स्टील अथॉरिटी ऑफ इण्डिया लिमिटेड
STEEL AUTHORITY OF INDIA LIMITED
राउरकेला इस्पात कारखाना
ROURKELA STEEL PLANT
बरसुआ लौह खादान - टेलडिही लौह खादान
BARSUA IRON MINES - TALDHI IRON MINES
P.O. TENSA - 770042
E-mail : gmofficebim@gmail.com

Ref. No. BIM/E&L/2023-24/196 Date: 30.12.2023

To,
The Director, IA Division,
Ministry of Environment, Forests and Climate Change,
Indira Paryavaran Bhawan, Jor Bagh Road, Aliganj,
New Delhi – 110003

Sub: Six monthly status of compliance of conditions stipulated in Environmental Clearance (Grant Order of MoEF&CC F. No. J-11015/351/2006-IA.II(M), dated 28th April, 2023) for the period ending 30th September, 2023.

Sir,

Please find enclosed herewith the updated six monthly compliance report with respect to the conditions stipulated in Environmental Clearance of Barsua-Taldih-Kalta Iron Mines of M/s. SAIL for production of 16.0 MTPA ROM and handling of 2.0 MTPA Sub-grade dumps / tailings (Total Excavation: 22.0 MTPA) vide MoEF&CC F. No. J-11015/351/2006-IA.II(M), dated 28th April, 2023 for the period ending 30th September, 2023. The report also contains the updated status of environmental monitoring of air, water and noise pertaining to the period ending 30th September, 2023.

Thanking You,

Yours faithfully,
For SAIL/Barsua-Taldih-Kalta Iron Mines

30/12/23

(Tilak Patnaik)
General Manager I/c, BIM, KIM & Taldih

Encl : As Above

Copy to:

1. The Dy. Director General of Forest (C), MoEF&CC,
   Govt. of India, Regional Office (EZ), A/3 Chandrasekharpur,
   Bhubaneswar-751023 (Odisha)
2. The Regional Director, Central Pollution Control Board,
   G97V+H5Q, Kasba New Market, Sector E,
   East Kolkata Twp, Kolkata, West Bengal – 700 107
3. The Member Secretary, Odisha State Pollution Control Board,
   Paribesh Bhawan, A/118 Nilakantha Nagar, Unit-VIII,
   Bhubaneswar-751012 (Odisha)

Status of Compliance to Conditions Stipulated in Environmental Clearance of Barsua-Taldih-Kalta Iron Mines of M/s Steel Authority of India Limited located at Tantra & Bahamba villages and Toda RF under Koira Tehsil, Sundargarh District, Odisha
(EC order no. J-11015/351/2006-IA.II (M), dated 28.04.2023)

(Period: April 2023 to September 2023)

A. SPECIFIC CONDITIONS

(i) This EC will be subject to the outcome of the Writ Petition (C) No-24282/2017 in the Hon'ble High Court of Odisha, Cuttack.

Status of Compliance
Agreed.

(ii) The Environmental Clearance (EC) is accorded for the reduced area of 2558.581 Ha [FC available 2419.871 ha+ non-forest land 138.710 ha) out of 2564.323 ha.

Status of Compliance
Agreed. The 5.742 ha of forest land which is under the occupation of Schedule Tribe & Other Traditional Forest Dwellers has been surrendered to the Govt. of Odisha vide proceeding no. 10426/S&M, Bhubaneswar, dated 16.10.2023. Copy of the proceeding is enclosed as **Annexure – I**.

(iii) No mining activity shall be carried out over an area of 5.742 ha (Schedule Tribe & Other Traditional Forest Dwellers).

Status of Compliance
Agreed. The 5.742 ha of forest land which is under the occupation of Schedule Tribe & Other Traditional Forest Dwellers has been surrendered to the Govt. of Odisha vide proceeding no. 10426/S&M, Bhubaneswar, dated 16.10.2023 and no mining activity will be carried out over the same area.

(iv) The Project Proponent shall commence the operation of the conveyor belt within 2 years from the date of issue of this EC, till the conveyor belt is implemented, SPCB shall grant CTO upto 12 MTPA Only (consisting of 4 MTPA from Barsua, 2 MTPA from Taldih and 4 MTPA from Kalta and 2 MTPA subgrade/tailings). After the operational of conveyor belt, SPCB may grant CTO upto 16 MTPA [(4 MTPA from Barsua, 8 MTPA from Taldih and 4 MTPA from Kalta) and 2 MTPA subgrade / tailings] based on site inspection of compliance of this conditions.

Status of Compliance
CTO granted for 12 MTPA capacity on 14.12.2023 with validity upto 31.03.2025.

(v) PP shall obtain NOC from Department of Steel and Mines, Odisha for extension of timeline to implement condition conveyor belt for transportation of minerals beyond the stipulated timeline as per guidelines/recommendation of NEERI.

Status of Compliance

NOC has been obtained from the Department of Steel and Mines, Odisha vide letter No. DMO-MCIII-MACON-0039-2023-6370/DoMG, dated 06.05.2023 for continuation of existing road transportation of iron ore from Taldih Iron Mines for 2 years & Kalta Iron Mines for 3 years w.e.f. 01.04.2023 in compliance to the recommended SOTM of CSIR-NEERI. Copy of the NOC is enclosed as **Annexure – II**.

(vi) The Project Proponent shall submit a progress report of implementation of the conveyor belt in compliance report of EC vide six monthly report to the Integrated Regional Office (IRO)/Ministry.

Status of Compliance

The Feasibility Report is scheduled to be tentatively delivered by CET in the first week of January, 2024.

(vii) The Project Proponent shall install the noiseless conveyor. Installation of the conveyor should be completed within two years after obtaining forest clearance of the proposed conveyor route.

Status of Compliance

Noiseless conveyor will be installed from Kalta Iron Mines to Roxy Siding. Presently land survey of proposed conveyor route is under progress for obtaining forest clearance.

(viii) The Project Proponent shall undertake the stringent air pollution measures to control the air pollution in the vicinity of the mine lease area and the efforts made and the outcome shall be submitted to the Ministry's Integrated Regional Office. The Project Proponent shall ensure that the concentration of the air pollutants does not exceed the prescribed National Ambient Air Quality Standards (NAAQS).

Status of Compliance

Stringent air pollution measures are being implemented to control the air pollution in the vicinity of the mine lease area. The statuses of implementation of environmental safeguards are being submitted to the Ministry's Integrated Regional Office along with six monthly compliance reports. The Air Quality for the period April, 2023 to September, 2023 is enclosed as **Annexure – III**.

(ix) The Project Proponent should follow-up the status of implementation on Site Specific Wildlife Conservation Plan from the Forest Officials and the same shall be submitted to the Ministry's Integrated Regional Office in the six monthly compliance reports.

Status of Compliance

The Site Specific Wildlife Conservation Plans of Barsua-Taldih-Kalta Iron Mines were prepared for an implementation period of 10 years. The implementation of the plan was started from 2016-17 by the State Forest Department. The Site Specific Wildlife Conservation Plans will be revised after completion of implementation.

(x) The Project Proponent shall effectively utilize the low grade Iron ore.

Status of Compliance

The low grade ore i.e. mineral rejects are being suitably blended from time to time, wherever possible with high-grade ore and / or feed to the processing plants. In addition to the above, as allowed by Ministry of Mines, Govt. of India in its order dated 16.09.2019 with amendments on 04.01.2020 & 03.12.2020, the low grade ores and tailings lying at mine pit heads of SAIL Mines are being sold in the open market.

(xi) The Project Proponent needs to utilize the mine waste water having high concentration of Fe content for different commercial applications in industries such as cosmetics, pharmaceutical, paint industry.

Status of Compliance

Effluents generated from the ore beneficiation plant of Barsua Iron Mine is being treated in Thickeners and about 60% of clear water from the thickener is being recycled back to the system. The underflow from thickener is discharged into Tailing Dam for further solid – liquid separation. The overflow from the tailings pond is further collected in the Zero Discharge System and pumped back to the system for recycling.

There is no industrial wastewater being generated at Taldih – Kalta Iron Mines as these mines are operating on dry basis. Further, Oil and Grease trap is provided for the workshop at Barsua-Taldih-Kalta Iron Mines. The treated water is used for gardening and floor washing.

(xii) The Project Proponent needs to complete the work of the concrete road from Kalta mine to NH-520 by September, 2023. No village road shall be used for transportation of minerals.

Status of Compliance

No village roads are being used for transportation of minerals. The concrete permanent approach road from Kalta Mine to NH-520 has been completed.

Concrete Approach Road at Kalta Block

(xiii) The Project Proponent shall pay to farmers of agricultural land if there is any loss due to pollution found by concerned District Commissioner as per extent rules or norms.

Status of Compliance

Compensation is being paid to the farmers of Kalta & Jhirpani as per the rate fixed by District Administration.

(xiv) The Project Proponent shall take adequate measures to prevent the pilferage of mineral.

Status of Compliance

The vehicles carrying ore from Taldih as well as Kalta Iron Mine are being covered with tarpaulins to prevent the pilferage of mineral during transportation.

(xv) The surface water quality from upstream and downstream are to be regularly monitored.

Status of Compliance

Regular monitoring of water quality of upstream and downstream of the nearby water body i.e. Kuradih Nallah as well as Samaj Nallah are being carried out and record of monitored data is being maintained and submitted to the MoEFCC and its Regional Office located at Bhubaneswar on six monthly basis. The monitoring is being done through an accredited laboratory M/s Superintendence Co. of India (P) Ltd. The surface water quality for the period from April, 2023 to September, 2023 is enclosed as **Annexure – IV.**

(xvi) The Project Proponent needs to maintain zero discharge and garland drains, settling ponds needs to be properly designed. Stone pitching shall be made at suitable places to regulate water flow.

Status of Compliance

The surface run-off generated from the mines is channelized through a series of garland drain to the lowest level of the pit for collection of runoff and settlement of suspended solids. Also, wastewater generated from wet beneficiation plant is discharged to the existing tailing pond and the overflow as well as seepage water are being re-used through a 'Zero discharge system'.

Check dams / Retaining wall / Toe walls have been provided at appropriate places to regulate water flow and to prevent washout to nearby agricultural fields and water bodies.

Zero Discharge System at Barsua Iron Mine

(xvii) The Project Proponent shall carry out the vacuum cleaning all along the mineral transportation route.

Status of Compliance

Vacuum cleaning is being done all along the mineral transportation route to prevent accumulations dust and to minimize generation of fugitive dust emissions during plying of heavy vehicles.

(xviii) The Project Proponent needs to facilitate the online education system in the schools by providing Wi-Fi connectivity, smart classrooms and desktops/tablets.

Status of Compliance

Noted.

(xix) The Project Proponent shall take adequate measures to protect the perennial nallas.

Status of Compliance

Due precautions are being taken and ensured that no natural watercourse / drainage channels obstructed due to any mining operation at the mines.

There are 33 nos. of Check dams / Retaining wall / Toe walls provided in Barsua-Taldih-Kalta mines to prevent flow of washout to nearby water bodies. Also, surface run-off generated from the mines is channelized through a series of garland drain to the lowest level of the pit for collection of runoff and settlement of suspended solids.

Retaining wall at Taldih A Block

Check Dam near Tantra Village

(xx) The Project Proponent needs to install the permanent water sprinklers along the haul road and the approach road. Further, 10 nos. of fog canon/mist sprayer of atleast 40 m throw shall be installed at various locations in the mine area.

Status of Compliance

Fixed water sprinklers of about 4 km have been provided in the permanent haul roads of Mining area and about 2 km has been provided in the approach road at Barsua Railway Siding.

Presently one number of fog cannon has been installed near mobile crushing & screening plant at Kalta Block. Further, additional 04 numbers will be installed during 12.0 MTPA expansion phase and additional 05 numbers will be installed during 16.0 MTPA expansion phase.

Fixed water sprinklers

Operation of Mist Cannon

(xxi) The Project Proponent shall explore the possibility of using atleast 20% of electric vehicles/LNG/CNG instead of diesel operation within three years from the start of mining operations.

Status of Compliance

Possibility of using electric vehicles instead of diesel operation vehicles is under consideration in line with the national policy.

(xxii) The budget of Rs. 21.88 Cr to address the concerns raised by the public including in the public hearing to be completed within 3 years from the date of start of mining operations. PP shall comply with all action plans made for public hearing concerns and make regular maintenance and record the progressive activity outcomes.

Status of Compliance

To address the concerns raised by the public in the public hearing, an amount of Rs. 5.72 Cr has been incurred up to September, 2023. The action plans made to address the concerns raised by the public in the public hearing will be completed within 3 years.

(xxiii) The Project Proponent should adopt the proper mitigation measures as proposed under EMP with budgetary provision of Rs.111.88 Crores. The adoption of mitigation measures and monitoring of the same as proposed in the EMP shall be done under the supervision of the qualified environmental personnel. The implementation status of the same shall be submitted to the Ministry's Integrated Regional Office.

Status of Compliance

The mitigation measures as proposed under EMP with budgetary provision of Rs.111.88 Crores will be implemented during expansion period and the implementation status of the same will be submitted to the Ministry's Integrated Regional Office.

(xxiv) The Project Proponent should establish in house (at project site) environment laboratory for measurement of environment parameter with respect to air quality and water (surface and

ground). A dedicated team to oversee environment management shall be setup at site which should comprise of Environment Engineers, Laboratory chemist and staff for monitoring of air, water quality parameters on routine basis instead of engaging environment monitoring laboratories/consultants. Any non-compliance or infringement should be reported to the concerned authority.

Status of Compliance

Agreed.

(xxv) The Project Proponent shall also organize employment-based apprenticeship/ internship training program every year with appropriate stipend for the youth and other programs to enhance the skill of the local people. The data should be maintained for the training imparted to the persons and the outcome of the training, for the assessment of the training program should be analyzed periodically and improved accordingly.

Status of Compliance

Apprenticeship training program for 14 local people has been provided to enhance the skill with appropriate stipend during the year 2023-24. The data are being maintained to access the outcome of the training.

(xxvi) The Project Proponent shall ensure the survival rate of 95% for planting the gap plantation and new plantation. The Project Proponent shall make the actual count on the saplings planted and its survival rate and in case of failure of achievement of 95% survival rate, action plan for achieving the target survival rate shall be submitted to the Ministry's Integrated Regional Office. Project proponent shall use saplings of 10 ft height for plantation.

Status of Compliance

Post plantation maintenance has been made compulsory to ensure the survival rate of 95% for planting the gap plantation and new plantation. 18 months old saplings from State Forest Department are being used for plantation.

(xxvii) The Project Proponent should periodically monitor and maintain the health records of the mine workers digitally prior to mining operations, at the time of operation of mine and post mining operations. Regular surveillance shall be carried through regular occupational health check-up every year for mine workers. PP shall also organize medical camp for the benefit of the local people and also the monitor the health impacts due to mining activity.

Status of Compliance

A full-fledged Occupational Health Centre (OHC) is run by the mines for regular health surveillance. Pre-placement medical examination and Periodical Medical Examination (PME) of all workmen working in the mines is being done at OHC once in every five years/three/one year depending on category. During April, 2023 to September, 2023, IME for 21 nos. of regular employees & 957 nos. of contractual employees and PME for 34 nos. of regular employees have been done and records are being maintained.

Medical Health Camp and free Ambulance services in the nearby villages namely Taldih, Tantra, Bahamba, Sasyakala, Kalta, Roxy, Gundichanali etc. are being provided on regular basis. Also, Health Workers in peripheral PHCs are being provided as per requirement.

(xxviii)The mining lease holders shall, after ceasing mining operations, undertake regrassing the mining area and any other area which may have been disturbed due to their mining activities and restore the land to a condition which is fit for growth of fodder, flora, fauna etc. The implementation report of the above said condition shall be submitted to the Ministry's Integrated Regional Office.

Status of Compliance

Addendum to the existing lease deed has been executed on 04.06.2020 incorporating the condition that "the mining lease holder (s) shall after ceasing mining operation, undertake re-grassing the mining area and any other area which may have disturbed due to their mining activities and restore the land to a condition which is fit for growth of fodder, flora, fauna etc." in pursuant to judgment of Hon'ble Supreme Court in WP(C) No.114 of 2014.

B. Recommendation of CSIR-NEERI Report on "Carrying Capacity Study for Environmentally Sustainable Iron and Manganese Ore Mining Activity in Keonjhar, Sundargarh and Mayurbhanj districts of Odisha State:

1) Project Proponent and Department of Steel & Mines, Govt. of Odisha shall ensure the implementation of recommendations of carrying capacity study report conducted by CSIR-NEERI w.r.t. mining proposal of Iron Ore and/or manganese in the State of Odisha.

Status of Compliance

Agreed.

2) Department of Steel & Mines, Govt. of Odisha should prepare 5 years regional plan for annual iron ore requirement from the state, which in turn shall be met from different mines/zones (e.g. Joda, Koira.) in the state. Accordingly, sustainable annual production (SAP) for each zone/mine may be followed adopting necessary environmental protection measures.

Status of Compliance

Amalgamated Barsua-Taldih-Kalta Iron Mines will adopt the necessary environmental protection & control measures and abide by the Sustainable Annual Production limit mentioned in Regional Plan prepared by the Department of Steel & Mines, Govt. of Odisha.

3) Project Proponent shall construct the cement concrete road from mine entrance and exit to the main road with proper drainage system and green belt development along the roads and also construction of road with minimum 300 m inside the mine. This should be done within one year for existing mines and new mine should have since beginning. The Department of Steel & Mines, Govt. of Odisha should ensure the compliance and should not issue the Mining Permits, if mine lease holder has not constructed proper cement concrete road as suggested. **This**

Environmental Clearance for the expansion project shall be operated only after the compliance of the above mentioned specific condition.

Status of Compliance

300 m Concrete approach road from mine entrance and exit to the main road have been provided at Taldih Iron Mine, Barsua Railway Siding, Kalta Iron Mine and Roxy Railway Siding with proper drainage system.

Concrete approach road at Taldih

Concrete Approach Road at Railway Siding

4) The Committee observed that as per the recommendations of NEERI report the PP needs to do regular vacuum cleaning of all mineral carrying roads aiming at "zero dust re-suspension" within 3 months. **This Environmental Clearance for the expansion project shall be operated only after the compliance of the above mentioned specific condition.**

Status of Compliance

Vacuum cleaning is being done all along the mineral transportation route to prevent accumulations dust and to minimize generation of fugitive dust emissions during plying of heavy vehicles.

Mechanized road sweeping machine

5) Project Proponent shall monitor the environmental quality parameters as per EC and CTE/CTO conditions, and implementation of suggested measures for control of road dust and air pollution. Odisha State Pollution Control Board has to ensure the compliance of CTE/CTO. Regional office of the MoEF&CC, Bhubaneswar shall monitor the compliance of the EC conditions. Regional office of the Indian Bureau of Mines (IBM) shall monitor the compliance of mining plan and progressive mine closure plan. Any violation by mine lease holder may invite actions per the provisions of applicable Acts.

Status of Compliance

Mine is ensuring the strict compliance to monitoring of environmental quality parameters and implementation of air pollution control measures as per EC and CTE/CTO conditions. Amalgamated Barsua-Taldih-Kalta iron mines of SAIL is regularly submitting the half-yearly EC and CTO compliance reports to respective authorities. Amalgamated Barsua-Taldih-Kalta iron mines will continue to furnish the required information and extend all support during the site visits by statutory agencies.

6) Project Proponent shall ensure the compliance of Suggested Ore Transport Mode (SOTM) with association of the State Government of Odisha. All existing mines should ensure adoption of SOTM within next 5 years. New mines or mines seeking expansion should incorporate provision of SOTM in the beginning itself, and should have system in place within next 5 years.

Status of Compliance

Presently the Iron Ore is being transported through closed conveyors from Barsua Iron Mines to Barsua Railway siding and through road from Taldih & Kalta Iron Mines to Barsua & Roxy Railway siding respectively.

Under the proposed expansion of these mines to 16 MTPA ROM, the ore from Taldih & Kalta mines shall be processed and conveyed through closed Conveyor belts to the respective railway sidings in compliance to suggested SOTM.

However, during the construction phase, Taldih Iron Mine shall continue to transport 2.0 MTPA of iron ore through existing transport road to Barsua Railway Siding and Kalta Iron Mines shall continue to transport 4.0 MTPA iron ore through existing transport road to Roxy Siding for which necessary NOC has been obtained from Govt. of Odisha.

Final product is dispatched from the SAIL's private railway siding through rail.

7) The State Govt. of Odisha shall ensure dust free roads in mining areas wherever the road transportation of mineral is involved. The road shoulders shall be paved with fence besides compliance with IRC guidelines. All the roads should have proper drainage system and apart from paving of entire carriage width the remaining right of way should have native plantation (dust capturing species). Further, regular maintenance should also be ensured by the Govt. of Odisha. Progress on development of dust free roads, implementation of SOTM, increased use of existing rail network, development of additional railway network/conveyor belt/ pipelines etc. shall be submitted periodically to Regional office of the MoEF&CC.

Status of Compliance

SAIL will abide by the SOTM system as and when the guidelines are formed by the Department of Steel & Mines, Govt. of Odisha in this regard.

The progress on implementation of SOTM is being submitted to MoEF&CC along with six monthly compliance reports.

8) Project Proponent shall develop the parking plazas for trucks with proper basic amenities/ facilities inside the mine. This should be done within one year for existing mines and new mines should have since beginning. **This Environmental Clearance for the expansion project shall be operated only after the compliance of the above mentioned specific condition.**

Status of Compliance

Parking plazas have already been developed at Taldih & Kalta Iron Mines with proper basic amenities.

Parking Plaza at Taldih Block

9) Department of Steel & Mines shall ensure the construction of NH 215 as minimum 4 lane road with proper drainage system and plantation and subsequent regular maintenance of the road as per IRC guidelines. Construction of other mineral carrying roads with proper width and drainage system along with road side plantation to be carried out. This shall be completed within 2 Years.

Status of Compliance

SAIL will extend necessary support if any required.

