



TSM/MoEF&CC/BS-01/2022-10/210

May 31, 2022

The Deputy Director General

Ministry of Environment, Forests and Climate Change,
Regional Office (EZ),
A/3, Chandrasekharpur,
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 Oct'21 to Mar'22.

Reference: I. EC vide letters no. J-11011/829/2008-IA-II (I), dated 20.07.2012 of 5.6 MTPA
II. EC vide letters no J-11011/405/2007-IA-II (I), dated 22.09.2008 of 3.1 MTPA
III. EC vide letters 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, 3.1 and 1.5 MTPA Integrated Steel Plant of Tata Steel Ltd., Meramandali for the period from October 2021 – March 2022 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:// environmentalclearance .nic.in](http://environmentalclearance.nic.in).

Hope the above are in line with the statutory requirements.

Thanking you,

Yours faithfully,

For Tata Steel Limited

Anoop Srivastava

Anoop Srivastava
Head Environment

Encl: As above

Copy to :

1. The Member Secretary, CPCB, Parivesh Bhawan, East Arjun Nagar, Delhi-110032.
2. The Member Secretary, SPCB, Parivesh Bhawan, A/118, Nilakahanta Nagar, Unit-VIII, Odisha, Bhubaneswar-751012.

TATA STEEL LIMITED

Narendrapur Kusunpanga Meramandali Dhenkanal 759 121 Odisha India Tel 91 6762 352000

Registered Office Bombay House 24 Homi Mody Street Fort Mumbai 400 001 India Tel 91 22 66654282 Fax 91 22 66657724

Corporate Identity Number L27100MH1907PLC000260 Website www.tatasteel.com



HALF YEARLY COMPLIANCE REPORT

for the period from
October 2021 to March 2022

Environment Clearance of 5.6 MTPA, 3.1MTPA and 1.5 MTPA Integrated Steel Plant

Letter nos.J-11011/8/2005-IA-II (I) dated 29.06.2005
J-11011/405/2007-IA-II (I) dated 22.09.2008
J-11011/829/2008-IA-II (I) dated 20.07.2012



TATA STEEL LIMITED

Narendrapur, Kusupanga, Meramandali, Dhenkanal, Odisha



HALF YEARLY COMPLIANCE REPORT

October'21 to March'22

Environment clearance of 5.6 MTPA Integrated Steel Plant
Letter no.: 1011/829/2008-IA-II (I) dated 20.07.2012

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.	<ul style="list-style-type: none">• Compliance reports including monitoring data are being sent to MOEF&CC, CPCB and SPCB regularly.• The last half yearly compliance report was submitted vide letter no. TSL/MoEF&CC/BS-01/2021-03/128 dated 22.11.2021.
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.	<ul style="list-style-type: none">• Six monthly compliance report including monitoring data for EC conditions of earlier 3.1 MTPA capacity is being sent to MOEF&CC, CPCB and SPCB regularly.• The last half yearly compliance report was submitted vide letter no. TSL/MoEF&CC/BS-01/2021-03/128 dated 22.11.2021.
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.	<ul style="list-style-type: none">• Consent to Operate for 5.6 MTPA integrated steel plant has been obtained from SPCB vide letter no 4049/IND-I-CON-5440, dated.17.03.2021 and is valid up to 31.03.2023.
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. Electro Static Precipitator (ESP), Gas cleaning plant (GCP), Bag Filter (BF) etc. shall be provided to keep the emission levels below by installing energy efficient technology.	<ul style="list-style-type: none">• Adequate air pollution control devices 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.• 08 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

HALF YEARLY COMPLIANCE REPORT

October'21 to March'22

		<p>Steel Limited in consultation with SPCB, Odisha.</p> <ul style="list-style-type: none"> 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	<p>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.</p>	<ul style="list-style-type: none"> 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. Five numbers of bag filters have also been provided in the iron ore circuit at crushing and screening points of raw material handling areas at the following locations. 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. 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 have also been installed in the sinter conveyor line.
vi	<p>The National Ambient Air Quality Standards issued by the Ministry vide G.S.R. No. 826(E) dated 16th November, 2009 shall be followed.</p>	<ul style="list-style-type: none"> 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 two locations for few days depending on the meteorological conditions and external factors.
vii	<p>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</p>	<ul style="list-style-type: none"> Adequate air pollution control devices have been installed to keep gaseous emissions within permissible limits and a detailed list of pollution control devices is enclosed as Annexure-I.

HALF YEARLY COMPLIANCE REPORT

October'21 to March'22

	monitored. Guidelines / Code of Practice issued by the CPCB shall be followed.	<ul style="list-style-type: none"> • 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'21 to Mar'22 is attached as Annexure-II and Annexure-III respectively.
viii	Proper PPE shall be provided to all the workers including contract workers.	<ul style="list-style-type: none"> • 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 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.	<ul style="list-style-type: none"> • 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.	<ul style="list-style-type: none"> • During the period Oct'21 to Mar'22 water consumption for the Steel plant is approx. 2258 m³ / hr. • All effluents are being treated in primary treatment plants (19 nos.) and Effluent Treatment Plants (3 nos.). • 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 has been reused. During the period Oct'21 to Mar'22, 2935234 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.

HALF YEARLY COMPLIANCE REPORT

October'21 to March'22

		<ul style="list-style-type: none"> • HDPE pond of 50000m³ capacity has been constructed to store & reuse rainwater. • Zero Effluent Discharge (ZED) project will be implemented 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.	<ul style="list-style-type: none"> • Lagoons and HDPE pond have been created to store rainwater water. This water is reused in the process when required. However, recently detailed scientific study has been carried out for management of surface runoff & rainwater harvesting. During the period Oct'21 to March'22, 22475 m³ of rainwater has been utilized in process. • RWH potential has been studied by engaging an expert M/s. KRG Foundation, Chennai & 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, rain water collected from DRI & RMHS area are channelized through drains into a series of storage cum percolation pond (3nos lagoons have been 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.	<ul style="list-style-type: none"> • Monitoring of influent, effluent, surface and groundwater quality is being carried out regularly in our laboratory. However, analysis of surface and groundwater quality is being carried out quarterly by a Govt. laboratory and the monitoring results are submitted to SPCB / CPCB / MOEF&CC at regular intervals. • 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 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.	<ul style="list-style-type: none"> • 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-V. • SMS slag is being used in sinter plant after processing in metal recovery plant. • Balance slag is being used for soling of roads.

HALF YEARLY COMPLIANCE REPORT

October'21 to March'22

		<ul style="list-style-type: none"> • Fly ash brick and paver block have been manufacturing units have been installed inside the plant for use in construction activities including road construction etc. inside the plant. This is also helping in maximum utilization of fly ash. During the period Oct'21 to Mar'22, 340090 Nos. of fly ash brick has been manufactured and utilized. • 686559 Nos. of paver block has been manufactured and used in road construction in the plant. • Fly ash is also being supplied to nearby fly ash brick manufacturing units, free of cost, for maximum utilization of ash. • Fly ash is also being supplied to cement plants through rake & bulker. • Fly ash is being used in the construction of national highway (NH-55). • Ash is also being used in filling 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.	<ul style="list-style-type: none"> • 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. A copy of HW annual return for the period Apr'21 to Mar'22 is attached as Annexure-VII.
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.	<ul style="list-style-type: none"> • Vehicles carrying raw materials and finished products 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.

HALF YEARLY COMPLIANCE REPORT

October'21 to March'22

		<ul style="list-style-type: none"> • Three Nos. of wheel washing systems have been installed at RMHS, BFPP1 and BFPP2. • Mechanized road sweepers have been deployed for dry sweeping of 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.	<ul style="list-style-type: none"> • The analysis of trace metals in raw materials is being done by CSIR-IMMT, Bhubaneswar. Copy of the same is enclosed as Annexure-VIII.
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.	<ul style="list-style-type: none"> • 37 km of internal roads have been concreted/paved. Those 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.	<ul style="list-style-type: none"> • Dry quenching has been commissioned at Coke Oven – II and now in operation. However, construction of Dry Quenching at Coke Oven – I is in the process and expected to be completed by July 2023.
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.	<ul style="list-style-type: none"> • A copy of the report of onsite emergency management plan along with mitigation measures approved by the Director of Factories and Boilers was submitted after grant of EC. However, the modified document was again submitted along with the half yearly EC compliance vide letter No. TSL/MoEF&CC/BS01/2021-03/128 dated 22.11.2021.
xx	As proposed, green belt shall be developed in 33 % of plant area as per the CPCB guidelines in consultation with the DFO.	<ul style="list-style-type: none"> • 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.

HALF YEARLY COMPLIANCE REPORT

October'21 to March'22

		<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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.	<ul style="list-style-type: none"> • Various socio-economic development programs covering education (Green school project in collaboration with TERI), roads in the nearby villages, safe drinking water, sanitation, sports, and health care etc. are undertaken in nearby villages as per the suggestions made in public hearing. The above includes social engineering as well as infrastructure projects.
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.	<ul style="list-style-type: none"> • 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 Apr'21 to Mar'22 is enclosed as Annexure-IX.
xxiv	The company shall provide housing for construction labour within the site with all 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.	<ul style="list-style-type: none"> • All necessary infrastructure and housing facilities were provided for workers during construction phase of the plant within the site. Same facilities are being continued during operational phase of the plant also. A full-fledged township with amenities (school, health center, recreation club) has also been constructed to improve quality of life of employees & their family members.
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.	<ul style="list-style-type: none"> • An environment laboratory having facilities for monitoring of all environmental parameters have established. However, it is in process of being upgraded to environment research laboratory with the help of Tata Steel R&D. One project has also been recognized in Tata Innovista & received several patents from govt. of India.

HALF YEARLY COMPLIANCE REPORT

October'21 to March'22

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.	<ul style="list-style-type: none"> 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.	<ul style="list-style-type: none"> No expansion or modification has been carried out without prior approval of Ministry of Environment, Forests and Climate Change. Enhancement of Hot Metal production from 3.919 MTPA to 5.0 MTPA through no increase in pollution load (NIPL) route under para 7(ii)b of EIA notification S.O.980(E) dated 03.02.2021 is planned. Certificate from OSPCB approved environment auditor has been obtained and the same has been verified/approved by OSPCB. Grant of consent to establish is under process.
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\	<ul style="list-style-type: none"> All the existing units have been provided with adequate air pollution control devices to keep the emission within the stipulated standards.
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 NO _x 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.	<ul style="list-style-type: none"> 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. The last half yearly compliance report was submitted vide letter no. TSL/MoEF&CC/BS-01/2021-03/128 dated 22.11.2021.
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.	<ul style="list-style-type: none"> 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.

HALF YEARLY COMPLIANCE REPORT

October'21 to March'22

		<ul style="list-style-type: none"> 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).	<ul style="list-style-type: none"> Acoustic hoods, silencers, enclosures etc. on all sources of noise generation have been provided. Work zone noise monitoring is being carried out and maintain record. The ambient and work zone noise level monitoring report 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.	<ul style="list-style-type: none"> Occupational health surveillance of the workers is being periodically done. 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.	<ul style="list-style-type: none"> Lagoons and HDPE pond have been created to store rain water and process water. This water is reused in the process when required. However, recently detailed scientific study has been carried out for management of surface runoff & rain water harvesting. During the period Oct'21 to March'22, 22475 m³ of rainwater has been utilized in process. RWH potential has been studied by engaging an expert M/s. KRG Foundation, Chennai & 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, rain water collected from DRI & RMHS area are channelized through drains into a series of storage cum percolation pond (3nos lagoons have been 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.	<ul style="list-style-type: none"> 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.

HALF YEARLY COMPLIANCE REPORT

October'21 to March'22

		<ul style="list-style-type: none"> • 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.	<ul style="list-style-type: none"> • 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.	<ul style="list-style-type: none"> • 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.	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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. TSL/MoEF&CC/BS-01/2021-03/128 dated 22.11.2021.

HALF YEARLY COMPLIANCE REPORT

October'21 to March'22

xiv	<p>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.</p>	<ul style="list-style-type: none"> • 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. TSBSL/SPCB/BS-03/2021-15/97, dated 29.09.2021.
xv	<p>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.</p>	<ul style="list-style-type: none"> • 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	<p>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.</p>	<ul style="list-style-type: none"> • 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.

