided by the management for pollution control and to meet recurring costs. Environmental requirements are given top priority for fund allocation and approval of capital projects. • The funds earmarked for environment pollution control measures are not diverted for any other purpose. • The company has invested adequate capital expenditure to improve mix of clean power & also reduction of carbon emissions.

viii	The Regional Office of the Ministry at Bhubaneswar / CPCB / SPCB will monitor the stipulated conditions. A six monthly compliance report and monitoring data along with statistical interpretation should be submitted to them regularly.	• Six monthly compliance report and monitoring data are being submitted regularly. Last report has been submitted on 30.11.2022.
ix	The Project Proponent shall inform the public that the project has been accorded environmental clearance by the Ministry and copies of the clearance letter are available with the SPCB and may also be seen at Website of the Ministry of Environment and Forests at http:/envfor.nic.in. This shall be advertised within seven days from the date of issue of the clearance letter, at least in two local newspapers that are widely circulated in the region of which one shall be in the vernacular language of the locality concerned and a copy of the same should be forwarded to the Regional office at Bhubaneswar.	• Published in Times of India (English) dated 06.07.2005 and in Samaya (Oriya) dated 07.07.2005. • The same has already been communicated to the Regional Office of MOEF&CC, Bhubaneswar.
x	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.	• Project was completed and in operation. Consent to Operate was granted vide letter no. 23568/IND-I-CON-5440 dated 27.11.2012.

Annexure-I

DETAILS OF AIR POLLUTION CONTROL DEVICES

SL	Process	Bag filters (Nos.)	ESP (Nos.)	Other Pollution Control Devices
1.	RMHS & RMPP	02	-	Gun Sprinklers-128 nos. DFS Nozzles-242 nos. Auto DFS-24nos.
2.	Coke oven - I	04	-	Scrubber-01 nos.
3.	Coke oven - II	11	-	Scrubber-04 nos.
4.	Sinter Plant-I	01	03	-
5.	Sinter plant – II & III	07	04	-
6.	DRI	03	15	-
7.	Blast Furnace-I	03	-	Scrubber-01 nos.
8.	Blast Furnace-II	04	-	Scrubber-01 nos.
9.	Lime Plant	10	-	-
10.	SMS-II	07	-	-
11.	SMS-III	03	-	Scrubber-02 nos.
12.	Blast Furnace Power Plant-I	-	03	-
13.	Blast Furnace Power Plant-II	-	02	-

