

**PROCEEDINGS OF THE MEETING OF STATE LEVEL EXPERT APPRAISAL
COMMITTEE, ODISHA HELD ON 13th NOVEMBER, 2020**

The SEAC met on 13th November, 2020 at 11:00 AM through video conferencing in Google Meet under the Chairmanship of Sri. B. P Singh. The following members were present in the meeting.

1. Sri. B. P. Singh	-	Chairman
2. Prof (Dr.) H. B. Sahu	-	Member
3. Dr. D. Swain	-	Member
4. Prof. (Dr.) P.K. Mohanty	-	Member
5. Sri. J. K. Mahapatra	-	Member
6. Sri. K. R. Acharya	-	Member
7. Prof.(Dr.) B.K. Satpathy	-	Member
8. Dr. Sailabala Padhi	-	Member
9. Dr. K.C.S Panigrahi	-	Member

The agenda-wise proceedings and recommendations of the committee are detailed below.

ITEM NO. 01

PROPOSAL OF ENVIRONMENTAL CLEARANCE FOR DALPAHAR IRON AND MANGANESE ORE MINE OF SRI D.C JAIN FOR ENHANCEMENT IN PRODUCTION CAPACITY OF IRON ORE FROM 708 TPA TO 0.31 MTPA AND MANGANESE ORE 0.094MTPA OVER AN MINING LEASE AREA 89.961 HA IN VILLAGE - DALPAHAR, TAHASIL-BARBIL, DISTRICT - KEONJHAR OF SAMARENDRA MOHANTY (GM) – TOR

1. The proposal is for environmental clearance for Dalpahar Iron and Manganese ore mine of Shri D.C. Jain for iron ore production upto 0.31 MTPA and Manganese Ore upto 0.094 MTPA along with crushing and screening plant over an area of 89.961 Ha in Baitarani R.F., Champua sub division, Barbil tehsil, Keonjhar district, Odisha.
2. This expansion project falls under category B as per MoEF&CC, Govt. of India notification in this respect, because of mining lease being less than 100 Ha.
3. The project proponent intimated that earlier ToR for production of Iron ore 0.31 MTPA and Manganese ore 0.094 MTPA along with crushing & screening plant was granted by MoEF&CC, Govt. of India vide letter dated 23rd September 2008. Public hearing for the proposal was held on 26th August 2011. Final EIA/EMP was submitted to MoEF&CC, Govt. of India vide letter dated 05.03.2012., and the proposal was appraised and recommended by the EAC in its meeting held on 20th to 22nd June 2012.
4. The project proponent has informed that the grant of EC was held for policy decision on NEERI carrying capacity study report. Post policy decision on the above, the project proponent appraised the proposal before MoEF&CC, Govt. of India vide its letter dated 19.01.2018, However, MoEF&CC, Govt. of India sought for additional information for compliance vide its letter dated 15th May 2018. The points raised by MoEF&CC, Govt. of India and its compliance submitted by Project Proponent to SEIAA/SEAC as its fall under category B (as per the MoEF&CC, Govt. of India EIA notification dated 14th August 2018 i.e. ≤ 100 Ha mining proposal are considered at respective SEIAA/SEAC) is as follows;

i. **Letter from the State Govt. of Odisha w.r.t. validity and veracity of the mine lease**