HALF YEARLY COMPLIANCE REPORT

October'21 to March'22

Environment clearance of 3.1 MTPA Integrated Steel Plant
Letter no.: J-11011/405/2007-IA-II (I) dated 22.09.2008

SPECIFIC CONDITIONS:

SL	CONDITIONS	COMPLIANCE STATUS
i	<p>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/Nm³. Bag filters should be provided to the induction furnace to control the particulate emission below 100 mg/Nm³. 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.</p>	<ul style="list-style-type: none"> • Adequate air pollution control devices have been installed to reduce particulate matter levels in ambient air. Details list of pollution control devices installed is enclosed as Annexure-I. • 23 nos. online CEMS w.r.t gas and 34 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).

HALF YEARLY COMPLIANCE REPORT

October'21 to March'22

ii	<p>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/Nm³. 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 be 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.</p>	<p>Following facilities have been installed to control dust emissions:</p> <p>DRI & WHRB:</p> <ul style="list-style-type: none"> 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. <p>BLAST FURNACE:</p> <ul style="list-style-type: none"> Two nos. of bag filter have been installed in Cast House and stock house. To keep the emission well within the norms. <p>IF, LRF & CCM:</p> <ul style="list-style-type: none"> 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. <p>SMS II:</p> <ul style="list-style-type: none"> 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	<p>All the standards prescribed for the coke oven plants shall be followed as per the latest guidelines. Proper and full utilization of coke oven gases in power plant using waste heat recovery steam generators shall be ensured and no flue gases should be discharged into the air.</p>	<ul style="list-style-type: none"> 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.

HALF YEARLY COMPLIANCE REPORT

October'21 to March'22

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.	<ul style="list-style-type: none"> • Dry quenching has been commissioned for Coke Oven – II and now in operation. However, Coke Oven – I is in the process of transfer from wet to dry quenching and expected to be completed by July 2023.
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.	<ul style="list-style-type: none"> • Adequate air pollution control devices have been installed to keep gaseous emissions within permissible limits and a detailed 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'21 to March'22 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.	<ul style="list-style-type: none"> • Two bag filters, and adequate no. of DFDS and SFDS have been provided at coal circuit. • Five numbers of bag filters have also been provided in the iron ore circuit at crushing and screening points of raw material handling areas at the following locations: • 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. • 266 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. • 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	<ul style="list-style-type: none"> • Vehicles carrying raw materials and finished products are being covered with tarpaulin. • Water sprinkling arrangement has been made by installation of 128 numbers of

HALF YEARLY COMPLIANCE REPORT

October'21 to March'22

	loading and unloading of the raw material and finished product.	<p>rotary gun sprinklers at raw material handling areas to control dust emissions during loading and unloading of raw materials at site.</p> <ul style="list-style-type: none"> • 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. • Three Nos. of wheel washing systems have been installed at RMHS, BFPP1 and BFPP2.
viii	<p>Total water requirement should not exceed 1, 29,600 m³/day. Permission for drawl of 2,40,000 m³/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.</p>	<ul style="list-style-type: none"> • During the period Oct'21 to Mar'22 water consumption for the steel plant is about 2258 m³ / hr. • All effluents are being treated in primary treatment plants (19 nos.) and common Effluent Treatment Plants (3 nos.). • Treated water is being reused for dust suppression, ash handling, make up for DRI & cooling towers and also for green area development. • Process effluent after treatment has been reused. During the period Oct'21 to Mar'22, 2935234 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. • HDPE pond of 50000 m³ capacity has been constructed to store & reuse of rainwater. • Zero Effluent Discharge (ZED) project will be implemented by March 2024.
ix	<p>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)</p>	<ul style="list-style-type: none"> • 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.

HALF YEARLY COMPLIANCE REPORT

October'21 to March'22

		<ul style="list-style-type: none"> • 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.	<ul style="list-style-type: none"> • 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-V. • 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.	<ul style="list-style-type: none"> • 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.	<ul style="list-style-type: none"> • SMS slag is being used in sinter plant after processing in metal recovery plant. • Balance slag is being used for soling of roads. • We are also exploring the use of SMS slag in cement plant and brick manufacturing plant. • 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	<ul style="list-style-type: none"> • 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.

HALF YEARLY COMPLIANCE REPORT

October'21 to March'22

	waste shall be submitted to Ministry's Regional office at BBSR, CPCB and OPCB.	<ul style="list-style-type: none"> Annual return of hazardous waste is being regularly submitted to SPCB Odisha. A copy of HW annual return for the period April'21 to March'22 is enclosed as Annexure-VII.
xiv	A time bound action plan shall be submitted to reduce solid waste its proper utilization and disposal.	<ul style="list-style-type: none"> The solid wastes generated from various plant units are being efficiently recycled back within the plant processes. 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.	<ul style="list-style-type: none"> Fly ash brick and paver block have been manufacturing units have been installed inside the plant for use in construction activities including road construction etc. inside the plant. This is also helping in maximum utilization of fly ash. During the period Oct'21 to Mar'22 340090 Nos, of fly ash bricks have been manufactured and utilized. Pavers block 686559 Nos. has been manufactured and used in road construction in the plant. Fly ash is also being supplied to nearby fly ash brick manufacturing units, free of cost, for maximum utilization of ash. Fly ash is also being supplied to cement plants through rake & bulker. Fly ash is being used in construction of national highway (NH-55). Ash is also being used in filling low lying areas & abandoned stone quarries as per guidelines of CPCB/ OSPCB after grant of necessary consent.
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.	<ul style="list-style-type: none"> Green belt development is under progress in and around the plant complex by planting indigenous species as per CPCB guidelines. Till March'22, 33.66% 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.

HALF YEARLY COMPLIANCE REPORT

October'21 to March'22

		<ul style="list-style-type: none"> • Proper maintenance of green coverage is 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.	<ul style="list-style-type: none"> • 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.	<ul style="list-style-type: none"> • 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.	<ul style="list-style-type: none"> • No expansion or modification has been carried out without prior approval of Ministry of Environment, Forests and Climate Change.
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.	<ul style="list-style-type: none"> • 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.	<ul style="list-style-type: none"> • 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-X. • The last half yearly compliance report was submitted vide letter no. TSL/MoEF&CC/BS-01/2021-03/128 dated 22.11.2021.

HALF YEARLY COMPLIANCE REPORT

October'21 to March'22

v	<p>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 asphaltting or concreting of the roads shall be done to control fugitive emission.</p>	<p>To have a control on fugitive emissions, following measures have taken:</p> <ul style="list-style-type: none"> • 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	<p>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.</p>	<ul style="list-style-type: none"> • 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	<p>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).</p>	<ul style="list-style-type: none"> • 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-XI.
viii	<p>Occupational health surveillance of the workers should be done on a regular basis and records maintained as per the Factories Act.</p>	<ul style="list-style-type: none"> • Occupational health surveillance of the workers is being periodically done.

HALF YEARLY COMPLIANCE REPORT

October'21 to March'22

		<ul style="list-style-type: none"> 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.	<ul style="list-style-type: none"> Lagoons and HDPE pond have been created to store rainwater and process water. This water is reused in the process when required. However, recently detailed scientific study has been carried out for management of surface runoff & rain water harvesting. During the period Oct'21 to Mar'22, 22475 m³ of rainwater has been utilized in process. RWH potential has been studied by engaging an expert M/s. KRG Foundation, Chennai & 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, rain water collected from DRI & RMHS area are channelized through drains into a series of storage cum percolation pond (3 nos. lagoons have been 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.	<ul style="list-style-type: none"> 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- IX.
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.	<ul style="list-style-type: none"> 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.

HALF YEARLY COMPLIANCE REPORT

October'21 to March'22

xii	<p>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.</p>	<ul style="list-style-type: none"> • 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. TSL/MoEF&CC/BS-01/2021-03/128 dated 22.11.2021.
xiii	<p>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.</p>	<ul style="list-style-type: none"> • 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	<p>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.</p>	<ul style="list-style-type: none"> • 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.

HALF YEARLY COMPLIANCE REPORT

October'21 to March'22

Environment clearance of 1.5 MTPA Integrated Steel Plant
Letter no.: 11011/8/2005-IA-II (I) dated 29.06.2005

SPECIFIC CONDITIONS:

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.	<ul style="list-style-type: none"> • All the existing units have been provided with adequate air pollution control devices to keep the emission within the stipulated standards. Detail 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-III. • 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. • 23 numbers of online gas analyzers for gaseous parameters have been provided on stacks. • 34 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.	<ul style="list-style-type: none"> • During the period Oct'21 to Mar'22 consumption for the Steel plant is about 2258 m³ / hr. • All effluents are being treated in primary treatment plants (19 nos.) and Effluent Treatment Plants (3 nos.). • Treated water is being used for dust suppression, ash handling, make up for DRI & cooling towers, and for green area development. • Process effluent after treatment has been reused. During the period October'21 to March'22, 2935234 m³ of water has been

HALF YEARLY COMPLIANCE REPORT

October'21 to March'22

		<p>recycled. However, we are further improving the efficiency of the water management system by technology intervention to increase the utilization.</p> <ul style="list-style-type: none"> • The sanitary sewage is being treated in 4 Sewage Treatment Plants and used for green belt development and low-end application in plant. • HDPE pond of 50000m³ capacity has been constructed to store & reuse rainwater. • Zero Effluent Discharge (ZED) project will be implemented by March 2024.
iii	<p>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.</p>	<ul style="list-style-type: none"> • 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. • Five numbers of bag filters have also been provided in the iron ore circuit at crushing and screening points of raw material handling areas at the following locations. • 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. • 266 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

HALF YEARLY COMPLIANCE REPORT

October'21 to March'22

		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/Nm ³ .	<ul style="list-style-type: none"> • 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-III.
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.	<ul style="list-style-type: none"> • 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.	<ul style="list-style-type: none"> • 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 enclosed as Annexure-X. • The last half yearly compliance report was submitted vide letter no. TSL/MoEF&CC/BS-01/2021-03/128 dated 22.11. 2021.
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.	<ul style="list-style-type: none"> • The entire quantity of blast furnace slag is dispatched to cement manufacturers base on long term MoU with the cement manufacturers. • Details of generation and utilization of Blast Furnace slag is given as Annexure-V. • SMS slag is being used in sinter plant after processing in metal recovery plant. • Balance slag is being used for soling of roads.

HALF YEARLY COMPLIANCE REPORT

October'21 to March'22

		<ul style="list-style-type: none"> • Fly ash brick and paver block have been manufacturing units have been installed inside the plant for use in construction activities including road construction etc. inside the plant. This is also helping in maximum utilization of fly ash. During the period Oct'21 to Mar'22 340090 Nos, of fly ash brick has been manufactured and utilized. • Pavers block 686559 Nos. has been manufactured and used in road construction in the plant. • Fly ash is also being supplied to nearby fly ash brick manufacturing units, free of cost, for maximum utilization of ash. • Fly ash is also being supplied to cement plants through rake & bulker. • Fly ash is being used in the construction of national highway (NH-55). • Ash is also being used in filling low lying areas & abandoned stone quarries as per guidelines of CPCB/ OSPCB after grant of necessary consent.
viii	Resettlement & Rehabilitation plan for displacement of families shall be as per the land acquisition Act & state government guidelines.	<ul style="list-style-type: none"> • 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.	<ul style="list-style-type: none"> • Green belt development is under progress in and around the plant complex by planting indigenous species as per CPCB guidelines. Till March'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. • Proper maintenance of green coverage is ensured throughout the year by a dedicated horticulture team.
x	The company shall undertake community welfare measures for the local villagers &	<ul style="list-style-type: none"> • All necessary infrastructure and housing facilities were provided for workers during

HALF YEARLY COMPLIANCE REPORT

October'21 to March'22

	earmark separate funds for construction of schools, hospitals, community hall for peripheral development of all the villagers located around the plant site.	<p>construction phase of the plant within the site. Same facilities are being continued during operational phase of the plant also. A full-fledged township with amenities (school, health center, recreation club) has also been constructed to improve quality of life of employees & their family members.</p> <ul style="list-style-type: none"> • A Detailed breakup of CSR initiatives is enclosed as Annexure- IX.
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.	<ul style="list-style-type: none"> • Necessary forest clearances have already been obtained vide file no. 8-84/2005-FC dated 13.11.2006 enclosed as Annexure- XII.
xii	Occupational health surveillance of the workers shall be done on a regular basis and records maintained as per the factories act.	<ul style="list-style-type: none"> • Occupational health surveillance of the workers is being periodically done. • Necessary PPEs are provided to all the employees including the contractual workers.
xiii	Recommendations made in the CREP shall be implemented	<ul style="list-style-type: none"> • Tata Steel Limited has implemented all CREP recommendations.
xiv	Company shall keep proper housekeeping within the plant premises.	<ul style="list-style-type: none"> • Various initiatives are being taken for proper housekeeping within the Plant premises. Mechanized Road Sweepers, truck mounted mix canon have also 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.	<ul style="list-style-type: none"> • Lagoons and HDPE pond have been created to store rainwater and process water. This water is reused in the process when required. However, recently detailed scientific study has been carried out for management of surface runoff & rain water harvesting. During the period Oct'21 to March'22, 22475 m3 of rainwater has been utilized in process. • RWH potential has been studied by engaging an expert M/s. KRG Foundation, Chennai & 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, rain water collected from DRI & RMHS area are channelized through



HALF YEARLY COMPLIANCE REPORT

October'21 to March'22

		drains into a series of storage cum percolation pond (3nos lagoons have been 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.	<ul style="list-style-type: none"> 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.	<ul style="list-style-type: none"> No expansion or modification has been carried out without prior approval of the Ministry of Environment, Forests and Climate Change.
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 NO _x 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.	<ul style="list-style-type: none"> 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-X. The last half yearly compliance report was submitted vide letter no. TSL/MoEF&CC/BS-01/2021-03/128 dated 22.11.2021.
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.	<ul style="list-style-type: none"> 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.
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	<ul style="list-style-type: none"> 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-XI.

