By-Email

Ref.No.: MGM/P&E/213 Date:29/05/2025

To,
Dy. Director General,
Integrated Regional Office,
Ministry of Environment and Forest & Climate Change, Eastern Region Office,
A/3, Chandrasekharpur, Bhubaneswar-751023

Subject: Submission of half-yearly compliance report on the stipulated environmental clearance terms and conditions in respect of Joda West Iron and Manganese Mine of M/s TATA Steel Ltd., for the period from October'2024 to March'2025

Reference:
1) MoEFCC's Letter Ref No: J-11015/86/2004-IA. II(M) dated 13th September 2005.
2) MoEFCC's notification vide S.O-5845 (E), dated 28th November 2018.

Respected Sir,

We are herewith submitting the six-monthly compliance report on the status of the implementation of the conditions stipulated in environmental clearance vested to us vide MoEFCC's Letter Ref No: J-11015/86/2004-IA. II(M) dated 13th September 2005 in respect of Joda West Iron and Manganese Mine of M/s TATA Steel Ltd. for the period from October'2024 to March'2025 for your kind perusal.

This is in reference to the above referred MoEFCC's notification, the six-monthly compliance report is being submitted only in soft copy mode, shared with your good office at e-mail @ roez.bsr-mef@nic.in.

We believe the above submission is in order.

Thanking You,

Yours Faithfully,

F: TATA STEEL LTD.

Pinku Kumar

Head (Mine Planning),
Joda West Iron & Manganese Mines,
Ferro Alloys Mineral Division

Encl: As above.
Copy To:
1) Zonal Office Kolkata, Central Pollution Control Board, South end Conclave, Block 502, 5th and 6th Floors, 1582 Rajdanga Main Road, Kolkata, West Bengal 700107.
2) The Member Secretary, State Pollution Control Board, A/118, Nilakantha Nagar, Bhubaneswar, Odisha-751012.
3) The Regional Officer, State Pollution Control Board, Baniapat, DD College Road, Keonjhar, Odisha-758001.

TATA STEEL LIMITED
Ferro Alloys & Manganese Division, Manganese Group of Mines, At/P.O.: Bichhakundi, Via: Joda,
Dist: Keonjhar Odisha – 758 034 Tel.: 9238101370, email : mnminesadmin@tatasteel.com
Regd. Office : Bombay House, 24 Homi Modi Street, Mumbai – 400 001 Tel 912266658282, Fax 912266657724
Corporate Identity Number L27100MH1907PLC000260 Website www.tatasteel.com

Your (Half Yearly Compliance Report) has been Submitted with following details	
Proposal No	IA/OR/MIN/11664/2005
Compliance ID	128476439
Compliance Number(For Tracking)	EC/M/COMPLIANCE/128476439/2025
Reporting Year	2025
Reporting Period	01 Jun(01 Oct - 31 Mar)
Submission Date	30-05-2025
RO/SRO Name	Shri Senthil Kumar Sampath
RO/SRO Email	agmu156@ifs.nic.in
State	ODISHA
RO/SRO Office Address	Integrated Regional Offices, Bhubaneswar
Note:- SMS and E-Mail has been sent to Shri Senthil Kumar Sampath, ODISHA with Notification to Project Proponent.	

Half Yearly Compliance Report
2025
01 Jun(01 Oct - 31 Mar)

Acknowledgement

Proposal Name	Joda West Manganese Ore Mine of M/s Tata Steel, Dist. Keonjhar, State-Odisha {Production Capacity: 1.80 LTPA of Manganese Ore}, ML Area 1437.719 Ha.
Name of Entity / Corporate Office	Tata Steel
Village(s)	N/A
District	KENDUJHAR

Proposal No.	IA/OR/MIN/11664/2005
Plot / Survey / Khasra No.	N/A
State	ODISHA
MoEF File No.	No.J-11015/86/2004-IA.II(M)

Category	Non-Coal Mining
Sub-District	N/A
Entity's PAN	*****2803M
Entity name as per PAN	UTSAV KASHYAP

Compliance Reporting Details

Reporting Year	2025
Remarks (if any)	Six Monthly EC Compliance Report for Joda West Iron and Mn Mine Project Proponent: Tata Steel Limited Project Type: Mining (Opencast) Mineral: Manganese
Reporting Period	01 Jun(01 Oct - 31 Mar)

Details of Production and Project Area

Name of Entity / Corporate Office Tata Steel

	Project Area as per EC Granted	Actual Project Area in Possession
Private	9.347	71.273
Revenue Land	229.029	119.894
Forest	1199.34	1246.55
Others	0	0
Total	1437.716	1437.7169999999999

Production Capacity

Sr. no	Product Name	units	Valid Upto	Capacity	Production last year	Capacity as per CTO
1	Manganese Ore	Tons per Annum (TPA)	31/03/2026	180000	173933	180000

Conditions

Specific Conditions

Sr.No.	Condition Type	Condition Details
1	Statutory compliance	Mining shall not be undertaken in areas of forestland within the lease for which necessary approval/ forestry clearance has not been obtained.

PPs Submission: Complied The present leasehold area of Joda West Iron and Manganese Mine is 1437.719 ha. Out of which, forest land and non-forest land prevails over 1246.552 ha and 191.167 ha. respectively. Stage-II Forest clearance has been accorded vide letter no F F.No.8-89/2004-FC, dated 10.08.2007 for 436.678 ha of forest land. FC for balance area of 809.874 ha (Sabik Forest and Balance Forest) has been applied. Presently mining is restricted to only 436.678 ha diverted forest land, non-forestland of 191.167 ha and some portions of the broken-up forestland (broken up prior to 1980).	Date: 29/05/2025

2	LAND RECLAMATION	Topsoil should be stacked properly with proper slope at earmarked site(s) with adequate measures and should be used for reclamation and rehabilitation of mined out area.

PPs Submission: Complied During this FY-2024-25 a total of 1927 m3 of topsoil was generated This topsoil has been systematically stacked in a designated area earmarked for storage. Concurrently it has been utilized for plantation over matured dumps and for roadside avenue plantation.	Date: 29/05/2025

3	WASTE MANAGEMENT	OB and other wastes should be stacked at earmarked sites only and should not be kept active for long periods of time. Plantation should be taken up for soil stabilization along the slopes of the dump and terraced after every 5-6 m of height and overall slope angle shall be maintained not exceeding 28°. Sedimentation pits shall be constructed at the corners of the garland drains. Retention/toe walls shall be provided at the base of the dumps.