- The project proponent submitted that the mining lease of Dalpahar area i.e. 101.171 Ha comprises of 5 blocks i.e. Block No. A (89.961Ha), B1 (0.607 Ha), B2 (7.689 Ha), B3 (1.012 Ha) & C (1.902 Ha). The said blocks were granted over 101.171 Ha vide letter No. III (A)MG.101/846179 dated 05.06.1984 by Govt. of Orissa whereas each blocks as above were executed separately on 09.06.1986 for 20 years.
- Further, State Govt. has declared all the blocks as lapsed u/s 4A of the MMDR Act, 1957. Whereas, Block A (89.961 Ha) got lapsed vide his letter No. 3882/III(A)AM-07/2012/SM. Bhubaneswar dated 01.05.2015.
- Whereas, as per the direction of Hon'ble High Court of Orissa and further hearing at Steel & Mines dept., Govt. of Odisha passed the order vide no.6610/ IV (AB) SM-11/2015/S&M, Bhubaneswar dated 06.09.2019 "xxxxxxx pleased to decided not to declare and record the Iron & Mn mining lease of Late D C Jain (power of attorney Sri Avin Jain) over an area of 89.961 Ha (Block-A) of Keonjhar district as lapsed" xxxxxxxxxxxx.
- As per the section 8 A (3) of MMDR (Amendment) Act, 2015 the validity of the lease period of 89.961 Ha (Block A) is deemed to be extended up to 08.06.2036.
- Since the lease area is confined to 89.961 Ha, so as per the MoEF&CC notification dated 14th August 2018 Lessee has submitted the compliance to SEIAA/SEAC, Odisha.

ii. **Validity and veracity of Forest clearance dated 01.04.2015 from the FC division of the Ministry and status of deposition of NPV**

- Further, Project Proponent has informed that 16.464 Ha of broken up forest land (out of 101.171 Ha) was granted by MoEF&CC, Govt. of India vide letter F.No.8-103/2000-FC dated 14.09.2005 under Section-2 of FC Act earlier during the original lease period. Out of this broken up diverted area, 10.594Ha is coming within the Block – A, i.e. within 89.961Ha. NPV for the entire lease area i.e. Rs 9,49,99,569/-has been paid. The Project Proponent stated that, As per circular/guideline of MoEF&CC, Govt. of India vide letter No. 11-51/2015-FC, dated. 01.04.2015 the above forest clearance is valid till the expiry of lease i.e., up to 8th June 2036.
- For the balance forest area, general approval accorded under section 2(iii), FC act 1980 as per the MoEF&CC, Govt. of India guidelines dated 1st April 2015.
- Further, for the balance forest area, Forest diversion proposal applied under section 2(ii), FC act 1980 which is under process at MoEF&CC, Govt. of India.
- In recent past EAC/SEAC has recommended the Environmental Clearances to the project having part forest clearance under section 2 (ii) of FC Act, 1980 as per the above guideline. (Ex- Roida II iron ore Mines of K.N. Ram)

iii. Project Proponent needs to submit the valid Mining Plan/Scheme

Project Proponent submitted that, Review of Mining plan with progressive mine closure plan (PMCP) over an area of **89.961 Ha (block A)** got approved by IBM vide letter No. RMP/A/53-ORI/BHU/2019-20 dated 01.04.2020.