HALF YEARLY COMPLIANCE REPORT

October'21 to March'22

	viz. 75 dB (A) (daytime) and 70 dB (A) (nighttime).	
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.	<ul style="list-style-type: none"> • 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- IX.
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.	<ul style="list-style-type: none"> • 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.	<ul style="list-style-type: none"> • Six monthly compliance report and monitoring data are being submitted regularly. Last report has been submitted on 22.11.2021.
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.	<ul style="list-style-type: none"> • 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.



HALF YEARLY COMPLIANCE REPORT

October'21 to March'22

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.	<ul style="list-style-type: none">• Project was completed and in operation. Consent to Operate was granted vide letter no. 23568/IND-I-CON-5440 dated 27.11.2012.
---	--	---

DETAILS OF AIR POLLUTION CONTROL DEVICES

SL	Process	Bag filters (Nos.)	ESP (Nos.)	Other Pollution Control Devices
1	Sinter Plant-I	01	03	-
2	Sinter plant - II	03	02	-
3	Sinter plant - III	02	02	-
4	Coke oven - I	04	-	Scrubber-01 nos.
5	Coke oven - II	11	-	Scrubber-04 nos.
6	Blast Furnace-I	03	-	Scrubber-01 nos.
7	Blast Furnace-II	04	-	Scrubber-01 nos.
8	Blast Furnace Power Plant-I	-	03	-
9	Blast Furnace Power Plant-II	-	04	-
10	SMS-I	04	-	-
11	SMS-II	07	-	-
12	SMS-III	03	-	Scrubber-01 nos.
13	RMPP	07	-	DFS Nozzles -242 nos. Auto DFS-24 nos.
14	DRI	03	15	-
15	Lime Plant	10	-	-
16	RMHS	-	-	Gun sprinklers-128 nos.
17	BOF Briquetting Plant	07	-	
18	Junction House-35	01	-	
19	Junction House-36	01		

SUMMARY OF FUGITIVE EMISSION RESULTS MONTHLY AVERAGE VALUES				
TATA STEEL LIMITED				
Sl. No	Location	PM 10 in µg/m³	Standard in µg/m³	
Sinter Plant II				
1	Near SP-2 cooling tower F-200	374	2000	
2	Near SP-2 chimney Backside area	1253		
3	Near 7003 conveyor Belt	1016		
4	Near 7002 conveyor Belt	1204		
Sinter Plant III				
1	Near chiller Plant SP-2,3 & parking area	242		
2	Near 7008 conveyor Belt SP-3	2309		
3	Near screening Building	1526		
4	Near cooler area B/50	228		
5	Near Fire water pump House SP-2 (Screening Building)	331		
6	Near conveyor -2E 08-002	1331		
7	Near weigh feeder 1020	804		
8	Near cooler SP-3 D/15	297		
Sinter Plant I				
1	Near SP-1 conveyor J-29	1241		
2	Near SP-1 agglomeration Plant	829		
3	Near proportion ting Building	916		
4	Near SP-1 Mixing House	1480		
5	Near Crusher Building	1897		
6	Near Flux Screening Building	1883		
Lime Plant				
1	Near DM Water storage Tank	320	-	
2	Conveyor 2A&B	398		
3	Conveyor 2C&D	382		
4	Kiln 1&2 Screen House	620		
5	Kiln 3&4 Screen House	600		
6	Near DE system	341		
7	Near Mechanical Work shop	339		
8	Near Blower house(Waste gun filter 1,2&3)	278		
9	Near Compressor House	293		
10	Lime delivery building	1138		
11	Near De dusting -3 ID Fan	427		
12	Near lime dolo sizing unit	823		
13	Near Dedusting 01 Area	180		
14	Under Conveyor	267		
Blast furnace-I				
1	Near Thickener	299	4000	
2	Near Main pump house	243		
3	Secondary cooling tower	212		
4	Near Chiller Plant	283		
5	Near stock house	1626		
6	Near Cast house	1631		

Blast furnace-II			
1	Cast House	365	3000
2	Dry Pit	348	
3	Furnace	805	
4	Stock House	2500	
5	Near Thickener	204	
Coke Oven-1			
1	Coke cutter section	550	4000
2	Fine crusher station	1934	
3	Near Battery Stack	293	
4	Near quenching tower	250	
5	Secondary crusher	845	
6	Near Coke Yard	421	
Coke Oven-II			
1	Coke treatment building	837	4000
2	Near BOD plant	208	
3	Near Tar recovery system/byproduct recovery	255	
4	Near Canteen	297	
5	Coal crushing building	874	
6	Near CDQ stack	189	
7	Near Coal mixing building	711	
8	Near Coke Oven-II junction (Plaza-I)	242	
RMHS			
1	RMHS Entry Point	185	2000
2	Coal Yard -7 Lucky Mineral Office	278	
3	Infront of PCI building	273	
4	Near JH-21 Yard-7 (Iron ore conveying)	686	
5	Near Stacker yard No. 4&5	312	
6	Near Non cooking coal shed	239	
7	Near RMPP Office JH	554	
8	Near DRI -10 trafficpost	207	
9	Near DRI -1 traffic post Plaza -1	142	
RMPP			
1	Near CSB-1	836	2000
2	Near CSB-2	840	
3	Near tertiary Crushing & Screening Building Area	2984	
4	Near Iron Crusher Area	1281	
5	Near Ground Hopper Area	218	
DRI			
1	Near WHRB -5 ash silo	642	2000
2	Near WHRB -4 ash silo	716	
3	Near Briquetting plant	973	
4	Near PSB-2 building	2342	
5	Near PSB-3 building	1970	
6	Near PSB- 4 building	1155	
7	Near PSB-5 building	2328	
8	Near training center	158	
9	Near DRI -5 day bin	697	

10	Near DRI-I char silo	750	
11	Near DRI -III car Silo	796	
B.B Plant			
1	Plant Office	341	2000
2	Storage building	1416	
3	Flux crushing and screen building	1550	
Power Plant			
1	BFPP1 Ash silo	832	-
2	AEL ash silo	1036	
3	Near BOF gas holder	140	
4	Near stack -II AEL	183	
SMS-II			
1	SMS-2 Near Canteen	688	4000
2	SMS-2 Furnace area	876	
3	Lime briquetting plant	630	
4	Baghouse SMS-II	408	
SMS-III			
1	BOF sludge Yard	132	3000
2	BOF DE system	300	
3	BOF Furnace area	574	
4	Slag yard entrance	1076	
5	MRSS-II	310	
IBMD Sales yard			
1	Near Brick area	111	-
2	Near Wooden area	111	
3	Near Scarp Cutting Area	270	
MRP Plant near Sarpa boundary			
1	Near BC-12 Area	1070	-
2	Near BC-13 Area	849	
3	Near Drum Magnet area	956	
4	Near Feed Hopper Area	979	
Old MRP Plant			
1	Discharge Of BC-12 &13	3010	-
2	Discharge Of BC-9 &10	1205	
3	Material Feeding Area	1584	
4	Slag Pit Ramp Entrance Area	1323	
5	Slag Pit unloading Point Area	759	
6	Slag pit near MRP plant side	466	
Wagon Tippler Area			
1	Near Wagon Tippler Entrance Area	308	-
2	Near Wagon Tippler No-1	563	
3	Near Wagon Tippler No-2	525	
4	Near Wagon Tippler No-3	600	
5	Near Wagon Tippler No-4	476	
6	Track Hopper No-1&2	1303	
7	Foot Over Bridge	203	
BFPP-2			
1	Near ESP Area	200	-
2	Near Ash silo Area	498	
BFPP-1			

1	Near ESP Area	280	-
2	Near Ash silo Area	998	
HSM			
1	Near Stack area	133	-
2	Nera Gate 10 Area	250	
3	Nera Coil Yard area	870	
CRM			
1	Near ETP Area	169	-
2	Near canteen area	143	
3	Near Used Oil Storage Area	233	

SUMMARY OF STACK MONITORING

Period: From October'21 to March'22

S.N	Sampling Location	Oct'21	Nov'21	Dec'21	Jan'22	Feb'22	Mar'22	Standard mg/Nm ³
01	AFBC	SD						100
02	Sinter Plant -1(85 M2 ESP)	15.34	11.73	11.98	18.28	12.60	13.19	100
03	Blast Furnace –I, Cast House	2.83	9.41	10.61	12.09	13.92	31.15	100
04	Blast Furnace –I, Stock House	19.39	3.70	3.21	4.22	7.43	6.49	100
05	SMS- 1	SD						100
06	SMS 2 (FES 1)	12.12	6.97	9.96	11.72	21.73	20.05	100
07	SMS 2 (FES 2)	6.68	13.34	22.94	23.95	15.39	21.64	100
08	BFPP ESP 1	12.35	21.36	47.73	34.57	26.71	16.68	50
09	BFPP ESP 2	22.83	25.42	23.92	21.03	20.60	17.41	50
10	BFPP ESP 3	36.57	40.62	28.65	23.20	14.46	20.69	50
11	Sinter Plant- 2	35.55	40.98	41.70	39.75	42.45	42.84	50
12	Sinter Plant- 3	43.25	42.62	40.98	40.95	41.25	42.87	50
13	SMS- 3 BOF (Secondary chimney)	21.53	25.15	15.06	16.67	18.36	15.47	50
14	BFPP- 2 Boiler- 2 &3	28.55	28.56	22.35	26.30	17.86	12.03	50
15	Coke oven (Battery- 1)	35.85						50
16	Coke oven (Battery- 2)	13.19	36.04	36.12	36.09	35.82	34.41	50
17	Coke oven- 2 (Battery- 2)	37.27	15.73	14.83	16.32	21.08	27.08	50
18	Blast Furnace –2, Cast House	9.50	37.33	36.87	36.30	37.44	38.11	50
19	Blast Furnace –2, Stock House	8.73	11.94	14.00	18.92	26.82	13.55	50
20	WHRB-1	SD						50
21	WHRB-2	SD						50
22	WHRB-3	17.65	28.34	36.76	31.53	38.60	42.03	50
23	WHRB-4	16.48	15.09	16.67	20.64	27.68	18.70	50
24	WHRB-5	SD	18.62	20.70	24.14	20.71	27.92	50
25	WHRB-6	15.09	15.14	14.52	13.72	7.80	7.81	50
26	WHRB-7	10.43	10.46	11.01	10.81	27.44	46.52	50
27	WHRB-8	SD	SD	32.92	31.60	19.83	21.93	50
28	WHRB-9	7.70	17.53	24.91	20.06	15.81	16.70	50
29	WHRB-10	14.37	15.31	19.49	33.71	8.29	7.02	50