10) Regular vacuum cleaning of all mineral carrying roads aiming at "Zero Dust Re- suspension" shall be adopted by PWD/ NHAI/ Mine Lease Holders within a time Period of 3 months for existing roads. **This Environmental Clearance for the expansion project shall be operated only after the compliance of the above mentioned specific condition.**

Status of Compliance

Vacuum cleaning is being done all along the mineral transportation route to prevent accumulations dust and to minimize generation of fugitive dust emissions during plying of heavy vehicles.

11) In case the total requirement of iron ore exceeds the suggested limit for that year, permission for annual production by an individual mine may be decided depending on approved EC capacity (for total actual dispatch) and actual production rate of individual mine during last year or any other criteria set by the State Govt., i.e. Dept. of Steel & Mines. Department of Steel and Mines in consultation with Indian Bureau of Mines-RO should prepare in advance mine-wise annual production scenario so that demand for iron ore can be anticipated, and actual production/dispatch does not exceed the suggested annual production.

Status of Compliance

Amalgamated Barsua–Taldih–Kalta Iron Mines will abide by the guidelines issued by the Department of Steel & Mines, Govt. of Odisha in this regard.

12) R&D studies towards utilization of low-grade iron ore should be conducted through research/academic institutes like IMMT, Bhubaneswar, NML Jamshedpur, and concerned metallurgical departments in IITS, NITS etc., targeting full utilization of low-grade iron ore (Fe content upto 45% by 2020 and upto 40% by 2025). In fact, life cycle assessment of whole process including environmental considerations should be done for techno-economic and environmental viability. R&D studies on utilization of mine wastewater having high concentration of Fe content for different commercial applications in industries such cosmetics, as pharmaceutical, paint industry should also be explored. Responsibility: IBM, Dept. of Steel & Mines, Individual Mine Lease Holders.

Status of Compliance

The low grade ore i.e. mineral rejects are being suitably blended from time to time, wherever possible with high-grade ore and / or feed to the processing plants. In addition to the above, as allowed by Ministry of Mines, Govt. of India in its order dated 16.09.2019 with amendments on 04.01.2020 & 03.12.2020, the low grade ores and tailings lying at mine pit heads of SAIL Mines are being sold in the open market.

13) The mining activity in Joda-Koira sector is expected to continue for another 100 years, therefore, it will be desirable to develop proper rail network in the region. Rail transport shall not only be pollution free mode but also will be much economical option for iron ore transport. The rail network and/or conveyor belt system upto public railway siding needs to be created. The total length of the conveyor belt system/ rail network to be developed from mines to nearest railway sidings by 11 mines in Joda region is estimated to be about 64 km. Similarly, in Koira region, total length of rail network/ conveyor system for 8 mines (under SOTM 1 & 2) is estimated to be around 95 km. Further, it is suggested to develop a rail network connecting Banspani (Joda region) and Roxy railway sidings in Koira region. Responsibility: Dept. of Steel & Mines, Govt. of Odisha and Concerned Mines along with Indian Railways. Time Period: Maximum 7 years

(by 2025). The Department of Steel & Mines, Govt. of Odisha should follow-up with the concerned Departments and railways so that proposed proper rail network is in place by 2025.

Status of Compliance

SAIL will abide by the directions of Department of Steel & Mines, Govt. of Odisha in this regard.

14) State Govt. of Odisha shall make all efforts to ensure exhausting all the iron & manganese ore resources in the existing working mines and from disturbed mining leases/zones in Joda and Koira region. The criteria suggested shall be applicable while suggesting appropriate lease area and sustainable mining rate. Responsibility: Dept. of Steel & Mines, Govt. of Odisha.

Status of Compliance

Amalgamated Barsua-Taldih-Kalta Iron Mines will work according to the instructions given by the Department of Steel & Mines, Govt. of Odisha in this regard. Mining will be done as per the IBM approved mining plan.

15) Mining Operations/Process Related: Project Proponent shall implement the following mitigation measures: (i) Appropriate mining process and machinery (viz. right capacity, fuel efficient) should be selected to carry out various mining operations that generate minimal dust/air pollution, noise, wastewater and solid waste, e.g. drills should either be operated with dust extractors or equipped with water injection system. (ii) After commencement of mining operation, a study should be conducted to assess and quantify emission load generation (in terms of air pollution, noise, waste water and solid waste) from each of the mining activity (including transportation) on annual basis. Efforts should be made to further eliminate/ minimize generation of air pollution/dust, noise, wastewater, solid waste generation in successive years through use of better technology. This shall be ensured by the respective mine lease holders. (iii) Various machineries/equipment selected (viz. dumpers, excavators, crushers, screen plants etc.) and transport means should have optimum fuel/power consumption, and their fuel/power consumption should be recorded on monthly basis. Further, inspection and maintenance of all the machineries/ equipment/ transport vehicles should be followed as per manufacturer's instructions/ recommended time schedule and record should be maintained by the respective mine lease holders. (iv) Digital processing of the entire lease area using remote sensing technique should be carried out regularly once in 3 years for monitoring land use pattern and mining activity taken place. Further, the extent of pit area excavated should also be demarcated based on remote sensing analysis. This should be done by ORSAC (Odisha Space Applications Centre, Bhubaneswar) or an agency of national repute or if done by a private agency, the report shall be vetted/ authenticated by ORSAC Bhubaneswar. Expenses towards the same shall be borne by the respective mine lease holders. Responsibility: Individual Mine Lease Holders.

Status of Compliance

(i) Excavators of 7.5cum, 5.9cum & 4.5 cum are in use along with 100T, 60T & 50T dumpers for effective shovel-dumper combination. Regular water sprinkling is being done in the excavation areas, haul road, dump areas, loading and unloading areas. All the haulage roads

are being maintained properly with grader for smooth movement of vehicles so as to minimize dust/air pollution. All the drills are operated with dust extractors and some of drills are equipped with water injection system.

(ii) All efforts are being made to minimize generation of air pollution/dust, noise, waste water, solid waste generation in the mines through use of better technology. The quantification of emission load has been done and sent to State Pollution Control Board on 31.10.2019 and 18.08.2022

(iii) Inspection and maintenance of all the machineries/ equipment/ transport vehicles are being carried out as per manufacturer's instructions/ recommended time schedule and records are being maintained.

(iv) Digital processing of the entire lease area using drone survey technique are being done every year for monitoring the land use pattern and the mining activity.

16) **Air Environment Related:** Project Proponent shall implement the following mitigation measures: (i) Fugitive dust emissions from all the sources should be controlled regularly on daily basis. Water spraying arrangement on haul roads, loading and unloading and at other transfer points should be provided and properly maintained. Further, it will be desirable to use water fogging system to minimize water consumption. It should be ensured that the ambient air quality parameters conform to the norms prescribed by the CPCB in this regard. (ii) The core zone of mining activity should be monitored on daily basis. Minimum four ambient air quality monitoring stations should be established in the core zone for SPM, PM_{10}. $PM_{2.5}$, SO_2. NOx and CO monitoring. Location of air quality monitoring stations should be decided based on the meteorological data, topographical features and environmentally and ecologically sensitive targets and frequency of monitoring should be undertaken in consultation with the State Pollution Control Board (based on Emission Load Assessment Study). The number of monitoring locations may be more for larger capacity mines and working in larger area. Out of four stations, one should be online monitoring station in the mines having more than 3 MTPA EC Capacity. (iii) Monitoring in buffer zone should be carried out by SPCB or through NABET accredited agency. In addition, air quality parameters (SPM, PM_{10}. $PM_{2.5}$, SO_2, NOx and CO) shall be regularly monitored at locations of nearest human habitation including schools and other public amenities located nearest to source of the dust generation as applicable. (iv) Emissions from vehicles as well as heavy machinery should be kept under control and regularly monitored. Measures should be taken for regular maintenance of vehicles used in mining operations and in transportation of mineral. (v) The vehicles shall be covered with a tarpaulin and should not be overloaded. Further, possibility of closed container trucks should be explored for direct to destination movement of iron ore. Air quality monitoring at one location should also be carried out along the transport route within the mine (periodically, near truck entry and exit gate), Responsibility: Individual Mine Lease Holders and SPCB.

Status of Compliance

i) Fugitive dust emissions from all the sources are being controlled regularly on daily basis. A network of fixed water sprinklers over 6 km length has been laid on permanent haul roads. Mobile water tankers 28 KL which can cover the entire width of the haul road are in use for dust suppression. All feed hoppers where ore is unloaded and all transfer chutes have been provided with dry-fog dust suppression system. Mist cannons and water injection systems have placed at mobile crushing & Screening plants to prevent and control of fugitive dust emission. Ambient air quality conforms to the CPCB norms.

Mobile water sprinklers

Use of wet drilling

Wheel Washing Facility at Taldih Mine

Dry fog Dust Suppression in Crusher, Barsua

ii) The core zone of mining activity is being monitored on daily basis by installing 12 Nos. of Fugitive emission stations through NABET accredited agency. Apart from this four manual ambient air quality monitoring stations have been established for monitoring of PM10, PM2.5, SO2, NOx and CO twice in a week. Three (03) nos. of Continuous Ambient Air Quality monitoring system (CAAQMS) has been installed in consultation with the State Pollution Control Board out of which one is in the core zone and two are in the buffer zone and the data is being transmitted to SPCB server.

CAAQMS installed at Barsua Iron Mine

iii) Monitoring in buffer zone are being carried out through NABET accredited agency regularly nearest to human habitation.

iv) Vehicular emission of all the vehicles used in mining activities is being done at regular intervals. Maintenance of mining equipment is done on regular basis. It is mandatory for any vehicle entering the mine premises to have a PUC and valid fitness certificate.

v) It is ensured that all the vehicles exiting the mine gate are checked for use of tarpaulin cover and are not overloaded.

17) **Noise and Vibration Related:** Project Proponent shall implement the following mitigation measures: (i) Blasting operation should be carried out only during daytime. Controlled blasting such as Nonel, should be practiced. The mitigation measures for control of ground vibrations and to arrest fly rocks and boulders should be implemented. (ii) Appropriate measures should be taken for control of noise levels below 85 dBA in the work environment. Workers engaged in operations of HEMM, etc. should be provided with ear plugs/muffs (iii) Noise levels should be monitored regularly (on weekly basis) near the major sources of noise generation within the core zone. Further, date, time and distance of measurement should also be indicated with the noise levels in the report. The data should be used to map the noise generation from different activities and efforts should be made to maintain the noise levels with the acceptable limits of CPCB (CPCB, 2000) (iv) Similarly, vibration at various sensitive locations should be monitored at least once in month, and mapped for any significant changes due to successive mining operations. Responsibility: Individual Mine Lease Holders.

Status of Compliance

i) Blasting operations are carried out in day time only and controlled blasting practices are being carried out by using Nonel and Delay techniques so as to ensure minimal ground vibration.

ii) Adequate measures are taken for control of work noise levels such as all HEMMs have acoustic cabins with air conditioners and the exhaust manifold have silencers. Noisy Operations have been identified and persons engaged in such operations are provided with earplugs/muffs.

iii) Monitoring of Noise level are being done on weekly basis at the major sources of noise generation within core zone. Necessary efforts are being made to maintain the noise level with in the acceptable limits of CPCB (CPCB, 2000).

iv) All efforts are taken to ensure that blasting due to ground vibrations remain within safe limits by using Nonel and Delay techniques.

18) **Water/Wastewater Related:** Project Proponent shall implement the following mitigation measures: (i) In general, the mining operations should be restricted to above ground water table and it should not intersect groundwater table. However, if enough resources are estimated below the ground water table, the same may be explored after conducting detailed geological studies by GSI and hydro- geological studies by CGWB or NIH or institute of national repute, and ensuring that no damage to the land stability/ water aquifer system shall happen. The details/ outcome of such study may be reflected/incorporated in the EIA/EMP report of the mine appropriately. (ii) Natural watercourse and/or water resources should not be obstructed due to any mining operations. Regular monitoring of the flow rate of the springs and perennial nallas should be carried out and records should be maintained. Further, regular monitoring of water quality of nallas and river passing thorough the mine lease area (upstream and downstream locations) should be carried out on monthly basis. (iii) Regular monitoring of ground water level and its quality should be carried out within the mine lease area by establishing a network of existing wells and constructing new piezometers during the mining operation. The monitoring should be carried out on monthly basis. (iv) In order to optimize water requirement, suitable conservation measures to augment ground water resources in the area should be undertaken in consultation with Central Ground Water Board (CGWB). (v) Suitable rainwater harvesting measures on long term basis should be planned and implemented in consultation with CGWB, to recharge the ground water source. Further, CGWB can prepare a comprehensive plan for the whole region. (vi) Appropriate mitigation measures (viz. ETP, STP, garland drains. retaining walls, collection of runoff etc.) should be taken to prevent pollution of nearby river/other water bodies. Water quality monitoring study should be conducted by State Pollution Control Board to ensure quality of surface and ground water sources on regular basis. The study can be conducted through NABL/ NABET approved water testing laboratory However, the report should be vetted by SPCB. (vii) Industrial wastewater (workshop and wastewater from the mine) should be properly collected, treated in ETP so as to conform to the discharge standards applicable. (viii) Oil and grease trap should be installed before discharge of workshop effluents. Further, sewage treatment plant should be installed for the employees/colony, wherever applicable. (ix) Mine lease holder should ensure that no silt originating due to mining activity is transported in the surface water course or any other water body. Appropriate measures for prevention and control of soil erosion and management of silt should be undertaken. Quantity of silt/soil generated

should be measured on regular basis for its better utilization. (x) Erosion from dumps site should be protected by providing geo-textile matting or other suitable material, and thick plantation of native trees and shrubs should be carried out at the dump slopes. Further, dumps should be protected by retaining walls. (xi) Trenches / garland drain should be constructed at the foot of dumps to arrest silt from being carried to water bodies. Adequate number of check dams should be constructed across seasonal/perennial nallas (if any) flowing through the mine lease areas and silt be arrested. De-silting at regular intervals should be carried out and quantity should be recorded for its better utilization, after proper soil quality analysis. (xii) The water so collected in the reservoir within the mine should be utilized for the sprinkling on hauls roads, green belt development etc. (xiii) There should be zero waste water discharge from the mine. Based on actual water withdrawal and consumption/ utilization in different activities, water balance diagram should be prepared on monthly basis, and efforts should be made to optimize consumption of water per ton of ore production in successive years. Responsibility. Individual Mine Lease Holders, SPCB and CGWB.

Status of Compliance

i) Based on observations from nearby wells and water bodies, the minimum depth of water table is 404 mRL and maximum depth of water table is 593 mRL. Based on the Conceptual Plan, the ultimate pit depth will be 617mRL hence, throughout the course of mining operations, the ground water table will remain Undisturbed and the mining operation will not intersect ground water table.

ii) No natural water course will be obstructed due to mining operations. Regular monitoring of the flow rate of the spring and perennial nallahs i.e. Kuradih Nalla at Barsua part and Samaj Nalla at Taldih & Kalta part are being done and records are being maintained. Further, water quality of Kuradih Nalla & Samaj Nalla at upstream and downstream locations with respect to Barsua, Taldih & Kalta Mines are being carried out on monthly basis.

iii) Regular monitoring of ground water level and quality is being carried out on monthly basis. Three numbers of open wells as well as tube wells have been selected all around the mines viz, Barsua Valley, Tensa and Kalta for regular monitoring of water levels & quality. Further, 2 Nos. of piezometers have been installed at Barsua valley and Taldih for ground water monitoring.

iv) During monsoon, accumulated mine pit water is not discharged outside and is allowed to seep through to augment the ground water resources.

v) A Technical Feasibility Study for hydro-geological, rain water harvesting & augmentation of ground water resources has been conducted through M/s Tirupati Balajee Maharaj Consultant (P) Ltd. Two (02) nos. of Check dams has been constructed, one in Kuradih nala near pump house and other at Tantra Village near Taldih Block as per recommendation. Also one water body has been developed in the lease area for ground water recharge.

Development of water body

Check Dam near Tantra Village

i) Appropriate mitigation measures (viz. Garland drains, retaining walls, collection of runoff etc.) are taken to prevent pollution of nearby river/other water bodies. The water quality monitoring is being carried out on monthly basis by NABL accredited laboratory.

ii) There is no industrial wastewater being generated at Barsua – Taldih – Kalta Iron Mines. Maintenance of HEMMs is done centrally at Workshop.

iii) Oil and Grease trap is provided for the workshop at Barsua – Taldih – Kalta Iron Mine. The treated water is used for gardening and floor washing.

Oil & Grease trap at F/M Area, Barsua

iv) Through a series of retention wall, garland drain, settling pits and check dams, it is ensured that no silt originating due to mining activity is transported in the surface water course or any other water body.

v) Adequate measures to prevent soil erosion like grass plantation/coir matting on dump slopes are practiced. Further plantation with native species is done on all old dump slopes. Dumps are protected by retaining walls.

Coir Matting at Barsua Block

Plantation over waste dump

vi) Retaining wall with Garland drain has been constructed at the foot of the dumps to arrest silt. Check dams have been constructed for retention of suspended solids and allowing flow of clear water. This prevents contamination of outside water bodies from the wash-offs of the lease area. The check dams are periodically de-silted to keep them efficient.

vii) The mine pit water is allowed to seep through to augment the ground water resources.

viii) System for recovery and recycling of decanted water from the tailing pond has been provided at Barsua Iron Mine under Zero Discharge Project and it will be maintained in the future as well. Efforts are being made to reduce the specific water consumption in successive years.

Thickener for Treatment of Effluent from Beneficiation Plant

System for Recovery & Recycling of Tailings Pond Overflow

19) **Land/ Soil/ Overburden Related:** Project Proponent shall implement the following mitigation measures: (i) The top soil should temporarily be stored at earmarked site(s) only and it should not be kept unutilized for long (not more than 3 years or as per provisions mentioned in the mine plan/ scheme). The topsoil should be used for land reclamation and plantation appropriately. (ii) Fodder plots should be developed in the non-mineralized area in lieu of use of grazing land, if

any. (iii) Over burden/ low grade ore should be stacked at earmarked dump site (s) only and should not be kept active for long period. The dump height should be decided on case to case basis, depending on the size of mine and quantity of waste material generated. However, slope stability study should be conducted for larger heights, as per IBM approved mine plan and DGMS guidelines. The OB dump should be scientifically vegetated with suitable native species to prevent erosion and surface run off. In critical areas, use of geo textiles should be undertaken for stabilization of the dump. Monitoring and management of rehabilitated areas should continue until the vegetation becomes self-sustaining. Proper records should be maintained regarding species, their growth, area coverage etc. (iv) Catch drains and siltation ponds of appropriate size should be constructed to arrest silt and sediment flows from mine operation, soil, OB and mineral dumps. The water so collected can be utilized for watering the mine area, roads, green belt development etc. The drains should be regularly de-silted, particularly after monsoon and should be maintained properly. Appropriate documents should be maintained. Garland drain of appropriate size, gradient and length should be constructed for mine pit, soil. OB and mineral dumps and sump capacity should be designed with appropriate safety margin based on long term rainfall data. Sump capacity should be provided for adequate retention period to allow proper settling of silt material. Sedimentation pits should be constructed at the corners of the garland drains and de-silted at regular intervals. (v) Backfilling should be done as per approved mining plan/scheme. There should be no OB dumps outside the mine lease area. The backfilled area should be afforested, aiming to restore the normal ground level. Monitoring and management of rehabilitated areas should continue till the vegetation is established and becomes self-generating (vi) Hazardous waste such as, waste oil, lubricants, resin, and coal tar etc. should be disposed of as per provisions of Hazardous Waste Management Rules, 2016, as amended from time to time. Responsibility: Individual Mine Lease Holders.

Status of Compliance

(i) Preservation of topsoil: During the developmental stage, it is likely that we may encounter some amount of topsoil. Topsoil will be stored temporarily and will be utilized in afforestation and horticultural activities.

(ii) There are no fodder plots in the Amalgamated Barsua-Taldih-Kalta Iron Mines. However, the mining has been planned in such a way that the entire forest land will not be disturbed at a time which will support feeding of the lovestock..

(iii) OB/ low grade Ore are stacked at earmarked dump sites as per the approved Mining Plan. Dump stability study is under progress by NIT, Rourkela. As per the recommendation, the height of the dump will be maintained. The measures like geo-textile coir matting, grassing are already being implemented to take care of any erosion and for its stabilization. The plantation is monitored and maintained till it becomes self-sustaining. The records pertaining to plantation – species name, growth, area coverage is maintained at the mine.

(iv) Garland drains, Check dams and settling pits have been provided at appropriate places to arrest silt and sediment flows to ensure that only clear water will leave from lease boundary. The structures are regularly de-silted and maintained properly. Garland drains has been

constructed for the dumps as per approved mine plan. Settling pits of adequate capacity has been provided.

Coir Matting at Barsua Block

Dry Boulder wall at Waste Dump, Taldih

(v) Back filling of the area will be done as per the approved Mining Plan. The afforestation of the dumps will be done accordingly.

(vi) Hazardous wastes management is being done as per the provisions of Hazardous Waste management & handling Rules, 2016.

20) **Ecology/Biodiversity (Flora-Fauna) Related:** Project Proponent shall implement the following mitigation measures: (i) All precautionary measures should be taken during mining operation for conservation and protection of endangered fauna namely elephant, sloth bear etc. spotted in the study area. Action plan for conservation of flora and fauna should be prepared and implemented in consultation with the State Forest and Wildlife Department within the mine lease area, whereas outside the mine lease area, the same should be maintained by State Forest Department. (ii) Afforestation is to be done by using local and mixed species saplings within and outside the mining lease area. The reclamation and afforestation is to be done in such a manner like exploring the growth of fruit bearing trees which will attract the fauna and thus maintaining the biodiversity of the area. As afforestation done so far is very less, forest department needs to identify adequate land and do afforestation by involving local people in a time bound manner. (iii) Green belt development carried out by mines should be monitored regularly in every season and parameters like area under vegetation/plantation, type of plantation, type of tree species /grass species/scrubs etc., distance between the plants and survival rate should be recorded. (iv) Greenbelt is an important sink of air pollutants including noise. Development of green cover in mining area will not only help reducing air and noise pollution but also will improve the ecological conditions and prevent soil erosion to a greater extent. Further, selection of tree species for green belt should constitute dust removal/dust capturing plants since plants can act as efficient biological filters removing significant amounts of particulate pollution. Thus, the identified native trees in the mine area may be encouraged for plantation. Tree species having small leaf area, dense hair on leaf surface (rough surface), deep channels on leaves should be included for plantation. (v) Vetiver plantation on inactive dumps may be encouraged as the grass species has high strength of anchoring besides medicinal value. (vi) Details of compensatory

afforestation done should be recorded and documented by respective forest divisions and State Forest Department should present mine-wise annual status, along with expenditure details. Responsibility: Individual Mine Lease Holders and State Forest & Wildlife Department.