5. With the above compliance, the project proponent has submitted the revised EIA/EMP with latest baseline data (October 2019-December 2019) along with compliance of NEERI recommendations at SEIAA and presented the proposal before SEAC on 13th November 2020.
6. Further, the validity of the Public Hearing (held on 26th August 2011) is concerned; since it is not older than 3 years at the time of submission of proposal (5th March 2012) for grant of Environmental Clearance as per OM dated 29th August 2017.
7. There are instances of the MoEF&CC, Govt. of India EAC exempting public hearing as it was already conducted earlier (Si. No. 2.44 of EAC minutes held on 15th – 16th November 2018). Besides, the Expert Appraisal Committee, Non-Coal Mining in its Minutes of the Meeting held during April 20-21 2020 mentioned the criteria for exemption of Public Hearing i.e.
 - i. The project must have undergone a Public hearing under EIA Notification, as part of its appraisal earlier for the same capacity and ML area, during life of the project;
 - ii. The present proposal shall be with 'No increase in the production capacity and Mining lease;' and
 - iii. No change in mining namely, mining method, mining plan, mineral transportation, water requirement, reclamation plan.
 - iv. The Proposal shall not be a violation case.
8. The present proposal has undergone public hearing under EIA notification 2006 for 0.31 MTPA iron ore and 0.094 MTPA Manganese Ore along with crushing and screening plant. There is no increase in production capacity, lease area, mining method, plan for mining, transportation, water requirement. Also, the proposal is not a violation case as certified by the DDM, Joda vide its letter dated 12.11.2020.
9. Further, inline to the above the clarifications on requirement of public hearing has brought out by MoEF&CC, Govt. of India vide OM dated 12th November 2020.
10. Project Proponent submitted that, in pursuance of the Supreme Court order dated 02.08.2017 in CWP no. 114/2014, there is no such demand raised by the DDM, Joda as there was no excess production and the mining operation has been discontinued since August 1995 vide its letter dated 12th November 2020. The details of the past production duly authenticated by DDM, Joda vide its letter dated 05.11.2020 has been furnished.
11. Project Proponent submitted that, the mine lease area is within latitude 21° 58' 05" - 21° 58' 43" N and Longitude 85° 23' 30.47" - 85° 23' 33.77" E. The highest contour within the lease hold area is 723m MSL, which is along the south eastern portion of the lease area while the lowest contour being 553m a MSL in the SW corner of the lease area. NH 215 at a distance of 6.9 kms (W) from the project area. Jaroli railway station exists at 2.7 Km (SE), Banspani is at 3.5KM (NE). Water bodies like Baitarani River is flowing at 4.6 kms from the lease area in eastern side, Suna Nadi – 0.8km (NW), Dalko Nala-3.0 (NE). Entire lease area lies in Baitarani R.F. Other forests area like Sidhamath R.F –West is at 2.1 Kms and Chamakpur R.F is at 5.1 (E). Karo-Karampada elephant corridor is located at about 16 km from the mine lease area.

12. Project Proponent submitted that, Elephant, Sloth bear and Monitor Lizard are placed under Schedule-I as per Wild Life (Protection) Act, 1972 is found in the Study area. Site specific conservation plan has been prepared and approved by the PCCF (WL) and Chief Wildlife Warden, Odisha vide Memo No. 9070/1WL (C) SSP-44/2014, dated 27th November 2014 with an estimated cost of Rs. 250.254 lakhs which includes Rs.64.374 Lakhs for activities within the project area and Rs.185.520 Lakhs for activities within the project impact area.
13. Project Proponent submitted that, as per the approved mining plan geological resource estimated as 3.80 Million Ton of iron ore & 0.420 Million Ton Mn. Mining method will be other than Fully mechanized. One 100 TPH mobile crushing and one 200 TPH mobile screening unit will be used for sizing of minerals. It has been calculated that a quantity of 553012.8 cum of waste shall be generated from both iron and manganese ore zone during conceptual period. All the waste shall be utilized for back filling at the end of the mine life. Life of the mine is 12 years as per the present exploration data. Further likely to increase after detail exploration.
14. Project Proponent submitted that, height & width of the bench will be kept at 10m & more than 10m for iron ore zone. Height & width of the bench will be kept at 6 & 10m and 9 & more than 10m in manganese ore zone. Ultimate pit slope will be 37°. NOC from CGWA for 95 m³/day is under process. Manpower is 82 persons on direct basis and more than 100 people on indirect basis. Project cost is Rs 49 crores. Further, PP mentioned that in the post mining stage, out of the total mined out area of 81.648Ha, an area of 4.79Ha will be reclaimed by means of backfilling and plantation. Plantation on dead benches will be carried out over remaining mining area. A total of 89.096Ha (99.03% of the total lease area) will be covered under vegetation in the post mining stage.
15. Project Proponent informed that, the entire mining lease area falls within the Baitarani Reserve Forest. There is no habitation inside the mine lease area. Hence the question of rehabilitation and resettlement does not arise.
16. Project Proponent also submitted the Baseline data for revised EIA/EMP carried out systematically and meticulously as per relevant IS codes, CPCB & MoEF&CC guidelines during Post monsoon Season (Oct 2019 – Dec 2019). The existing Ambient Air Quality levels for PM₁₀, PM_{2.5}, SO₂ and NO₂ are within the prescribed limits. CO values in the all locations were found to be below detectable limit (DL – 1144 µg/m³). Silica values in the study area are found to be below detectable limit (Detection limit – 0.05mg/m³). The water quality of the collected ground water samples were found to be within the prescribed permissible limits of IS: 10500:2012 Norms for Drinking in the absence of an alternative source. Noise measurements were carried out continuously for a day once in a Season at 8 locations. While comparing with the MoEF&CC Norms, the monitored ambient noise levels are within the limit values. Soil samples were collected from 5 locations to assess the soil quality in and around the mines. Results of the soil samples show that, in the buffer zone, the pH values were ranging between 5.96 – 6.54 and Electrical Conductivity values were ranging between 13.8 – 39.7µmhos/cm. Soils are clay type. In the core zone, pH values were 6.23 and Electrical Conductivity values were 15.2 µmhos/cm. Soils are generally Clay Loam type.
17. Project Proponent submitted that, the resultant added concentrations with baseline figures for PM₁₀, PM_{2.5}, after adopting necessary mitigative measures are within the prescribed NAAQ limits of 100, 60 µg/m³ for PM₁₀, PM_{2.5}, respectively. For preservation of environment in this mine strict enforcement of management schemes and regular air quality monitoring will be undertaken for taking corrective actions, as needed. By adopting the effective implementation of all the mitigative measures, no adverse impact on Air quality due to the enhanced mining operation in this lease area is expected.
18. Project Proponent submitted that, ground water table is at a depth of more than 500 m RL and mining will be carried out for a maximum 520mRL. Hence, there will be no intersection of ground water table. The rain water falling in the quarry will be harvested in the sump at the