SD- Shut Down

SUMMARY OF STACK MONITORING

Period: From October'21 to March'22

S.N	Sampling Location	Oct'21		Nov'21		Dec'21		Jan'22		Feb'22		Mar'22	
		SO2	NOx	SO2	NOx	SO2	NOx	SO2	NOx	SO2	NOx	SO2	NOx
1	WHRB-1	SD		SD		SD		SD		SD		SD	
2	WHRB-2	SD		SD		SD		SD		SD		SD	
3	WHRB-3	565.87	23.84	635.05	66.07	632.50	9.94	629.09	39.83	629.09	39.83	245.83	30.88
4	WHRB-4	695.28	40.67	695.28	40.67	695.28	40.67	695.28	40.67	695.28	40.67	521.92	128.08
5	WHRB-5	SD		496.72	14.20	775.84	14.20	860.35	14.20	874.16	14.20	836.31	32.86
6	WHRB-6	365.00	47.00	365.00	47.00	365.00	47.00	365.00	47.00	365.00	47.00	365.00	47.00
7	WHRB-7	632.41	39.90	632.41	39.90	632.41	39.90	632.41	39.90	632.41	39.90	628.68	39.90
8	WHRB-8	SD		SD		460.80	35.90	460.80	35.90	460.80	35.90	460.80	35.90
9	WHRB-9	332.67	83.63	576.8	12.09	180.96	59.58	814.14	28.64	808.99	16.21	295.56	122.51
10	WHRB-10	299.8	83.51	299.8	83.51	179.29	151.83	179.29	118.85	818.86	68.02	763.66	52.59
11	Sinter Plant-1	489.00	214.00	489.00	214.00	489.00	214.00	489.00	214.00	489.00	214.00	489.00	214.00
12	Sinter Plant- 2	597.00	296.00	597.00	296.00	597.00	296.00	597.00	296.00	597.00	296.00	597.00	296.00
13	Sinter Plant- 3	36.93	325.55	150.74	274.93	416.76	226.84	568.73	267.09	538.16	175.16	700.48	175.16
14	BF PP-1 (Boiler-1)	976.12	110.87	646.07	122.39	729.57	122.07	818.10	118.10	829.44	105.93	646.00	118.10
15	BF PP-1 (Boiler-2)	1204.06	50.45	811.53	227.21	856.92	237.91	769.50	320.30	914.26	264.68	303.00	320.30
16	BF PP-1 (Boiler-3)	1172.86	221.99	971.48	193.10	900.25	200.28	573.30	138.90	824.11	117.10	850.00	138.90
17	BFPP- 2 Boiler- 2 &3	1315.25	60.87	1260.91	66.46	1198.39	73.92	1152.00	98.90	1178.17	45.38	1192.00	98.90
18	Coke oven (Battery- 1)	52.92	212.99	19.07	232.31	34.81	313.17	23.10	332.80	30.04	272.56	142.00	332.80
19	Coke oven (Battery- 2)	41.47	297.48	30.30	297.52	43.26	373.35	49.30	407.10	61.68	73.56	85.60	407.10
20	Coke oven-2 Battery	87.92	85.16	45.12	91.21	74.95	93.72	94.30	81.80	119.34	81.45	39.28	81.80

Summary of Surface Water Quality Analysis

Period: From Oct-21 to March-22

S.N	Parameter	Unit	Lingala Nala		Kishinda Nala		Standard as per Class C -IS 2296 /CPCB
			U/S	D/S	U/S	D/S	
1	pH Value	-	7.39 - 7.79	7.69 – 7.9	7.43 – 8.3	7.65 – 8.9	6.0-9.0
2	Colour	Hazen	0.26 - 2.3	0.53 – 2.6	0.85 – 4.6	0.75 – 4.9	300 (max)
3	Electrical Conductivity	µs/cm	424 - 498	385 - 484	599 – 658	458 – 611	--
4	Total Dissolved Solids	mg/l	342 -369	285 - 356	419 - 486	336 – 423	1500 (max)
5	Dissolved Oxygen	mg/l	5.6 - 6.3	5.9 – 7.1	5.9 – 7.4	6.8 – 6.9	4 (min)
6	BOD , 3days at 27°C	mg/l	0.9 - 1.5	1.1 – 1.4	1.2 – 1.8	1.6 – 1.7	3 (max)
7	Chlorides as Cl	mg/l	18.7- 41.5	20.1 – 29.0	29.4 – 37.5	26.7 - 43	600 (max)
8	Fluoride as F-	mg/l	0.8 – 1.2	0.7 – 1.0	3.2 – 6.5	1.8 – 5.1	1.5 (max)
9	Sulphate mg/l	mg/l	10.0 – 21.6	11.6 – 29.8	24.9 – 78.4	33 – 71.6	400 (max)
10	Nitrate as NO3-	mg/l	9.86 – 15.6	12.3 – 16.8	10.5 – 23.6	9.8 – 28.4	50 (max)
11	Hexa Chromium as Cr +6	mg/l	0.021 – 0.042	0.015 – 0.029	0.012 – 0.042	0.013 – 0.036	0.05
12	Cyanide as CN	mg/l	<0.03	<0.03	<0.03	<0.03	0.05 (max)
13	Copper as Cu	mg/l	0.031 – 0.045	0.028 – 0.063	0.007 – 0.018	0.01 – 0.025	1.5 (max)
14	Iron as Fe	mg/l	0.269 – 0.437	0.01 – 0.175	0.074 – 0.089	0.086 – 0.169	0.5 (max)
15	Cadmium as Cd	mg/l	0.003 – 0.009	0.005 – 0.009	0.004 – 0.01	0.004 – 0.01	0.01 (max)
16	Selenium as Se	mg/l	<0.001	<0.001	<0.001	<0.001	0.05 (max)
17	Arsenic as As As	mg/l	0.003 – 0.008	0.005 – 0.009	0.001 – 0.005	0.001 – 0.008	0.2 (max)
18	Lead as Pb(max)	mg/l	<0.001 - <0.01	<0.001 – 0.01	0.01 – 0.007	0.004 – 0.01	0.1 (max)
19	Zinc as Zn(max)	mg/l	0.022 – 0.096	0.027 – 0.152	0.056 – 0.152	0.074 – 0.196	15 (max)
20	Sodium Absorption Ratio	-	5.45-6.2	4.77-5.71	7.44-9.05	5.34-8.03	--
21	T. Hardness(as CaCO3)	mg/l	192 - 213	170 - 198	238 – 260.3	200.1 - 220	200
22	Calcium as Ca	mg/l	39.8 – 45.7	34.3 – 48.1	35.1 – 62.5	38.7 – 62.5	75
23	Magnesium as Mg	mg/l	18.9 - 26	17 – 28.4	19.9 – 43.1	15.5 – 26.6	30
24	Manganese as Mn,	mg/l	<0.001 – 0.024	<0.001 – 0.055	<0.001-0.045	<0.001 – 0.023	0.1
25	Sodium as Na,	mg/l	31.0-36.3	25.4-32.6	47.7-58.11	31.2-50.15	\$
26	Potassium as K,	mg/l	2.0-2.6	2.7-3.16	1.6-3.8	2.0-3.3	\$
27	Nickel as Ni	mg/l	<0.001-0.006	<0.001-0.017	<0.001-0.006	<0.001	0.02
28	Chemical Oxygen Demand	mg/l	36 - 56	28 - 36	26 - 42	24 - 32	\$
29	Free Ammonia	mg/l	<0.01	<0.01	<0.01	<0.01	0.5
30	Boron as B	mg/l	0.009 – 0.025	0.01 – 0.029	0.026 – 0.032	0.018 – 0.028	0.5
31	Total alkalinity as (as CaCO3)	mg/l	190 - 228	166 - 214	248 - 253	174 - 212	200

Note: \$ - No specific standards, ND - Not detected, U/S: Upstream D/S: Downstream

Source: IMMT, Bhubaneswar

Summary of Treated Domestic Effluent Analysis

Period: From Oct-21 to March-22

S.N	Location	Parameters in Range		
		pH	Suspended Solid in mg/l	BOD (3days at 27°C) in mg/l
1.	Colony STP	7.56-8.11	44-67	17.4-24.5
2.	BEL STP	7.55-8.29	49-55	19.8-25.6
3.	SMS-1 STP	7.29-8.16	48-63	15.0-23.2
4.	BF-1 STP	7.56-8.38	50-59	18.6-23.6
Standard		5.5-9.0	100	30

Summary of Effluent Treatment Plant Analysis

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
1.	ETP-1(Outlet)	7.47-8.50	44-58	32-48	3.60-8.60
2.	ETP-2(Outlet)	7.08-7.96	42-69	29-56	4.0-7.60
3.	ETP-3(Outlet)	7.29-8.17	42-58	67-96	5.80-13.50
4.	BF-1(Thickener Outlet)	6.85-8.18	56-73	40-67	4.0-8.10
5	BF-2(Thickener Outlet)	7.09-7.28	52-66	52-68	4.20-9.66
6	CRM (ETP Outlet)	6.78-8.31	45-59	178-208	22.8-26.2
7	SMS-3 (Thickener Outlet)	9.85- 10.33	52-78	38-68	3.60-10.66
8	Coke Oven-1 (ETP Outlet)	7.06-7.52	40-63	160-188	21.8-27.82
9	Coke Oven-2 (ETP Outlet)	7.17-7.84	51-73	148-192	20.8-26.8
Standard		5.5-9.0	100	250	30

Summary of ground water level monitoring report inside plant premises

Period: From Oct-21 to March-22

S.N	Location with description	Depth of Bore Well	Longitude	Latitude	Water level in mtr bgl	
					Dec-21	March-22
1	Near CRM	163ft	20°47.956'	85°15.076'	2.11	2.58
2	Colony near STP	165ft	20°49.045'	85°15.734'	1.68	3.48
3	RMHS Near Wagon Tippler	300ft	20°47.752'	85°15.993'	3.12	4.86
4	Near Blast Furnace-2	162ft	20°47.25'	85°15.613'	1.50	3.0
5	Near Gate no-10	166ft	20°48.653'	85°15.754'	2.16	3.82
6	Near Railway bridge	156ft	20°48.920'	85°15.858'	2.88	4.59

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 (Acceptable Limit)	Standard as per IS-10500-2012 (Permissible Limit)
1	pH	-	7.36	7.88	8.02	7.68	7.52	7.60	6.5-8.5	6.5-8.5
2	Colour	Hazen	Colourless	Colourless	Colourless	Colourless	Colourless	Colourless	5	15
3	Odour	-	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	Agreeable
4	T. Hardness (as CaCO ₃)	mg/l	226	388	452	320	402	352	200	600
5	Calcium as Ca	mg/l	54.5	93.8	109.0	76.9	97.0	85.0	75	200
6	Magnesium as Mg	mg/l	21.9	37.5	43.9	31.2	39.0	34.2	30	100
7	Iron as Fe	mg/l	0.11	0.13	0.14	0.10	0.15	0.11	0.3	0.3
8	Chlorides as Cl	mg/l	69.58	171.8	231.46	173.95	215.84	167.56	250	1000
09	Fluoride as F ⁻	mg/l	0.92	0.82	0.78	0.66	0.79	0.60	1.0	1.5
10	Dissolved solids	mg/l	318	468	566	424	492	480	500	2000
11	Nitrate as NO ₃ ⁻	mg/l	1.4	1.8	3.6	2.2	2.1	2.7	45	45
12	Chromium as Cr ⁺⁶	mg/l	0.01	0.014	0.02	0.016	0.012	0.013	0.05	0.05
13	Alkalinity as CaCO ₃	mg/l	48	60	65	56	51	57	200	600
14	Phosphate as PO ₄	mg/l	0.48	0.72	0.80	0.66	0.64	0.70	\$	\$

N.B-GW-1-Near colony STP, GW-2-Near CRM, GW-3-Near Wagon Tippler are, GW-4- Near BF-2, GW-5-Near Gate Number-1,GW-6- Near Railway Bridge at material road.