Annexure - II

SUMMARY OF STACK MONITORING

Period: From October 2022 to March 2023

S.N	Stack Attached to	Average Monthly Result in mg/m3						Standard as per CTO
		Oct'22	Nov'22	Dec'22	Jan'23	Feb'23	Mar'23	
1	AFBC	SD	SD	SD	SD	SD	SD	-
2	Sinter Plant -1 (85 M2 ESP)	14.21	6.38	16.15	12.31	16	18.1	100
3	Blast Furnace –I, Cast House	8.01	8.91	9.05	14.65	21.3	6.48	100
4	Blast Furnace –I, Stock House	4.6	4.1	4.08	5.32	9.4	11.9	100
5	SMS- 1	SD	SD	SD	SD	SD	SD	100
6	SMS 2 (FES 1)	9.61	6.8	8.36	6.93	7.3	8.86	100
7	SMS 2 (FES 2)	11.97	9.73	9.9	9.33	10	12.7	100
8	BFPP ESP 1	23.59	24.29	21.35	15.93	18.2	25.13	50
9	BFPP ESP 2	16.54	18.37	17.4	22.67	8.1	20.69	50
10	BFPP ESP 3	20.98	23.1	11.05	30.29	17.2	SD	50
11	Sinter Plant- 2	38.16	37.03	36.41	34.13	31.9	33.66	50
12	Sinter Plant- 3	39.52	42.06	37.74	34.27	37.7	38.41	50
13	SMS- 3 BOF (secondary chimney)	14.55	15.82	16.24	15.28	16.9	16.55	50
14	BFPP- 2 Boiler- 2	24.98	22.99	14.15	16.45	13.3	20.7	50
15	BFPP- 2 Boiler- 3							50
16	Coke oven (Battery- 1)	36.72	35.91	11.06	11.07	11	14.4	50
17	Coke oven (Battery- 2)	15.19	12.22	11.65	10.95	14.1	19.79	50
18	Coke oven- 2 (Battery- 2)	30.43	30.89	30.8	30.71	29.5	28.68	50
19	Blast Furnace –2, Cast House	13.16	13.09	15.68	17.86	7.2	9.87	50
20	Blast Furnace –2, Stock House	4.6	6.55	6.46	4.55	10.3	7.26	50
21	WHRB-1	49.6	35.69	32.82	25.97	13.5	SD	50
22	WHRB-2	23.72	SD	20.7	5.17	13.8	14.8	50
23	WHRB-3	10.2	20.1	21.87	19.08	22	24.46	50
24	WHRB-4	SD	7.3	13.67	10.91	15.6	8.7	50
25	WHRB-5	39.91	19.27	SD	9.82	13.2	18.91	50
26	WHRB-6	9.36	28.28	16.8	14.69	18.4	18.29	50
27	WHRB-7	32.57	8.28	18.58	28.43	24	29.57	50
28	WHRB-8	6.97	19.27	8.01	22.29	13.1	13.43	50
29	WHRB-9	15.7	34.58	13.85	15.08	13	13.43	50
30	WHRB-10	20.74	24.87	17.04	16.1	SD	5.96	50
31	DRI, Dedusting- 1	9.39	5.49	6.34	10.54	18.5	16.28	100
32	DRI, Dedusting- 2	12.08	15.66	14.11	14.69	16.7	19.2	100
33	DRI, Dedusting- 3	7.03	7.77	6.51	16.16	18.2	15.7	100
34	DRI, Dedusting- 4	15.46	18.39	17.15	32.24	20.1	21.97	100
35	DRI, Dedusting- 5	23.95	10.81	11.07	13.89	11.6	10.43	100

SD- Shut Down (Plant not in Operation)

SUMMARY OF STACK MONITORING

Period: From October 2022 to March 2023

Month		Oct'22		Nov'22		Dec'22		Jan'23		Feb'23		Mar'23	
S.N.	Stack Attached to	Result in mg/m3											
		SO_2	NO_X	SO_2	NO_X	SO_2	NO_X	SO_2	NO_X	SO_2	NO_X	SO_2	NO_X
1	BFPP ESP 1	380.94	67.69	598.82	133.9	868.24	215.45	977.87	247.6	857.02	260.27	1059.06	235.81
2	BFPP ESP 2	865.07	293.81	719.06	271.53	773.67	299.74	825.57	338.22	102.91	114.16	848.92	415.46
3	BFPP ESP 3	441.86	179.41	371.21	177.58	328.71	133.48	691.56	226.23	719.9	310.93	SD	
4	Sinter Plant- 2	296.87	138.76	252.27	104.51	264.9	96.85	162.72	55.78	186.68	95.15	360.31	168.93
5	Sinter Plant- 3	305.02	111.36	377.59	119.99	429.57	134.26	474.15	128	524.67	127.54	530.66	84.93
6	BFPP- 2 Boiler- 2	738.17	30.17	959.95	72.82	1055.77	60.66	843.38	33.38	787.49	28.49	973.91	24.28
7	BFPP- 2 Boiler- 3												
8	Coke oven (Battery- 1)	37.32	208.68	41.04	180.01	134.02	323.13	173.46	328.69	40.36	372.1	40.92	381.35
9	Coke oven (Battery- 2)	58.74	449.81	54.64	377	59.12	407.84	35.48	351.32	8.38	144.57	32.51	19.66
10	Coke oven- 2 (Battery- 2)	149.77	77.04	119.09	91.54	143.41	99.33	193.64	83.43	124.67	86.94	109.09	68.65
11	WHRB-1	852.97	71.66	1093.07	78.96	1087.03	95.71	938.28	86.2	299.64	43.98	SD	
12	WHRB-2	532	67.98	SD		974	102.9	759	97.9	759	97.9	673	99.2
13	WHRB-3	421.79	156.08	501.19	174.34	652	133.1	314.17	139.28	692.44	382.29	851.69	356.1
14	WHRB-4	SD		635	196.93	602.8	140.24	578.79	130.76	149.75	123.6	1167.62	128.1
15	WHRB-5	693.12	55.46	SD		SD		385.31	45.88	139.35	48.64	559.17	72.51
16	WHRB-6	62.19	3.48	740.69	33.63	539.2	181.12	432.15	156.33	230.69	141.5	225.92	142.6
17	WHRB-7	632.2	108.78	706.42	124.45	704.53	146.92	915.41	108.7	757.16	94.83	815.95	38.11
18	WHRB-8	UM		UM		UM		UM		UM		UM	
19	WHRB-9	428.96	111.97	417.2	42.28	580.86	25.73	847.76	311.03	603.2	629.78	933.44	416.31
20	WHRB-10	512.83	71.66	376.88	86.34	492.8	157.47	380.76	97.1	SD		479.29	99.01