PPs Submission: Complied Mining and all its associated operational activities are ensured in line with the provisions of approved mining plan. Dedicated sites have been earmarked for storing overburden (OB) and other waste and/or minerals/ mineral rejects. The status thereof is updated in the surface plan on quarterly basis. All matured dumps are stabilized by bio-reclamation with the plantation of Vetiver grass on the slopes and native varieties of forestry saplings. The dump is terraced at every 5-6 mtr and overall slope is maintained well within 28 degree. Environmental Protection Measures ensured at site especially for the dump management aspects are as follows: 1. Network of Garland Drains and/or Toe Walls 2. Intermittent Sedimentation tanks/settling pits 3. Slope stabilization by means of coir matting and/or vetiver grass plantation 4. Final rehabilitation measures by means of native varieties of forestry saplings both on the slope and benches of the dump.	Date: 29/05/2025

4	WATER QUALITY MONITORING AND PRESERVATION	Catch drains and siltation ponds of appropriate size should be constructed to arrest silt and sediment flows from soil, OB and mineral dumps. The drains should be regularly desilted and maintained properly. Garland drains (size, gradient & length) and sump capacity should be designed keeping 50% safety margin over and above the peak sudden rainfall and maximum discharge in the area adjoining the mine site. Sump capacity should also provide adequate retention period to allow proper settling of silt material.

		Storm water return system should be provided. Storm water should not be allowed to go to the effluent treatment plant during high rainfall/super cyclone period. A separate storm water sump for this purpose should be created.

PPs Submission: Complied Existing catch drains and garland drains have been constructed all along the periphery of dump at the toe, so that silt/sediments in the surface runoff can be arrested. Size, gradient and length of the drains and the ponds are adequately made with respect to the size of the same to take care of the peak flow during the rainy season. The garland drain, catch drains and sedimentation pits are periodically de-silted and maintained properly every year before the onset of monsoon. The storm water which gets collected in the lower most areas of the leasehold, during rains, is connected to a series of drains which lead to D Quarry mine pit to store the water and also recharge the ground water table.	Date: 29/05/2025

5	WATER QUALITY MONITORING AND PRESERVATION	Dimension of retaining wall at the toe of OB dumps and benches within the mine to check run-off and siltation should be based on the rainfall data.

PPs Submission: Complied While designing network of garland drains, check dams, retention walls and rain passes for slope protection as well as arresting silt and sediment during monsoon season, following factors are considered such as Rainfall (peak scenarios), catchment area, gradient slope and retention hours.	Date: 29/05/2025

6	AIR QUALITY MONITORING AND PRESERVATION	Trace Metals such as Ni, Co, As and Hg should be analyzed in dust fall and soil samples for at least one year during summer, monsoon and winter seasons. If concentrations of these metals are found below the standards then with prior approval of MOEF this specific monitoring could be discontinued.

PPs Submission: Complied Yearly monitoring of trace metals both in dust fall and soil samples for parameters like Ni, Co, As and Hg is being carried out. So far, no such trace mineral has been detected in the collected samples.	Date: 29/05/2025

7	AIR QUALITY MONITORING AND PRESERVATION	Mineral and OB transportation shall be done in trucks/dumpers covered with tarpaulins. Vehicular emissions should be kept under control and regularly monitored. Suitable measures should be taken to check fugitive emissions from haulage roads, transfer points, etc.

PPs Submission: Complied Mineral Transportation is ensured by tippers and all the trucks are covered with tarpaulins before issuance of transit permits for their onward transportation. All the dispatch vehicles are mandatorily required to have ,Pollution under Check (PUC) certificate to enter the mine. To restrict the fugitive emissions form haul roads, the following measures have been taken up: -1. Fixed Sprinkling System for the Haul Roads 2. Mist Canons at sorting yards 3. Automatic Wheel wash facility at the exit point of the mines 4. Dust suppression by means of mobile water tanker deployed for Haul Roads and other locations. 5. Fixed sprinkling arrangement at railway siding	Date: 29/05/2025

8	GREENBELT	A green belt of should be raised around ML area (296.163 ha), along roads, OB dump sites (64.774 ha), township (21.242 ha) and in other areas within the lease (227.63 ha) covering a total area of not less than 409.809 ha by planting native species in consultation with local DFO/Agriculture department. The density of the trees should be around 2500 plants per ha.

PPs Submission: Complied Plantation activities are ensured in accordance with the provisions of Progressive Mine Closure Plan (PMCP). Tata Steel Limited has developed a site-specific biodiversity management plan for implementation of measures for protection and conservation of biodiversity in and around the mine. Accordingly, emphasis on the principles of restoration is ensured by following scientific plantation	Date: 29/05/2025

	strategies with the help of mixed varieties of native (non-exotic) forestry saplings in the scheme of plantation. So far, around 114.830 hectares of area (including waste dump, safety zone, back filled area and avenue plantation zones) have been covered under plantation with 500164 nos of saplings (approx.). In the process of afforestation, the mine has ensured rehabilitation of around 45.1 hectares over OB dump, 62.881 ha of Avenue Planation and 6.848 ha of Safety zone plantation where the saplings have attained self-sustaining stage. Apart from above we have planted 7515 nos sapling in dump area during the period FY-24-25. The mine management has also established a centralized nursery over an area of 2000 sq-mtr with a generation potential of around 1 lakh saplings/year within the lease area for promoting greenbelt/ afforestation related measures which caters to all the sapling requirement of all the three leases in Manganese Group of Mines.	
9	WATER QUALITY MONITORING AND PRESERVATION	Groundwater shall not be used for mine operations. Prior approval of CGWA shall be obtained for using groundwater.
	PPs Submission: Complied Ground water is not being used for any mining associated processes. There are no wet beneficiation plants within the lease. Majorly water is used for meeting domestic requirements of office areas, rest shelters areas for workers, supply to villagers in nearby villages nearby and Haul Road dust suppression purposes. Presently, mine draws around 146 KLD of ground water from 3-4 bore wells which is exclusively used for drinking and domestic consumption and is also supplied to local villagers for drinking purposes. We are obtaining from the CGWA on regular time interval.	Date: 29/05/2025
10	MINING PLAN	Mining shall not intersect groundwater. Prior permission of the MOEF and CGWA shall be taken to mine below water table.
	PPs Submission: Complied As per the approved mining plan and status thereof, it is conclusive that ultimate pit depth of the mine at the end of mine plan period will not intercept the regional ground water table however during the advancement of mining operation at Gangeiguda Quarry feeble seepage from one of its face (attributed to some localized aquifer) was encountered and accordingly a detailed hydrogeological investigation was carried out in this regard by engaging a CGWA accredited/empaneled agency.	Date: 29/05/2025
11	WATER QUALITY MONITORING AND PRESERVATION	Regular monitoring of ground water level and quality should be carried out by establishing a network of existing wells and constructing new piezometers. The monitoring should be done for quantity four times a year in pre-monsoon (April / May), monsoon (August), post-monsoon (November) and winter (January) seasons and for quality in May. Data thus collected should be submitted to the Ministry of Environment & Forest and the Central Ground Water Authority quarterly.
	PPs Submission: Complied A network of open dug wells and bore wells have been identified for monitoring of GW levels and quality in and around the mine areas.	Date: 30/05/2025
12	WATER QUALITY MONITORING AND PRESERVATION	Trace metals such as Fe, Cr+6, Cu, Se, As, Cd, Hg, Pb, Zn and Mn shall be periodically monitored at specific locations in both surface water downstream and in ground water at lower elevations from mine area, in consultation with the OSPCB and State Ground Water Board. Suitable treatment measures shall be undertaken in case levels are found to be higher than permissible limits.
	PPs Submission: Complied Water Quality parameters are regularly tested for both surface water and ground water. Monitoring reports are submitted to SPCB from time to time. So far from the water quality analysis result of both surface and ground water attributes, no such adverse impacts have been observed when compared with applicable permissible limits/standards prescribed.	Date: 30/05/2025