Ground Water Level

Period: Oct'21 to March'22

S.N	Location	Sample Code	Longitude	Latitude	Water Level in mtr bgl	Water Level in mtr bgl
					Dec-21	March-22
1	Kharagprasad	GW-01	20° 49.299'	85° 18.923'	2.68	2.58
2	Charadagadia	GW-02	20° 47.768'	85° 17.083'	3.77	3.48
3	Sibpur	GW-03	20° 46.941'	85° 14.394'	3.6	4.86
4	Kochilamara	GW-04	20° 47.541'	85° 16.802'	2.88	3.0
5	Galpada	GW-05	20° 48.142'	85° 18.600'	4.1	3.82
6	Motonga	GW-06	20° 48.143'	85° 18.599'	2.88	4.59
7	Asanabania	GW-07	20° 47.534'	85° 16.802'	4.96	2.58
8	Narendrapur	GW-08	20° 49.483'	85° 15.530'	3.77	3.48
9	Khaliberena	GW-09	20° 46.946'	85° 14.396'	3.45	4.86
10	Ganthigadia	GW-10	20° 48.501'	85° 15.118'	4.07	3.0

Ground Water Quality Analysis Report of surrounding villages

December-21

S. N	Parameter	GW-01	GW-02	GW-03	GW-04	GW-05	GW-06	GW-07	GW-08	GW-09	GW-10	Drinking water desirable limits IS-10500-2012(permissible limit)
1	pH	6.89	7.30	7.65	7.72	7.13	7.38	7.80	7.49	7.55	7.67	6.5-8.5
2	Conductivity $\mu\text{s}/\text{cm}$	459	1948	406	1143	389	1054	978	820	799	784	-
3	TDS mg/l	225	952	198	561	191	632	485	405	502	715	2000
4	Total Hardness as CaCO ₃ mg/l	190	662	180	410	168	432	232	296	490	520	600
5	Calcium Hardness as CaCO ₃ mg/l	114	398	108	246	102	260	140	178	294	312	-
6	Magnesium Hardness as CaCO ₃ mg/l	76	264	72	164	66	172	92	118	196	208	-
7	Total. Alkalinity	68	84	62	112	48	136	92	77	122	172	600
8	P. Alkalinity as CaCO ₃ mg/l	0	0	0	0	0	0	0	0	+0	0	-
9	Chloride mg/l	56.8	124.9	34.08	73.8	34.08	85.2	79.5	65.32	56.8	113.6	1000
10	Fluoride mg/l	0.35	1.1	1.2	1.2	0.30	0.67	1.2	0.60	0.55	1.1	1.5
11	Total Phosphate as P mg/l	0.56	0.66	0.36	0.55	0.32	0.72	0.48	0.68	0.52	0.84	-
12	Nitrate NO ₃ -2 mg/l	2.6	4.8	1.5	2.2	1.6	2.7	1.8	2.1	3.6	3.9	45
13	Iron as Fe mg/l	0.12	0.10	0.13	0.11	0.10	0.12	0.14	0.14	0.13	0.12	0.3

S. N	Parameter	GW-01	GW-02	GW-03	GW-04	GW-05	GW-06	GW-07	GW-08	GW-09	GW-10	Drinking water desirable limits IS-10500-2012(permissible limit)
1	pH	7.60	7.35	7.63	7.32	7.81	7.42	7.93	7.93	7.41	7.66	6.5-8.5
2	Conductivity µs/cm	692	1969	364	1081	390	1293	1134	946	892	1477	-
3	TDS mg/l	339.5	965.4	230	577.6	195.4	629.2	492	462.4	432	732.1	2000
4	Total Hardness as CaCO3 mg/l	252	660	160	378	186	412	376	310	378	542	600
5	Calcium Hardness as CaCO3 mg/l	176	408	100	210	104	250	225	180	228	320	-
6	Magnesium Hardness as CaCO3 mg/l	76	252	60	168	82	162	151	130	150	222	-
7	Total. Alkalinity	75	125	80	195	90	190	105	105	195	268	600
8	P. Alkalinity as CaCO3 mg/l	0	0	0	0	0	0	0	0	0	0	-
9	Chloride mg/l	41.5	120	41.5	46.1	34.08	83.1	46.1	46.1	46.1	83	1000
10	Fluoride mg/l	0.2	1.0	0.5	0.59	0.33	0.9	1.1	0.94	1	1.1	1.5
11	Total Phosphate as P mg/l	0.37	0.32	0.38	0.47	0.44	0.41	0.43	0.32	0.32	0.66	-
12	Nitrate NO3 -2 mg/l	3.1	11	0.21	0.8	1.1	2.1	0.4	2.3	1.8	5.5	45
13	Iron as Fe mg/l	0.15	0.17	0.14	0.12	0.18	0.14	0.17	0.15	0.14	0.17	0.3

**Details of Slag Generation and Utilization
in
Blast Furnace – 1 & 2**

Month	Quantity Generated (MT)	Quantity Dispatched (MT)
Oct-21	152971	117693
Nov-21	146700	123531
Dec-21	165974	140873
Jan-22	146632	125123
Feb-22	135537	153823
Mar-22	168890	147830
Total	916704	808873

सीएसआइआर - खनिज एवं पदार्थ प्रौद्योगिकी संस्थान

(वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद)

भुवनेश्वर-751013, ओडिशा, भारत

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.



सीएसआईआर - खनिज एवं पदार्थ प्रौद्योगिकी संस्थान
(वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद)
भुवनेश्वर-751013, ओडिशा, भारत
CSIR - INSTITUTE OF MINERALS & MATERIALS TECHNOLOGY
(Council of Scientific & Industrial Research)
Bhubaneswar - 751013, Odisha, INDIA

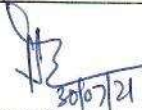
TEST REPORT

Ref. No. IMMT/CCD/07/2021

Date: 30.07.2021

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 ₂ O ₃	25.8	24.6	16.8	17.5
3	Fe ₂ O 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 ₂ O	1.39	1.37	1.21	1.16
9	K ₂ O	1.18	1.29	1.20	1.14
10	Cr ₂ O 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 ₂ O 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


(J. Das)

Principal Technical Officer
Central Characterization Dept.



सीएसआइआर - खनिज एवं पदार्थ प्रौद्योगिकी संस्थान

(वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद)

भुवनेश्वर-751013, ओडिशा, भारत

CSIR - INSTITUTE OF MINERALS & MATERIALS TECHNOLOGY

(Council of Scientific & Industrial Research)

Bhubaneswar - 751013, Odisha, INDIA

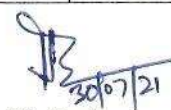
TEST REPORT

Ref. No. IMMT/CCD/07/2021

Date: 30.07.2021

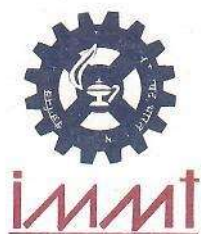
Table-2. Experimental variables for Toxicity Characteristic Leaching Procedure (TCLP) study of Ash samples conducted as per US-EPA method 1311.

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



(J. Das)

Principal Technical Officer
Central Characterization Dept.



सीएसआइआर - खनिज एवं पदार्थ प्रौद्योगिकी संस्थान

(वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद)

भुवनेश्वर-751013, ओडिशा, भारत

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

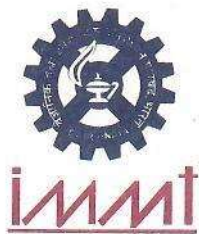
Table-3. Trace element analysis of TCLP or WET Procedure solutions of Ash samples; leaching studies conducted as per US-EPA method 1311 and Appendix II of section 66261 of Title 22 of California Code Regulations (CCR).

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
(J. Das)

Principal Technical Officer
Central Characterization Dept.



सीएसआइआर - खनिज एवं पदार्थ प्रौद्योगिकी संस्थान

(वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद)

भुवनेश्वर-751013, ओडिशा, 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

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:

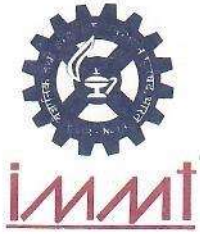
23.07.2021

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....



सीएसआइआर - खनिज एवं पदार्थ प्रौद्योगिकी संस्थान

(वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद)

भुवनेश्वर-751013, ओडिशा, भारत

CSIR - INSTITUTE OF MINERALS & MATERIALS TECHNOLOGY

(Council of Scientific & Industrial Research)

Bhubaneswar - 751013, Odisha, INDIA

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).

(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.



सीएसआईआर - खनिज एवं पदार्थ प्रौद्योगिकी संस्थान
(वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद)
भुवनेश्वर-751013, ओडिशा, भारत

CSIR - INSTITUTE OF MINERALS & MATERIALS TECHNOLOGY
(Council of Scientific & Industrial Research)
Bhubaneswar - 751013, Odisha, INDIA

TEST REPORT

Ref. No. IMMT/CCD/08/2021

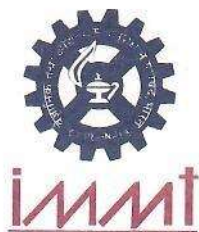
Date: 03.08.2021

Table-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

(J. Das)

Principal Technical Officer
Central Characterization Deptt.



सीएसआइआर - खनिज एवं पदार्थ प्रौद्योगिकी संस्थान
(वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद)
भुवनेश्वर-751013, ओडिशा, भारत

CSIR - INSTITUTE OF MINERALS & MATERIALS TECHNOLOGY

(Council of Scientific & Industrial Research)

Bhubaneswar - 751013, Odisha, INDIA

TEST REPORT

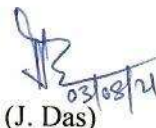
Ref. No. IMMT/CCD/08/2021

Date: 03.08.2021

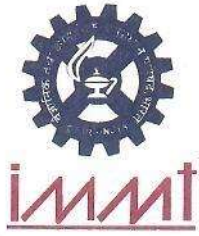
Table-2. Size (Sieve) analysis of Solid Waste samples of Tata Steel BSL Limited, Meramandali

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


(J. Das)

Principal Technical Officer
Central Characterization Deptt.



सीएसआइआर - खनिज एवं पदार्थ प्रौद्योगिकी संस्थान
(वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद)
भुवनेश्वर-751013, ओडिशा, भारत

CSIR - INSTITUTE OF MINERALS & MATERIALS TECHNOLOGY
(Council of Scientific & Industrial Research)
Bhubaneswar - 751013, Odisha, INDIA

TEST REPORT

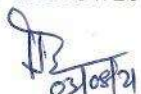
Ref. No. IMMT/CCD/08/2021

Date: 03.08.2021

Table-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 ₂ O ₃	Fe (T)	TiO ₂	MnO	CaO	MgO	Na ₂ O	K ₂ O	P ₂ O 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


(J. Das)

Principal Technical Officer
Central Characterization Deptt.



सीएसआईआर - खनिज एवं पदार्थ प्रौद्योगिकी संस्थान
(वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद)
भुवनेश्वर-751013, ओडिशा, भारत

CSIR - INSTITUTE OF MINERALS & MATERIALS TECHNOLOGY
(Council of Scientific & Industrial Research)
Bhubaneswar - 751013, Odisha, INDIA

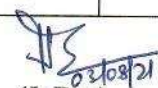
TEST REPORT

Ref. No. IMMT/CCD/08/2021

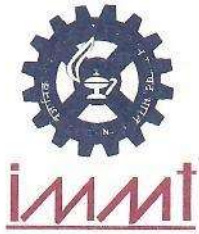
Date: 03.08.2021

Table-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


 (J. Das)

Principal Technical Officer
Central Characterization Deptt.



सीएसआइआर - खनिज एवं पदार्थ प्रौद्योगिकी संस्थान
(वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद)
भुवनेश्वर-751013, ओडिशा, 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

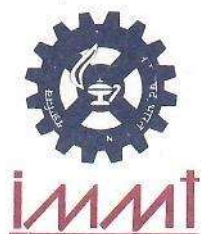
Table-4(b). Trace element analysis of TCLP or WET Procedure solutions of Solid waste samples; leaching studies conducted as per US-EPA method 1311 and Appendix II of section 66261 of Title 22 of California Code Regulations (CCR).

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.


(J. Das)

Principal Technical Officer
Central Characterization Dept.



सीएसआइआर - खनिज एवं पदार्थ प्रौद्योगिकी संस्थान

(वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद)

भुवनेश्वर-751013, ओडिशा, भारत

CSIR - INSTITUTE OF MINERALS & MATERIALS TECHNOLOGY

(Council of Scientific & Industrial Research)

Bhubaneswar - 751013, Odisha, INDIA

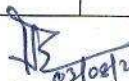
TEST REPORT

Ref. No. IMMT/CCD/08/2021

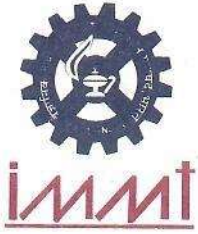
Date: 03.08.2021

Table-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


(J. Das)

Principal Technical Officer
Central Characterization Dept.