SD: Shut Down (Plant not in Operation); UM: Under Maintenance

---------- End of Report ----------

Annexure – III

SUMMARY OF AMBIENT AIR QUALITY
MONTHLY AVERAGE VALUES

Month	Locations of Monitoring	Monthly Average				
		Unit in $\mu g/m^3$				Unit in mg/m^3
	Pollutant	PM_{10}	$PM_{2.5}$	SO_2	NO_2	CO
	Standard	100	60	80	80	2
Oct'22	CAAQMS-1	77.9	41.1	12.7	14.5	0.6
	CAAQMS-2	105.3	51.6	13	9.6	0.5
	CAAQMS-3	77.6	50.8	13.1	16.9	0.3
	CAAQMS-4	92.7	34.6	5.6	22.9	0.5
	CAAQMS-5	69.1	40.8	11.7	22.9	0.9
	CAAQMS-6	105.7	22.1	16.7	21.4	0.9
	CAAQMS-7	149.3	48.1	16.4	32.3	1.1
Nov'22	CAAQMS-1	113.34	72.24	12.83	14.2	0.71
	CAAQMS-2	147	87.63	17.27	12.65	0.26
	CAAQMS-3	93.96	58.71	12.52	17.37	0.3
	CAAQMS-4	124.01	59.96	6.48	24.36	0.21
	CAAQMS-5	136.07	83.75	12.71	24.26	0.51
	CAAQMS-6	199.58	56.73	17.81	22.92	0.37
	CAAQMS-7	258.7	102.81	16.84	32.23	1.13
Dec'22	CAAQMS-1	113.34	72.24	12.83	14.2	0.71
	CAAQMS-2	147	87.63	17.27	12.65	0.26
	CAAQMS-3	93.96	58.71	12.52	17.37	0.3
	CAAQMS-4	124.01	59.96	6.48	24.36	0.21
	CAAQMS-5	136.07	83.75	12.71	24.26	0.51
	CAAQMS-6	199.58	56.73	17.81	22.92	0.37
	CAAQMS-7	258.7	102.81	16.84	32.23	1.13
Jan'23	CAAQMS-1	128.49	78.23	12.51	14.12	0.71
	CAAQMS-2	157.15	72.44	14.36	9.66	0.79
	CAAQMS-3	143.43	28.31	11.76	18.13	0.42
	CAAQMS-4	192.84	78.89	7.75	8.85	0.21
	CAAQMS-5	152.99	118.38	13.89	24.93	0.52
	CAAQMS-6	207.54	106.82	18.38	13.73	0.46
	CAAQMS-7	147.82	63.86	14.38	32.62	1.18