13	Statutory compliance	"Consent to Operate" should be obtained from SPCB before expanding mining activities.
PPs Submission: Complied Consent to Operate for Production of Mn Ore for 180000 TPA and Operation of stationary Screening Plant of 1X70 TPH has been accorded by SPCB, Odisha vide letter No. 4234/IND-I-CON-186 dated 17-03-2022 which is valid up to 31/03/2026.		Date: 29/05/2025
14	Statutory compliance	A plan for conservation Plan for conservation of endangered fauna including the Indian Elephant found in and around the mine area shall be prepared and implemented in consultation with identified agencies/institutions and with the State Forest Department. The Plan should be dovetailed with that prepared/under implementation/ proposed for the endangered fauna found in the Reserve Forest in the buffer zone of the project site. The costs for the specific activities/tasks should be earmarked in the Conservation Plan and shall not be diverted for any other purpose. Year-wise status of the implementation of the Plan and the expenditure thereon should be reported to the Ministry of Environment & forests, RO, Bhubaneshwar.
PPs Submission: Complied A site-specific wildlife conservation plan has been approved by PCCF, Bhubaneswar, Odisha and Chief Wildlife Warden Odisha vide memo no. 7726/1WL-SSP-93/2015 dated 31.08.2015. Following funds have been deposited by PP to State Forest Dept till date for Rs. 9,79,48,000/- for the implementation of various provisions of site-Specific wildlife conservation plan like avifauna monitoring, solar fencing and other Rs 6,18,21,917/- for the implementation of regional wildlife conservation as per the demand notices.		Date: 29/05/2025
15	MINING PLAN	A Final Mine Closure Plan along with details of Corpus Fund should be submitted to the Ministry of Environment & Forests 5 years in advance of final mine closure for approval.
PPs Submission: Complied A Final Mine Closure Plan (FMCP) shall be prepared in accordance with the provisions laid down under the GUIDELINES FOR PREPARATION OF FINAL MINE CLOSURE PLANS as prescribed by Indian Bureau of Mines. As per the said guideline, FMCP is required to be prepared 2 years in advance from the date of closure/life of the mine. However presently during the approval of Mine Plan, a progressive mine closure plan (PMCP) is being submitted for approval. During the process of such approval, based on the area put to use for excavation and allied activities, we have deposited a sum of Rs. 30.5990 Cr to Indian Bureau of Mines (IBM) in the form of Bank Guarantees towards financial assurance for the implementation of measures of PMCP provisions. This approval was communicated to the Regional office , MoEF and CC, Bhubaneswar vide our letter no MGM/P/E/106/23 dated 31.03.2023.		Date: 29/05/2025

General Conditions

Sr.No.	Condition Type	Condition Details
1	MISCELLANEOUS	The State Pollution Control Board should display a copy of the clearance letter at the Regional Office, District Industry Centre and Collector's Office/Tehsildar's Office for 30 days.
PPs Submission: Complied The EC documents was displayed in the office of Regional Office, District Industry Centre and Collector's Office/ Tehsildar's Office for 30 days.		Date: 29/05/2025
2	MINING PLAN	No change in mining technology and scope of working should be made without prior approval of the Ministry of Environment & Forests.

PPs Submission: Complied There is no change in the mining technology and scope of working of the mines. Mining is carried out as proposed by using shovel-dumper combination. Dry mobile screening is carried out with the help of a 1X75 TPH screen plant.		Date: 29/05/2025
3	MINING PLAN	No change in the calendar plan including excavation, quantum of manganese ore and waste should be made.
PPs Submission: Complied Production and excavation quantum is regulated by the Mine Plan approved by Indian bureau of Mines (IBM). No change in the calendar plan has been made. Total annual production achieved from the mine is well within the EC limit of 1.8 Lakh tonnes per annum.		Date: 29/05/2025
4	AIR QUALITY MONITORING AND PRESERVATION	Four ambient air quality-monitoring stations should be established in the core zone as well as in the buffer zone for RPM, SPM, SO2, NOx & CO monitoring. Location of the stations should be decided based on the meteorological data, topographical features, and environmentally and ecologically sensitive targets in consultation with the State Pollution Control Board. Data on ambient air quality (RPM, SPM, SO2, NOx & CO) should be regularly submitted to the Ministry including its regional office at Bhubaneshwar and the State Pollution Control Board / Central Pollution Control Board once in six months.
PPs Submission: Complied In consultation with Regional Office, State Pollution Control Board (Keonjhar Region), 06 nos of dedicated Ambient Air Quality monitoring station have been established and regular monitoring is being carried out twice a week .Photographs of fixed type platforms properly geotagged with the spatial coordinates have been shared with State Pollution Control Board and the same was accepted to SPCB during renewal of CTO. In addition to this, 12 nos of locations have also been identified in the buffer zone for regular monitoring. Abstract of Ambient Air Quality monitoring result for the period during October 2024 to March 2025 is enclosed as Annexure 1.		Date: 30/05/2025
5	AIR QUALITY MONITORING AND PRESERVATION	Drills should be wet operated or with dust extractors and controlled blasting should be practiced.
PPs Submission: Complied Wet drilling concept is already in place and practiced. Exploratory drills have been provided with inbuilt DE system. Controlled blasting technique with NONEL is in practice. Ground vibrations are being checked for every blast done in the mine. Blasting parameters are assessed periodically by engaging agency like CIMFR, Dhanbad. Based on the recommendation of such assessments, the blasting rounds are designed and fired		Date: 29/05/2025
6	AIR QUALITY MONITORING AND PRESERVATION	Fugitive dust emissions from all the sources should be controlled regularly monitored and data recorded properly. Water spraying arrangements on haul roads, wagon loading, dumpers/ trucks, loading & unloading points should be provided and properly maintained.
PPs Submission: Complied Following measures are ensured for containment of fugitive dust emission: 1. Mobile water tanker for Haul Roads, Dump yards and other locations) 2. Mist Canons for sorting yards and screening plants 3. Fixed Sprinkling system for static haul roads 4. Automatic Wheel wash facility at Railway Siding and exit point of the mines.		Date: 29/05/2025
7	Noise Monitoring & Prevention	Adequate measures should be taken for control of noise levels below 85 dBA in the work environment. Workers engaged in blasting and drilling operations, operations of HEMM, etc. should be provided with ear plugs/ muffs.