सीएसआइआर - खनिज एवं पदार्थ प्रौद्योगिकी संस्थान

(वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद)

भुवनेश्वर-751013, ओडिशा, भारत

CSIR - INSTITUTE OF MINERALS & MATERIALS TECHNOLOGY

(Council of Scientific & Industrial Research)

Bhubaneswar - 751013, Odisha, INDIA

TEST REPORT

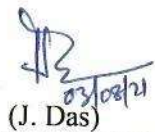
Ref. No. IMMT/CCD/08/2021

Date: 03.08.2021

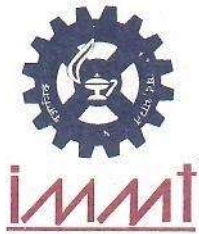
Table-5(b). Trace element analysis of TCLP or WET Procedure solutions of Solid waste samples; leaching studies conducted as per US-EPA method 1311 and Appendix II of section 66261 of Title 22 of California Code Regulations (CCR).

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.


(J. Das)

Principal Technical Officer
Central Characterization Dept.



सीएसआइआर - खनिज एवं पदार्थ प्रौद्योगिकी संस्थान
(वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद)
भुवनेश्वर-751013, ओडिशा, भारत

CSIR - INSTITUTE OF MINERALS & MATERIALS TECHNOLOGY
(Council of Scientific & Industrial Research)
Bhubaneswar - 751013, Odisha, INDIA

TEST REPORT

Ref. No. IMMT/CCD/08/2021

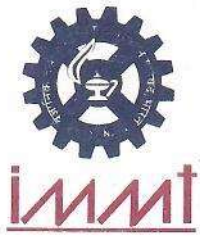
Date: 03.08.2021

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	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


 (J. Das)

Principal Technical Officer
Central Characterization Dept.



सीएसआइआर - खनिज एवं पदार्थ प्रौद्योगिकी संस्थान

(वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद)

भुवनेश्वर-751013, ओडिशा, 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(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.


(J. Das)

Principal Technical Officer
Central Characterization Dept.

01c



Annexure-VII

TSM/SPCB/BS-07/2022-16/203
May 23, 2022

The Member Secretary
State Pollution Control Board, Odisha
A/118, Paribesh Bhawan
Nilakanthanagar, Unit-VIII
Bhubaneswar -751012

Subject: Submission of hazardous waste annual return for the period April'21 to March'22.
Reference: Authorization no. IND-IV-HW-622/12122 dated 03.12.2021

Dear Sir,

In reference to the captioned subject and letter cited above. As per the provision of Hazardous and Other Wastes (Management & Transboundary Movement) Rules, 2016; we are submitting herewith annual returns (Form-4) of said rules for the period April 1, 2021 to March 31, 2022 of TATA Steel Ltd. At : Narendpur, PO: Kusupanga Via.: Meramandali, Dhenkanal (attached as **Annexure-I**).

Hope, the information furnished is in line with the requirement.

Thanking you,

Yours faithfully,
For Tata Steel Limited

Anoop Srivastava

Anoop Srivastava
Head Environment

Enclosure: As above

Copy to: The Regional Officer, State Pollution Control Board, Odisha, Angul



TATA STEEL LIMITED

Narendrapur Kusupanga Meramandali Dhenkanal 759 121 Odisha India Tel 91 6762 852000
Registered Office Bombay House 24 Homi Mody Street Fort Mumbai 400 001 India Tel 91 22 66654282 Fax 91 22 66657724
Corporate Identity Number L27100MH1907PLC000260 Website www.tatasteel.com

FORM 4

[See rules 6(5), 13(8), 16(6) and 20 (2)]

FORM FOR FILING ANNUAL RETURNS

[To be submitted to State Pollution Control Board by 30th day of June of every year for the preceding period April to March]

1. Name and address of facility:

Tata Steel Limited Meramandali
At-Narendrapur, PO- Kusupanga
Via- Meramandali, Dist-Dhenkanal
PIN-759121, Odisha (India)
Tel: 91-6762-300000
Fax: 011-66173997

2. Authorisation no. and date of issue: Authorization no. IND-IV-HW-622/12122 dated 03.12.2020

3. Name of the authorised person and full address with telephone, fax and e-mail:

Anoop Srivastava
Head-Environment
At-Narendrapur, Po- Kusupanga
Via- Meramandali, Dist-Dhenkanal
PIN-759121, Odisha (India)
Tel: 91-6762-300000
Fax: 011- 66173997

4. Production during the year:

Total Production (Crude Steel) during 2021-22: 4891179 T

Part A. To be filled by hazardous waste generators

1. Total quantity of waste generated category wise:

SL	Waste Description	Schedule and Waste Stream/Class	Quantity (in Tonnes/KL)
1	Used /Spent Oil	Schedule -I Stream -5.1	295.04 KL
2	Waste/Residue Containing Oil	Schedule -I Stream -5.2	25.86 T
3	Oil and grease skimming (Oily Sludge)	Schedule -I Stream -35.4	101.6 T
4	Residue from Coke Oven by-product plant (BOD Plant Sludge)	Schedule- I Stream-13.6	2496.53 T

5	Decanter tank sludge and tar sludge tank residue	Schedule- I Stream-13.4 & 13.5	1396 T
6	Acidic & Alkali Residues/Spent Acid and Alkali	Schedule- I Stream-12.1 & 12.2	23.17 T
7	ETP Sludge/ Chemical Sludge from wastewater Treatment Plant	Schedule- I Stream-35.3	694.38 T
8	Spent Ion Exchange Resin containing toxic metals.	Schedule- I Stream-35.2	3 T
9	Process wastes, Residues and sludges/ Spent Solvent (Waste Thinner–Oily Waste)	Schedule -I Stream -21.1 & 21.2	39.63 T
10	Insulation material (Glass wool)	Schedule -II Class-C	114.21 T
11	Empty Barrels/Containers/Liners contaminated with Hazardous chemicals/wastes	Schedule -I Stream -33.1	18.22 T
12	Exhaust Air or Gas Cleaning Residue /LD Sludge	Schedule -I Stream -35.1 & Schedule -II Stream -C2	164247 T
13	Zinc Dross/ Ash/ Skimmings/ Residues	Schedule -IV Stream – (11 to 15)	471.41 T

2. Quantity dispatched

(i) to disposal facility:

SL	Waste Description	Quantity (in Tonnes/KL)	Name of the Disposal Facilities
1	Oil and grease skimming (Oily Sludge)	101.6 T	M/s RE Sustainability Ltd. (Formerly M/s Ramky Enviro Engineers Ltd.), Jajpur, Odisha
2	Insulation material (Glass wool)	114.21 T	
3	Acidic & Alkali Residues/Spent Acid and Alkali	23.17 T	
4	ETP Sludge of CRM/Chemical Sludge from wastewater Treatment Plant	694.38 T	
5	Process wastes, Residues and sludges/ Spent Solvent (Waste Thinner–Oily Waste)	37.54 T	Adityapur Waste Management Pvt. Ltd.

(i) to recycler or co-processors or pre-processor:

SL	Waste Description	Quantity (in Tonnes/KL)	Name of the Reprocessing Facilities
1	Used /Spent Oil	247.2 T	M/s Bristol Petroleum Pvt. Ltd. At-26/5/D E,A.M.Ghosh Road,Budge,24 Parganas (S),WB
2	Empty Barrels/Containers/Liners contaminated with Hazardous chemicals/wastes	18.22 T	Eco Resource Solution, Daleiput, Khurda, Odisha
3	Zinc Dross/ Ash/ Skimmings/ Residues	471.41 T	1. M/s Neelam Metal Products 2. M/s Cosmo Agromet Industries 3. M/s East Coast Bio-Tech Project.

(ii) Others: Not Applicable

3. Quantity utilised in-house if any:

SL	Waste Description	Quantity (in Tonnes/KL)	Mode of utilization
1	Waste/Residue Containing Oil	25.86 T	Feed to boiler along with coal
2	Residue from Coke Oven by-product plant (BOD Plant Sludge)	2496.53 T	Internally reused in coke oven plant
3	Decanter tank sludge and tar sludge tank residue	1396 T	Internally reused in coke oven plant
4	Exhaust Air or Gas Cleaning Residue /LD Sludge	179882 T	Internally reused in sinter plant

4. Quantity in storage at the end of the year –

SL	Waste Description	Quantity (in Tonnes/KL)
1	Spent Ion Exchange Resin containing toxic metals.	3 T
2	Process wastes, Residues and sludges/ Spent Solvent (Waste Thinner – Oily Waste) *	2.09 T

*Presently, in Odisha CHWTSDF is not available for disposal of incinerable material.

Anoop Sainatava

Date: 19.05.2022

Place: TSL Meramandali

For Signature of the Occupier or Operator of the disposal facility

सीएसआईआर - खनिज एवं पदार्थ प्रौद्योगिकी संस्थान
(वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद)
भुवनेश्वर-751013, ओडिशा, भारत

CSIR - INSTITUTE OF MINERALS & MATERIALS TECHNOLOGY
(Council of Scientific & Industrial Research)
Bhubaneswar - 751013, Odisha, INDIA



TEST REPORT

Ref. No. IMMT/CCD/05/2021

Date: 21.05.2021

Name & Address of the Party:

Tata Steel BSL Ltd.
At-Narendrapur, P.O.-Kusupanga
Via-Meramandali, Dist-Dhenkanal
Pin-759121, Odisha.

Sample Details:

1. Indian Coal (01 No.) 2. Imported Coal (01 No.)
3. Iron Ore (01 No.) 4. Lime stone (01 No.)

Date of Receiving:

30.03.2021

Date(s) of Conducting Test:

05.04.2021

Date of Completion of Test:

12.05.2021

Method Adopted:

1. Proximate analysis of coal samples by classical methods.
2. Major and trace element analysis of coal, iron ore and lime stone 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:

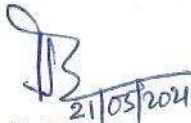
Table-1. Proximate analysis of coal samples.

Table-2. Chemical composition analysis of coal samples.

Table-3. Trace element analysis of coal samples.

Table-4. Chemical composition analysis of iron ore and lime stone samples.

Table-5. Trace element analysis of iron ore and lime stone samples.


21/05/2021
(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.



सीएसआईआर - खनिज एवं पदार्थ प्रौद्योगिकी संस्थान
(वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद)
भुवनेश्वर-751013, ओडिशा, भारत

CSIR - INSTITUTE OF MINERALS & MATERIALS TECHNOLOGY
(Council of Scientific & Industrial Research)
Bhubaneswar - 751013, Odisha, INDIA

TEST REPORT

Ref. No. IMMT/CCD/05/2021


Date: 21.05.2021

Table-1. Proximate analysis of coal samples.

Sample ID	Moisture (%)	Volatile Matter (%)	Ash (%)	Fixed Carbon (%)
Indian coal	3.96	27.91	36.36	31.77
Imported coal	1.86	22.64	8.6	66.90

Table-2. Chemical composition analysis of coal samples.

Sl. No.	Component	Concentration in Test Samples, %	
		Indian Coal	Imported Coal
1	SiO ₂	21.84	1.76
2	Al ₂ O ₃	8.71	1.82
3	Fe ₂ O ₃	0.59	0.42
4	TiO ₂	0.95	0.24
5	MnO	0.003	0.007
6	CaO	0.17	0.89
7	MgO	0.03	0.24
8	Na ₂ O	1.78	0.28
9	K ₂ O	0.46	0.15
10	P ₂ O ₅	0.05	0.03
11	SO ₃	0.41	0.52
12	LOI	63.64	91.4


(J. Das) 21/05/2021

Principal Technical Officer
Central Characterization Dept.