Status of Compliance

(i) Two Site Specific wildlife conservation plans (SSWCP) were approved by Chief Wildlife Warden, Odisha vide dated 25.02.2013 for 2486.313 ha & 13.01.2016 for 77.94 ha. An amount of Rs.17.82 Crores & Rs. 9.84 Crores were deposited for implementation of approved SSWCPs in Buffer Zone of Barsua-Taldih-Kalta Iron Mines.

(ii) Efforts are being made continually for afforestation by using local and mixed species saplings within and outside the mining lease area to enhance the biodiversity of the region.

(iii) Green belt development done is monitored till it becomes self-sustaining.

(iv) Green belt development is being done by using native species in consultation with State Forest Department.

(v) Coir matting with bamboo plantation has been done over the OB dumps in order to stabilize the dumps.

(vi) Details of compensatory afforestation done has been recorded and documented by Barsua-Taldih-Kalta Iron Mines along with expenditure details.

21) **Socio-Economic Related:** Project Proponent shall implement the following mitigation measures: (i) Public interaction should be done on regular basis and social welfare activities should be done to meet the requirements of the local communities. Further, basic amenities and infrastructure facilities like education, medical, roads, safe drinking water, sanitation, employment, skill development, training institute etc. should be developed to alleviate the quality of life of the people of the region. (ii) Land outees and land losers/affected people, if any, should be compensated and rehabilitated as per the national/state policy on Resettlement and Rehabilitation. (iii) The socio-economic development in the region should be focused and aligned with the guidelines/initiatives of Govt. of India/ NITI Aayog around prosperity, equality, justice, cleanliness, transparency, employment, respect to women, hope etc. This can be achieved by providing adequate and quality facilities for education, medical and developing skills in the people of the region. District administration in association with mine lease holders should plan for "Samagra Vikas" of these blocks well as other blocks of the district. While planning for different schemes in the region, the activities should be prioritized as per Pradhan Mantri Khanij Kshetra Kalyan Yojna (PMKKKY), notified by Ministry of Mines, Govt. of India, vide letter no. 16/7/2017- MVI (Part), dated September 16, 2015. Responsibility: District Administration and Individual Mine Lease Holders.

Status of Compliance

(i) Social welfare activities to meet the requirements of the local communities are done through CSR department for the people residing near the Project. They interact regularly with the local communities to identify their needs and requirement and accordingly plan the yearly

activities. Further, SAIL has well developed township at Tensa and Kalta with infrastructure facilities like school, hospital, RO plant for drinking water, training institute, etc.

(ii) There is no case of displacement of people due to the project.

(iii) SAIL is already supporting the State Government in facilitating the development of schools, conducting health camps, construction of medical facilities, provision of training and skill development programs, etc. and will continue to extend support in future too.

22) **Road Transport Related:** Project Proponent shall implement the following mitigation measures: (i) All the mine lease holders should follow the suggested ore transport mode (SOTM), based on its EC capacity within next 5 years. (ii) The mine lease holders should ensure construction of cement road of appropriate width from and to the entry and exit gate of the mine. Further, maintenance of all the roads should be carried out as per the requirement to ensure dust free road transport. (iii) Transportation of ore should be done by covering the trucks with tarpaulin or other suitable mechanism so that no spillage of ore/dust takes place. Further, air quality in terms of dust, PM_{10} should be monitored near the roads towards entry & exit gate on regular basis, and be maintained within the acceptable limits. Responsibility: Individual Mine Lease Holders and Dept. of Steel & Mines.

Status of Compliance

(i) Presently the Iron Ore is being transported through closed conveyors from Barsua Iron Mines to Barsua Railway siding and through road from Taldih & Kalta Iron Mines to Barsua & Roxy Railway siding respectively. Under the proposed expansion of these mines to 16 MTPA ROM, the ore from Taldih & Kalta mines shall be processed and conveyed through closed Conveyor belts to the respective railway sidings in compliance to suggested SOTM. However, during the construction phase, Taldih Iron Mine shall continue to transport 2.0 MTPA of iron ore through existing transport road to Barsua Railway Siding and Kalta Iron Mines shall continue to transport 4.0 MTPA iron ore through existing transport road to Roxy Siding for which necessary NOC has been obtained from Govt. of Odisha.

(ii) 300 m Concrete approach road from mine entrance and exit to the main road has been provided at Taldih Iron Mine, Barsua Railway Siding, Kalta Iron Mine and Roxy Railway Siding with proper drainage system.

(iii) It is being ensured that all the vehicles exiting the mine gate are checked for use of tarpaulin cover and are not overloaded to avoid spillage of material during transportation. Also wheel washing system has been provided at the exit points of the mines in order to control dust emission.

23) **Occupational Health Related:** Project Proponent shall implement the following mitigation measures: (i) 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 periodically. (ii) Occupational health surveillance program for all the employees/workers

(including casual workers) should be undertaken periodically (on annual basis) to observe any changes due to exposure to dust, and corrective measures should be taken immediately, if needed. (iii) Occupational health and safety measures related awareness programs including identification of work related health hazard, training on malaria eradication, HIV and health effects on exposure to mineral dust etc., should be carried out for all the workers on regular basis. A full time qualified doctor should be engaged for the purpose. Periodic monitoring (on 6 monthly basis) for exposure to respirable minerals dust on the workers should be conducted, and record should be maintained including health record of all the workers. Review of impact of various health measures undertaken (at an interval of 3 years or less) should be conducted followed by follow-up of actions, wherever required. Occupational health centre should be established near mine site itself. Responsibility: Individual Mine Lease Holders and District Administration (District Medical Officer).

Status of Compliance

(i) Personal Protective Equipment for working in dusty areas are provided to all personnel. Periodic training on safety and health aspects is carried out at the vocational training Centre.

(ii) Initial Medical Examination & Periodic Medical Examinations are conducted for all employees at the BIM and KIM Hospital periodically and records are maintained. This is being carried out in compliance to Mines Act, 1952 & Rules 1956 and amendments thereto. The occupational health surveillance shows that there is no occurrence of any kind of occupational health diseases.

(iii) Awareness programs on Occupational Health and Safety are being done regularly by BIM hospital, Tensa and IGH, Rourkela. Similar programs are arranged at site level to include all the contract workers as well. A full-time Occupational Health Centre has been established for periodic health check-up of employees and contract workers. All the health records are maintained.

C . STANDARD CONDITIONS FOR MINING OF MINERALS

I. Statutory compliance

1) This Environmental Clearance (EC) is subject to orders/ judgment of Hon'ble Supreme Court of India, Hon'ble High Court, Hon'ble NGT and any other Court of Law, Common Cause Conditions as may be applicable.

Status of Compliance

Agreed.

2) The Project proponent complies with all the statutory requirements and judgment of Hon'ble Supreme Court dated 2nd August, 2017 in Writ Petition (Civil) No. 114 of 2014 in matter of Common Cause versus Union of India & Ors before commencing the mining operations.

Status of Compliance

Agreed.

3) The State Government concerned shall ensure that mining operation shall not be commenced till the entire compensation levied, if any, for illegal mining paid by the Project Proponent through their respective Department of Mining & Geology in strict compliance of Judgment of Hon'ble Supreme Court dated 2nd August, 2017 in Writ Petition (Civil) No. 114 of 2014 in matter of Common Cause versus Union of India & Ors.

Status of Compliance

Subsequent to the judgment of Apex Court dated 02.08.2017, the Govt. of Odisha has issued demand notices to Barsua-Kalta Mines for payment of compensation towards excess production on or before 31st December, 2017 against EC / CTO capacity. Dy. Director of Mines (DDM), Koira vide letter dated 02.09.2017 issued a demand notice for payment of Rs. 66,89,42,779.50/- in respect of Barsua/ Kalta Iron Mines to recover price of mineral produced without / beyond EC alone under Section 21 (5) of MMDR Act, 1957. The said amount was deposited on 29.12.2017 under protest. Further, letter No.5962/Mines dtd 24.10.2017 of DDM, Koira has directed to pay compensation of Rs.90,19,71,684.40/- for mining in excess of the permissible limit under the Consent to Operate. Against the above stated demands, SAIL had filed a Writ Petition bearing WP (C) No- 24282/2017 in High Court of Odisha, Cuttack. The matter was heard and Hon'ble High Court had passed the stay order on 04.04.2018 & matter is sub-judice.

4) The Project Proponent shall follow the mitigation measures provided in MoEFCC's Office Memorandum No. Z-11013/57/2014-IA.II (M), dated 29th October, 2014, titled "Impact of mining activities on Habitations-Issues related to the mining Projects wherein Habitations and villages are the part of mine lease areas or Habitations and villages are surrounded by the mine lease area".

Status of Compliance

The mitigation measures suggested in MoEFCC's Office Memorandum No. Z-11013/57/2014-IA.II (M), dated 29th October, 2014, titled "Impact of mining activities on Habitations-Issues related to the mining Projects wherein Habitations and villages are the part of mine lease areas or Habitations and villages are surrounded by the mine lease area" is being followed during mining operation.

5) A copy of EC letter will be marked to concerned Panchayat / local NGO etc. if any, from whom suggestion / representation has been received while processing the proposal.

Status of Compliance

Copy of this EC letter has been sent to the Sarpanch office of Tensa, Sasyakala, Kalta, Chordhara villages vide letter dated 29.04.2023.

6) State Pollution Control Board/Committee shall be responsible for display of this EC letter at its Regional office, District Industries Centre and Collector's office/ Tehsildar's Office for 30 days.

Status of Compliance

Copy of this EC letter has been sent to the Tehsildar's Office, Koira, State Pollution Control Board Regional office, Rourkela, District Industries Centre, Rourkela and Collector's office, Sundargarh vide letter dated 29.04.2023.

7) The Project Authorities should widely advertise about the grant of this EC letter by printing the same in at least two local newspapers, one of which shall be in vernacular language of the concerned area. The advertisement shall be done within 7 days of the issue of the clearance letter mentioning that the instant project has been accorded EC and copy of the EC letter is available with the State Pollution Control Board/Committee and web site of the Ministry of Environment, Forest and Climate Change (www.parivesh.nic.in). A copy of the advertisement may be forwarded to the concerned MoEFCC Regional Office for compliance and record.

Status of Compliance

Grant of this EC has been widely advertised in three local newspapers i.e. The New Indian Express (English), The Prameya (Odia) and The Samaja (Odia) on dated 03.05.2023. Also, copy of the same forwarded to the MoEF&CC IRO office at Bhubaneswar vide letter no. BIM/E&L/2023-24/028, dated 03.05.2023.

8) The Project Proponent shall inform the MoEF&CC for any change in ownership of the mining lease. In case there is any change in ownership or mining lease is transferred. PP needs to apply for transfer of EC as per provisions of the para 11 of EIA Notification, 2006 as amended from time to time.

Status of Compliance

Agreed.

II. Air quality monitoring and preservation

9) The Project Proponent shall install a minimum of 3 (three) online Ambient Air Quality Monitoring Stations with 1 (one) in upwind and 2 (two) in downwind direction based on long term climatological data about wind direction such that an angle of 120 is made between the monitoring locations to monitor critical parameters, relevant for mining operations, of air pollution viz. PM_{10}, $PM_{2.5}$, NO_2, CO and SO_2 etc. as per the methodology mentioned in NAAQS Notification No. B-29016/20/90/PCI/I, dated 18.11.2009 covering the aspects of transportation and use of heavy machinery in the impact zone. The ambient air quality shall also be monitored at prominent places like office building, canteen etc. as per the site condition to ascertain the exposure characteristics at specific places. The above data shall be digitally displayed within 03 months in front of the main Gate of the mine site.

Status of Compliance

3 (three) Nos. of Continuous Ambient Air Quality Monitoring Stations (CAAQMS) at Barsua & Kalta has been commissioned and the monitored data is being transmitted to SPCB server. Apart from this, 4 (four) nos. of ambient air quality monitoring stations at Barsua-Taldih-Kalta Iron Mines has been established in the core zone as well as in the buffer zone based on the

topography and meteorological conditions of the area to monitor the critical parameters viz. PM_{10}, $PM_{2.5}$, NO_2, CO and SO_2. The monitored data are digitally displayed at the main gate of the mine.

10) Effective safeguard measures for prevention of dust generation and subsequent suppression (like regular water sprinkling, metalled road construction etc.) shall be carried out in areas prone to air pollution wherein high levels of PM_{10} and $PM_{2.5}$ are evident such as haul road, loading and unloading point and transfer points. The Fugitive dust emissions from all sources shall be regularly controlled by installation of required equipments/ machineries and preventive maintenance. Use of suitable water-soluble chemical dust suppressing agents may be explored for better effectiveness of dust control system. It shall be ensured that air pollution level conform to the standards prescribed by the MoEFCC/ Central Pollution Control Board.

Status of Compliance

Dry Fog System (DFS) and Mist Cannon have been provided in crushing and screening plants. Also, fixed water sprinklers of about 6 km have been installed in the permanent haul roads. Further, regular water sprinkling is being done with 2 X 28KL highly pressurized mobile water tankers for Barsua Block, 1 X 12 KL & 1 X 10KL mobile water tanker for loading area of Barsua, 3 X 20 KL, 1 X 16 KL & 1 X 10 KL mobile water tankers for Kalta Block and 1 X 12 KL & 2 X 20 KL mobile water tankers for Taldih Block which is sufficient to keep the haul road in wet condition and conform to the standards prescribed by the MoEFCC/ Central Pollution Control Board.

III. Water quality monitoring and preservation

11) In case, immediate mining scheme envisages intersection of ground water table, then Environmental Clearance shall become operational only after receiving formal clearance from CGWA. In case, mining operation involves intersection of ground water table at a later stage, then PP shall ensure that prior approval from CGWA and MoEFCC is in place before such mining operations. The permission for intersection of ground water table shall essentially be based on detailed hydro-geological study of the area.

Status of Compliance

Based on observations from nearby wells and water bodies, the minimum depth of water table is 404 mRL and maximum depth of water table is 593 mRL. Based on the approved Mining Plan, the ultimate pit depth will be 617mRL hence, throughout the course of mining operations, the ground water table will remain Undisturbed and the mining operation will not intersect ground water table.

12) Project Proponent shall regularly monitor and maintain records w.r.t. ground water level and quality in and around the mine lease by establishing a network of existing wells as well as new piezo-meter installations during the mining operation in consultation with Central Ground Water Authority/ State Ground Water Department. The Report on changes in Ground water level and

quality shall be submitted on six-monthly basis to the Regional Office of the Ministry, CGWA and State Groundwater Department / State Pollution Control Board.

Status of Compliance

Monthly monitoring of ground water level and quality is being carried out through a NABL accredited laboratory and the monitoring reports are being submitted along with six monthly compliance report. 3 nos. of open wells as well as tube wells have been selected all around the mines viz, Barsua Valley, Tensa and Kalta for regular monitoring of water levels & quality. Further, 2 Nos. of piezometers have been installed at Barsua valley and Taldih for ground water monitoring. The monitoring results of ground water level and quality are enclosed as **Annexure – V and Annexure – VI respectively**.

13) The Project Proponent shall undertake regular monitoring of natural water course/ water resources/ springs and perennial nallahs existing/ flowing in and around the mine lease including upstream and downstream. Sufficient number of gullies shall be provided at appropriate places within the lease for management of water. The parameters to be monitored shall include their water quality vis-à-vis suitability for usage as per CPCB criteria and flow rate. It shall be ensured that no obstruction and/ or alteration be made to water bodies during mining operations without justification and prior approval of MoEFCC. The monitoring of water courses/ bodies existing in lease area shall be carried out four times in a year viz. pre- monsoon (April May), monsoon (August), post-monsoon (November) and winter (January) and the record of monitored data may be sent regularly to Ministry of Environment. Forest and Climate Change and its Regional Office, Central Ground Water Authority and Regional Director, Central Ground Water Board, State Pollution Control Board and Central Pollution Control Board. Clearly showing the trend analysis on six-monthly basis.

Status of Compliance

Regular monitoring of water quality of Kuradih Nalla & Samaj Nalla at upstream and downstream locations with respect to Barsua, Taldih & Kalta Mines are being carried out on monthly basis. Further, the flow rate of the spring and perennial nallahs i.e. Kuradih Nalla at Barsua part and Samaj Nalla at Taldih & Kalta part are being done and record of monitored data is being maintained and submitted regularly to the Ministry of Environment, Forest and Climate Change and its Regional Office, Central Ground Water Authority and Regional Director, Central Ground Water Board, State Pollution Control Board and Central Pollution Control Board once in every six month along with six monthly compliance report. The monitoring is being done through an accredited laboratory M/s Superintendence Co. of India (P) Ltd. The surface water quality and flow rate of perennial nalla for the period from April, 2023 to September, 2023 is enclosed as **Annexure – IV and Annexure – VII respectively.**

14) Quality of polluted water generated from mining operations which include Chemical Oxygen Demand (COD) in mines run-off, acid mine drainage and metal contamination in runoff shall be monitored along with Total Suspended Solids (TDS). Dissolved Oxygen (DO), pH and Total Suspended Solids (TSS). The monitored data shall be uploaded on the website of the company as

well as displayed at the project site in public domain, on a display board, at a suitable location near the main gate of the Company. The circular No. J- 20012/1/2006-IA.II (M) dated 27.05.2009 issued by Ministry of Environment, Forest and Climate Change may also be referred in this regard.

Status of Compliance

The quality of polluted water generated from wet beneficiation plant and tailing pond discharge is being monitored for metal contamination along with COD, TDS, DO, pH and TSS. The monitored data is being uploaded on the website of the company as well as digitally displayed at the main gate of the mine. The effluent quality for the period from April, 2023 to September, 2023 is enclosed as **Annexure - VIII**.

15) Project Proponent shall plan, develop and implement rainwater harvesting measures on long term basis to augment ground water resources in the area in consultation with Central Ground Water Board/State Groundwater Department. A report on amount of water recharged needs to be submitted to Regional Office MoEFCC annually.

Status of Compliance

A Technical Feasibility Study for hydro-geological, rain water harvesting & augmentation of ground water resources has been conducted through M/s Tirupati Balajee Maharaj Consultant (P) Ltd. Two (02) nos. of Check dams has been constructed, one in Kuradih nala near pump house and other at Tantra Village near Taldih Block as per recommendation. Also one water body has been developed in the lease area for ground water recharge.

16) Industrial waste water (workshop and waste water from the mine) should be properly collected and treated so as to conform to the notified standards prescribed from time to time. The standards shall be prescribed through Consent to Operate (CTO) issued by concerned State Pollution Control Board (SPCB). The workshop effluent shall be treated after its initial passage through Oil and grease trap.

Status of Compliance

State-of-art Oil & grease traps have been provided for treating the effluents from workshop and garages in the HEMM maintenance unit. Effluents generated from the beneficiation plants are being treated in Thickeners followed by Tailing Ponds. The clear water to the tune of 60% is being recycled and the underflow from thickener is discharged into Tailing Dam.

17) The water balance/water auditing shall be carried out and measure for reducing the consumption of water shall be taken up and reported to the Regional Office of the MoEF&CC and State Pollution Control Board/Committee.

Status of Compliance

Noted.

IV. Noise and vibration monitoring and prevention

18) The peak particle velocity at 500m distance or within the nearest habitation, whichever is closer shall be monitored periodically as per applicable DGMS guidelines.

Status of Compliance

The Peak Particle Velocity (PPV) as measured in the mines during the earlier studies at the 200 m to 250 m distance was 12.5 mm/sec. Using the empirical equations derived from trial blasting studies already conducted, the maximum PPV has been estimated to be 1.67 mm/sec at 530 m and minimum PPV of 0.12 mm/sec. at 5500 m distances. The results are well within the ceilings of maximum permissible PPV as per circular DGMS (Tech)/(S&T) Circular No.7 of 1997 dated 29/08/1997.

19) The illumination and sound at night at project sites disturb the villages in respect of both human and animal population. Consequent sleeping disorders and stress may affect the health in the villages located close to mining operations. Habitations have a right for darkness and minimal noise levels at night. PPs must ensure that the biological clock of the villages is not disturbed; by orienting the floodlights/ masks away from the villagers and keeping the noise levels well within the prescribed limits for day/night hours.

Status of Compliance

The Crushing & Screening Plant of Barsua Iron Mines of M/s SAIL is operating since 1960 and is well housed with enclosures to reduce the impact of noise level on surroundings. The noise level in the nearby habitation areas are being monitored (both day & night time) on monthly basis through NABL accredited laboratory and found well within the limits. Copy of the monitoring result for the period from April, 2023 to September, 2023 is enclosed as **Annexure – IX**. There is no illumination directed towards villages or forest area outside the lease. All the illumination provided in the mines and other infrastructures are as per DGMS guideline.

20) The Project Proponent shall take measures for control of noise levels below 85 dBA in the work environment. The workers engaged in operations of HEMM, etc. should be provided with ear plugs /muffs. All personnel including laborers working in dusty areas shall be provided with protective respiratory devices along with adequate training, awareness and information on safety and health aspects. The PP shall be held responsible in case it has been found that workers/ personals/ laborers are working without personal protective equipment.