		PPs Submission: Complied Ear plugs and Earmuffs are provided to the workers working in mining operation and DG operations and other high noise generating equipment's. Provision of acoustic enclosures are invariably ensured before the installation of such noise generating instruments. Following monitoring measures are ensured for the regulation of noise pollution associated impacts: 1. Monitoring of Noise level (both ambient noise survey) and workplace noise survey is carried out on monthly basis using an integrated sound level meter. 2. Occupational Noise Exposure assessment is also carried out for the persons engaged in high noise generating areas on quarterly basis by sampling individual workers over eight-hour durations.	Date: 29/05/2025
8	WATER QUALITY MONITORING AND PRESERVATION	Industrial wastewater (workshop and wastewater from the mine) should be properly collected, treated so as to conform to the standards prescribed under GSR 422 (E) dated 19th May 1993 and 31st December 1993 or as amended from time to time. Oil and grease trap should be installed before discharge of workshop effluents.	
		PPs Submission: Complied For effective management of effluent following mitigative measures are ensured at the mine level: 1. Effluents from Workshop/Garage: Vehicle washing system and associated operational activities are provided with separate catchment drains and finally the effluents are collected in Oil-Water Separation system having skimming arrangements for oil and grease. 2. Wastewater/runoff collected from the mine pits: Since there is no wet process thus no wastewater is generated at any stage from any process. 3. Surface runoff is channelized and accumulated in the mine pit. After adequate retention period, the same is pumped to water treatment plant for final treatment before domestic consumption. 4. Periodically water samples from mine pits and oil-water separation system are collected and analyzed by an NABL accredited agency for checking compliance w.r.t applicable standards.	Date: 29/05/2025
9	MISCELLANEOUS	Environmental laboratory should be established with adequate number and type of pollution monitoring and analysis equipment in consultation with the State Pollution Control Board.	
		PPs Submission: Complied Environmental Monitoring services are carried out by engaging an NABL Accredited agency having it's laboratory recognized by Ministry of Environment, Forest and Climate Change.	Date: 29/05/2025
10	Human Health Environment	Personnel working in dusty areas should wear protective respiratory devices and they should also be provided with adequate training and information on safety and health aspects. Occupational health surveillance program of the workers should be undertaken periodically to observe any contractions due to exposure to dust and take corrective measures, if needed.	
		PPs Submission: Complied Personnel Protective Equipments (PPEs) are being mandatorily used by all the workers as per applicability. It is regularly ensured at the entry points. Safe Operating Procedure based training is imparted to all the workers apart from the initial VT training. Periodical Medical Examination of employees (departmental and contractual) are conducted as per prescribed norms of Mines Rule, 1955. Besides, Occupational health surveillance assessment as are also carried out.	Date: 29/05/2025
11	MISCELLANEOUS	A separate environmental management cell with suitable qualified personnel should be set up under the control of a Senior Executive, who will report directly to the Head of the Organization.	
		PPs Submission: Complied The company has made a robust arrangement for reviewing and monitoring the implementation of Environment management plan. A Centralized Environmental Management Department has been set up headed by the Chief (Environment) and supporting staff. The operation and legal sections at mine level include Head (Mine Planning), Head (Environment), Senior Manager - Mine Planning, Area Manager (RM Environment), Environment Engineer, Chemists, etc.	Date: 29/05/2025

12	MISCELLANEOUS	The funds earmarked for environmental protection measures should be kept in separate account and should not be diverted for other purpose. Year wise expenditure should be reported to the Ministry and its Regional Office located at Bhubaneswar.
PPs Submission: Complied A dedicated cost Centre for maintaining all environmental expenditure is maintained in a separate GL account having a unique cost centre mapped in the SAP system. All sorts of environmental protection related expenditures are booked in the said cost centre for accounting purpose. The details of expenditure incurred during the last 3 financial years is as under- 1.FY-2022-23- Rs. 272.92 Lakhs 2.FY-2023-24- Rs. 378.33 Lakhs 3.FY-2024-25-Rs.372.58 Lakhs		Date: 29/05/2025
13	Statutory compliance	The Regional Office of this Ministry located at Bhubaneshwar shall monitor compliance of the stipulated conditions. The project authorities should extend full cooperation to the officer (s) of the Regional Office by furnishing the requisite data / information / monitoring reports.
PPs Submission: Complied The company has been extending full co-operation to the officers of the Regional Office and other statutory agencies by furnishing the requisite data / information / monitoring reports as and when required. The same shall be continued in future as well.		Date: 29/05/2025
14	PUBLIC HEARING	A copy of clearance letter will be marked to the concerned Panchayat/local NGO, if any, from whom suggestion/ representation has been received while processing the proposal.
PPs Submission: Complied The clearance letter has been uploaded on the website of the Company. Copy of the clearance letter marked to Chairman, Municipal Council, Joda on 12.01.2006.		Date: 29/05/2025
15	MISCELLANEOUS	The project authorities should advertise at least in two local newspapers widely circulated around the project, one of which shall be in the vernacular language of the locality concerned within seven days of the issue of the clearance letter informing that the project has been accorded environmental clearance and a copy of the clearance letter is available with the State Pollution Control Board and may also be seen at Website of the Ministry of Environment & Forests at http://envfor.nic.in. and a copy of the same should be forwarded to the Regional Office of this Ministry located at Bhubaneswar.
PPs Submission: Complied A copy of Environmental Clearance with regard to Joda West Manganese Mine was published in Oriya News Papers Dharitri and Sambad on 17.10.2005.		Date: 29/05/2025

Visit Remarks

Last Site Visit Report Date:	N/A
Additional Remarks:	

Note: This acknowledgement is as per the details submitted by project proponent. In no way is this document to be considered as conclusion on any action on the compliance of the project. This is strictly for the project proponent's reference purpose.