सीएसआईआर - खनिज एवं पदार्थ प्रौद्योगिकी संस्थान
(वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद)
भुवनेश्वर-751013, ओडिशा, भारत

CSIR - INSTITUTE OF MINERALS & MATERIALS TECHNOLOGY
(Council of Scientific & Industrial Research)
Bhubaneswar - 751013, Odisha, INDIA

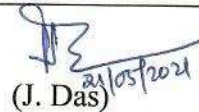
TEST REPORT

Ref. No. IMMT/CCD/05/2021

Date: 21.05.2021

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	28.57	0.67
2	Cd	mg/kg	0.19	0.10
3	Cu	mg/kg	41.45	5.18
4	Ni	mg/kg	15.18	6.34
5	Co	mg/kg	27.74	10.93
6	Cr	mg/kg	72.36	22.91
7	Zn	mg/kg	11.42	5.64
8	Ag	mg/kg	0.68	0.32
9	Sb	mg/kg	7.27	0.86
10	Mo	mg/kg	4.17	0.21
11	V	mg/kg	74.26	4.63
12	Se	mg/kg	1.02	0.38
13	Ba	mg/kg	145.32	23.44
14	As	mg/kg	52.83	4.67
15	Hg	mg/kg	3.12	1.35
16	B	%	0.17	0.08
17	F ⁻ in water leaching (1:20) solutions.	mg/L	0.06	0.05


(J. Das)

Principal Technical Officer
Central Characterization Dept.



सीएसआईआर - खनिज एवं पदार्थ प्रौद्योगिकी संस्थान
(वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद)
भुवनेश्वर-751013, ओडिशा, भारत

CSIR - INSTITUTE OF MINERALS & MATERIALS TECHNOLOGY
(Council of Scientific & Industrial Research)
Bhubaneswar - 751013, Odisha, INDIA

TEST REPORT

Ref. No. IMMT/CCD/05/2021

Date: 21.05.2021

Table-4. Chemical composition analysis of iron ore and lime stone samples.

Sl. No.	Component	Concentration in Test Samples, %	
		Iron Ore	Lime Stone
1	SiO ₂	2.18	1.74
2	Al ₂ O ₃	1.21	1.32
3	Fe ₂ O ₃	88.36	0.35
4	TiO ₂	0.05	0.01
5	MnO	0.07	0.003
6	CaO	0.03	53.85
7	MgO	0.007	0.85
8	Na ₂ O	1.31	0.93
9	K ₂ O	0.69	0.25
10	P ₂ O ₅	0.02	0.01
11	SO ₃	0.05	0.09
12	LOI	0.91	38.52


21/05/2021
(J. Das)

Principal Technical Officer
Central Characterization Dept.



सीएसआईआर - खनिज एवं पदार्थ प्रौद्योगिकी संस्थान
(वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद)
भुवनेश्वर-751013, ओडिशा, भारत

CSIR - INSTITUTE OF MINERALS & MATERIALS TECHNOLOGY
(Council of Scientific & Industrial Research)
Bhubaneswar - 751013, Odisha, INDIA

TEST REPORT

Ref. No. IMMT/CCD/05/2021

Date: 21.05.2021

Table-5. Trace element analysis of iron ore and lime stone samples.

Sl. No.	Parameters	Trace element concentrations in test samples		
		Unit	Iron Ore	Lime Stone
1	Pb	mg/kg	12.22	1.89
2	Cd	mg/kg	0.16	0.14
3	Cu	mg/kg	3.15	0.81
4	Ni	mg/kg	1.66	8.91
5	Co	mg/kg	25.6	24.4
6	Cr	mg/kg	34.0	5.88
7	Zn	mg/kg	13.4	5.15
8	Ag	mg/kg	0.53	0.48
9	Sb	mg/kg	1.02	0.41
10	Mo	mg/kg	0.21	0.42
11	V	mg/kg	7.23	2.69
12	Se	mg/kg	0.13	0.11
13	Ba	mg/kg	48.14	12.4
14	As	mg/kg	10.02	6.21
15	Hg	mg/kg	0.23	0.12
16	B	%	0.31	0.42


(J. Das)

Principal Technical Officer
Central Characterization Dept.

CSR Expenditure and Activity highlights

PROGRAM HEAD	2021-22	MAJOR INTERVENTIONS/REMARKS
Health & drinking water	668.92	Mobile Medical Unit; Dengue/Malaria control; Maternal health; Adolescent empowerment; Drinking Water; Includes COVID Response- Covid Hospital; Relief and other works on COVID.
Education	36.86	School infrastructure; Education project: QUEST
Livelihood	126.52	WEE Project; Other livelihood activities
Infrastructure & misc.	365.30	Construction & repair of road; Installation of solar lights
Sports	16.09	Volleyball coaching; Sports tournaments
Environment	0	Plantation done through Horticulture Dept. hence charged to that dept. in FY'19, '21 & '22)
TOTAL	1213.69	

Note: Environment: plantation done in villages and school, saplings being provided by TSL, Meramandali, Horticulture dept. So no expenditure.

**SUMMARY OF AMBIENT AIR QUALITY
MONTHLY AVERAGE VALUES**

Month	Pollutant	Standard	CAAQMS						
			# 01	# 02	# 03	# 04	# 05	# 06	# 07
October 2021	PM 10	100	30.34	95.01	82.95	78.19	87.63	UM	128.51
	PM 2.5	60	7.47	50.05	17.57	20.20	18.14		54.89
	SO ₂	80	14.50	20.50	13.25	8.76	10.44		8.78
	NO _x	80	15.02	9.52	48.72	8.59	14.99		31.97
	CO	2	0.26	0.80	0.30	0.53	0.32		0.40
November 2021	PM 10	100	45.92	140.83	109.73	90.04	91.02	UM	178.66
	PM 2.5	60	15.32	79.97	34.85	25.76	19.82		86.76
	SO ₂	80	11.78	30.86	13.87	9.44	10.96		9.11
	NO _x	80	15.22	9.35	29.17	8.60	13.98		32.48
	CO	2	0.34	0.88	0.30	0.67	0.33		0.64
December 2021	PM 10	100	37.19	139.31	100.86	83.41	82.13	UM	203.03
	PM 2.5	60	13.52	80.87	31.02	21.06	19.79		92.39
	SO ₂	80	11.04	25.00	14.01	10.68	11.17		9.76
	NO _x	80	15.15	9.67	24.77	23.91	17.83		32.52
	CO	2	0.79	0.87	0.30	0.68	0.32		0.50
January 2022	PM 10	100	35.48	140.93	118.43	110.41	33.91	163.15	197.50
	PM 2.5	60	13.23	85.98	33.33	29.42	17.99	51.06	100.58
	SO ₂	80	10.49	30.26	15.32	20.16	10.33	7.48	11.00
	NO _x	80	15.28	9.55	22.76	30.72	12.44	27.38	32.37
	CO	2	0.31	0.90	0.31	0.50	0.32	0.67	0.39
February 2022	PM 10	100	43.80	244.88	183.99	59.63	88.22	155.17	194.37
	PM 2.5	60	22.33	110.72	55.96	14.94	19.91	79.73	72.04
	SO ₂	80	12.25	45.07	23.01	11.89	10.98	9.36	10.97
	NO _x	80	25.29	19.49	53.69	28.73	12.8	35.37	32.77
	CO	2	0.50	1.02	0.7	0.22	0.41	0.63	UM
March 2022	PM 10	100	62.19	202.23	142.6	53.51	94.34	177.94	132.27
	PM 2.5	60	11.39	82.73	31.55	31.98	25.7	25.17	54.05
	SO ₂	80	10.81	21.88	18.39	9.78	10.53	9.16	11.80
	NO _x	80	15.16	10.25	23.2	28.22	5.03	24.42	32.50
	CO	2	0.32	0.88	0.3	0.24	0.51	0.60	UM

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.

All values are in $\mu\text{g}/\text{m}^3$ and CO values are in mg/m^3 . Values are derived from 24 hourly average data.

SUMMARY OF WORK ZONE NOISE MONITORING

TATA STEEL LIMITED

PERIOD: From October'21 to March'22

SL	Name of the unit	Location	Noise level in d B(A) at 3 mt.	Standard as per Factory Rule Govt of Odisha 1950(8 Hrs)
			Range	
1	AFBC 33 MW PP	Near ID fan-1 area	SD	
		Near PA fan area		
		Near SA fan area		
		Near Boiler area		
		Near Control area		
		Near Air Compressed House area		
		Near Cooling tower area		
2	BF-1 STOCK HOUSE	Near ID fan area-1	85.1-85.8	90.0
		Near ID fan area-2	84.7-86.5	
		Near Fines Building area	83.4-83.7	
3	BF-1 CAST HOUSE	Near ID fan-1 area	83.9-85.1	
		Near ID fan-2 area	84.2-85.5	
		Near ID fan-3 area	84.1-85.3	
		Near ID fan-4 area	83.4-85.1	
		Near Main Pump House area	82.5-85.7	
		Near furnace area	82.5-85.7	
4	SP-1	Near Secondary Cooling tower area	83.0-86.5	
		Near Main ID fan area	82.3-92.8	
		Near HT Control room area	83.3-84.8	
		Near Proportioning building area	82.1-84.3	
		Near Cooler fan area-1	84.0-85.4	
		Near Cooler fan area-2	83.4-85.1	
		Near Cooler fan area-3	84.0-84.9	
		Near Cooler fan area-4	84.3-85.9	
		Near 85m ² ESP IN D Fan area	84.2-85.7	
		Near 110m ² ESP ID fan area	84.7-85.8	
5	SP-2	Near Pump House Building area	82.1-84.3	
		Near bag filter ID fan area	82.8-84.7	
		Near Main ESP ID area	84.1-87.1	
		Near PD ESP ID fan area	84.2-85.1	
		Near Cooler fan area-1	84.0-86.3	
		Near Cooler fan area-2	84.6-86.4	
		Near Cooler fan area-3	84.7-87.0	
		Near M. N. D Area	83.3-84.1	

SL	Name of the unit	Location	Noise level in d B(A) at 3mtr	Standard as per Factory Rule Govt of Odisha 1950(8 Hrs)
			Range	
6	SP-3	Near Main ESP ID area	84.1-85.9	90.0
		Near PD ESP ID fan area	83.6-84.9	
		Near Cooler fan area-1	84.8-86.5	
		Near Cooler fan area-2	84.1-86.5	
		Near Cooler fan area-3	83.8-87.4	
		Near M. N. D Area	82.8-84.6	
7	HSM	Near COG Fan area-1& 2	82.8-84.3	
		Near RHF Office area	83.2-85.0	
		Near Roughing Mill area	82.8-85.6	
		Near Roll Shot area	83.3-84.1	
		Near Roll Shop area	82.5-85.0	
		Near HSM Quality Lab area	83.3-85.4	
		Near B F G Motor fan RHF	83.2-84.2	
		Near Combustion fan area	85.1-87.0	
Near Re-heating Furnace	83.2-84.5			
8	BOF	Near Secondary ID fan area-1	85.1-87.2	
		Near Secondary ID fan area-2	85.1-87.1	
		Near Secondary ID fan area-3	85.5-86.3	
		Near Secondary ID fan area-4	85.6-87.5	
		Near Cooling Tower area	85.3-87.1	
		Near Weigh bridge area	83.0-83.7	
		Near Primary ID Fan-1 area	83.0-84.8	
9	BF-2 (CH)	Near Motor I D fan-1 area	83.8-85.0	
		Near Motor I D fan-2 area	84.1-85.1	
		Near Motor I D fan-3 area	83.8-85.5	
		Near Cooling tower area	83.0-84.7	
		Near Fire Pump House	83.2-85.7	

S.N	Name of the unit	Location	Noise level in d B(A) at 3mtr	Standard as per Factory Rule Govt of Odisha 1950(8 Hrs)
			Range	
10	BF-2 (SH)	Near ID fan area-1	84.3-86.0	90.0
		Near ID fan area-2	83.4-84.8	
		Near Cast House Area	84.3-86.0	
11	OXYGEN PLANT-2	Near Nitrogen compressor House-1	107.2-109.2	
		Near Nitrogen compressor House-2	106.6-109.5	
		Near Nitrogen compressor House-3	107.2-108.7	
		Near Air compressor House area-1	103.1-108.1	
		Near Control room office	93.1-95.4	
		Near A C Package room	84.3-86.4	
		Near Argon cold box area	83.1-84.2	
		Near Turbine-1 area	85.3-86.5	
12	CRM	Near CRM mill Control room area	82.2-83.9	
		Near Air Receiver Tank	84.9-87.0	
		Near Fire water pump house	83.9-85.1	
		Near ETP area	82.0-85.2	
		Near JP-1 Coil yard area	84.3-86.3	
		Near JP-2 Coil yard area	84.5-86.6	
		Near JP-3 Coil yard area	84.0-85.0	
		Near Hot Generator Area	83.7-84.7	
13	CO-1	Near Coal Pushing ID fan area	84.6-88.0	
		Near Stone Cutter Building area	79.2-84.5	
		Near Battery-1 area	73.9-84.1	
		Near NHS ID Fan Area	76.6-84.3	
		Near Battery-2 area	61.5-84.5	
14	CO-2	Near Pusher car Emission control system I D Fan area	82.3-84.6	
		Near Guide car emission I D Fan 1/2 area	83.4-84.1	
		Near Exhauster house area	85.1-86.4	
		Near pushing emission control system ID Fan 1/2 area	81.4-85.3	
		Near Water pump house area	84.1-85.2	
		Near Chemical Dosing E.T.P room area	82.3-83.6	