lowest level of the quarry. This sump will act as a settling pond to prevent solids escaping along with discharge, before outlet etc.

19. Project Proponent submitted that, ` 70 lakh has been allocated for various social welfare activities under their CER and CSR programmes for the upcoming 5 years. These activities will begin once the mining operation resumes.
20. Project Proponent also submitted the public hearing point wise compliance with budgetary provision. They have committed to comply the all once mine will come into operation.
21. Project Proponent committed to work towards 'Zero Harm' from their mining activities and carry out Health Risk Assessment (HRA) for identification of workplace hazards and assess their potential risks to health and determine appropriate control measures to protect the health and wellbeing of workers and nearby community. In order to prevent from the Health Hazard, various protection measures like adopting dust sprinkling, development of plantation / green belt, etc. has been proposed to reduce pollution, providing safety / PPE to workers, conducting IME, PME, covering various statutory medical examination, conducting regular awareness training programme, etc., will be provided. A total budgetary provision of ` 4 lakhs per annum under capital cost and ` 2 lakhs is allocated under recurring cost towards Occupational health and Safety Budget.
22. Project Proponent submitted that, a financial provision of ` 134 Lakhs is made for various environmental control measures proposed in this report under capital cost and ` 55.3 Lakhs per annum is allocated as the recurring cost.
23. Lessee has undertaken that "they will follow the guidelines/policy decision by the MoEF&CC, Govt. of India and State Govt. Odisha in regard to the implementation of the recommendations given by NEERI in its carrying capacity study report in respect to Odisha".
24. The project proponent along with their consultant **M/s Creative Engineers and Consultants, Chennai** made a detailed presentation on the proposal before the SEAC

Considering the information / documents furnished by the proponent and presentation made by the consultant **M/s Creative Engineers and Consultants, Chennai** on behalf of the project proponent, the SEAC recommended the following:

- a) Public hearing has already been conducted for the proposal earlier on 26th August 2011. For this reason, conducting a fresh Public Hearing is not required for the proposal for the reason as stated in para-7 above.
- b) The following specific ToRs are prescribed in addition to standard ToRs along with specific conditions as recommended by CSIR-NEERI on carrying capacity study as per **Annexure - A** for conducting detailed EIA study and preparation of revised EIA/EMP report.
 - (i) Blasting & vibration study need to be conducted
 - (ii) Slope stability study need to be conducted
 - (iii) Composite Air Quality Modelling including other operating mines in the buffer zone
 - (iv) Quality and quantity of low-grade ore and its usage
 - (v) Socio Economic study to be conducted.
 - (vi) Updated Site-specific conservation plan.
 - (vii) Details of low-grade ore generation and management and waste generation management with composition with material balance.
 - (viii) Slope study for mine and OB/waste to be undertaken by an Institute of repute.