Compliance to the Environment Clearance Letter No: J-11015/86/2004-IA. II(M) dated 13th September 2005 in respect of "*Expansion of Joda West Manganese Mines (0.45LTPA to 1.80 LTPA) of M/s Tata Steel Limited located in villages Joda, Bichhakundi, Kamarjoda, Banspani and Bhuyan Roida, Tehsil-Barbil, District-Keonjhar, Odisha*."

Table A:- Specific Conditions

SN.	EC Conditions	Status of Compliance
(i)	Mining shall not be undertaken in areas of forestland within the lease for which necessary approval/ forestry clearance has not been obtained.	The present leasehold area of Joda West Iron & Manganese Mine is 1437.719 ha. Out of which, forest land and non-forest land prevails over 1246.552 ha and 191.167 ha. respectively. Stage-II Forest clearance has been accorded vide letter no F F.No.8-89/2004-FC, dated 10.08.2007 for 436.678 ha of forest land. FC for balance area of 809.874 ha (Sabik Forest & Balance Forest) has been applied. Presently mining is restricted to only 436.678 ha diverted forest land, non-forestland of 191.167 ha and some portions of the broken-up forestland (broken up prior to 1980).
(ii)	Topsoil should be stacked properly with proper slope at earmarked site(s) with adequate measures and should be used for reclamation and rehabilitation of mined out area.	During this FY-2024-25 a total of 1927 m3 of topsoil was generated This topsoil has been systematically stacked in a designated area earmarked for storage. Concurrently it has been utilized for plantation over matured dumps and for roadside avenue plantation.
(iii)	OB and other wastes should be stacked at earmarked sites only and should not be kept active for long periods of time. Plantation should be taken up for soil stabilization along the slopes of the dump and terraced after every 5-6 m of height and overall slope angle shall be maintained not exceeding 28°. Sedimentation pits shall be constructed at the corners of the garland drains. Retention/toe walls shall be provided at the base of the dumps.	Mining and all its associated operational activities are ensured in line with the provisions of approved mining plan. Dedicated sites have been earmarked for storing overburden (OB) and other waste and/or minerals/ mineral rejects. The status thereof is updated in the surface plan on quarterly basis. All matured dumps are stabilized by bio-reclamation with the plantation of Vetiver grass on the slopes and native varieties of forestry saplings. The dump is terraced at every 5-6 mtr and overall slope is maintained well within 28°. Environmental Protection Measures ensured at site especially for the dump management aspects are as follows: 1. Network of Garland Drains and/or Toe Walls 2. Intermittent Sedimentation tanks/settling pits 3. Slope stabilization by means of coir matting and/or vetiver grass plantation 4. Final rehabilitation measures by means of native varieties of forestry saplings both on the slope and benches of the dump.
(iv)	Catch drains and siltation ponds of appropriate size should be constructed to arrest silt and sediment flows from soil, OB and mineral dumps. The drains should be regularly desilted and maintained properly. Garland drains (size, gradient & length) and sump capacity should be designed keeping 50% safety margin over and above the peak sudden rainfall and maximum discharge in the area adjoining the mine site. Sump capacity should also provide adequate retention period to allow proper settling of silt	Existing catch drains & garland drains have been constructed all along the periphery of dump at the toe, so that silt/sediments in the surface runoff can be arrested. Size, gradient and length of the drains and the ponds are adequately made with respect to the size of the same to take care of the peak flow during the rainy season. The garland drain, catch drains and sedimentation pits are periodically de-silted and maintained properly every year before the onset of monsoon. The storm water which gets collected in the lower most areas of the leasehold, during rains, is connected to a series of drains which lead to D Quarry mine pit to store the water and also recharge the ground water table.

SN.	EC Conditions	Status of Compliance
	material. Storm water return system should be provided. Storm water should not be allowed to go to the effluent treatment plant during high rainfall/super cyclone period. A separate storm water sump for this purpose should be created.	
(v)	Dimension of retaining wall at the toe of OB dumps and benches within the mine to check run-off and siltation should be based on the rainfall data.	While designing network of garland drains, check dams, retention walls and rain passes for slope protection as well as arresting silt and sediment during monsoon season, following factors are considered such as Rainfall (peak scenarios), catchment area, gradient slope and retention hours.
(vi)	Trace Metals such as Ni, Co, As and Hg should be analyzed in dust fall and soil samples for at least one year during summer, monsoon and winter seasons. If concentrations of these metals are found below the standards then with prior approval of MOEF this specific monitoring could be discontinued.	Yearly monitoring of trace metals both in dust fall and soil samples for parameters like Ni, Co, As and Hg is being carried out. So far, no such trace mineral has been detected in the collected samples.
(vii)	Mineral and OB transportation shall be done in trucks/dumpers covered with tarpaulins. Vehicular emissions should be kept under control and regularly monitored. Suitable measures should be taken to check fugitive emissions from haulage roads & transfer points, etc.	Mineral Transportation is ensured by tippers and all the trucks are covered with tarpaulins before issuance of transit permits for their onward transportation. All the despatch vehicles are mandatorily required to have "Pollution under Check (PuC)" certificate to enter the mine. To restrict the fugitive emissions form haul roads, the following measures have been taken up: -1. Fixed Sprinkling System for the Haul Roads 2. Mist Canons at sorting yards 3. Automatic Wheel wash facility at the exit point of the mines 4. Dust suppression by means of mobile water tanker deployed for Haul Roads and other locations. 5. Fixed sprinkling arrangement at railway siding
(viii)	A green belt of should be raised around ML area (296.163 ha), along roads, OB dump sites (64.774 ha), township (21.242 ha) and in other areas within the lease (227.63 ha) \covering a total area of not less than 409.809 ha by planting native species in consultation with local DFO/Agriculture department. The density of the trees should be around 2500 plants per ha.	Plantation activities are ensured in accordance with the provisions of Progressive Mine Closure Plan (PMCP). Tata Steel Limited has developed a site-specific biodiversity management plan for implementation of measures for protection and conservation of biodiversity in and around the mine. Accordingly, emphasis on the principles of restoration is ensured by following scientific plantation strategies with the help of mixed varieties of native (non-exotic) forestry saplings in the scheme of plantation. So far, around 114.830 hectares of area (including waste dump, safety zone, back filled area and avenue plantation zones) have been covered under plantation with 500164 nos of saplings (approx.). In the process of afforestation, the mine has ensured rehabilitation of around 45.1 hectares over OB dump, 62.881 ha of Avenue Planation and 6.848 ha of Safety zone plantation where the saplings have attained self-sustaining stage. Apart from above we have planted 7515 no's sapling in dump area during the period FY'24-25. The mine management has also established a centralized nursery over an area of 2000 sq-mtr with a generation potential of around 1 lakh saplings/year within the lease area for promoting greenbelt/ afforestation related measures which caters to all the sapling