S.N	Name of the unit	Location	Noise level in d B(A) at 3mtr	Standard as per Factory Rule Govt of Odisha 1950(8 Hrs)
			Range	
15	BFPP-1 (Boiler-1)	Near ID Fan Area-1	75.3-83.1	90.0
		Near ID Fan Area-2	75.6-84.0	
		Near FD fan Area	85.3-87.9	
		Near Boiler Area	83.4-84.8	
	BFPP-1 (Boiler-2)	Near ID Fan Area-1	84.0-85.5	
		Near ID Fan Area-2	84.2-85.7	
		Near FD fan Area	83.5-88.0	
		Near Boiler Area	85.0-85.3	
	BFPP-1 (Boiler-3)	Near ID Fan Area-1	75.1-84.7	
		Near ID Fan Area-2	78.7-85.8	
		Near FD fan Area	86.8-89.2	
		Near Boiler Area	85.0-87.3	
16	BFPP-2 (Boiler-2)	Near ID Fan Area-1	82.1-84.9	
		Near ID Fan Area-2	83.3-84.4	
		Near PA fan Area	86.2-87.3	
		Near Boiler Area	86.5-87.7	
		Near SA Fan	85.0-85.3	
	BFPP-2 (Boiler-3)	Near ID Fan Area-1	83.8-84.5	
		Near ID Fan Area-2	84.0-85.5	
		Near PA fan Area	85.3-86.5	
		Near Boiler Area	84.4-85.9	
		Near SA Fan	86.0-88.0	
17	Lime Plant	Near De dusting-2 ID fan area	83.3-85.0	
		Near Blower room area	109.2-111.8	
		Near Cooling tower area	83.5-85.0	
		Near De dusting-3 ID fan area	83.5-84.1	
		Near Pump House area	84.3-85.7	
		Near Compressor building area	86.0-88.1	

S.N	Name of the unit	Location	Noise level in d B(A) at 3mtr	Standard as per Factory Rule Govt of Odisha 1950(8 Hrs)
			Range	
18	WHRB-1	Near ID fan area	SD	90.0
		Near Boiler area		
		Near Cooling tower area		
		Near De-dusting area		
19	WHRB-02	Near ID fan area	SD	
		Near Boiler area		
		Near Cooling tower area		
		Near De-dusting area		
20	WHRB-03	Near ID fan area	78.7-84.6	
		Near Boiler area	83.5-86.2	
		Near Cooling tower area	82.7-86.0	
		Near De-dusting area	84.2-87.4	
21	WHRB-04	Near ID fan area	83.4-84.6	
		Near Boiler area	84.1-86.7	
		Near Cooling tower area	82.6-85.4	
22	WHRB-05	Near ID fan area	83.3-83.9	
		Near Boiler area	83.2-85.6	
		Near Cooling tower area	84.1-85.4	
		Near De-dusting area	83.8-84.8	
23	WHRB-06	Near ID fan area	83.5-84.9	
		Near Boiler area	83.9-86.0	
		Near Cooling tower area	84.0-84.7	
		Near De-dusting area	84.2-87.8	
24	WHRB-07	Near ID fan area	82.4-84.3	
		Near Boiler area	83.8-85.8	
		Near cooling tower area	83.8-85.0	
		Near De-dusting area	83.6-85.4	
25	WHRB-08	Near ID fan area	83.9-84.4	
		Near Boiler area	82.5-83.7	
		Near Cooling tower area	84.0-85.6	
		Near De-dusting area	84.6-85.8	
26	WHRB-09	Near ID fan area	82.2-84.5	
		Near Boiler area	83.9-86.0	
		Near Cooling tower area	83.5-84.1	
27	WHRB-10	Near ID fan area	83.2-84.4	
		Near Boiler area	83.3-86.2	
		Near Cooling tower area	84.0-85.5	
		Near De-dusting area	84.6-87.5	
28	Gas fired Boiler 60 TPH	Near ID fan -1 area	82.6-85.3	
		Near ID fan -2 area	81.2-84.8	
		Near FD fan -1 area	82.5-85.9	
		Near FD fan -2 area	81.3-85.8	
		Near Boiler area	82.8-84.9	

S.N	Name of the unit	Location	Noise level in d B(A) at 3mtr	Standard as per Factory Rule Govt of Odisha 1950(8 Hrs)
			Range	
29	Gas fired Boiler 125 TPH	Near ID fan -1 area	84.7-87.0	90.0
		Near ID fan -2 area	85.4-86.8	
		Near FD fan -1 area	85.1-87.3	
		Near FD fan -2 area	85.4-86.4	
		Near Boiler area	84.2-85.4	
30	Gas fired Boiler 250 TPH	Near ID fan -1/2 area	84.2-85.2	
		Near FD fan -1/2 area	85.2-86.2	
		Near Boiler area	84.8-85.4	
31	RMHS- 2 & 3 area	Near RMHS-2EP-2Electrical building Area	83.2-84.8	
		Near RMHS -2 Yard No-4,5 Area	83.2-85.0	
		Near Yard No-2/3 Area	83.1-84.9	
		Near BB Plant site Office Area	83.1-85.4	
32	RMPP	Near Pump House Area	82.4-83.5	
		Near RMPP CSB-1 ID Fan area	83.5-86.3	
		Near RMPP CSB-2 ID Fan area	83.8-86.1	
33	Coal Washery	Near Hammer Mill Area	82.7-85.2	
		Near Flip Flop Screen Area	82.7-83.6	
		Near Silo Feeder Area	82.7-84.8	
34	SMS-2	Near Motor ID fan area-1 area	86.9-106.7	
		Near Motor ID fan area-2 area	85.8-104.4	
		Near Motor ID fan area-3 area	86.3-95.5	
		Near Motor ID fan area 4 area	86.0-92.3	
		Near Motor ID fan area 5 area	87.1-87.4	
		Near Control room area	84.3-85.0	
35	Centralize Compressor House -2	Near Entrance Point	79.9-90.9	
		Near Exit Point	80.2-92.6	
		Near Equipment	87.4-98.6	
		Inside Shift office	59.9-71.5	
		Inside Operator office	66.0-77.3	
		Inside Store	72.7-78.6	
36	110 MW Compressor House	Near Entrance Point	81.3-94.8	
		Near Equipment	84.2-99.2	
		Inside Operator office	73.9-81.2	
37	BFPP-1 Compressor House	Near Entrance Point	77.1-98.4	
		Near Equipment	88.6-104.4	

N.B- 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.

AMBIENT NOISE MONITORING

TATA STEEL LIMITED

Period: Oct'21 to Mar'22

S.N	Location	Noise level in dB(A) Leq (Day time-Range)	Noise level in dB(A) Leq (Night time-Range)	Standard Day Time
1.	Colony	49.6-53.2	44.6-45.9	55
2.	Near Boundary (Sarapa)	52.8-55.2	50.2-50.9	75
3.	Near Cooling tower of AEL	54.5-57.4	52.2-53.4	75

9

Stage - II

Annexure-XII

F. No. 8-84/2005-FC
Government of India
Ministry of Environment & Forests
(FC Division)

Paryavaran Bhawan
CGO Complex, Lodhi Road
New Delhi-110 003

Dated : 13th November 2006

To

The Secretary (Forests),
Government of Orissa,
Bhubaneswar.

Sub: **Diversion of 61.48 ha of Revenue Forest/DPF in Dhenkanal and Angul Districts of Orissa for setting up of an Integrated Steel Plant by M/s Bhusan Steel and Strips Limited.**

Sir,

I am directed to refer to your letter No. 10F(Cons)52/2005/6686/F&E, Bhubaneswar dated 22.09.2005 whereunder the above mentioned proposal was submitted seeking prior approval of the Central Government in accordance with Section-2 of the Forest (Conservation) Act, 1980 and to say that the above proposal was examined by the Forest Advisory Committee (FAC) constituted under Section-3 of the Act.

2. After careful consideration of the proposal of the State Government and on the basis of recommendations of the above mentioned Advisory Committee, the Central Government granted in-principle approval vide letter dated 25.11.2005 subject to certain conditions. The compliance of these conditions was submitted vide your letter No. 10F(Cons)52/2005/17702/F&E dated 28.10.2006. After consideration of the proposal and compliance of various conditions by the State Government, the Central Government hereby conveys its approval under Section-2 of the Forest (Conservation) Act, 1980 for **diversion of 61.48 ha of Revenue Forest/DPF** in Dhenkanal and Angul Districts of Orissa for setting up of an Integrated Steel Plant by M/s Bhusan Steel and Strips Limited, subject to the fulfilment of following conditions :-

- (i) Legal status of the forest shall remain unchanged.
- (ii) Compensatory Afforestation shall be raised and maintained over non-forest land equal in extent to the forest land being diverted, at the project cost.
- (iii) The non-forest land identified for Compensatory Afforestation shall be declared as Reserved/Protected Forests. The Nodal Officer shall report compliance within three months.
- (iv) RCC pillars of 4 feet height shall be erected and maintained to demarcate the area by the user agency at the project cost and will be marked with forward and back bearings.
- (v) An undertaking from the user agency may also be obtained stating that in case the rates of Net Present Value (NPV) are revised upwards, the additional/differential amount shall be paid by the user agency.
- (vi) The State Government shall deposit Net Present Value and all other funds with the Ad-hoc Body of Compensatory Afforestation Fund Management and Planning Authority (CAMPA), in Account No. CA 1585 of Corporation Bank (A Government of India Enterprises), Block-11, Ground Floor, C.G.O. Complex, Phase-1, Lodhi Road, New Delhi-

110003, as per the instructions communicated vide letter No. 5-2/2006-FC dated 20.05.2006.

- (vii) The Conservation Plan, as submitted by the State Government shall be implemented at the project cost under supervision of Chief Wild Life Warden of the State.
- (viii) All efforts should be made for improvement of wildlife habitat around leasehold area in consultation with the Chief Wild Life Warden of the State Forest Department, as per the Wildlife Management Plan and at the project cost.
- (ix) The rehabilitation of displaced persons should not be done on forest land. The Rehabilitation and Resettlement Plan shall be implemented for settlement of displaced persons, at the project cost.
- (x) Trees shall be felled only when it becomes necessary and that too under strict supervision of State Forest Department, and at the cost of the project.
- (xi) No labour camps shall be established on the forest land.
- (xii) All necessary measures should be taken by the user agency to protect the environment.
- (xiii) Sufficient firewood shall be provided by the user agency to the labourers at the project cost after purchase from the State Forest Department/Forest Development Corporation.
- (xiv) The user agency shall ensure that there should be no damage to the available wildlife.
- (xv) The forest land shall not be used for any purpose other than that specified in the proposal.
- (xvi) The forest land thus diverted shall be non-transferable. Whenever and whatever extent of forest land is not required by the user agency, it shall be surrendered to the State Forest Department under intimation to this Ministry.

The State Government shall ensure compliance of all the above conditions.

Yours faithfully,

(Pankaj Asthana)
Assistant Inspector General of Forests

Copy to :-

1. The Principal Chief Conservator of Forests, Government of Orissa, Bhubaneswar.
2. The Nodal Officer, Forest Department, Government of Orissa, Bhubaneswar.
3. The Chief Conservator of Forests (Central), Regional Office, Bhubaneswar.
4. User Agency.
5. Guard File.
6. Monitoring Cell of FC Section.

(Pankaj Asthana)
Assistant Inspector General of Forests