Feb'23	CAAQMS-1	126.41	61.24	12.87	8.27	0.67
	CAAQMS-2	135.53	52.71	12.98	9.71	0.73
	CAAQMS-3	69.01	20.91	12.88	23.73	0.4
	CAAQMS-4	103.84	51.22	10.09	UM	0.62
	CAAQMS-5	142.82	84.11	22.16	15.06	0.55
	CAAQMS-6	187.33	81.54	11.82	24.77	0.7
	CAAQMS-7	182.35	60.6	22.52	33.1	1.12
Mar'23	CAAQMS-1	85.3	54.93	12.72	5.52	0.7
	CAAQMS-2	118.08	37.91	14.67	9.62	0.78
	CAAQMS-3	72.29	34.07	13.7	18.9	0.42
	CAAQMS-4	126.1	74.23	7.48	UM	0.25
	CAAQMS-5	105.54	61.58	16.71	10.02	0.52
	CAAQMS-6	106.02	45.45	6.04	20.95	0.79
	CAAQMS-7	103.03	40.9	24.13	24.33	1.23

All values are in $\mu g/m^3$ except CO values are in mg/m^3. All Values are derived from 24 hourly average data except CO values which are derived from 8 hourly average data.

CAAQMS 1: Near Township; CAAQMS 2: Near Utility Department; CAAQMS 3: Near CRM; CAAQMS 4: Near Water Complex; CAAQMS 5: Near Coke Oven 2; CAAQMS 6: Near Wagon Tippler; CAAQMS 7: Near Material Gate, UM: Under Maintenance.

Annexure - IV

Details of Slag Generation and Utilization
(Blast Furnace – 1 & 2)

Month	Quantity Generated (MT)	Quantity Dispatched (MT)
Oct'22	162122	180738
Nov'22	160541	165881
Dec'22	156283	168216
Jan'23	137559	148405
Feb'23	150219	128115
Mar'23	165052	196022
Total	**931776**	**987377**

Environment Laboratory
TATA Steel Meramandali, Odisha

Ref.No. EMD/LAB/2022-23/81
Dt.04.11.2022

AMBIENT NOISE MONITORING
TATA STEEL Ltd. (Oct '22)

S.N	Location	Monitoring Date	Noise Level dB(A) Leq (day time)	Standard dB(A) Leq(Day Time)	Noise Level dB(A) Leq (Night time)	Standard dB(A) Leq(Night Time)
1	Colony	27.09.2022	54.1	55.0	44.6	44.5
2	AEL	28.10.2022	56.7	75.0	69.0	70.0
3	Coke Oven-2	25.10.2022	62.2		69.3	

Section (I/C) | Manager (Lab) | Sr.Manager (Lab I/C)

...End Report...

Works: At- Narendrapur,P.O- Kusupanga,Via-Meramandali,Dhenkanal,Odisha-759121,Tel: 6764-229800

Environment Laboratory
TATA Steel Meramandali, Odisha

Ref.No. EMD/LAB/2022-23/88
Dt.07.12.2022

AMBIENT NOISE MONITORING
TATA STEEL Ltd. (NOV'22)

S.N	Location	Monitoring Date	Noise Level dB(A) Leq (day time)	Standard dB(A) Leq(Day Time)	Noise Level dB(A) Leq (Night time)	Standard dB(A) Leq(Night Time)
1	Colony	10.11.2022	52.5	55.0	43.6	45.0
2	Coke Oven-2	14.11.2022	57.1	75.0	50.0	70.0
3	AEL	16.11.2022	61.4	75.0	59.4	70.0

A.K. Pradhan
Section (I/C)

Manager (Lab)

Sr.Manager (Lab I/C)

...End Report...

Works: At- Narendrapur,P.O- Kusupanga,Via-Meramandali,Dhenkanal,Odisha-759121,Tel: 6764-229800

Environment Laboratory
TATA Steel Meramandali, Odisha

Ref.No. EMD/LAB/2022-23/95
Dt.04.01.2023

AMBIENT NOISE MONITORING
TATA STEEL Ltd. (DEC'22)

S.N	Location	Monitoring Date	Noise Level dB(A) Leq (day time)	Standard dB(A) Leq(Day Time)	Noise Level dB(A) Leq (Night time)	Standard dB(A) Leq(Night Time)
1	Colony	22.12.2022	53.5	55.0	44.2	45.0
2	Coke Oven-2	12.12.2022	66.9	75.0	60.2	70.0
3	AEL	07.12.2022	57.8	75.0	63.9	70.0

Section (I/C) | Manager (Lab) | Sr.Manager (Lab I/C)

...End Report...