SN.	EC Conditions	Status of Compliance
		requirement of all the three leases in Manganese Group of Mines.
(ix)	Groundwater shall not be used for mine operations. Prior approval of CGWA shall be obtained for using groundwater.	Ground water is not being used for any mining associated processes. There are no wet beneficiation plants within the lease. Majorly water is used for meeting domestic requirements of office areas, rest shelters areas for workers, supply to villagers in nearby villages nearby and Haul Road dust suppression purposes. Presently, mine draws around 146 KLD of ground water from 3-4 bore wells which is exclusively used for drinking & domestic consumption and is also supplied to local villagers for drinking purposes. We are obtaining (NOC) from the CGWAon regular basis.
(x)	Mining shall not intersect groundwater. Prior permission of the MOEF and CGWA shall be taken to mine below water table.	As per the approved mining plan and status thereof, it is conclusive that ultimate pit depth of the mine at the end of mine plan period will not intercept the regional ground water table however during the advancement of mining operation at Gangeiguda Quarry feeble seepage from one of its face (attributed to some localized aquifer) was encountered and accordingly a detailed hydrogeological investigation was carried out in this regard by engaging a CGWA accredited/empanelled agency.
(xi)	Regular monitoring of ground water level and quality should be carried out by establishing a network of existing wells and constructing new piezometers. The monitoring should be done for quantity four times a year in pre-monsoon (April / May), monsoon (August), post-monsoon (November) and winter (January) seasons and for quality in May. Data thus collected should be submitted to the Ministry of Environment & Forest and the Central Ground Water Authority quarterly.	A network of open dug wells and bore wells have been identified for monitoring of GW levels and quality in and around the mine areas.
(xii)	Trace metals such as Fe, Cr^{+6}, Cu, Se, As, Cd, Hg, Pb, Zn and Mn shall be periodically monitored at specific locations in both surface water downstream and in ground water at lower elevations from mine area, in consultation with the OSPCB and State Ground Water Board. Suitable treatment measures shall be undertaken in case levels are found to be higher than permissible limits.	Water Quality parameters are regularly tested for both surface water and ground water. Monitoring reports are submitted to SPCB from time to time. So far from the water quality analysis result of both surface and ground water attributes, no such adverse impacts have been observed when compared with applicable permissible limits/standards prescribed.
(xiii)	"Consent to Operate" should be obtained from SPCB before expanding mining activities.	Consent to Operate for Production of Mn Ore for 180000 TPA and Operation of stationary Screening Plant of 1X70 TPH has been accorded by SPCB, Odisha vide letter No. 4234/IND-I-CON-186 dated 17-03-2022 which is valid up to 31/03/2026.
(xiv)	A plan for conservation Plan for conservation of endangered fauna including the Indian Elephant found in and around the mine area shall be prepared and implemented in	A site-specific wildlife conservation plan has been approved by PCCF, Bhubaneswar, Odisha and Chief Wildlife Warden Odisha vide memo no. 7726/1WL-SSP-93/2015 dated 31.08.2015.

SN.	EC Conditions	Status of Compliance
	consultation with identified agencies/institutions and with the State Forest Department. The Plan should be dovetailed with that prepared/under implementation/ proposed for the endangered fauna found in the Reserve Forest in the buffer zone of the project site. The costs for the specific activities/tasks should be earmarked in the Conservation Plan and shall not be diverted for any other purpose. Year-wise status of the implementation of the Plan and the expenditure thereon should be reported to the Ministry of Environment & forests, RO, Bhubaneshwar.	Following funds have been deposited by PP to State Forest Dept till date for – Rs. 9,79,48,000/- for the implementation of various provisions of site-Specific wildlife conservation plan like avifauna monitoring, solar fencing and other Rs 6,18,21,917/- for the implementation of regional wildlife conservation as per the demand notices.
(xv)	A Final Mine Closure Plan along with details of Corpus Fund should be submitted to the Ministry of Environment & Forests 5 years in advance of final mine closure for approval.	A Final Mine Closure Plan (FMCP) shall be prepared in accordance with the provisions laid down under the "GUIDELINES FOR PREPARATION OF FINAL MINE CLOSURE PLANS" as prescribed by Indian Bureau of Mines. As per the said guideline, FMCP is required to be prepared 2 years in advance from the date of closure/life of the mine. However presently during the approval of Mine Plan, a progressive mine closure plan (PMCP) is being submitted for approval. During the process of such approval, based on the "area put to use" for excavation and allied activities, we have deposited a sum of Rs. 30.5990 Cr to Indian Bureau of Mines (IBM) in the form of Bank Guarantees towards financial assurance for the implementation of measures of PMCP provisions. This approval was communicated to the Regional office , MoEF & CC, Bhubaneswar vide our letter no MGM/P&E/106/23 dated 31.03.2023.

Table B:- General Conditions

SN.	EC Conditions	Status of Compliance
(i)	No change in mining technology and scope of working should be made without prior approval of the Ministry of Environment & Forests.	There is no change in the mining technology and scope of working of the mines. Mining is carried out as proposed by using shovel-dumper combination. Dry mobile screening is carried out with the help of a 1X75 TPH screen plant.
(ii)	No change in the calendar plan including excavation, quantum of manganese ore and waste should be made.	Production and excavation quantum is regulated by the Mine Plan approved by Indian bureau of Mines (IBM). No change in the calendar plan has been made. Total annual production achieved from the mine is well within the EC limit of 1.8 Lakh tonnes per annum.
(iii)	Four ambient air quality-monitoring stations should be established in the core zone as well as in the buffer zone for RPM, SPM, SO2, NOx & CO monitoring. Location of the stations should be decided based on the meteorological data, topographical	In consultation with Regional Office, State Pollution Control Board (Keonjhar Region), 06 no's of dedicated Ambient Air Quality monitoring station have been established and regular monitoring is being carried out twice a week Photographs of fixed type platforms properly geotagged with the spatial coordinates have been shared with State Pollution Control Board and the same was accepted to SPCB during renewal of CTO.