- (ix) Baseline Data study – Three-dimensional simulation study (predictive study) to be undertaken for this expansion as well as other operating mines and proposed mines by an Institute of repute.
- (x) Traffic Density should to be undertaken by a domain expert inside the mine lease area at intersection with the haulage road and at intersection points of haulage road with NH/SH/Public roads and mitigation measures for decongestion, if any.
- (xi) Occupational health for employees and nearby localities/villages to be identified and SOP for measures to address the health issues be submitted.
- (xii) Environmental issues/concerns raised in minutes of meeting of Public Hearing held on 26.08.2011 be highlighted and physical measures undertaken be submitted to mitigate the same.

ITEM NO. 02

PROPOSAL OF ENVIRONMENTAL CLEARANCE OF KALAMANG WEST (NORTHERN PART) IRON ORE MINES FOR MINING OF IRON ORE WITH PRODUCTION CAPACITY OF 2.95 MTPA (ROM) AT VILLAGE- KALAMANG & GHODABUDANI DISTRICT- SUNDERGARH & VILLAGE - GANDALPADA, DISTRICT - KEONJHAR, ODISHA (MLA: 92.875 HA) OF M/S TATA STEEL BSL LTD. - TOR

1. The proposal was considered by the committee to determine the “Terms of Reference (ToR)” for undertaking detailed EIA study for the purpose of obtaining environmental clearance in accordance with the provisions of the EIA Notification, 2006 and amendment thereafter.
2. As per EIA Notification dated 14.09.06 and its subsequent amendments S.O.141 (E) on dated 15.1.2016, the project falls under, Category “B1”.
3. The Kalamang West (Northern Part) Block Iron Ore Mine of M/s TATA Steel BSL Ltd. is proposed over an area of 92.875 hectares (ha) which involves 42.608 ha of forest land (16.658 ha in Keonjhar Forest Division, District Keonjhar and 25.950 ha in Bonai Forest Division, District Sundargarh) and 50.267 ha of non-forest land. The Mining area is situated in three villages namely, village Kalamang & Ghodabudani of Tehsil – Koira, District Sundargarh & village Gandalpada of Tehsil - Barbil, District Keonjhar State Odisha.
4. The Government of Odisha had issued Letter of Intent (LoI) vide Govt. letter No. IV(MISC) SM-53/2017/5285/SM dt.24.06.2017 as per Rule 10(2) was again modified by Steel and Mines Department, Government of Odisha vide letter no. IV(MISC) SM-53/2017/6287/SM dt.27.07.2017 revising the earlier mentioned area of 92.0 ha to 92.875 ha for grant of Mining Lease for Kalamang West (Northern Part) Iron Ore Block in village Kalamang & Ghodabudhani in District Sundargarh and village Gandalpada in District Keonjhar is in the name of M/s Bhushan Steel Ltd. The change of name from Bhushan Steel Limited to TATA STEEL BSL Limited was approved by the Department of Steel and Mines vide letter No. 1409/SM/dated 27.02.2019 for grant of a Mining Lease. Now, M/s Tata Steel BSL Ltd. has requested to ‘The Additional Chief Secretary’ of Department of Steel and Mines, Govt. of Odisha for extension of validity of LOI vide letter no TSBSL/CS/2020/101 dated 05.03.2020.
5. **Location & Connectivity** : Kalamang West (Northern Part) Block Iron Ore Mine of M/s Tata Steel BSL Limited having lease area 92.875 hectares is situated in three villages namely Kalamang & Ghodabudani of Sundargarh District & village Gandalpada of Keonjhar Districts, of State Odisha. The geo-coordinates is Latitude: 21° 56' 47.757"- 21° 57' 32.347" N Longitude: 85° 17' 06.658" - 85° 17' 57.531" E. The mine is well connected

by NH-215, which is about 1.80 km in NW. Nearest Railway Station is Barbil which is about 17.86 Km in NNE direction. Rourkela Airport at 59 Km NW, Jharsuguda Airport 128 km W and Biju Patnaik International Airport, Bhubaneswar is about 196 Km in SSE direction from the project site.