Status of Compliance

Regular maintenances and periodic checks of the HEMM are being carried out to control noise below 85 dB (A) in the work environment. The operators engaged in blasting/ drilling operations and operator of HEMM are provided with PPEs such as ear plug/ ear muffs with helmet. Use of these protective measures is ensured by educating the workers on ill effect of the prolonged excessive exposure to high Noise levels and daily checks by shift mining engineers regarding usage of ear plug/ear muffs. The measured noise level in critical areas is enclosed **as Annexure – X**. Dust masks have been provided to personnel working in dusty areas and ensured by daily checks. Training on safety and health aspects is being imparted on regular basis.

V. Mining plan

21) The Project Proponent shall adhere to approved mining plan, inter alia, including. total excavation (quantum of mineral, waste, over burden, inter burden and top soil etc.); mining technology; lease area; scope of working (method of mining, overburden & dump management, O.B& dump mining, mineral transportation mode, ultimate depth of mining. concurrent reclamation and reclamation at mine closure; land-use of the mine lease area at various stages of mining scheme as well as at the end-of-life; etc.).

Status of Compliance

Mining is being done in accordance with approved Mining Plan/ Scheme of Mining. There is no change in the calendar plan including total excavation, mining technology, lease area and scope of working.

22) The land-use of the mine lease area at various stages of mining scheme as well as at the end-of-life shall be governed as per the approved Mining Plan. The excavation vis-à-vis backfilling in the mine lease area and corresponding afforestation to be raised in the reclaimed area shall be governed as per approved mining plan. PP shall ensure the monitoring and management of rehabilitated areas until the vegetation becomes self- sustaining. The compliance status shall be submitted half-yearly to the MoEFCC and its concerned Regional Office.

Status of Compliance

Currently, reclamation over an area of 3.8 ha in the fully exhausted mined out area forming dump No.-8 and backfilling over an area of 8.0 ha of mined out benches in the eastern side of Quarry-3 is under progress. The Mine is in operation as per the approved Mining Plan/scheme and Progressive Mine Closure Plan.

VI. Land reclamation

23) The Overburden (O.B.), waste and topsoil generated during the mining operations shall be stacked at earmarked OB dump site(s) only and it should not be kept active for a long period of time. The physical parameters of the OB/ waste dumps / topsoil dump like height, width and angle of slope shall be governed as per the approved Mining Plan and the guidelines/circulars issued by D.G.M.S. The topsoil shall be used for land reclamation and plantation.

Status of Compliance

The over burden (OB) / sub-grade ore generated during the mining operations is being stored at earmarked sites only, as per the approved Modification of Mining Plan. Phase wise stabilization with installation of coir mats and broadcasting of grass seeds are carried out as per approved plan. For effective stabilization, terracing of the OB dumps with overall slope of the dump is being maintained to below 27°. Though the generation of top soil is very less, it is being stacked separately at earmarked site and used for rehabilitation of dumps and other areas through plantation.

24) The slope of dumps shall be vegetated in scientific manner with suitable native species to maintain the slope stability, prevent erosion and surface run off. The selection of local species regulates local climatic parameters and help in adaptation of plant species to the microclimate. The gullies formed on slopes should be adequately taken care of as it impacts the overall stability of dumps. The dump mass should be consolidated with the help of dozer/ compactors thereby ensuring proper filling/ leveling of dump mass. In critical areas, use of geo textiles/ geo-membranes / clay liners / Bentonite etc. shall be undertaken for stabilization of the dump.

Status of Compliance

Also, Geo-textile coir matting of 28000 Sq. m has been done in Barsua Block. Plantation of species like bamboo and Sal have been carried out over the dump slopes for stabilization and prevention of washout. Masonry steps have been constructed on the slopes to allow runoff to flow down.

25) Catch drains, settling tanks and siltation ponds of appropriate size shall be constructed around the mine working, mineral yards and Top Soil/OB/Waste dumps to prevent run off of water and flow of sediments directly into the water bodies (Nallah/ River) Pond etc.). The collected water should be utilized for watering the mine area, roads, green belt development, plantation etc. The drains/ sedimentation sumps etc. shall be de-silted regularly, particularly after monsoon season, and maintained properly.

Status of Compliance:

The surface run-off generated from the mines is channelized through a series of garland drain to the lowest level of the pit for collection of runoff and settlement of suspended solids and to prevent flow of sediments to nearby water bodies. The garland drains are periodically de-silted to keep them efficient.

26) Check dams of appropriate size, gradient and length shall be constructed around mine pit and OB dumps to prevent storm run-off and sediment flow into adjoining water bodies. A safety margin of 50% shall be kept for designing of sump structures over and above peak rainfall (based on 50 years data) and maximum discharge in the mine and its adjoining area which shall also help in providing adequate retention time period thereby allowing proper settling of sediments/ silt material. The sedimentation pits sumps shall be constructed at the corners of the garland drains.

Status of Compliance

There are 33 nos. of Check dams / Retaining wall / Toe walls provided in Barsua-Taldih-Kalta mines to prevent direct flow of washout to nearby water bodies. Also, surface runoff management study of Barsua-Taldih-Kalta Mining Lease has been conducted through NIT Rourkela. The findings of the report are under implementation in a phased manner.

VII. Transportation

27) No Transportation of the minerals shall be allowed in case of roads passing through villages/ habitations. In such cases, PP shall construct a 'bypass' road for the purpose of transportation of

the minerals leaving an adequate gap (say at least 200 meters) so that the adverse impact of sound and dust along with chances of accidents could be mitigated. All costs resulting from widening and strengthening of existing public road network shall be borne by the PP in consultation with nodal State Govt. Department. Transportation of minerals through road movement in case of existing village/ rural roads shall be allowed in consultation with nodal State Govt. Department only after required strengthening such that the carrying capacity of roads is increased to handle the traffic load. The pollution due to transportation load on the environment will be effectively controlled and water sprinkling will also be done regularly. Vehicular emissions shall be kept under control and regularly monitored. Project should obtain Pollution Under Control (PUC) certificate for all the vehicles from authorized pollution testing centers. [If applicable in case of road transport].

Status of Compliance

No village roads are being used for transportation of minerals. Pollution Under Control (PUC) certificate is made compulsory for deployment of vehicles in Mines. Scheduled / Preventive maintenance of HEMM and light vehicles are undertaken regularly to keep the vehicular emissions under control. The vehicles used for transportation of ore are covered with tarpaulins and ensured that there is no overloading with the help of weighbridge. The vehicular emission results are enclosed in **Annexure – XI**.

28) The Main haulage road within the mine lease should be provided with a permanent water sprinkling arrangement for dust suppression. Other roads within the mine lease should be wetted regularly with tanker-mounted water sprinkling system. The other areas of dust generation like crushing zone, material transfer points, material yards etc. should invariably be provided with dust suppression arrangements. The air pollution control equipments like bag filters, vacuum suction hoods, dry fogging system etc. shall be installed at Crushers, belt-conveyors and other areas prone to air pollution. The belt conveyor should be fully covered to avoid generation of dust while transportation. PP shall take necessary measures to avoid generation of fugitive dust emissions.

Status of Compliance

Dry Fog System (DFS) and Mist Cannon have been provided in crushing and screening plant. Also, fixed water sprinklers of about 6 km have been provided in the permanent haul roads. Further, regular water sprinkling is being done with 2 X 28KL highly pressurized mobile water tankers for Barsua Block, 1 X 12 KL & 1 X 10KL mobile water tanker for loading area of Barsua, 3 X 20 KL, 1 X 16 KL & 1 X 10 KL mobile water tankers for Kalta Block and 1 X 12 KL & 2 X 20 KL mobile water tankers for Taldih Block which is sufficient to keep the haul road in wet condition. The conveyor system used for ore transportation from the plant to stacking yards at Barsua Block is fully covered.

Mobile water sprinklers

Closed Conveyor System at Barsua Block

VIII. Green Belt

29) The Project Proponent shall develop greenbelt in 7.5m wide safety zone all along the mine lease boundary as per the guidelines of CPCB in order to arrest pollution emanating from mining operations within the lease. The whole Green belt shall be developed within first 5 years starting from windward side of the active mining area. The development of greenbelt shall be governed as per the EC granted by the Ministry irrespective of the stipulation made in approved mine plan.

Status of Compliance

Safety Zone plantation over 93.679 ha safety zone area of Barsua-Taldih-Kalta Iron Mines has been completed through State Forest Department.

Safety Zone Plantation

30) The Project Proponent shall carryout plantation/ afforestation in backfilled and reclaimed area of mining lease, around water body, along the roadsides, in community areas etc. by planting the native species in consultation with the State Forest Department/ Agriculture Department/ Rural development department/ Tribal Welfare Department/ Gram Panchayat such that only those species be selected which are of use to the local people. The CPCB guidelines in this respect

shall also be adhered. The density of the trees should be around 2500 saplings per Hectare. Adequate budgetary provision shall be made for protection and care of trees.

Status of Compliance

Plantation/ afforestation of 2, 17,865 saplings have been planted covering an area of 102.98 ha since 2010 in and around the mining lease area.

During the year 2023-24, plantation of 5000 saplings covering an area of 2.0 Ha at Taldih Block & Waste Dump of Barsua Block has been completed. The detail of plantation is placed at **Annexure - XII**.

Plantation over waste dump / non-mineralized area

31) The Project Proponent shall make necessary alternative arrangements for livestock feed by developing grazing land with a view to compensate those areas which are coming within the mine lease. The development of such grazing land shall be done in consultation with the State Government. In this regard, Project Proponent should essentially implement the directions of the Hon'ble Supreme Court with regard to acquisition of grazing land. The sparse trees on such grazing ground, which provide mid-day shelter from the scorching. sun, should be scrupulously guarded/ protected against felling and plantation of such trees should be promoted.

Status of Compliance

There is no grazing land present in the Amalgamated Barsua-Taldih-Kalta Iron Mines. However, the mining has been planned in such a way that the entire forest land will not be disturbed at a time which will support feeding of the lovestock.

IX. Public hearing and human health issues

32) Project Proponent shall make provision for the housing for workers/labors or shall construct labor camps within/outside (company owned land) with necessary basic infrastructure/ facilities like fuel for cooking, mobile toilets, mobile STP, safe drinking water, medical health care, crèche for kids etc. The housing may be provided in the form of temporary structures which can

be removed after the completion of the project related infrastructure. The domestic waste water should be treated with STP in order to avoid contamination of underground water.

Status of Compliance

SAIL has well-developed townships at Tensa, Barsuan and Kalta with residential accommodation for employees and workers with all necessary infrastructure such as LPG gas connection through co-operative society for cooking, electricity, welfare amenities like toilets, drinking water and medical facilities etc. Whenever required, the construction labour are hired from the local villagers and only few are being hired from outside, for which housing facilities along with necessary infrastructure are being provided at the existing colony of the mines.

X. Corporate Environment Responsibility (CER)

33) The Project Proponent shall submit the time- bound action plan to the concerned regional office of the Ministry within 6 months from the date of issuance of environmental clearance for undertaking the activities committed during public consultation by the project proponent and as discussed by the EAC, in terms of the provisions of the MoEF&CC Office Memorandum No.22-65/2017-IA.III dated 30 September, 2020. The action plan shall be implemented within three years of commencement of the project.

Status of Compliance

A time bound action plan for the activities committed during public consultation has been prepared along with final EIA-EMP report for implementation within a period of 3 years of commencement of the project. A copy of the action plan is enclosed as **Annexure - XIII**.

XI. Miscellaneous

34) The Project Proponent shall prepare digital map (land use & land cover) of the entire lease area once in five years purpose of monitoring land use pattern and submit a report to concerned Regional Office of the MoEF&CC.

Status of Compliance

Digital processing of the entire lease area using remote sensing technique has been studied through satellite imagery i.e. Linear Imaging Self-Scanner during March, 2021 by IIT ISM, Dhanbad. Copy of the report is enclosed as **Annexure - XIV.**

35) The Project Authorities should inform to the Regional Office regarding date of financial closures and final approval of the project by the concerned authorities and the date of start of land development work.

Status of Compliance

The Barsua and Kalta Iron Mines are operating since 1960 and 1966 respectively. Development work in Taldih block started since 9th June 2016 and installation of various facilities at Taldih Block are under progress.

36) The Project Proponent shall submit six monthly compliance reports on the status of the implementation of the stipulated environmental safeguards to the MOEFCC & its concerned Regional Office, Central Pollution Control Board and State Pollution Control Board.

Status of Compliance

Six monthly compliance reports on the status of implementation of environmental safeguards are being submitted to MoEF&CC, New Delhi, Regional Office, MoEF&CC, Bhubaneswar, Central Pollution Control Board and State Pollution Control Board.

Copy of the compliance report including environmental quality data is being uploaded to the SAIL web site i.e. www.sail.co.in.

37) A separate 'Environmental Management Cell' with suitable qualified manpower should be set-up under the control of a Senior Executive. The Senior Executive shall directly report to Head of the Organization. Adequate number of qualified Environmental Scientists and Mining Engineers shall be appointed and submit a report to RO, MOEF&CC.

Status of Compliance

A full-fledged Environment & Lease Department has been established at Barsua Iron Mines to look after environmental aspects headed by an AGM (Env), who reports to Mines Manager. He is further assisted by two officers for environmental management at mines.

38) The concerned Regional Office of the MoEF&CC shall randomly monitor compliance of the stipulated conditions. The project authorities should extend full cooperation to the MOEF&CC officer(s) by furnishing the requisite data/information/monitoring reports.

Status of Compliance

Full co-operation is extended to the officer(s) of the regional office of MoEF&CC by furnishing the requisition data information, monitoring reports etc.

39) In pursuant to Ministry's O.M No 22-34/2018-IA III dated 16.01.2020 to comply with the direction made by Hon'ble Supreme Court on 8.01.2020 in W.P. (Civil) No 114/2014 in the matter Common Cause vs Union of India, the mining lease holder shall after ceasing mining operations, undertake regrassing the mining area and any other area which may have been disturbed due to other mining activities and restore the land to a condition which is fit for growth of fodder, flora, fauna etc.

Status of Compliance

Addendum to the existing lease deed has been executed on 04.06.2020 incorporating the condition that “the mining lease holder (s) shall after ceasing mining operation, undertake re-grassing the mining area and any other area which may have disturbed due to their mining activities and restore the land to a condition which is fit for growth of fodder, flora, fauna etc.” in pursuant to judgment of Hon’ble Supreme Court in WP(C) No.114 of 2014.

40) The Ministry or any other competent authority may alter/modify the above conditions or stipulate any further condition in the interest of environment protection.

Status of Compliance

Agreed.

41) Concealing factual data failure to comply with any or submission of false/ fabricated data and of the conditions mentioned above may result in withdrawal of this clearance and attract action under the provisions of Environment (Protection) Act, 1986.

Status of Compliance

Agreed.

D. STANDARD EC CONDITIONS FOR MINERAL BENEFICIATION PLANTS:

I. Statutory Compliance:

1) The project proponent shall obtain forest clearance under the provisions of Forest (Conservation) Act, 1986, in case of the diversion of forest land for non-forest purpose involved in the project.

Status of Compliance

Out of 2564.323 ha amalgamated lease area, 2425.613 ha is Forest Land. Stage-II forest clearance for diversion of forest land over 2341.931 ha in ML – 130 was granted by MoEFCC vide F. No. 8-90/1996-FC(pt.), dated 06.03.2013. MoEFCC vide order no. F.No.8-18/2014-FC dated 23.10.2017 granted Stage-II FC for diversion of entire 77.94 ha of forest land under ML – 162. The remaining 5.742 ha of forest land which was under the occupation of Schedule Tribe & Other Traditional Forest Dwellers has been surrendered to the Govt. of Odisha vide proceeding no. 10426/S&M, Bhubaneswar, dated 16.10.2023.

2) The project proponent shall obtain clearance from the National Board for Wildlife, if applicable.

Status of Compliance

No notified National Park / Wildlife Sanctuary / Biosphere Reserve / Tiger Reserve are located within 10 kms from the Mining Lease boundary. Hence it is not applicable to this project.

3) The project proponent shall prepare a Site-Specific Conservation Plan & Wildlife Management Plan and approved by the Chief Wildlife Warden. The recommendations of the approved Site-Specific Conservation Plan / Wildlife Management Plan shall be implemented in consultation with the State Forest Department. The implementation report shall be furnished along with the six-monthly compliance report. (in case of the presence of Schedule-I species in the study area).

Status of Compliance

Two Site Specific Wildlife Conservation Plans (SSWCP) were approved by Chief Wildlife Warden, Odisha vide letter dated 25.02.2013 for 2486.383 ha & 13.01.2016 for 77.94 ha. Amounts of Rs.17.82 Crores & Rs. 9.84 Crores were deposited for implementation of approved SSWCPs in Buffer Zone of Barsua-Taldih-Kalta Iron Mines.

The details of cost incurred towards implementation of approved interventions of the Site Specific Wildlife Conservation Plans from the fund realised by SAIL are as follows:

Cost incurred for Implementation of Site Specific Wildlife Conservation Plan of ML – 130

Sl. No.	Year	Cost Incurred (Rs. in Lakhs)
1	2013-14	81.91
2	2014-15	81.05
3	2015-16	93.04
4	2016-17	27.31
5	2017-18	25.13
6	2018-19	64.21
7	2019-20	55.46
8	2020-21	68.24
9	2021-22	42.83
10	2022-23	45.74
11	2023-24 (Till Sept'2023)	37.19
	Total	**622.10**

Cost incurred for Implementation of Site Specific Wildlife Conservation Plan of ML – 162

Sl. No.	Year	Cost Incurred (Rs. in Lakhs)
1	2016-17	12.92
2	2017-18	10.06
3	2018-19	32.81
4	2019-20	4.22
5	2020-21	1.20
6	2021-22	20.65
7	2022-23	0.00
8	2023-24 (Till Sept'2023)	0.22
	Total	**82.08**

4) The project proponent shall obtain Consent to Establish / Operate under the provisions of Air (Prevention & Control of Pollution) Act, 1981 and the Water (Prevention & Control of Pollution) Act, 197 4 from the concerned State Pollution Control Board/ Committee.

Status of Compliance

Consent to Establish was obtained from SPCB, Odisha for a capacity of 16.0 MTPA ROM and excavation and dispatch of 2.0 MTPA sub-grade / tailings for Amalgamated Barsua-Taldih-Kalta Iron Mines Vide No. 9222/IND-II-CTE-6910, dated 07.06.2023.

Consent to Operate has also been obtained from SPCB, Odisha vide Order no. 6813/IND-I-CON-1(A), dated 26.04.2023 for a quantity of 8.05 MTPA including excavation and dispatch of 2.0 MTPA sub-grade / tailings with validity up to 31.03.2024.

5) The project proponent shall obtain the necessary permission from the Central Ground Water Authority, in case of drawl of ground water / from the competent authority concerned in case of drawl of surface water required for the project.

Status of Compliance

Department of Water Resources, Govt. of Odisha has allocated 3.406 cusec of Surface Water from Kuradih Nalla in favour of Barsua Iron Mines vide letter No. 4897/WR, dated 15.02.2021.

6) The project proponent shall obtain authorization under the Hazardous and other Waste Management Rules, 2016 as amended from time to time.

Status of Compliance

The Hazardous Waste Authorization obtained from SPCB, Odisha vide letter No. IND-IV-HW-423/6210 dated 15.04.2023 which is valid till 31.03.2024.

II. Air quality monitoring and preservation

7) The project proponent shall install 24x7 continuous emission monitoring system at process stacks to monitor stack emission with respect to standards prescribed in Environment (Protection) Rules 1986 as amended from time to time and connected to SPCB and CPCB online servers and calibrate these system from time to time according to equipment supplier specification through labs recognised under Environment (Protection) Act, 1986 or NABL accredited laboratories. Monitor fugitive emissions in the plant premises.

Status of Compliance

Three nos. of Continuous Ambient Air Quality Monitoring Stations (CAAQMS) have been established at Barsua-Taldih-Kalta Iron Mines with real time monitoring with a facility for data transmission to SPCB server. Work order for Comprehensive Maintenance Contract (CMC) for CAAQMS equipments installed at Barsua-Taldih-Kalta Iron Mines has been issued to the proprietor M/s Envea India Pvt. Ltd. vides Ref. No. RSP/PROJ/CC/WO/05 of 2021-22, dated 03.12.2021 for a period of two years for maintenance and calibration of the equipment on regular basis. Fugitive Dust Emission Monitoring is being done in twelve locations at Barsua-Taldih-Kalta Iron Mines through a NABL accredited laboratory on daily basis and report is being submitted once in six months to the State Pollution Control Board.

8) The project proponent shall monitor fugitive emissions in the plant premises at least once in every quarter through labs recognised under Environment (Protection) Act, 1986.

Status of Compliance

Fugitive Dust Emission Monitoring is being done in twelve locations at Barsua-Taldih-Kalta Iron Mines through a NABL accredited laboratory on daily basis and report is being submitted once in six months to the State Pollution Control Board.

9) The project proponent shall install system to carryout Continuous Ambient Air Quality monitoring for common/criterion parameters relevant to the main pollutants released (e.g. PM_{10} and $PM_{2.5}$ in reference to PM emission, and SO2 and NOx in reference to S02 and NOx emissions) within and outside the plant area at least at four locations (one within and three outside the plant area at an angle of 120’ each) covering upwind and downwind directions.

Status of Compliance

Three nos. of Continuous Ambient Air Quality Monitoring Stations (CAAQMS) have been established at Barsua-Taldih-Kalta Iron Mines out of which one within and two outside the Mining area covering upwind and downwind directions.

10) The project proponent shall submit monthly summary report of continuous stack emission and air quality monitoring and results of manual stack monitoring and manual monitoring of air quality fugitive emissions to Regional Office of MoEF&CC. Zonal office of CPCB and Regional Office of SPCB along with six-monthly monitoring report.

Status of Compliance

The monthly summary report of Continuous Ambient Air Quality Monitoring (CAAQMS) and results of manual monitoring of air quality / fugitive emissions is enclosed as **Annexure - III.**

11) Appropriate Air Pollution Control (APC) system shall be provided for all the dust generating points including fugitive dust from all vulnerable sources, so as to comply prescribed stack emission and fugitive emission standards.