SN.	EC Conditions	Status of Compliance
	features, and environmentally and ecologically sensitive targets in consultation with the State Pollution Control Board. Data on ambient air quality (RPM, SPM, SO2, NOx & CO) should be regularly submitted to the Ministry including its regional office at Bhubaneshwar and the State Pollution Control Board / Central Pollution Control Board once in six months.	In addition to this, 12 no's of locations have also been identified in the buffer zone for regular monitoring. Abstract of Ambient Air Quality monitoring result for the period during October 2024 to March 2025 is enclosed as Annexure 1.
(iv)	Drills should be wet operated or with dust extractors and controlled blasting should be practiced.	Wet drilling concept is already in place and practiced. Exploratory drills have been provided with inbuilt DE system. Controlled blasting technique with NONEL is in practice. Ground vibrations are being checked for every blast done in the mine. Blasting parameters are assessed periodically by engaging agency like CIMFR, Dhanbad. Based on the recommendation of such assessments, the blasting rounds are designed and fired.
(v)	Fugitive dust emissions from all the sources should be controlled regularly monitored and data recorded properly. Water spraying arrangements on haul roads, wagon loading, dumpers/ trucks, loading & unloading points should be provided and properly maintained.	Following measures are ensured for containment of fugitive dust emission: 1. Mobile water tanker for Haul Roads, Dump yards and other locations) 2. Mist Canons for sorting yards and screening plants 3. Fixed Sprinkling system for static haul roads 4. Automatic Wheel wash facility at Railway Siding and exit point of the mines.
(vi)	Adequate measures should be taken for control of noise levels below 85 dBA in the work environment. Workers engaged in blasting and drilling operations, operations of HEMM, etc. should be provided with ear plugs/ muffs.	Ear plugs & Earmuffs are provided to the workers working in mining operation & DG operations and other high noise generating equipment's. Provision of acoustic enclosures are invariably ensured before the installation of such noise generating instruments. Following monitoring measures are ensured for the regulation of noise pollution associated impacts: 1. Monitoring of Noise level (both ambient noise survey) and workplace noise survey is carried out on monthly basis using an integrated sound level meter. 2. Occupational Noise Exposure assessment is also carried out for the persons engaged in high noise generating areas on quarterly basis by sampling individual workers over eight-hour durations.
(vii)	Industrial wastewater (workshop and wastewater from the mine) should be properly collected, treated so as to conform to the standards prescribed under GSR 422 (E) dated 19th May 1993 and 31st December 1993 or as amended from time to time. Oil and grease trap should be installed before discharge of workshop effluents.	For effective management of effluent following mitigative measures are ensured at the mine level: 1. Effluents from Workshop/Garage: Vehicle washing system and associated operational activities are provided with separate catchment drains and finally the effluents are collected in Oil-Water Separation system having skimming arrangements for oil and grease. 2. Wastewater/runoff collected from the mine pits: Since there is no wet process thus no wastewater is generated at any stage from any process. 3. Surface runoff is channelized and accumulated in the mine pit. After adequate retention period, the same is pumped to water

SN.	EC Conditions	Status of Compliance
		treatment plant for final treatment before domestic consumption. 4. Periodically water samples from mine pits and oil-water separation system are collected and analysed by an NABL accredited agency for checking compliance w.r.t applicable standards.
(viii)	Environmental laboratory should be established with adequate number and type of pollution monitoring and analysis equipment in consultation with the State Pollution Control Board.	Environmental Monitoring services are carried out by engaging an NABL Accredited agency having its laboratory recognized by Ministry of Environment, Forest & Climate Change.
(ix)	Personnel working in dusty areas should wear protective respiratory devices and they should also be provided with adequate training and information on safety and health aspects. Occupational health surveillance program of the workers should be undertaken periodically to observe any contractions due to exposure to dust and take corrective measures, if needed.	Personnel Protective Equipment's (PPEs) are being mandatorily used by all the workers as per applicability. It is regularly ensured at the entry points. Safe Operating Procedure based training is imparted to all the workers apart from the initial VT training. Periodical Medical Examination of employees (departmental & contractual) are conducted as per prescribed norms of Mines Rule, 1955. Besides, Occupational health surveillance assessment as are also carried out.
(x)	A separate environmental management cell with suitable qualified personnel should be set up under the control of a Senior Executive, who will report directly to the Head of the Organization.	The company has made a robust arrangement for reviewing and monitoring the implementation of Environment management plan. A Centralized Environmental Management Department has been set up headed by the Chief (Environment) and supporting staff. The operation and legal sections at mine level include Head (Mine Planning), Head (Environment), Senior Manager - Mine Planning, Area Manager (RM Environment), Environment Engineer, Chemists, etc.
(xi)	The funds earmarked for environmental protection measures should be kept in separate account and should not be diverted for other purpose. Year wise expenditure should be reported to the Ministry and its Regional Office located at Bhubaneswar.	A dedicated cost Centre for maintaining all environmental expenditure is maintained in a separate GL account having a unique cost centre mapped in the SAP system. All sorts of environmental protection related expenditures are booked in the said cost centre for accounting purpose. The details of expenditure incurred during the last 3 financial years is as under: • FY-2022-23: Rs. 272.92 Lakhs • FY-2023-24: Rs. 378.33 Lakhs • FY_2024-25: Rs.372.58 Lakhs
(xii)	The Regional Office of this Ministry located at Bhubaneshwar shall monitor compliance of the stipulated conditions. The project authorities should extend full cooperation to the officer (s) of the Regional Office by furnishing the requisite data / information / monitoring reports.	The company has been extending full co-operation to the officers of the Regional Office and other statutory agencies by furnishing the requisite data / information / monitoring reports as and when required. The same shall be continued in future as well.
(xiii)	A copy of clearance letter will be marked to the concerned Panchayat/local NGO, if any, from	The clearance letter has been uploaded on the website of the Company. Copy of the clearance letter marked to Chairman, Municipal Council, Joda on 12.01.2006.