Works: At- Narendrapur,P.O- Kusupanga,Via-Meramandali,Dhenkanal,Odisha-759121,Tel: 6764-229800

Environment Laboratory
TATA Steel Meramandali, Odisha

Ref.No. EMD/LAB/2022-23/102
Dt.06.02.2023

AMBIENT NOISE MONITORING (Day)
TATA STEEL Ltd. (JAN' 23)

S.N	Location	Monitoring Date	Noise Level dB(A) Leq (day time)	Standard dB(A) Leq (day Time)
1	Colony	24.01.2023	53.7	55.0
2	Coke Oven-2	03.01.2023	70.6	75.0
3	AEL	10.01.2023	71.4	75.0

Section (I/C)

Manager (Lab)

Sr.Manager (Lab I/C)

...End Report...

Works: At- Narendrapur,P.O- Kusupanga,Via-Meramandali,Dhenkanal,Odisha-759121,Tel: 6764-229800

Environment Laboratory
TATA Steel Meramandali, Odisha

Ref.No. EMD/LAB/2022-23/108
Dt.02.03.2023

AMBIENT NOISE MONITORING
TATA STEEL Ltd. (FEB' 23)

S.N	Location	Monitoring Date	Noise Level dB(A) Leq (day time)	Standard dB(A) Leq(Day Time)	Noise Level dB(A) Leq (Night time)	Standard dB(A) Leq(Night Time)
1	Colony	21.02.2023	53.5	55.0	44.8	45.0
2	Coke Oven-2	07.02.2023	60.8	75.0	58.5	70.0
3	AEL	02.02.2023	72.4	75.0	68.8	70.0

A.K. Pradhan.
Section (I/C)

Manager (Lab)

Maitreyee Dey
Sr.Manager (Lab I/C)

...End Report...

Works: At- Narendrapur,P.O- Kusupanga,Via-Meramandali,Dhenkanal,Odisha-759121,Tel: 6764-229800

Environment Laboratory
TATA Steel Meramandali, Odisha

Ref.No. EMD/LAB/2022-23/116
Dt.05.04.2023

AMBIENT NOISE MONITORING
TATA STEEL Ltd. (MARCH' 23)

S.N	Location	Monitoring Date	Noise Level dB(A) Leq (day time)	Standard dB(A) Leq(Day Time)	Noise Level dB(A) Leq (Night time)	Standard dB(A) Leq(Night Time)
1	Colony	21.03.2023	53.2	55.0	44.5	45.0
2	Coke Oven-2	14.03.2023	60.3	75.0	57.3	70.0
3	AEL	30.03.2023	62.9	75.0	69.5	70.0

A.K. Pradhan
Section (I/C)

Manager (Lab)

Maj. Reddy
Sr.Manager (Lab I/C)

...End Report...

Works: At- Narendrapur,P.O- Kusupanga,Via-Meramandali,Dhenkanal,Odisha-759121,Tel: 6764-229800

Annexure-VI

CSR EXPENDITURE AND ACTIVITY HIGHLIGHTS (Around Tata Steel Limited, Meramandali) For Period October 2022 to March 2023		
PROGRAM HEAD	**Expenditure in Lakhs**	**MAJOR INTERVENTIONS/REMARKS**
Health	77.44	Mobile Medical Unit; Adolescent empowerment; Dengue/Malaria control
Drinking Water	35.29	Installation of tubewells; deep bore wells with overhead tank and pipeline system
Education	276.33	School infrastructure; Education project: QUEST
Livelihood	140.00	WEE Project; Other livelihood activities- Pisciculture; Vegetable production
Community Infrastructure	544.21	Construction & repair of road; Installation of solar lights
Sports	48.45	Volleyball coaching; Sports tournaments; Outdoor leadership camps
Ethnicity	1.14	Support to dist. administration to organize program for Juang tribe on awareness on Govt. schemes
TOTAL	**1122.86**	**Rs.11.23 Crores**