Status of Compliance

Dry Fog System (DFS) and Mist Cannon have been provided in crushing and screening plant. Also, fixed water sprinklers of about 6 km have been provided in the permanent haul roads. Further, regular water sprinkling is being done with 2 X 28 KL highly pressurized mobile water tankers for Barsua Block, 1 X 12 KL & 1 X 10 KL mobile water tanker for loading area of Barsua, 3 X 20 KL, 1 X 16 KL & 1 X 10 KL mobile water tankers for Kalta Block and 1 X 12 KL & 2 X 20 KL mobile water tankers for Taldih Block. All these dust control measures installed at the mines are sufficient to control fugitive dust emission.

12) The project proponent use leak proof trucks/dumpers carrying ore and other raw materials and cover them with tarpaulin.

Status of Compliance

It is ensured that all the vehicles exiting the mine gate are checked for use of tarpaulin cover and there is no overloading with the help of weighbridge to avoid spillage of ore during transportation.

13) Wind shelter fence and chemical spraying shall be provided on the raw material stock piles.

Status of Compliance

Water mist fog canons have been provided to cover temporary fine ore stock piles and loading areas.

14) Design the ventilation system for adequate air changes as per ACGIH document for all tunnels, motor houses, Oil Cellars.

Status of Compliance

Proper ventilation system has been provided in the oil & lubricant storage room and battery storage room for adequate air changes.

III. Water quality monitoring and preservation

15) The project proponent shall install 24x7 continuous effluent monitoring system with respect to standards prescribed in Environment (Protection) Rules 1986 as amended from time to time and connected to SPCB and CPCB online servers and calibrate these system from time to time according to equipment supplier specification through labs recognised under Environment (Protection) Act, 1986 or NABL accredited laboratories.

Status of Compliance

Oil & grease traps have been provided for treating the effluents from workshop and garages in the HEMM maintenance unit. The treated waste water is reused for vehicle and floor washing. Effluents generated from the beneficiation plants are being treated in Thickeners followed by Tailing Ponds. The clear water to the tune of 60% is being recycled and the underflow from thickener is discharged into Tailing Dam. The overflow as well as seepage water from tailing pond are being re-used through Zero discharge system.

16) The project proponent shall monitor regularly ground water quality at least twice a year (pre and post monsoon) at sufficient numbers of piezometers/sampling wells in the plant and adjacent areas through labs recognised under Environment (Protection) Act. 1986 and NABL accredited laboratories.

Status of Compliance

Monthly monitoring of ground water level and quality is being carried out through a NABL accredited laboratory and the monitoring reports are being submitted along with six monthly compliance report. 3 nos. of open wells as well as tube wells have been selected all around the mines viz, Barsua Valley, Tensa and Kalta for regular monitoring of water levels & quality. Further, 2 Nos. of piezometers have been installed at Barsua valley and Taldih for ground water monitoring. The results are enclosed as **Annexure – V and Annexure – VI respectively**.

17) The project proponent shall submit monthly summary report of continuous effluent monitoring and results of manual effluent testing and manual monitoring of ground water quality to Regional Office of MoEF&CC, Zonal office of CPCB and Regional Office of SPCB along with six-monthly monitoring report.

Status of Compliance

The relevant parameters in the effluents are being monitored monthly basis. The effluent quality for the period from April, 2023 to September, 2023 is enclosed as **Annexure - VIII.**

18) The project proponent shall provide the slime disposal facility with impervious lining and collection wells for seepage. The water collected from the slime pond shall treated and recycled.

Status of Compliance

The Tailing Pond at Barsua Iron Mine is located on the hard & plain area and is in operation since 1969. The overflow as well as seepage water from tailing pond are being re-used through Zero discharge system.

19) Adhere to 'Zero Liquid Discharge'

Status of Compliance

Agreed. Wastewater generated from wet beneficiation plant is discharged to the existing tailing pond and the overflow as well as seepage water are being re-used through a 'Zero discharge system'.

20) Sewage Treatment Plant shall be provided for treatment of domestic wastewater to meet the prescribed standards.

Status of Compliance

Individual septic tank with soak pits has been provided in the colony. The domestic effluents are discharged to soak pit via septic tank.

21) Garland drains and collection pits shall be provided for each stock pile to arrest the run-off in the event of heavy rains and to check the water pollution due to surface run off.

Status of Compliance

The surface run-off generated from the mines is channelized through a series of garland drain to the lowest level of the pit for collection of runoff and settlement of suspended solids and to prevent flow of sediments to nearby water bodies. The garland drains are periodically de-silted to keep them efficient.

22) The project proponent shall practice rainwater harvesting to maximum possible extent.

Status of Compliance

A Technical Feasibility Study for hydro-geological, rain water harvesting & augmentation of ground water resources has been conducted through M/s Tirupati Balajee Maharaj Consultant (P) Ltd. Two (02) nos. of Check dams has been constructed, one in Kuradih nala near pump house and other at Tantra Village near Taldih Block as per recommendation. Also one water body has been developed in the lease area for ground water recharge.

23) The project proponent shall make efforts to minimise water consumption in the steel plant complex by segregation of used water, practicing cascade use and by recycling treated water.

Status of Compliance

All efforts are being made for reduction of water consumption in the Mining areas as well as in the residential colony. System for recovery and recycling of decanted water from the tailing pond has been provided at Barsua Iron Mine under Zero Discharge Project.

IV. Noise monitoring and prevention

24) Noise level survey shall be carried as per the prescribed guidelines and report in this regard shall be submitted to Regional Officer of the Ministry as a part of six-monthly compliance report.

Status of Compliance

Monitoring of Noise level are being done on weekly basis at the major sources of noise generation within core zone. Necessary efforts are being made to maintain the noise level with in the acceptable limits of CPCB (CPCB, 2000). The result of noise monitoring is being submitted to Regional Officer of the Ministry as a part of six-monthly compliance report.

25) The ambient noise levels should conform to the standards prescribed under E(P)A Rules, 1986 viz. 75 dB(A) during day time and 70 dB(A) during night time.

Status of Compliance

The noise level in the nearby habitation areas are being monitored (both day & night time) on monthly basis through NABL accredited laboratory and found well within the limits.

V. Energy Conservation measures

26) Provide solar power generation on roof tops of buildings, for solar light system for all common areas, street lights, parking around project area and maintain the same regularly.

Status of Compliance

Solar power of 20 KW has been provided in the Mining areas and Hospital and the same are being maintained regularly.

27) Provide LED lights in their offices and residential areas.

Status of Compliance

All conventional lights have been replaced with LED lights in the office and residential colony.

VI. Waste management

28) The waste oil, grease and other hazardous waste shall be disposed of as per the Hazardous & Other waste (Management & Transboundary Movement) Rules, 2016.

Status of Compliance

The hazardous wastes are being disposed of as per the Hazardous & Other waste (Management & Transboundary Movement) Rules, 2016.

29) Kitchen waste shall be composted or converted to biogas for further use (to be decided on case to case basis depending on type and size of plant).

Status of Compliance

Municipal Solid waste disposal yard has been constructed for disposal of municipal waste collected through a dedicated door to door collection system.

VII. Green Belt and EMP

30) Green belt shall be developed in an area equal to 33% of the plant area with a native tree species in accordance with CPCB guidelines. The greenbelt shall inter alia cover the entire periphery of the plant.

Status of Compliance

Mining has been planned in such a way that at least 33% of the lease area shall be under forest cover all the time. Apart from this, Safety Zone plantation over 93.679 ha safety zone area of Barsua-Taldih-Kalta Iron Mines has been completed through State Forest Department and also so far 2, 17,865 saplings have been planted covering an area of 102.98 ha since 2010. During the year 2023-24, plantation of 5000 saplings covering an area of 2.0 Ha at Waste Dump of Barsua Block and near Taldih Block has been completed.

31) The project proponent shall prepare GHG emissions inventory for the plant and submit the programme for reduction of the same including carbon sequestration including plantation.

Status of Compliance

Agreed. The detail of plantation is enclosed as **Annexure - XII**.

VIII. Public hearing and Human health issues

32) Emergency preparedness plan based on the Hazard identification and Risk Assessment (HIRA) and Disaster Management Plan shall be implemented.

Status of Compliance

Barsua-Taldih-Kalta Iron Mines is certified with ISO 14001:2015, ISO 9001: 2015 and ISO 45001:2018 and as a part of compliance Hazard identification and Risk Assessment (HIRA) of all the departments has been done and are being implemented.

33) The project proponent shall carry out heat stress analysis for the workmen who work in high temperature work zone and provide Personal Protection Equipment (PPE) as per the norms of Factory Act.

Status of Compliance

Not Applicable. Barsua-Taldih-Kalta Iron Mines is situated at an altitude of about 850 mRL, which normally stay cooler than the surroundings even during hot summer.

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

Status of Compliance

SAIL has well-developed townships at Tensa, Barsuan and Kalta with residential accommodation for employees and workers with all necessary infrastructure such as LPG gas connection through co-operative society for cooking, electricity, welfare amenities like toilets,

drinking water and medical facilities etc. Whenever required, the construction labour are hired from the local villagers and only few are being hired from outside, for which housing facilities along with necessary infrastructure are being provided at the existing colony of the mines.

35) Occupational health surveillance of the workers shall be done on a regular basis and records maintained as per the Factories Act.

Status of Compliance

Initial Medical Examination & Periodic Medical Examinations are conducted for all employees at the BIM and KIM Hospital periodically and records are maintained. This is being carried out in compliance to Mines Act, 1952 & Rules 1956 and amendments thereto. The occupational health surveillance shows that there is no occurrence of any kind of occupational health diseases.

IX. Corporate Environment Responsibility

36) The Project Proponent shall submit the time-bound action plan to the concerned regional office of the Ministry within 6 months from the date of issuance of environmental clearance for undertaking the activities committed during public consultation by the project proponent and as discussed by the EAC, in terms of the provisions of the MoEF&CC Office Memorandum No 22-65/2017-IA III dated 30 September, 2020. The action plan shall be implemented within three years of commencement of the project.

Status of Compliance

A time bound action plan for the activities committed during public consultation has been prepared along with final EIA-EMP report for implementation within a period of 3 years of commencement of the project.

37) The company shall have a well laid down environmental policy duly approve by the Board of Directors. The environmental policy should prescribe for standard operating procedures to have proper checks and balances and to bring into focus any infringements/deviation/violation of the environmental forest wildlife norms/ conditions. The company shall have defined system of reporting infringements / deviation / violation of the environmental / forest I wildlife norms/ conditions and / or shareholders/ stake holders. The copy of the board resolution in this regard shall be submitted to the MoEF&CC as a part of six-monthly report.

Status of Compliance

SAIL has imbibed its commitment to preserve and protect environment in its workings through their Corporate Environmental Policy (CEP) and SAIL-Barsua-Taldih-Kalta mine's Integrated Environment Policy, approved by the Board of the company as well as the plant-level top management of Barsua-Taldih-Kalta Iron Mines.

Barsua-Taldih-Kalta Iron Mines unit-level Integrated Policy has been derived from guiding principles of SAIL's Corporate Environment policy, which is more specific to the unit & addresses compliance to environmental, forest and other statutory conditions. In pursuit to adhere to the environmental policy for environmental-friendly mining process, the Standard

operating procedures (SOPs) have been formulated, implemented & well established which takes care of the guiding principle.

In line with SAIL's commitment for environmental protection, the above objective has been intended to be achieved through the following:

- Conduct mining & processing operation in compliance with the relevant environment legislations.
- Conserve energy and other natural resources in minimising waste generation.
- Protect the environment by minimising pollution and its impact.
- Increase greenery in and around the Mine.
- Encourage environmental awareness among all level of the employees.
- Periodical review of the system for continual improvement.

The Environmental Policy of SAIL as well as Barsua-Taldih-Kalta Iron Mines is enclosed as **Annexure - XV**.

38) A separate Environmental Cell both at the project and company head quarter level, with qualified personnel shall be set up under the control of senior Executive, who will directly to the head of the organization.

Status of Compliance

A full-fledged Environment & Lease Department has been established at Barsua Iron Mines to look after environmental aspects headed by an AGM (Env), who reports to Mines Manager. He is further assisted by two officers for environmental management at mines.

In addition there is a dedicated Environment and Lease (E&L) Department headed by Chief General Manager (RP&E) under Odisha Group of Mines, SAIL-Rourkela Steel Plant), Rourkela headed by Executive Director (ED), Mines.

39) Action plan for implementing EMP and environmental conditions along with responsibility matrix of the company shall be prepared and shall be duly approved by competent authority. The year wise funds earmarked for environmental protection measures shall be kept in separate account and not to be diverted for any other purpose. Year wise progress of implementation of action plan shall be reported to the Ministry/Regional Office along with the Six Monthly Compliance Report.

Status of Compliance

Funds earmarked for environmental protection measures at the mines are booked separately and not being diverted for other purpose. Year wise expenditure for last 3 years on Environmental protection measures is furnished below. The details of expenditure are enclosed as **Annexure – XVI**.

Year	Approx. Expenditure
2021-22	422.43 Lakhs
2022-23	315.75 Lakhs
2023-24 (Up to Sept' 2023)	98.68 Lakhs

40) Self-environmental audit shall be conducted annually. Every three years third party environmental audit shall be carried out.

Status of Compliance

Barsua-Taldih-Kalta Iron Mines is certified with ISO 14001:2015 and as a part of compliance surveillance audit is being conducted annually and re-certification audit is being conducted once in every three years through third party.

41) All the recommendations made in the Charter on Corporate Responsibility for Environment Protection (CREP) for the Mineral Beneficiation plants shall be implemented.

Status of Compliance

Agreed.

X. Miscellaneous

42) The project proponent shall make public the environmental clearance granted for their project along with the environmental conditions and safeguards at their cost by prominently advertising it at least in two local newspapers of the District or State, of which one shall be in the vernacular language within seven days and in addition this shall also be displayed in the project proponent's website permanently.

Status of Compliance

Grant of this EC has been widely advertised in three local newspapers i.e. The New Indian Express (English), The Prameya (Odia) and The Samaja (Odia) on dated 03.05.2023. Also, copy of the EC has been displayed in the SAIL web site i.e. www.sail.co.in.

43) The copies of the environmental clearance shall be submitted by the project proponents to the Heads of local bodies, Panchayats and Municipal Bodies in addition to the relevant offices of the Government who in turn has to display the same for 30 days from the date of receipt.

Status of Compliance

Copy of this EC letter has been sent to the Sarpanch office of Tensa, Sasyakala, Kalta, Chordhara villages in addition to the Tehsildar's Office, Koira, SPCB Regional office & District Industries Centre, Rourkela and Collector's office, Sundargarh vide letter dated 29.04.2023.

44) The project proponent shall upload the status of compliance of the stipulated environment clearance conditions, including results of monitored data on their website and update the same on half-yearly basis.

Status of Compliance

The status of compliance of the stipulated environment clearance conditions, including results of monitored data is being uploaded to the company website www.sail.co.in on half-yearly basis.

45) The project proponent shall monitor the criteria pollutants level namely; PM_{10}, SO2, NOX (ambient levels as well as stack emissions) or critical sectoral parameters, indicated for the projects and display the same at a convenient location for disclosure to the public and put on the website of the company.

Status of Compliance

Critical parameters i.e. PM10, PM2.5, Nox, SO2 and CO in ambient air and relevant parameters in the effluents are being monitored regularly. The monitored data is being displayed at the main gate of the mines. Also the same is being uploaded to the company website www.sail.co.in along with six monthly compliance report.

46) The project proponent shall submit six-monthly reports on the status of the compliance of the stipulated environmental conditions on the website of the ministry of Environment, Forest and Climate Change at environment clearance portal.

Status of Compliance

Six monthly compliance reports on the status of implementation of environmental safeguards are being submitted to MoEF&CC, New Delhi, Regional Office, MoEF&CC, Bhubaneswar, Central Pollution Control Board and State Pollution Control Board.

47) The project proponent shall submit the environmental statement for each financial year in Form-V to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently and put on the website of the company.

Status of Compliance

The environmental statement report in prescribed format-V for the financial year 2022-23 has been submitted vide letter no. BIM /E&L/2023-24/076, dated 08.07.2023 to the State Pollution Control Board and also the same has been uploaded to the company website www.sail.co.in.

48) The project proponent 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. Commencing the land development work and start of production operation by the project.

Status of Compliance

The Barsua and Kalta Iron Mines are operating since 1960 and 1966 respectively. Development work in Taldih block started since 9th June 2016 and installation of various facilities at Taldih Block are under progress.

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

Status of Compliance

Agreed.

50) The project proponent shall abide by all the commitments and recommendations made in the EIA/EMP report, commitment made during Public Hearing and also that during their presentation to the Expert Appraisal Committee.

Status of Compliance

Agreed.

51) No further expansion or modifications in the plant shall be carried out without prior approval of the Ministry of Environment, Forests and Climate Change (MOEF&CC).

Status of Compliance

Agreed.

30/11/23

Tilak Patnaik
G.M. I/c. (BIM-TIM-K...
SAIL, RSP, BIM

Annexure - I

Government of Odisha

Department of Steel and Mines

***

PROCEEDING

No. 10426 /S&M, Bhubaneswar date 16.10.2023

SM-MCI-MISC-0041-2020

Sub:- Surrender of part area of 5.742 ha forest land out of the Amalgamated Mining Lease area over an area of 2564.323 ha of Barsua-Taldih-Kalta Iron Mines of Steel Authority of India Limited (SAIL) located in Koira Tehsil, Sundargarh District, Odisha under Rule 21(1) of MCR 2016.

ORDER

Whereas, two contiguous Mining Leases of SAIL viz (i) ML-130 (Barsuan, Taldih-Kalta over 2486.383 ha) (ii) ML-162 (Infrastructure lease over 77.94 ha) covering total area of 2564.323 ha located in Sundargarh District, Odisha were allowed to be amalgamated as per provisions under Rule 56 of MC Rules, 2016 vide this Department proceeding dated 02.12.2020 with validity up to 05.01.2030. The Supplementary Lease Deed for amalgamated area over 2564.323 ha has been executed by the lessee on 30.03.2021 and registered on 06.04.2021. The mining lease is a subsisting working mine.

And whereas, the Executive Director(Mines), Rourkela Steel Plant(RSP), SAIL vide letter dated 25.07.2023 has submitted application for surrender of part area measuring 5.742 ha of forest land out of the amalgamated Mining Lease area 2564.323 ha of Barsua-Taldih-Kalta Iron Mines of Steel Authority of India Limited (SAIL) located in Koira Tahsil, Sundargarh District, Odisha as per the Rule 21(1) of MCR 2016.

And whereas, the Executive Director(Mines), Rourkela Steel Plant(RSP), SAIL has intimated that out of the total amalgamated lease area (i.e., 2564.323 ha), 2425.613 ha is forest land (2347.673 ha under ML-130 and 77.94 ha under ML-162) and 138.710 ha is non-forest land. Out of the total forest land, forest clearances under FC Act, 1980 have been obtained from MoEF&CC for diversion of 2419.871 ha excluding 5.742 ha forest land, which is under occupation of Schedule Tribes and their rights have been established under FRA, 2006.

And whereas, as reported by Director of Mines and Geology, M/s SAIL has submitted FMCP over part surrender area of 5.742 hects of Forest land approved by IBM vide letter No. MCDR-MIFL0FE/25/2022-BSS-IBM-RO-BSS dt.26.05.2023 and evidence to establish implementation of the approved FMCP over 5.742 hects of Forest land granted by IBM vide their letter No. MCDR-MIFL0FE/25/2022-BBS-IBM-RO-BBS dt.11.08.2023 as required under rule 21(2) of MC Rules,2016.

And whereas, the Director of Mines and Geology has indicated that there is no liability of pending dues against the lessee and accordingly on the basis of compliance to

the applicable provisions of Rule 21(2) of MC Rules, 2016, has recommended for according necessary approval for part surrender as requested by the Lessee .

Now, therefore, the Government after careful consideration have been pleased to accept the Surrender of part area of 5.742 ha out of the Amalgamated Mining Lease area over an area of 2564.323 ha of Barsua-Taldih-Kalta Iron Mines of Steel Authority of India Limited (SAIL) located in Koira Tehsil, Sundargarh District, Odisha under Rule 21(1) of MCR 2016 and SAIL is allowed to retain the balance area under their possession till expiry of the validity of the lease.

By order of the Governor,

Additional Secretary to Govt.

By Registered Post with A/D

Memo No. 10427 /SM Date 16.10.2023

Copy forwarded to M/s Steel Authority of India Ltd., Rourkela Steel Plant, Rourkela, Dist.- Sundargarh, Odisha-769011, Phone-0661-2510801, email:edmines.rsp@sail.in for information and necessary action.

Additional Secretary to Government

Memo No. 10428 /SM Date 16.10.2023

Copy forwarded to the Director, Mines and Geology, Odisha, Bhubaneswar for information with a request to ensure necessary amendment to the lease deed in respect of this mining lease.

Additional Secretary to Government

Memo No. 10429 /SM Date 16.10.2023

Copy forwarded to the Collector, Sundargarh / DDM, Koira for information and necessary action.

Additional Secretary to Government

Memo No. 10430 /SM Date 16.10.2023

Copy forwarded to the Special Secretary, Forest & Environment Department / Member Secretary, SPCB /Regional Controller of Mines, IBM, Bhubaneswar for information and necessary action.

Additional Secretary to Government

Annexure-D

By e-mail

DIRECTORATE OF MINES & GEOLOGY
STEEL AND MINES DEPARTMENT, GOVT. OF ODISHA,
BHUBANESWAR
Heads of Department Building, Unit-V, Pin-751001
Tel No.: 0674-2391537, Fax No.: 0674-2391684
Email ID: dirmines_odisha@rediffmail.com

No. DMO-MCIII-MACON-0039-2023-6370/DoMG, Dt. 06-05-2023

From

G. Rajesh, IFS
Director of Mines & Geology, Odisha
Bhubaneswar.

To

The Deputy Director of Mines, Koira.
District-Sundargarh.