6. **Environmental Sensitivity:** The mine lease area consist of 42.608 ha of forest land (16.658 ha in Keonjhar Forest Division, District Keonjhar and 25.950 ha in Bonai Forest Division, District Sundargarh). There is no National Park, wildlife sanctuary, biosphere reserve within 15 km radius of the Mine. However, Karo Karampada Elephant corridor is located at about 8.6 km N of the lease area. There is no perennial surface water body in the applied mine lease area.
7. **Method of Mining:** Opencast Fully Mechanized Mining method has been proposed. It is proposed to commence mining operation from north eastern part of the lease. In the plan period of about 2.95 MTPA, has been proposed for production. As the mining activities in the lease area is to be commenced, activities connected with development of the mine such as scrapping of weathered zones, cutting of trees/bushes, making of access roads, infrastructure development etc will be given prime preference. After the development of an access road to the targeted area a box cut will be opened and thereafter, it will be expanded both laterally and depth-ward to fulfill the required production target.
8. The aforesaid mine lease area measuring 92.875 ha is for extraction of Iron Ore. The annual excavation is targeted at 2.95 MTPA (RoM) Iron Ore with total maximum excavation of 3.92 MTPA. The ROM will be fed to a mobile crushing/ screening plant of 1000 TPH capacity. The lump ore and fines will be segregated in the Crushing /Screening plant.
9. **Drilling & Blasting:** Drilling will be carried out using 110-150 mm dia. Drill with 3.0-4.0m burden & 3.5-4.5 m spacing based on the geological rock characteristics. Taking into account the disposition of the ore body, it has been estimated that about 80 % (approx.) of planned quantity will require drilling & blasting.
10. **Loading & transportation:** Blasted material will be loaded with hydraulic excavators of bucket capacity of 2.5 to 4.0 cum into 35/50 ton capacity dumpers and will be transported to a proposed crushing & screening plant for production of lump & fines. Dumpers of 15/25T capacity would be utilized for shifting of crushed ore to the stack-yard. Marketable ore will be dispatched by road through trucks of different capacities and rail. Waste generated will be transported to proposed waste dump.
11. **Nature of Waste:** The iron ore deposits of the area are associated with BHJ, Laterite, lateritic soil and shale. These will be generated from the lease area as waste with iron ore. No top-soil will be generated in the ensuing plan period.
12. **Dumping Site:** A quantity of 141,10,154 m³ waste will be generated during the conceptual plan period. 14,58,980 m³ waste will be generated in the ensuing plan period out of which 8,55,122 m³ of waste is proposed to be stored on the earmarked 3 dumps and the rest 1,12,241 m³ will be utilized for making of roads and other related construction activities. Rest quantity of generated waste of vol. 4,91,557 m³ will be utilized in the proposed backfilling.
13. **Rehabilitation & Resettlement:** The mine lease area comprise of 20.580 Ha private land. Few habitations of Ghodabudhani village are located in the lease area. Rehabilitation & resettlement of all the PAFs will be carried out as per the State R&R Policy.