SN.	EC Conditions	Status of Compliance
	whom suggestion/ representation has been received while processing the proposal.	
(xiv)	The State Pollution Control Board should display a copy of the clearance letter at the Regional Office, District Industry Centre and Collector's Office/ Tehsildar's Office for 30 days.	The EC documents was displayed in the office of Regional Office, District Industry Centre and Collector's Office/ Tehsildar's Office for 30 days.
(xv)	The project authorities should advertise at least in two local newspapers widely circulated around the project, one of which shall be in the vernacular language of the locality concerned within seven days of the issue of the clearance letter informing that the project has been accorded environmental clearance and a copy of the clearance letter is available with the State Pollution Control Board and may also be seen at Website of the Ministry of Environment & Forests at http://envfor.nic.in. and a copy of the same should be forwarded to the Regional Office of this Ministry located at Bhubaneswar.	A copy of Environmental Clearance with regard to Joda West Manganese Mine was published in Oriya News Papers Dharitri & Sambad on 17.10.2005.

Annexure-01

Joda West Manganese Mines of Tata Steel Limited
Manual Ambient Air Quality Report (Core Zone)
Reporting period :- Oct-24 to Mar-25

Location	Parameter	UoM	Oct-24	Nov-24	Dec-24	Jan-25	Feb-25	Mar-25
Near Time Office	Particulate Matter (<10um	µg/m^3	86.56	234.00	230.60	169.38	155.14	138.77
	Particulate Matter (<2.5un	µg/m^3	43.62	123.00	130.80	93.50	88.14	82
	Sulphur Dioxide (SO2)	µg/m^3	<6.0	6.43	6.78	6.43	6.43	5.94
	Nitrogen Dioxide (NO2)	µg/m^3	22.24	25.48	25.02	24.05	20.19	17.32
	Carbon Monoxide (CO)	mg/m^3	0.22	0.39	0.53	0.57	0.24	0.8
	Ozone (O3)	µg/m^3	<20.0	<20.0	<20.0	<20.0	<20.0	<20.0
	Ammonia (NH3)	µg/m^3	<20.0	<20.0	<20.0	<20.0	<20.0	<20.0
	Arsenic as (As)	ng/m^3	<1	<1	<1	<1	<1	<1
	Benzo(a)Pyrene	ng/m^3	<20.0	<20.0	<20.0	<20.0	<20.0	<20.0
	Benzene	µg/m^3	<2.0	<0.74	<0.74	<0.74	<0.74	<0.74
	Lead (as Pb)	µg/m^3	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01
	Manganese as Mn	µg/m^3	0.22	<0.06	0.60	1.19	0.89	0.76
	Nickel as Ni	ng/m^3	<4.0	0.04	0.14	1.19	0.11	<0.2
D Quarry Sorting Yard	Particulate Matter (<10um	µg/m^3	70.66	147.75	170.20	177.68	187.14	165.77
	Particulate Matter (<2.5un	µg/m^3	35.36	78.98	95.88	105.13	106.86	94.33
	Sulphur Dioxide (SO2)	µg/m^3	<6.0	6.23	6.43	6.39	6.49	6
	Nitrogen Dioxide (NO2)	µg/m^3	20.48	22.03	21.24	18.18	21.86	18.01
	Carbon Monoxide (CO)	mg/m^3	0.22	0.32	0.33	0.43	0.45	0.81
	Ozone (O3)	µg/m^3	<20	<20	<20	<20	<20	<20
	Ammonia (NH3)	µg/m^3	<20.0	<20.0	<20.0	<20.0	<20.0	<20.0
	Arsenic as (As)	ng/m^3	<1.0	<1.0	0.09	0.12	0.21	<1.0
	Benzo(a)Pyrene	ng/m^3	<1.0	<0.36	<0.36	<0.36	<0.36	<0.36
	Benzene	µg/m^3	<2.0	<0.74	<0.74	<0.74	<0.74	<0.74
	Lead (as Pb)	µg/m^3	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01
	Manganese as Mn	µg/m^3	0.14	<0.06	1.14	1.01	0.97	1.26
	Nickel as Ni	ng/m^3	<4.0	0.07	0.13	1.01	0.08	<0.2
D Quarry Screen Plant	Particulate Matter (<10um	µg/m^3	61.74	116.00	171.50	189.75	194.14	183.88
	Particulate Matter (<2.5un	µg/m^3	31.15	59.00	97.12	108.63	110.57	104.88
	Sulphur Dioxide (SO2)	µg/m^3	<6.0	<6.0	6.27	6.44	6.54	6.2
	Nitrogen Dioxide (NO2)	µg/m^3	16.95	14.40	22.58	20.90	20.72	19.93
	Carbon Monoxide (CO)	mg/m^3	0.15	0.16	0.33	0.32	0.36	0.86
	Ozone (O3)	µg/m^3	<20.0	<20.0	<20.0	<20.0	<20.0	<20.0
	Ammonia (NH3)	µg/m^3	<20.0	<20.0	<20.0	<20.0	<20.0	<20.0
	Arsenic as (As)	ng/m^3	<1.0	<1.0	0.09	0.34	0.56	<1.0
	Benzo(a)Pyrene	ng/m^3	<1.0	<0.36	<0.36	<0.36	<0.36	<0.36
	Benzene	µg/m^3	<2.0	<0.74	<0.74	<0.74	<0.74	<0.74
	Lead (as Pb)	µg/m^3	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01
	Manganese as Mn	µg/m^3	0.11	<0.06	0.98	0.94	0.93	0.9
	Nickel as Ni	ng/m^3	<4.0	<0.02	0.19	0.94	0.09	<0.2

H Quarry Rest Shelter	**Particulate Matter (<10um**	µg/m^3	66.20	138.25	165.30	192.25	173.71	176.88
	Particulate Matter (<2.5un	µg/m^3	33.28	73.63	92.23	112.38	99.86	95.11
	Sulphur Dioxide (SO2)	µg/m^3	<6.0	<6.0	6.39	6.44	6.51	6.54
	Nitrogen Dioxide (NO2)	µg/m^3	17.66	20.55	19.88	22.22	21.79	21.01
	Carbon Monoxide (CO)	mg/m^3	0.15	0.30	0.24	0.26	0.28	0.84
	Ozone (O3)	µg/m^3	<20	<20	<20	<20	<20	<20
	Ammonia (NH3)	µg/m^3	<20.0	<20.0	<20.0	<20.0	<20.0	<20.0
	Arsenic as (As)	ng/m^3	<1.0	<1.0	0.06	0.20	0.33	<1.0
	Benzo(a)Pyrene	ng/m^3	<1.0	<1.0	<0.36	<0.36	<0.36	<0.36
	Benzene	µg/m^3	<2.0	<2.0	<0.74	<0.74	<0.74	<0.74
	Lead (as Pb)	µg/m^3	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01
	Manganese as Mn	µg/m^3	0.11	<0.06	0.50	0.64	0.70	0.52
	Nickel as Ni	ng/m^3	6.90	0.03	0.14	0.64	0.08	<0.2