Sub: - Issuance of NOC to SAIL for installation of Belt Conveyors for evacuation of Iron ore from Taldih and Kalta Iron Mines under the Mining Lease of Barsua-Taldih-Kalta Iron Mines in compliance to the recommended SOTM of CSIR- NEERI.

In inviting a reference to your letter No. 165/Mines dt. 17.01.2023 on the subject mentioned above, I am enclosing herewith the approval of State Govt. vide letter No. 4237/SM dt. 28.04.2023 for issue of NOC in favour of M/s SAIL for continuation of existing road transportation of iron ore from the Taldih Iron and Kalta Iron Mines as requested by the lessee company. You are therefore instructed to allow the lessee company, M/s SAIL continuation of existing road transportation of iron ore from the Taldih Iron Mine for 2 years and Kalta Iron Mine for 3 years to M/s SAIL's Private Railway Sidings at Barsua and Roxy respectively w.e.f. 01.04.2023 with the following conditions under intimation to the Collector, Sundargarh and DFO, Bonai and report compliance.

1. The lessee company shall follow the strict Environment Protection measures like watering the roadways at regular intervals.

2. The lessee company shall follow other preventive measures to minimize the Pollution as because of plying of trucks.

3. The lessee company shall undertake for compliance the condition of conveyor belt for transportation of minerals as per recommendation of CSIR, NEERI on Suggested Ore Transport Mode (SOTM).

Encl: - As above

DIRECTOR OF MINES & GEOLOGY (O)

Memo No. 6371 **/DoMG Dt.** 06-05-2023

Copy alongwith enclosures forwarded to the Collector, Sundargarh / D.F.O., Bonai for kind information and necessary action.

DIRECTOR OF MINES & GEOLOGY (O)

Memo No. 6372 **/DoMG Dt.** 06-05-2023

Copy alongwith enclosures forwarded to the Project Head, PMU Section for information and necessary action.

DIRECTOR OF MINES & GEOLOGY (O)

Memo No. 6373 **/DoMG Dt.** 06-05-2023

Copy forwarded to the P.S. to Additional Chief Secretary to Govt., Department of Steel & Mines, Odisha for kind information of Additional Chief Secretary to Govt. w.r.t. Govt. letter dt. 28.04.2023.

DIRECTOR OF MINES & GEOLOGY (O)

Annexure - III

BARSUA-TALDIH-KALTA IRON MINES

DETAIL ANALYSIS OF AIR QUALITY MONITORING

Location	APRIL 2023					'MAY 2023					'JUNE 2023					'JULY 2023					'AUGUST 2023					'SEPTEMBER 2023				
	RSPM (PM_{10})	$PM_{2.5}$	SO_2	NO_x	CO	RSPM (PM_{10})	$PM_{2.5}$	SO_2	NO_x	CO	RSPM (PM_{10})	$PM_{2.5}$	SO_2	NO_x	CO	RSPM (PM_{10})	$PM_{2.5}$	SO_2	NO_x	CO	RSPM (PM_{10})	$PM_{2.5}$	SO_2	NO_x	CO	RSPM (PM_{10})	$PM_{2.5}$	SO_2	NO_x	CO
Unit	**µg/m3**	**µg/m3**	**µg/m3**	**µg/m3**	**mg/m3**	**µg/m3**	**µg/m3**	**µg/m3**	**µg/m3**	**mg/m3**	**µg/m3**	**µg/m3**	**µg/m3**	**µg/m3**	**mg/m3**	**µg/m3**	**µg/m3**	**µg/m3**	**µg/m3**	**mg/m3**	**µg/m3**	**µg/m3**	**µg/m3**	**µg/m3**	**mg/m3**	**µg/m3**	**µg/m3**	**µg/m3**	**µg/m3**	**mg/m3**
A) Ambient Air Quality in Residential, rural & other areas.																														
Norm as per NAAQS	**100**	**60**	**80**	**80**	**4**	**100**	**60**	**80**	**80**	**4**	**100**	**60**	**80**	**80**	**4**	**100**	**60**	**80**	**80**	**4**	**100**	**60**	**80**	**80**	**4**	**100**	**60**	**80**	**80**	**4**
A 1	55.49	34.36	10.05	17.90	0.50	61.03	38.67	10.67	19.52	0.41	68.98	39.27	10.92	19.20	0.39	39.16	22.36	6.79	10.62	0.25	38.37	23.31	6.53	11.34	0.23	36.11	21.38	5.93	9.40	0.23
A 2	69.18	44.32	13.98	23.49	0.74	80.95	48.41	13.81	24.65	0.66	78.24	47.90	13.21	22.03	0.49	45.04	26.39	7.82	12.53	0.28	45.17	26.38	7.33	12.47	0.30	49.67	28.50	7.50	11.60	0.33
A 3	54.79	33.14	9.64	15.93	0.43	62.17	37.13	10.46	18.62	0.40	65.64	37.25	10.06	17.71	0.33	42.91	24.26	7.80	12.08	0.23	35.62	20.47	6.44	9.27	0.21	38.46	20.86	6.34	10.05	0.29
A 4	80.32	48.80	14.12	24.79	0.89	83.49	49.89	15.30	25.72	0.64	81.34	51.22	12.98	21.64	0.49	63.39	36.03	8.53	12.63	0.33	44.68	25.82	7.41	12.65	0.27	47.65	26.32	7.27	10.92	0.31

*** unit in µg/m^3**

Note : Ambient Air Quality Monitoring was conducted as per MoEF Notification No. GSR 826(E), dtd.16.11.2009.

B) Results of Fusitive Emission / Work Zone Quality.

	APRIL 2023		'MAY 2023		'JUNE 2023		'JULY 2023		'AUGUST 2023		'SEPTEMBER 2023	
Norm as per IBM	1200 µg/m3		1200 µg/m3		1200 µg/m3		1200 µg/m3		1200 µg/m3		1200 µg/m3	
Actual(PM)	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
F 1	601.5	746.5	614	782.3	714	896.5	148.7	507.5	86.26	285.7	82.95	442.53
F 2	594.3	741.9	619	815.3	740.7	913.3	139.5	513.6	82.25	216	87.54	462.71
F 3	385.4	541.2	459	704.9	511.8	762.4	58.28	402.7	64.59	185.6	64.75	319.82
F 4	609	762.4	612	786.4	693.4	882.2	107.2	510.2	3.32	476.2	69.21	416.31
F 5	589.5	743	589	794.6	651.4	867.1	113.7	511.6	79.32	479.3	84.72	428.35
F 6	374.9	529.4	428	689.1	513.6	782.4	61.91	413.3	68.51	313.8	57.21	412.63
F 7	801.4	928.5	803	964.2	813.5	1044	152.5	892.4	102.82	829.4	96.23	810.32
F 8	696.6	842.1	703	892.5	646.5	921.6	130.6	813.7	56.72	693.5	78.96	710.45
F 9	611.4	752.4	609	778.5	689.3	892.3	96.87	596.3	78.32	479.9	68.29	467.56
F 10	596.3	789.5	620	842.5	639.1	910.8	128.5	723.6	39.48	721.5	113.8	631.28
F 11	368	533.8	417	643.5	513.5	792.5	67.42	402.6	64.87	323.4	62.54	309.24
F 12	808.4	967.2	806	996.7	823.4	1042	148.3	892.3	108.37	841.5	92.86	804.37

*** unit in µg/m^3**

Note : Fusitive emission standards as per MoEF Notification No. GSR 809(E), dtd.4.10.2010 on iron ore mining and processing. Particulate matter (PM)-1200 µg/m^3 at a distance of 25±2m. In the pre dominant downward direction from the source of generation .

NB :

Locations :

A 1 : Tensa Hospital, Tensa
A 2 : Barsua valley, Township
A 3 : Tantara Village
A 4 : Mine Site Office (KIM)

F1 : Ore Handling plant(BIM)
F2: Excavation & loading (BIM)
F3 : Haul Road(BIM)
F4 : Dump Area(BIM)

F5 : Stock pile & Loading(B/V, BIM)
F6 : Haul Road (TIM)
F7 : Mobile Screening Area (TIM)
F8 : Excavation Area(TIM)

F9: Drilling Area (KIM)
F10: Excavation (KIM)
F11: Haul Road Area (KIM)
F12: Mobile Crushing & Screening Area (KIM)

Real Time Data Acquisition And Monitoring

Site Name: Barsuan-Taldih-Kalta Iron Ore Mine Of M/s. SAIL

Report: Custom Report

From Date: 2023/04/01 00:00:00 To Date : 2023/09/30 12:53:16

Description	Near Canteen Barsua-PM10_U	Near Canteen Barsua-PM2.5_U
Prescribed Standards	-	-
Maximum Data	31.09	33.07
Minimum Data	0.01	14.61
Arithmetic Mean	20.68	18.24
Median	24.56	15.42
Standard Deviation	12.41	7.28
Maximum Value At Time	2023-04-01	2023-09-01
Minimum Value At Time	2023-09-01	2023-08-01
Valid Data Points	6	6
Total Data Points	6	6
Data Availability %	100.0%	100.0%

	Time	Near Canteen Barsua-PM10_U	Near Canteen Barsua-PM2.5_U
Sl No.			
1	2023-04-01	31.09	15.44
2	2023-05-01	30.18	15.38
3	2023-06-01	30.26	15.51
4	2023-07-01	13.64	15.40
5	2023-08-01	18.93	14.61
6	2023-09-01	0.01	33.07

Report Details: BarsuaTaldih | 2023-12-12 12:51:28 | Custom Report

Real Time Data Acquisition And Monitoring

Site Name: Barsuan-Taldih-Kalta Iron Ore Mine Of M/s. SAIL

Report: Custom Report

From Date: 2023/04/01 00:00:00 To Date : 2023/09/30 12:52:45

Description	Near Canteen Kalta-PM10_U	Near Canteen Kalta-PM2.5_U
Prescribed Standards	-	-
Maximum Data	104.37	42.45
Minimum Data	46.79	20.17
Arithmetic Mean	72.9	32.7
Median	71.87	33.52
Standard Deviation	19.57	7.91
Maximum Value At Time	2023-04-01	2023-04-01
Minimum Value At Time	2023-07-01	2023-07-01
Valid Data Points	6	6
Total Data Points	6	6
Data Availability %	100.0%	100.0%

Sl No.	Time	Near Canteen Kalta-PM10_U	Near Canteen Kalta-PM2.5_U
1	2023-04-01	104.37	42.45
2	2023-05-01	71.76	36.48
3	2023-06-01	82.09	30.56
4	2023-07-01	46.79	20.17
5	2023-08-01	71.98	28.75
6	2023-09-01	60.40	37.81

Report Details: BarsuaTaldih | 2023-12-12 12:50:34 | Custom Report

Real Time Data Acquisition And Monitoring

Site Name: Barsuan-Taldih-Kalta Iron Ore Mine Of M/s. SAIL

Report: Custom Report

From Date: 2023/04/01 00:00:00 To Date : 2023/09/30 12:51:37

Description	Near Mining Site Office Barsua-PM10_U	Near Mining Site Office Barsua-PM2.5_U	Near Mining Site Office Barsua-SO2_U	Near Mining Site Office Barsua-NOx_U
Prescribed Standards	-	-	-	-
Maximum Data	74.4	27.96	8.75	20.35
Minimum Data	18.79	9.99	8.31	18.64
Arithmetic Mean	39.99	18.46	8.54	19.41
Median	36.39	19.48	8.53	19.24
Standard Deviation	18.64	7.59	0.17	0.76
Maximum Value At Time	2023-04-01	2023-08-01	2023-05-01	2023-08-01
Minimum Value At Time	2023-09-01	2023-04-01	2023-09-01	2023-04-01
Valid Data Points	6	6	6	6
Total Data Points	6	6	6	6
Data Availability %	100.0%	100.0%	100.0%	100.0%

Sl No.	Time	Near Mining Site Office Barsua-PM10_U	Near Mining Site Office Barsua-PM2.5_U	Near Mining Site Office Barsua-SO2_U	Near Mining Site Office Barsua-NOx_U
1	2023-04-01	74.40	9.99	8.68	18.64
2	2023-05-01	36.18	10.00	8.75	18.69
3	2023-06-01	42.43	16.06	8.60	19.01
4	2023-07-01	36.61	23.84	8.43	19.48
5	2023-08-01	31.56	27.96	8.46	20.35
6	2023-09-01	18.79	22.90	8.31	20.26

Annexure-IV

BARSUA-TALDIH-KALTA IRON MINE

WATER QUALITY OF STREAM SAMPLES/SURFACE WATER

Sl.No.	Parameters	'APRIL 2023						'MAY 2023						JUNE 2023					
		SW 1	SW 2	SW 3	SW 4	SW 5	SW 6	SW 1	SW 2	SW 3	SW 4	SW 5	SW 6	SW 1	SW 2	SW 3	SW 4	SW 5	SW 6
1	pH	7.0	7.0	6.0	7.0	7.0	7.0	6.3	6.4	5.9	6.4	6.6	6.4	6.2	6.3	4.1	6.3	6.3	6.3
2	Temperature	23°c	23°c	23°c	23°c	24°c	24°c	31.2°c	30.2°c	30.2°c	31.2°c	30.2°c	30.9°c	26°c	26°c	25°c	25°c	26°c	26°c
3	Turbidity(NTU)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.2	2.4	1.8	1.5	1.1	1
4	Residual Free Chlorine mg/l	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
5	Alkalinity as CaCo3 mg/l	16	24	28	28	24	48	30	20	40	40	30	60	24	28	12	56	24	60
6	Chloride as Cl mg/l	4	4	4	4	4	4	20	10	4	10	10	40	4	4	4	4	12	4
7	Total Hardness as CaCo3 mg/l	36	28	26	24	20	52	24	32	44	48	40	64	28	20	20	40	20	56
8	Calcium as Ca mg/l	7	4	5	3	6	21	8	6.4	10.2	9.6	6.4	12.4	4.8	4.8	4.8	9.6	64	11.2
9	Magnesium as Mg mg/l	7	4	5	3	0.972	<0243	0.972	3.9	3.9	5.8	5.8	7.8	3.88	1.94	1.94	3.88	0.97	6.8
10	Sulphate as So4 mg/l	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	16	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
11	Nitrate as No3 mg/l	2.2	2.6	2.9	3.5	3.2	2.8	4.1	3.1	1.6	2.2	2.4	1.9	1.2	1.1	2	1.9	1.5	1.6
12	Fluoride as F mg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	165	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
13	Total dissolve Solids mg/l	29	31	40	40	26	63	22	28	37	37	23	165	28	24	37	65	25	70
14	Total Suspended Solids mg/l	1	2	1	2	2	3	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2	<1.0	1	2	3
15	D.O.	3.5	3.8	3.9	3.7	3.6	3.5	4	3.9	3.8	3.8	3.9	3.7	4	3.9	3.8	4	4.1	4
16	COD	57	65	57	73	65	73	56	72	64	80	56	72	64	72	56	72	64	80
17	Oil and Grease mg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
18	Iron as Fe mg/l	<0.05	<0.05	<0.05	0.463	0.088	0.174	<0.02	<0.02	<0.02	0.462	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	0.09
19	Copper as Cu mg/l	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
20	Zinc as Zn mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
21	Aluminium as Al mg/l	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
22	Boron as B mg/l	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
23	Manganese as Mn mg/l	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
24	Lead as Pb mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
25	Cadmium as Cd mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
26	Arsenic as As mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
27	Mercury as Hg mg/l	<0.01	<0.01	<0.01	<0.01	<0.001	<0.001	0.003	0.003	<0.001	<0.001	<0.001	<0.001	0.001	0.001	<0.001	<0.001	<0.001	<0.001
28	Nickel as Ni mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.02	<0.02	<0.02	0.462	<0.02	<0.02	<0.02	<0.02	<0.02	0.462	<0.02	<0.02
29	Chromium as Cr +6mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
30	Phenolic compound mg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
31	Cyanide as CN mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
32	Sulphide as S mg/l	N.T	N.T	N.T	N.T	N.T	N.T	N.T	N.T	N.T	N.T	N.T	N.T	N.T	N.T	N.T	N.T	N.T	N.T
33	Free Ammonia as N mg/l	N.T	N.T	N.T	N.T	N.T	N.T	N.T	N.T	N.T	N.T	N.T	N.T	N.T	N.T	N.T	N.T	N.T	N.T
34	Kjeldahl Nitrogen as N mg/l	5.3	5.9	5.6	6.2	5.04	5.9	5.3	6.2	5.6	6.4	5.3	6.2	8	7	6	5	6	8
35	Ammonia as N mg/l	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02

NB :

SW 1: Kuradih Nala US : BIM

SW 2: Kuradih Nala DS : BIM

SW 3: Samaj Nallah US : Near Tantra

SW 4: Samaj Nallah DS : Near Phuljhar

SW 5: Samaj Nallah US : KIM

SW 6 : Samaj Nallah DS : KIM

N.T: Not Tracble

Annexure-IV

BARSUA-TALDIH-KALTA IRON MINE

WATER QUALITY OF STREAM SAMPLES/SURFACE WATER

Sl.No.	Parameters	'JULY 2023						'AUGUST 2023						'SEPTEMBER 2023					
		SW 1	SW 2	SW 3	SW 4	SW 5	SW 6	SW 1	SW 2	SW 3	SW 4	SW 5	SW 6	SW 1	SW 2	SW 3	SW 4	SW 5	SW 6
1	pH	6.5	6.7	6.1	6.4	6.7	6.5	6.6	6.7	5.7	6.1	6.5	6.6	7.1	7.3	7.2	6.7	6.98	6.96
2	Temperature	28.6°c	28.4°c	28.6°c	28.7°c	28.7°c	28.6°c	28.5°c	28.9°c	29.0°c	29.1°c	29.1°c	28.7°c	25°c	25°c	25°c	25°c	25°c	25°c
3	Turbidity(NTU)	2.2	1.9	<1.0	1	<1.0	<1.0	1.7	1.9	<1.0	1.4	<1.0	<1.0	1.8	3.9	6	42	13	10
4	Residual Free Chlorine mg/l	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
5	Alkalinity as CaCo3 mg/l	20	28	36	32	32	52	20	24	20	20	44	24	28	28	24	32	24	44
6	Chloride as Cl mg/l	4	4	4	4	4	4	4	4	4	8	4	4	4	4	4	8	4	4
7	Total Hardness as CaCo3 mg/l	20	28	32	20	20	56	40	28	20	20	72	24	32	32	32	32	32	44
8	Calcium as Ca mg/l	3.2	8	8	6.4	6.4	12.8	4.8	6.4	4.8	6.4	11.2	4.8	6.4	13	13	111	3	9.6
9	Magnesium as Mg mg/l	2.9	2	2.9	0.972	0.972	5.8	6.8	2.9	1.94	0.972	10.69	2.92	4	<0.243	<0.243	0.972	6	5
10	Sulphate as So4 mg/l	1	<1.0	2	<1.0	2	4	1	1.3	<1.0	1.75	1.06	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
11	Nitrate as No3 mg/l	2.9	2.6	2.7	3.5	3.8	4	1.4	2.6	2.8	1.9	2.2	2.5	3.2	3.4	2.9	2.2	3.8	3.6
12	Fluoride as F mg/l	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.15	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
13	Total dissolve Solids mg/l	25	33	49.0	37.0	22	67	26	32	32	29	61.0	23.0	33	46	34	48	24	56
14	Total Suspended Solids mg/l	4	2	1	<1.0	<0.1	<0.1	<1.0	1	<1.0	1	<1.0	1	2	2	1	14	4	2
15	D.O.	4	3.9	4	3.8	3.9	3.8	3.8	3.8	3.8	3.7	3.6	3.7	3.9	3.6	3.7	3.8	4	3.9
16	COD	64	80	56	72	64	72	56	64	64	72	56	64	17	14	10	44	18	7
17	Oil and Grease mg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
18	Iron as Fe mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.157	0.11	<0.05	<0.05	<0.05	<0.05	0.162	<0.05	<0.05	<0.05	<0.05	0.09
19	Copper as Cu mg/l	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
20	Zinc as Zn mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.04	<0.04	<0.04	<0.04	<0.04
21	Aluminium as Al mg/l	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
22	Boron as B mg/l	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
23	Manganese as Mn mg/l	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
24	Lead as Pb mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
25	Cadmium as Cd mg/l	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
26	Arsenic as As mg/l	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
27	Mercury as Hg mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
28	Nickel as Ni mg/l	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.462	<0.02	<0.02
29	Chromium as Cr +6mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
30	Phenolic compound mg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
31	Cyanide as CN mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
32	Sulphide as S mg/l	N.T	N.T	N.T	N.T	N.T	N.T	N.T	N.T	N.T	N.T	N.T	N.T	N.T	N.T	N.T	N.T	N.T	N.T
33	Free Ammonia as N mg/l	N.T	N.T	N.T	N.T	N.T	N.T	N.T	N.T	N.T	N.T	N.T	N.T	N.T	N.T	N.T	N.T	N.T	N.T
34	Kjeldahl Nitrogen as N mg/l	5.6	6.4	5.9	7	5.3	6.2	5.3	6.9	5.6	6.2	5.6	6.4	6	5	5	6	6	5
35	Ammonia as N mg/l	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02

NB :

SW 1: Kuradih Nala US : BIM

SW 2: Kuradih Nala DS : BIM

SW 3: Samaj Nallah US : Near Tantra

SW 4: Samaj Nallah DS : Near Phuljhar

SW 5: Samaj Nallah US : KIM

SW 6 : Samaj Nallah DS : KIM

N.T: Not Tracble

Annexure – V

BARSUA-TALDIH-KALTA IRON MINE

GROUND WATER LEVEL MEASUREMENTS			
Month	Water level below the Ground Surface (in meters)		
	Locations		
	Barsua Valley	Zero Pount, Tensa	Kalta Bast, Kalta
APRIL' 2023	1.45	1.87	1.995
MAY' 2023	1.48	1.90	2.075
JUNE' 2023	1.52	1.95	2.135
JULY' 2023	0.94	1.54	1.605
AUGUST' 2023	0.43	1.40	1.525
SEPTEMBER' 2023	0.05	1.23	0.890

BARSUA-TALDIH-KALTA IRON MINE

WATER QUALITY OF GROUND WATER

Sl.No.	Parameters	'APRIL 2023			MAY 2023			'JUNE 2023			'JULY 2023			'AUGUST 2023			'SEPTEMBER 2023		
		GW1	GW 2	GW3	GW1	GW2	GW3	GW1	GW2	GW3	GW1	GW2	GW3	GW1	GW2	GW3	GW1	GW2	GW3
1	pH	7	7	7	6.4	6.26	5.58	5.05	5.85	6.93	5.17	6.27	5.78	5.15	5.86	6.22	6.05	6.55	6.41
2	Colour(Hazen unit)	5	<1.0	<1.0	7	<1.0	11	<1.0	<1.0	14	<1.0	<1.0	<1.0	1.1	4.5	11	<1.0	1	14
3	Turbidity (NTU)	1.1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.2	<1.0	<1.0	2.9	<1.0	<1.0	1	<1.0	1.2	1.1	1.8
4	Temperature ^{0}C	23°c	23°c	23°c	24°c	24°c	25°c	31°c	28.9°c	29.9°c	29.7°C	28.7°C	28.9°c	28.9°c	29.9°c	28.8°c	25°c	25°c	27°c
5	Total Hardness as $CaCO_3$,mg/l	92	136	100	120	144	72	28	136	28	32	128	60	20	128	60	32	136	64
6	Alkalinity as $CaCO_3$,mg/l	84	136	88	50	130	140	28	124	28	20	116	40	24	96	72	24	120	60
7	Chlorides as Cl , mg/l	4	12	16	10	20	20	4	12	4	4	12	8	4	16	4	4	16	8
8	Calcium as Ca, mg/l	18	37	30	27.2	36.8	11.2	8	32	6.4	6.4	32	11.2	6.4	32	16	6.4	35	19
9	Magnesium as Mg, mg/l	12	11	6	12.6	12.6	10.7	1.9	13.6	2.9	4	12	8	0.872	11.66	4.86	4	12	4
10	Residual Free Chlorine, mg/l	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
11	Sulphate as SO_4,mg/l	<1.0	5.6	2.6	<1.0	8.1	<1.0	<1.0	<1.0	<1.0	<1.0	6.92	<1.0	<1.0	18.2	6	16.5	11.6	8.7
12	Nitrate as NO_3, mg/l	1.2	0.98	1.1	0.55	0.68	0.86	0.892	0.627	1.09	1.2	2.3	1	0.93	17.1	2.42	1.5	2	1.2
13	Iron as Fe,mg/l	1.2	<0.05	1.5	<0.05	<0.05	<0.05	<0.02	0.136	0.24	<0.05	<0.05	<0.05	<0.05	0.07	0.013	<0.02	0.02	<0.02
14	Copper as Cu,mg/l	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
15	Manganese as Mn,mg/l	0.071	0.689	0.17	<0.03	<0.03	<0.03	<0.03	0.618	<0.03	<0.03	0.618	<0.03	<0.03	0.4	<0.03	<0.03	0.4	<0.03
16	Phenolic Compounds C_6H_5OH, mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
17	Zinc as Zn, mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	1.928	<0.01	1.14	0.16	<0.01	<0.01	<0.01	<0.01	0.67	<0.01	<0.01	0.67	<0.01
18	Cadmium as Cd, mg/l	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
19	Arsenic as As, mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
20	Cyanide as CN, mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
21	Lead as pb	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
22	Total Chromium as Cr^{+6}, mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
23	Mineral oil ,mg/l	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.001
24	Fluoride as F, mg/l	0.162	0.095	0.201	0.243	0.196	0.224	0.162	0.224	0.176	0.124	0.236	0.177	<0.1	0.261	<0.1	0.109	0.223	<0.1
25	Selenium as Se, mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
26	Total Dissolved solids (mg/l)	94	160	130	138	159	75	30	30	25	29	154	79	29	175	99	29	169	99
27	Aluminium as Al mg/l	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.02	<0.2	<0.2	<0.2	<0.2	<0.2
28	Boron as B mg/l	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
29	Odour	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
30	Taste	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
31	Mercury as Hg, mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.001	<0.001	<0.001
32	Anionic detergent	<0.01	<0.01	<1.0	<0.01	<0.01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

NB :

GW 1 : Hand pump at Zero point : (BIM)

GW 2 : Hand pump at Banka Bazar B/Valley

GW 3 : Hand Pump at Kalta Village (KIM)

Annexure-VII

BARSUA-TALDIH-KALTA IRON MINE

FLOW RATE OF PERENNIAL NALLAH			
Month	Locations		
	Kuradih Nallah (in m^3/Sec)	Samaj Nallah, Taldih (in m^3/Sec)	Samaj Nallah, Kalta (in m^3/Sec)
APRIL' 2023	1.570	0.242	0.231
MAY' 2023	1.599	0.218	0.249
JUNE' 2023	1.429	0.180	0.212
JULY' 2023	5.096	0.598	0.712
AUGUST' 2023	7.481	1.212	1.470
SEPTEMBER' 2023	13.772	2.112	2.494

Annexure-VIII

BARSUA-TALDIH-KALTA IRON MINES

WATER QUALITY OF EFFLUENT WATER

Sl.No.	Parameters	APRIL 2023		MAY 2023		JUNE 2023		JULY 2023		AUGUST 2023		SEPTEMBER 2023	
		EW 1	EW 2	EW 1	EW 2	EW 1	EW 2	EW 1	EW 2	EW 1	EW 2	EW 1	EW 2
1	pH	6	7	6.55	6.73	5.9	6.06	6.17	6.7	6.31	6.44	6.9	7.01
2	Temperature	24°c	23°c	25°c	25°c	30.6°c	30.7°c	28.6°c	28.5°c	29.3°c	29.0°c	25°c	25°c
3	Selenium as Se, mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
4	Total Residual Chloride mg/l	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
5	Alkalinity as CaCo3 mg/l	12	84	70	110	28	28	20	64	16	64	36	64
6	Chloride as Cl mg/l	4	4	20	20	4	4	4	4	4	4	4	4
7	Total Hardness as CaCo3 mg/l	20	96	64	100	32	28	32	60	16	64	52	68
8	Calcium as Ca mg/l	6	19	14.4	20.8	8	4.8	11	14	1.6	17.6	11	16
9	Magnesium as Mg mg/l	0.972	12	6.8	11.7	2.92	3.8	0.972	5.832	2.9	4.86	6	7
10	Sulphide as S mg/l	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
11	Nitrate as No3 mg/l	4.8	4.2	3.9	4.2	3.8	2.9	2.8	2.9	4.2	2.8	5.2	4.8
12	Fluoride as F mg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.4	0.2	<0.1	<0.1
13	Total dissolve Solids mg/l	30	103	80	103	30	28	28	15	24	72	41	71
14	Suspended Solids mg/l	9	4	<1.0	<1.0	14	5	3	1	2	1	4	1
15	B.O.D (3 days at 27 ^{O}C) mg/l	28	12	17	12	29	20	20	18	26	14	<3.0	<3.0
16	C.O.D	98	73	88	56	147	98	88	64	160	72	9	14
17	Oil and Grease mg/l	6	2	5	2	0.96	<0.1	6	2	3	1	1	0.96
18	Total Chromium as Cr mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
19	Copper as Cu mg/l	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.05	<0.05	<0.04	<0.04	<0.04	<0.04
20	Zinc as Zn mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.05	<0.01	<0.01	<0.01	<0.01
21	Boron as B mg/l	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
22	Odour	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Obnoxious	Obnoxious	Obnoxious	Obnoxious	Obnoxious	Obnoxious
23	Colour	6.5	<1.0	9	4	8	1	35	25	28	18	4	10
24	Lead as Pb mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
25	Cadmium as Cd mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.05	<0.01	<0.05	<0.01	<0.05
26	Arsenic as As mg/l	<0.01	<0.01	<0.05	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
27	Mercury as Hg mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.01	<0.001	<0.001
28	Nickel as Ni mg/l	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
29	Hexavalent Chromium as Cr^{+6} mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
30	Phenolic compound As C_6H_5OH mg/l	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.002	<0.002
31	Cyanide as CN mg/l	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.05	<0.05
32	Dissolved Phosphate as P mg/l	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
33	Ammonical Nitrogen as N mg/l	<0.02	<0.02	<0.02	<0.02	0.262	0.09	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
34	Total Kjeldahl Nitrogen as N mg/l	8.4	5.9	7.8	5.6	7	5.8	7.5	6.2	7	5.6	6	5.4
35	Free Ammonia as NH_3 mg/l	N.T	N.T	N.T	N.T	N.T	N.T	N.T	N.T	N.T	N.T	N.T	N.T
36	Iron as Fe mg/l	0.321	1.53	<0.02	<0.02	0.529	0.462	0.469	0.325	<0.05	0.07	<0.05	0.07

NB :
EW 1: Tailing Dam (Before) Discharge
EW 2: Tailing Dam (After) Discharge
N.T: Not Tracble

Annexure-IX

BARSUA-TALDIH-KALTA IRON MINE

DETAIL MONITORING OF NOISE QUALITY

Sl. No.	LOCATION	APRIL 2023		MAY 2023		JUNE 2023		JULY 2023		AUGUST 2023		SEPTEMBER 2023	
		Day time Leq. dB (A)	Night time Leq. dB (A)	Day time Leq. dB (A)	Night time Leq. dB (A)	Day time Leq. dB (A)	Night time Leq. dB (A)	Day time Leq. dB (A)	Night time Leq. dB (A)	Day time Leq. dB (A)	Night time Leq. dB (A)	Day time Leq. dB (A)	Night time Leq. dB (A)
1	Tensa Hospital	40.2	31.3	42.4	33.1	43	32.4	42.3	30.1	40.2	38.4	41.1	35.2
2	VTC Tensa	57.1	45.2	55.3	43.5	57.2	45.3	55.4	42.2	56.1	43.4	55.3	42.1
3	Barsua Valley Township	50.2	40.3	49.1	41.2	47.5	40.1	45.1	41.2	46.3	39.3	42.4	37.5
4	Tantra Village (TIM)	49.1	40.3	45.5	39.2	47.1	40	43.2	38.5	40.4	37.2	42.4	35.2
5	Guest House Kalta	45.6	40.3	40.2	38.4	42.4	36.2	40.4	32.3	38.3	30.1	35.1	28.3

Annexure-X

BARSUA-TALDIH-KALTA IRON MINE

DETAIL MONITORING OF NOISE QUALITY

Sl. No.	LOCATION	APRIL 2023		MAY 2023		JUNE 2023		JULY 2023		AUGUST 2023		SEPTEMBER 2023	
		Day time Leq. dB (A)	Night time Leq. dB (A)	Day time Leq. dB (A)	Night time Leq. dB (A)	Day time Leq. dB (A)	Night time Leq. dB (A)	Day time Leq. dB (A)	Night time Leq. dB (A)	Day time Leq. dB (A)	Night time Leq. dB (A)	Day time Leq. dB (A)	Night time Leq. dB (A)
1	Drilling (BIM)	71.2-73.3	-	72.1-73.4	-	72.1-74.1	-	72.2-74.1	-	72.5-73.5	-	72.1-73.1	-
2	Excavation & Loading (BIM)	71.2-72.4	61.1-62.3	72.2-73.2	62.4-64.1	72.2-73.5	62.1-63.1	72.6-73.3	63.3-64.2	72.1-74.1	62.3-63.2	72.4-74.3	62.2-65.2
3	Haul Road (BIM)	72.3-74.1	62.1-63.4	72.3-73.4	62.3-64.2	72.2-73.3	62.1-63.2	72.1-73.4	61.2-62.4	72.3-73.3	61.5-63.0	72.3-73.4	62.2-63.4
4	Secondary Crusher (BIM)	72.0-73.2	61.4-63.2	72.2-73.3	63.1-63.5	72.2-73.3	62.1-63.2	72.2-73.3	62.2-63.3	72.0-73.2	62.4-63.2	72.1-73.4	61.2-63.1
5	Wagon Loading Area (B/V)	71.0-73.3	62.3-64.1	72.5-74.1	62.0-64.2	73.1-74.0	62.4-65.1	71.1-72.4	61.2-62.6	72.1-72.5	62.1-63.2	72.1-73.5	60.1-62.4
6	Haul Road (TIM)	72.3-73.3	62.2-63.3	72.1-73.5	62.5-65.3	72.4-74.3	62.2-64.2	72.0-73.1	62.2-63.4	71.4-73.5	61.2-62.3	71.2-73.1	61.1-63.2
7	Crushing & Screening (TIM)	72.1-73.3	62.1-63.0	72.2-73.2	62.4-64.1	72.1-73.2	63.2-64.2	72.2-73.3	61.5-63.2	71.4-72.5	61.2-63.3	72.2-73.1	61.2-62.0
8	Excavation Area (TIM)	71.1-73.4	60.3-62.3	72.2-73.3	62.3-64.2	72.2-73.3	62.3-64.2	72.4-73.2	62.2-63.5	72.4-73.2	62.4-63.5	71.4-73.3	61.2-62.3
9	Drilling (KIM)	72.2-74.1	-	72.0-74.2	-	73.2-74.1	-	72.1-73.2	-	72.5-74.1	-	72.1-73.4	-
10	Excavation & Loading (KIM)	72.1-72.5	61.3-63.4	72.2-73.3	62.1-63.1	72.1-74.2	62.1-63.4	72.2-73.1	61.2-63.1	72.1-73.4	61.5-63.4	72.2-73.2	61.3-63.4
11	Haul Road (KIM)	71.2-72.5	62.2-63.3	72.1-72.5	62.1-64.1	72.0-73.4	62.0-64.2	72.2-73.2	62.2-63.1	72.3-72.5	62.0-62.3	71.3-72.2	60.0-62.5
12	Crushing & Screening (KIM)	72.2-74.1	62.2-63.5	72.3-73.2	62.2-63.3	72.1-73.4	62.2-64.1	72.3-73.6	62.3-63.4	73.2-73.4	61.5-63.3	72.7-73.4	61.4-63.2

Annexure - XI

BARSUA-TALDIH-KALTA IRON MINES

RESULTS OF VEHICULAR EMMISSION				
SL. NO	Vehicle Registration No. / I.D. No.	Model No.	RESULTS Smoke Density (Light Absorption coefficient unit 1/meter) 2nd Qtr. 2023-24	Permissible Emission Limit As per National Register of Motor Vehicles
1	OR 14S 3752	HPD-103	0.28	1.62
2	OD 14E 8392	WS-100	0.28	2.45
3	OD 14M 4886	HPD-101	0.28	1.62
4	OD 14M 4885	HPD-102	0.28	1.62
5	OR 14T 4191	HPD-90	0.28	2.45
6	OR 14W 9579	HPD-98	0.28	2.45
7	OR 14Y 3496	Maintenance Van	0.28	2.45
8	OR 14X 3345	HL 770 7A	0.28	2.45
9	OD 14Y 8824	F-150	0.28	2.45
10	OR 14W 9578	HPD-97	0.28	2.45
11	Dumper (50T)	HPD-104	1.26	2.45
12	Dumper (50T)	HPD-105	1.28	2.45
13	Motor Grader BG-825-25135	MG-07	1.27	2.45
14	Tyre Holder (BEML)	BL-14TH	1.29	2.45
15	SHOVEL (BE-1000)	EX-22	1.3	2.45
16	OD 09L 0559	DPV-144	0.28	1.62
17	OD 33T 3029	DPV-148	0.28	1.62
18	OD 09L 0639	DPV-139	0.28	1.62
19	OD 33T 3089	DPV-171	0.28	1.62
20	OD 09L 2849	DPV-147	0.28	1.62
21	OD 09H 3419	DPV-128	0.28	2.45
22	OD 09X 3385	DPV-84	0.28	0.7
23	OD 02CE 4525	DPV-105	0.28	0.7
24	OD 33T 3009	DPV-166	0.28	1.62
25	OD 33AC 4170	DPV-321	0.28	0.7
26	OD 33L 3899	DPV-134	0.28	2.45
27	OD 33G 4279	DPV-95	0.28	2.45
28	OD 33L 1109	DPV-115	0.28	2.45
29	OR 02BM 5769	DPV-41	0.28	2.45
30	OD 33F 4939	DPV-64	0.28	2.45

Annexure - XI

BARSUA-TALDIH-KALTA IRON MINES

RESULTS OF VEHICULAR EMMISSION

SL. NO	Vehicle Registration No. / I.D. No.	Model No.	RESULTS Smoke Density (Light Absorption coefficient unit 1/meter) 1st Qtr. 2023-24	Permissible Emission Limit As per National Register of Motor Vehicles
1	OR 14S 3752	HPD-103	0.25	1.62
2	OD 14E 8392	WS-100	0.25	2.45
3	OD 14M 4886	HPD-101	0.26	1.62
4	OD 14M 4885	HPD-102	0.25	1.62
5	OR 14T 4191	HPD-90	0.26	2.45
6	OR 14W 9579	HPD-98	0.25	2.45
7	OR 14Y 3496	Maintenance Van	0.26	2.45
8	OR 14X 3345	HL 770 7A	0.26	2.45
9	OD 14Y 8824	F-150	1.27	2.45
10	OR 14W 9578	HPD-97	0.25	2.45
11	Dumper (50T)	HPD-104	1.26	2.45
12	Dumper (50T)	HPD-105	1.28	2.45
13	Motor Grader BG-825-25135	MG-07	1.25	2.45
14	Tyre Holder (BEML)	BL-14TH	1.32	2.45
15	SHOVEL (BE-1000)	EX-22	1.29	2.45
16	OD 09L 2849	DPV-150	0.26	1.62
17	OD 33T 3089	DPV-171	0.26	1.62
18	OD 33T 3029	DPV-172	0.26	1.62
19	OD 09L 2769	DPV-153	0.26	1.62
20	OD 33G 2856	DPV-87	0.25	2.45
21	OD 09L 2869	DPV-146	0.26	1.62
22	OD 33AC 4170	DPV-321	0.25	2.45
23	OD 09L 0639	DPV-139	0.25	1.62
24	OR 02BN 6389	BUS-10	0.25	2.45
25	OD 09L 2839	DPV-147	0.25	1.62
26	OD 33F 4889	DPV-67	0.25	1.62
27	OD 33L 3929	DPV-132	0.26	2.45
28	OD 33G 4289	DPV-94	0.26	1.62
29	OD 33F 4969	DPV-63	0.26	2.45
30	OD 09N 8579	DPV-219	0.29	1.62
31	OD 14J 7585	DPV-110	0.26	2.45
32	OD 33L 1109	DPV-115	0.25	1.62
33	OD 09N 8499	DPV-220	0.26	1.62
34	OD 33L 3909	DPV-131	0.25	2.45
35	OD 33G 4279	DPV-95	0.25	2.45
36	OD 09N 8489	DPV-224	0.26	1.62
37	OD 33F 4939	DPV-64	0.25	2.45
38	OD 33L 3899	DPV-134	0.25	2.45
39	OD 33F 5039	DPV-68	0.25	2.45
40	OD 09N 8479	DPV-223	0.25	2.45

BARSUA-TALDIH-KALTA IRON MINE

DETAILS OF PLANTATION

YEAR	INSIDE MINING LEASE			OUTSIDE MINING LEASE		
	No. of trees	Area in Ha.	Rate of survival in %	No. of trees	Area in Ha.	Rate of survival in %
2010-11				8450	3.86	85.27
2011-12	25000	8.00	73.60	4600	3.02	65.43
2012-13	25000	10.00	85.00	1780	0.80	70.00
2013-14	25480	10.20	85.00	1620	1.20	90.00
2014-15	0	0.00		7400	3.30	71.89
2015-16	11600	16.00	50.00	8700	5.00	80.17
2016-17	8000	5.00	85.00	9985	3.50	80.00
2017-18	500	0.40	75.00	17750	8.40	70.41
2018-19	300	0.20	85.00	11700	4.90	79.15
2019-20				20000	6.20	80.00
2020-21				13000	5.50	81.15
2021-22				7000	2.50	77.00
2022-23	1500	1.00	100.00	3500	2.00	80.00
2023-24	5000	2.00	100.00			
TOTAL	**102380**	**52.800**	**79.15**	**115485**	**50.180**	**77.67**

Apart from above, the following plantation has been done through State Forest Department

1. Safety Zone Plantation of 32073 saplings over an area of 93.679 Ha
2. 1.5 times safety zone plantation of 28104 saplings over an area of 140.519 Ha
3. Compensatory Afforestation of 1237179 saplings over an area of 6122.269 Ha

Annexure - XIII

Sl. No.	Name & Address	Point Represented
54	Shri Pabitra Mohan Behera, Tensa	Supported the expansion project
55	Shri Samir Kr. Padhi, Tensa	Supported the expansion project and requested for development of a fruit orchard in the region
56	Shri Kamal Singh, Barsuan	Objected the project stating that the public hearing is illegal and unconstitutional. He stated that for peace and empowerment of scheduled area, PESA Act was passed by the Government in 1996 but unfortunately this act has not been implemented for public
57	Shri Rajesh Behera, Barsuan	Stated about importance of SAIL for the development of region. He also thanked local Authorities, SAIL Management, politicians and trade unions for recruiting in SAIL through local exchange. He supported expansion of project in the public hearing.

Table 7.49: Action Plan to Address the Major Issues Raised during Public Hearing of Barsua-Taldih-Kalta Iron Mines and the budget for the same with a timeline of 3 years from the date of start of mining operation

Sl. No	Issues Raised by Public	Action Plan for addressing the Issues					
		Action Plan	Brief Description	Fund Allocation (Budget)			
				First Year (Mar' 2023)	Second Year (Mar' 2024)	Third Year (Mar' 2025)	Total Cost
				Recurring Cost	Recurring Cost	Recurring Cost	
1 Environment:							
1.1	Control of water pollution, waste management for dump stabilisation and check dam for siltation control.	Retaining walls with garland drains & settling pits have been constructed around OB dumps. Similar structures will be constructed around mineral dumps & quarry areas as stated in the Environment Management Plan. Further improvements to the system would be taken as per direction of State Pollution Control Board	Length of Retaining Wall (m)	1235	500	800	160.00
			Length of Garland Drain (m)	1250	520	850	
			No of Settling Pits	5	2	3	
			Location	Fines dump at Taldih & along mine quarry at Barsua	Along mine quarry at Barsua	Along mine quarry at Taldih and Mineral rejects dump at Kalta	
			Budget (in Rs Lakhs)	70.00	30.00	60.00	
		Construction of Check dams for siltation control as proposed in EMP.	Length of Check Dam (m)	20	40	40	35.00
			Location	Tantra	Kalta	Barsuan	
			Budget (in Rs Lakhs)	5.00	15	15	
1.2	Control of air pollution and noise pollution on the roads due to truck transportation.	Water sprinkling on mining roads to be carried out by existing fixed & mobile and addl. mobile & fixed water sprinklers. Dust suppression system at crushers, screens and	Additional Mobile Water Sprinkler (Nos) at Taldih & Kalta	1 x 20 KL	1 x 28 KL	2 x 28 KL	880.00
			Addl. Fixed water sprinklers at Taldih and		2000	2000	

Sl. No	Issues Raised by Public	Action Plan for addressing the Issues					
		Action Plan	Brief Description	Fund Allocation (Budget)			
				First Year (Mar' 2023)	Second Year (Mar' 2024)	Third Year (Mar' 2025)	Total Cost
				Recurring Cost	Recurring Cost	Recurring Cost	
		other mineral handling areas to be continued. Plantation will be carried out for control of Noise pollution as proposed in EMP.	Kalta (m)				
			Location	Kalta	Kalta & Taldih	Kalta & Taldih	
			Budget (in Rs Lakhs)	40.00	320.00	520.00	
		Dust suppression through vehicle mounted mist cannons in the mineral handling areas	Vehicle Mounted Mist Cannons (Nos)		1	1	80.00
			Location		Barsua Railway siding	Roxy Railway siding	
			Budget (in Rs Lakhs)		40.00	40.00	
1.3	Tree Plantation to check pollution and plantation of trees in vacant places, both Sides of roads and Nalas.	Plantation is being done in the vacant places within the lease and township area and will continue to do. For Road side and nala side plantation, steps to be taken in consultation with state forest department as proposed in EMP.	No of Saplings	3000	5000	5000	52.00
			Location	Dump - 8, Barsua	Tantra village & Dump - 8, Barsua	Barsuan, Roxy siding	
			Budget (in Rs Lakhs)	12.00	20.00	20.00	
1.4	De-silting of Nalas and Check dams	The check dams and sedimentation pits are de-silted before onset of monsoon every year and shall continue to do so.	All check dams and sedimentation pits will be de-silted before onset of monsoon every year (Cost of De-siltation)	5.00	5.00	5.00	15.00
1.5	Protection of agricultural land during expansion period.	During expansion period proper care will be taken for protection of agricultural land in the nearby areas.	Financial Assistance for improvement in productivity of agricultural land in Kalta & Jhirpani.	15.00	15.00	15.00	45.00
2.0 Employment:							
2.1	Employment of local people in the company on priority basis and employment to	Employment to be given through MDO as per the skill and qualification. Local public will be given priority for employment.	Employment to be given through MDO		613 Nos.	520 Nos.	Will be deployed through MDO

Sl. No	Issues Raised by Public	Action Plan for addressing the Issues					
		Action Plan	Brief Description	Fund Allocation (Budget)			
				First Year (Mar' 2023)	Second Year (Mar' 2024)	Third Year (Mar' 2025)	Total Cost
				Recurring Cost	Recurring Cost	Recurring Cost	
	local educated youth as per their qualifications.						
2.2	Manual Mining of part of Taldih Block	Mining shall be done as per the approved mining plan.	--	--	--	--	--
2.3	Loss of livelihood of workers working in Roxy Railway Siding and mines due to mechanization and installation of conveyor belt.	No workers will lose employment due to mechanisation of siding and mines.	--	--	--	--	--
3.0 Peripheral Development:							
3.1	**Education & Training:**						
3.1.1	Development of Anganwadi of the region.	For development of Anganwadi, the matter will be taken up with Govt. authority.	Infrastructure & Material assistance will be provided as per the requirement.	1.00	1.00	1.00	3.00
3.1.2	Uniform school fee for regular and contractual employees in SAIL Managed schools	Uniform fee structure shall be implemented in the SAIL Managed schools for regular and SAIL's Contractors employees.	Subsidy provided towards school fees of in the SAIL Managed schools for SAIL's Contractors employees.	70.00	70.00	70.00	210.00
3.1.3	School bus from peripheral villages for attending school	Under periphery development activity Bus facility for the students to be increased.	Operation of existing buses from Barsuan & Kalta will be extended to nearby villages.	30.00	30.00	30.00	90.00
3.1.4	Providing teachers in the schools of peripheral villages.	Para teachers have already been provided in the peripheral schools and shall be increased as per	Existing Para Teachers (No)	38	38	38	109.50
			Additional Para Teachers	4	2	2	

Sl. No	Issues Raised by Public	Action Plan for addressing the Issues					
		Action Plan	Brief Description	Fund Allocation (Budget)			
				First Year (Mar' 2023)	Second Year (Mar' 2024)	Third Year (Mar' 2025)	Total Cost
				Recurring Cost	Recurring Cost	Recurring Cost	
		requirement.	(No)				
			Budget (in Rs Lakhs)	35.00	36.50	38.00	
3.1.5	Establishment of English medium school, re-opening of ITI	For English medium school and re-opening of ITI, the matter will be taken up with Govt. authority.	One english medium school in collaboration with DAV is already in function at Tensa. Affiliation with NCBT is under process for running of existing ITI.	45.00	16.00	16.00	77.00
3.1.6	Emphasize on skilled development trainings.	Skilled development trainings are being conducted in the peripheral villages and shall be continued.	Engagement of stitching teachers and training on Mushroom cultivation	1.00	1.50	1.00	3.50
3.1.7	Empowerment for Self-help groups (SHGs) in nearby region.	Continue support for the nearby SHGs are there and necessary assistance will be continued for their livelihood generation.	Providing Stitching Machine, Spice making machine, Financial assistance for Mushroom cultivation	2.00	2.00	2.00	6.00
3.1.8	Sports promotion and opening of hockey academy and providing coaching.	As per the request of village committee, assistance for the cultural activity & sports activities would be taken. For opening of hockey academy, the matter will be taken up with Govt. authority.	One Football & one Hockey team will be adopted from peripheral villages and provided training for their development. Organising Sports meets and providing sports material.	10.00	10.00	10.00	30.00
3.2	Transportation of minerals by trucks of local transporters instead of Conveyor belt.	Preference will be given to the local transporters for mineral transporting works. Further, implementation of system improvements to be taken care of in accordance with the notifications of State and Central	--	--	--	--	--

Sl. No	Issues Raised by Public	Action Plan for addressing the Issues					
		Action Plan	Brief Description	Fund Allocation (Budget)			
				First Year (Mar' 2023)	Second Year (Mar' 2024)	Third Year (Mar' 2025)	Total Cost
				Recurring Cost	Recurring Cost	Recurring Cost	
		Government.					
3.3	Health and medical facility.	A full fledge hospitals with ambulance facility is already in place at Tensa and Kalta with free treatment and free medicine facility for the villagers. The medical testing facility will be increased as per requirement. Health camp for the nearby village area to be carried out regularly.	Providing free medical facility in the SAIL Hospital at Tensa & Kalta for nearby villagers. Providing Health Camp and free Ambulance services in the nearby villages namely Taldih, Tantra, Bahamba, Sasyakala, Kalta, Roxy, Gundichanali etc. Engagement of Health Workers in peripheral PHC as per requirement.	15.00	15.00	15.00	45.00
3.4	Drinking water facility.	Company will provide drinking water facilities through bore well with Syntax tank as per requirement in co-ordination with village committees.	No of Drinking water facility to be installed at Jhirpani, Toda, Tantra & Taldih	4	2	2	60.00
			Maintenance of existing drinking water facility at Sasyakala, Taldih, Tantra, Kalta	30	30	30	
			Budget (in Rs Lakhs)	30.00	15.00	15.00	
3.5	Road widening and its repair	As per the request of village committee and Road construction authorities, support to be given for road repair and widening activity.	Providing infrastructure support to the Road construction agency.	--	--	--	--
3.6	Elephant menace control & improving lighting.	Steps to be taken as per the approved site specific wildlife management plan and guidance	Engagement of Protection Watchers	40.00	40.00	40.00	120.00

Sl. No	Issues Raised by Public	Action Plan for addressing the Issues					
		Action Plan	Brief Description	Fund Allocation (Budget)			
				First Year (Mar' 2023)	Second Year (Mar' 2024)	Third Year (Mar' 2025)	Total Cost
				Recurring Cost	Recurring Cost	Recurring Cost	
		from Forest department.					
3.7	Improvement in Urinal and toilet facility at Siding & Mines.	The matter has already been taken up and work order has been placed for construction of urinal and toilet facility at Siding and Mines.	No of Urinal & Sanitary Toilets	10	5	5	32.00
			Location	Roxy	Tantra	Tantra	
			Budget (in Rs Lakhs)	16.00	8.00	8.00	
3.8	Group insurance for contractual workers	The matter has already been taken up for group insurance of contractual workers.	Group insurance will be provided to Contractual Workers	4.00	4.00	4.00	12.00
3.9	Community centre at Toda, Jhirpani and Roxy Siding	Construction of community centre at Taldih, Jhirpani, Roxy and other peripheral villages will be taken in a phased manner.	No of Community Centre	1	1	1	110.00
			Village	Roxy	Taldih	Jhirpani	
			Budget (in Rs Lakhs)	30.00	50.00	30.00	
3.10	Blasting impact for kacchha houses	Controlled blasting shall be continued to minimize the vibration due to blasting. Relevant safety guidelines / Rules of DGMS shall be strictly adhered to.	--	--	--	--	--
3.11	Development of fruit Orchard:	A fruit orchard has already been developed at Tantra village and same will be expanded in future.	Extension of existing fruit orchard at Tantra and Maintenance	7.00	3.00	3.00	13.00
						Grant Total (in Rs. Lakhs)	**2188**

Annexure - XIV

LAND USE AND LAND COVER MAP OF BARSUA-TALDIH-KALTA (ML-130) & ML-139 MINING LEASES AREA OF BARSUA & KALTA IRON MINES, ODISHA

Sponsored by

Steel Authority of India Limited

Raw Materials Division

Consultant-in-Charge

Dr. Vasanta Govind Kumar Villuri

Assistant Professor

Department of Mining Engineering

Indian Institute of Technology (Indian School of Mines), Dhanbad

July 2021

Introduction

Land Use Land Cover Land studies are carried out to reveal how much of a region is covered by forests, wetlands, impervious surfaces, agriculture, and other land and water types. The water types include wetlands or open water. The Land Use information describes how people use the landscape. Such uses include developmental use, conservation related use, or mixed uses.

Land use and land cover map of Barsua Iron Mines, Odisha have been developed from Linear Imaging Self scanning Sensor (LISS) data obtained from Indian Remote Sensing satellite- Resource sat-2, LISS-IV (2021) sensor and Cartosat (2021) sensor. The satellite images so obtained were processed applying supervised classification method have using the Erdas Imagine software. The Land Use Land Cover has been classified into six classes, which are built-up land, open forest, dense forest, agricultural land, wasted land and water body. The areas under each of these classes were estimated on the basis of the pixel grid cell process in Erdas Imagine software following the rules of NRSC/ISRO Land Use and Cover Monitoring. The theme of Barsua Iron Mines, Odisha LULC is given in the following **Table 1**.

Table-1. Descriptions of land use and land cover classes (Source- NRSC/ISRO)

Sl.	Description-1	Description-2	Remark
1.	Built-up Land	Urban	Residential, Mixed built up, Public / Semi Public, Communication, Public utilities /facility, Commercial, Transportation, Reclaimed land, Vegetated Area, Recreational, Industrial, Industrial / Mine dump, Ash/ Cooling pond.
		Rural	Rural.
		Mining	Mine / Quarry, Abandoned Mine Pit, Land fill area.
2.	Agriculture Land	Crop land	Kharif, Rabi, Zaid, Two cropped, More than two cropped.
		Plantation	Plantation-Agricultural, Horticultural, Agro Horticultural.

		Fallow	Current and Long Fallow.
		Current Shifting cultivation	Current Shifting cultivation.
3.	Forest Land	Evergreen/Semi evergreen	Dense / Closed and Open category of Evergreen / Semi evergreen.
		Deciduous	Dense / Closed and Open category of Deciduous and Tree Clad Area.
		Forest Plantation	Forest Plantation.
		Scrub Forest	Scrub Forest, Forest Blank, Current &Abandoned Shifting Cultivation.
		Swamp/ Mangroves	Dense / Closed & Open Mangrove.
4.	Barren/ uncultivable/ Wastelands	Salt Affected Land	Slight, Moderate & Strong Salt Affected Land.
		Gullied/ Ravinous Land	Gullied, Shallow ravine & Deep ravine area.
		Scrub land	Dense / Closed and Open category of scrub land.
		Sandy area	Desertic, Coastal, Riverine sandy area.
		Barren rocky	Barren rocky.
		Rann	Rann.
5.	Wetlands/Water Bodies	Inland Wetland	Inland Natural and Inland Manmade wetland
		Coastal Wetland	Coastal Natural and Coastal Manmade wetland
		River / Stream / canals	Perennial & Dry River/stream and line & unlined canal/drain
		Water bodies	Perennial, Dry, Kharif, Rabi &Zaid extent of lake/pond and reservoir and tanks

Built-up land: It is an area of human habitation developed due to non-agricultural use and that has a cover of buildings, transport and communication, utilities in association with water, vegetation and vacant land. LULC map consists of 3 classes under built-up viz., urban, rural and mining. In this region, ore mining town have emerged Barsua Iron Mines.

Forest: The term forest is used to refer to land with a tree canopy cover of more than 10 percent and area of more than 0.5 ha. Forests are determined by both the presence of trees and the absence of other predominant land uses. The trees should be able to reach a minimum height of 5 m. The two categories i.e. open forest and dense forest is predominant in Barsua Iron Mines.

Wasted land or Wet land: Wasted lands are those areas where the water table is at, near, or above the land surface for a significant part of most years. The hydrologic regime is such that aquatic or hydrophyte vegetation usually is established, although alluvial and tidal flats may be no vegetated. Wastelands frequently are associated and topographic lows, even in mountainous regions.

Water body: This category comprises areas with surface water in the form of ponds, river, lakes, tanks and reservoirs. Rivers/streams are natural course of water flowing on the land surface along a definite channel/slope regularly or intermittently towards a sea in most cases or in to a lake or an inland basin in desert areas or a marsh or another river. Canals are artificial watercourse constructed for irrigation, navigation or to drain out excess water from agricultural lands.

Agricultural land: These are the lands primarily used for farming and for production of food, fiber, and other commercial and horticultural crops. Agricultural Land may be defined broadly as land used primarily for production of food and fiber. These are the areas with standing crop as on the date of Satellite overpass. Cropped areas appear in bright red to red in color with varying shape and size in a contiguous to noncontiguous pattern. They are widely distributed indifferent terrains; prominently appear in the irrigated are as irrespective of the source of irrigation. It includes Kharif, Rabi and Zaid croplands along with areas under double or triple crops.

1. Barsua- Taldih- Kalta area land use and land cover (ML-130):

The Barsua- Taldih- Kalta mining area (2472.561 ha) was classified for land use and land cover by using supervised classification technique. Seven classes are identified over the study area namely dense forest (1493.722 ha), open forest (272.976 ha), water bodies (2.704 ha), agricultural land and plantation (10.350 ha), barren land/waste land (272.976 ha), mining land (303.441 ha) and built-up (50.684 ha) shown in Figure-1.

Figure: 1. Land use Land cover map of Barsua-Taldih- Kalta Mine Lease (ML-130)

Accuracy assessment was carried out using 100 points, from field data, existing maps and land cover map of (Bhuvan ISRO). Then location of the 100 points was chosen using random stratified method to represent different land cover classes of the area. The land cover mapping of the images, ancillary data and the result of visual interpretation was integrated with the classification result using GIS in order to improve the classification accuracy of the classified image.

The summary of the land use land cover classifications is shown in the Table 2. The classification distributions are shown in the Figure 2.

Table 2: Land use land cover classifications of ML-130 Lease

LU/LC classes	ML-130 Mining Lease (ha)
Built-up Land	**50.684**
Agriculture Land	**10.350**
Dense forest	**1493.722**
Open Forest	**338.684**
Water body	**2.704**
Waste land	**272.976**
Mining	**303.441**
Total Area (ha)	**2472.561**

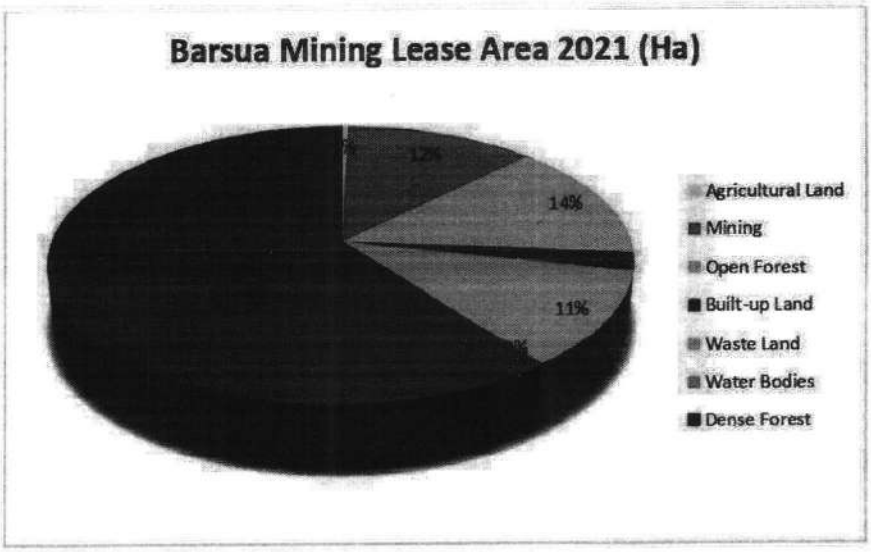

Figure 2: Land use distribution of Barsua-Taldih-Kalta (ML-130) Iron Mines

स्टील अथॉरिटी ऑफ इण्डिया लिमिटेड
STEEL AUTHORITY OF INDIA LIMITED

Corporate Environmental Policy

Steel Authority of India Limited, one of the leading steel producers of India, in its endeavour to strengthen environment management and maintain clean and sustainable environment in and around its plants, mines & other units is committed to:

i. Protect the environment by integrating sound environmental practices for control and prevention of pollution from all its activities.

ii. Comply with legal and other requirements pertaining to the environment, forests and wildlife and to go beyond.

iii. Systematic approach of environment management by accreditation with Environment Management System.

iv. Contribute towards mitigation of climate change through adoption of measures to reduce emission of greenhouse gases, enhancing green coverage, adopting energy efficient technologies, enhancing use of green energy.

v. Promoting innovative environment-friendly processes and products.

vi. Ecological restoration of degraded mined out landscapes.

vii. Integrate principle of "reduce, recover, recycle and reuse" in its operations for conservation of natural resources, including water, to ensure sustainable future.

viii. Continual improvement of environmental performance by setting challenging targets, transparent reporting system and robust review mechanism.

ix. Continuously monitor emissions, discharges and ambient air quality and uplink with SPCB and CPCB portals for self-regulation of environmental deviations, if any.

x. Communicate environmental performance to all stakeholders through annual report, Board report, Corporate Sustainability Report and all such means from time-to-time.

xi. Engaging employee for commitment and responsibility towards environment protection through capacity building.

xii. Promoting environmentally responsible behaviour amongst all stakeholders.

Date: 4th August 2021

Soma Mondal
Chairman, SAIL

STEEL AUTHORITY OF INDIA LIMITED
RAW MATERIALS DIVISION
BARSUA IRON MINE

सेल SAIL

POLICY

INTEGRATED MANEAGMENT SYSTEM
(ISO 9001:2015, ISO 14001:2015 & ISO 45001:2018)

BARSUA IRON MINE (BIM) is one of the Iron Ore Mines of Raw Materials Division, STEEL AUTHORITY OF INDIA LIMITED (SAIL) which meets the internal requirement of Iron Ore for Steel Plants of SAIL. The INTEGRATED MANAGEMENT SYSTEM [IMS - ISO 9001:2015, ISO 14001:2015 & ISO 45001:2018] of BIM has been aligned with the Vision of our Organization. The core objective of BARSUA IRON MINE is to produce Iron Ore Lump and Fines . In line with IMS, BARSUA IRON MINE strives to :

- Improve quality at every stage of activities for customer satisfaction.
- Integrate sound environmental management practices in all our activities.
- Conduct our operations in environmentally responsible manner to minimize pollution and its impact on environment.
- Conserve energy and other natural resources, minimize waste generation and promote recovery, recycle and reuse.
- Encourage employees to participate in maintaining a safe and healthy working environment.
- Abide by all applicable legislations related to Business, Environment and Occupational Health & Safety.
- Review Integrated Management System periodically for continual improvement.

(A. K. SINHA)
General Manager

7th May 2019

Annexure- XVI

BARSUA-TALDIH-KALTA IRON MINE

TOTAL EXPENDITURE INCURRED FOR ENVIRONMENTAL PROTECTION MEASURES DURING THE YEAR 2023-24.

Sl. No.	Environmental Protection Measures	Amount (in Lakhs)
1	House Keeping of CAAQMS & Maintenance of Garden	9.77
2	Plantation	5.20
3	Water Spraying	13.85
4	Environmental Monitoring	8.87
5	Maintenance of CAAQMS	8.85
6	Surface Runoff Management Study	19.67
7	Payment for Protection Watchers	21.60
8	Operational cost of Motor Grader	4.94
9	Conducting Awareness Programme	1.84
10	Monitoring of Protection measures	4.09
Total		**98.68**