14. **Green Belt:** Plantation will be carried out in 7.5 m wide safety barrier zone, backfilled area, inactive dump slopes, etc. At conceptual stage, almost entire mine lease area will be reclaimed by plantation.
15. **Water Requirement :** The estimated water requirement for domestic and mining purposes including plantation is to the tune of 65 m³/day and 170 m³/day respectively. The Peak total water requirement at mine for domestic and industrial use will be 235 m³/day. The availability of water for drinking and domestic purposes will be made from bore wells and that for mining use will be from sources like Mine pit (When available) / perennial stream / river.
16. **Power Requirement:** The fully mechanized mining will be done in a 3 shifts of 8 hours each. The mining equipment will be operated by diesel. The use of electricity will be for lighting/illumination purposes in mining operations and will be obtained from Odisha State Electricity Board (OSEB). The electricity/DG power will be provided at the office, camp and mines. Power requirement - 1800-2000 KW ; Source of power Odisha State Electricity Board, DG sets - 850 KVA X 3 nos. or 2250 KVA.
17. **Employment Potential:** The project will generate direct to the tune of about 428 persons as well as indirect employment opportunities for the nearby villages.
18. The cost of the project is Rs.216.20 Crores.
19. The Environment consultant **M/s Visiontek Consultancy Services Pvt. Ltd. – Bhubaneswar** along with the proponent made a presentation on the proposal before the Committee.

Considering the information / documents furnished by the proponent and presentation made by the consultant **M/s Visiontek Consultancy Services Pvt. Ltd. – Bhubaneswar**, the SEAC prescribed the following specific ToRs in addition to standard ToRs along with specific conditions as recommended by CSIR-NEERI on carrying capacity study as per **Annexure -B** for conducting detailed EIA study.

- (i) Quality and quantity of low-grade ore generation and its usage and declaration.
- (ii) Details on Rehabilitation & Resettlement plan for 2 villages.
- (iii) Private Land acquisition status.
- (iv) Copy of forest clearance status.
- (v) 2-3 roads will be de-routed, details to be submitted.
- (vi) Permission copy for usage of water from Sona nadi.
- (vii) Traffic study, slope study, socio economic study to be conducted in comprehensive manner.
- (viii) Waste generation and management.
- (ix) Material Balance chart.
- (x) Copy of Forest Diversion proposal.
- (xi) Site specific conservation plan.
- (xii) Re-plantation of trees, uprooted in mining area in safety zone.
- (xiii) Public Hearing to be conducted in both the Districts of Keonjhar and Sundergarh.
- (xiv) Water Balance with water harvesting details be submitted.
- (xv) Traffic Density should to be undertaken by a domain expert inside the mine lease area at intersection with the haulage road and at intersection points of haulage road with

NH/SH/Public roads and mitigation measures for decongestion, if any by a domain expert.

- (xvi) Slope study for mine and OB/waste to be undertaken by an Institute of repute.
- (xvii) Socio-economic study to be undertaken by an Institute of repute
- (xviii) Baseline Data study – Three-dimensional simulation study (predictive study) to be undertaken compressive with this proposed mine, any other proposed mines & the existing other operating mines.
- (xix) OB/waste management & “zero discharge” management to be submitted.
- (xx) Details of retaining wall, garland drain and settling pond to be submitted along with de-silting Management and SOP for desilting perpetually if any from any waterbody/agricultural land.
- (xxi) Identification of occupational health hazards and perennial measure for mitigation of the same through domain health expert.

ITEM NO. 03

PROPOSAL OF ENVIRONMENTAL CLEARANCE FOR BHAGABANPUR DECORATIVE STONE MINES OVER AN AREA OF 4.500 HA OR 11.12AC. LOCATED IN VILLAGE- BHAGABANPUR, TAHASIL- KUKUDAKHANDI, DISTRICT- GANJAM, ODISHA (SUBMITTED UNDER CLUSTER APPROACH) OF MD. IRFAN RAZZAK – TOR

1. The proposal was considered by the committee to determine the “Terms of Reference (ToR)” for undertaking detailed EIA study for the purpose of obtaining environmental clearance in accordance with the provisions of the EIA Notification, 2006 and amendment thereafter.
2. As per EIA Notification dated 14.09.06 and its subsequent amendments S.O.141 (E) on dated 15.1.2016, the project falls under Category “B” under item No-1(a)-‘Mining of Minerals’.
3. The present proposal is mining of decorative stone from Bhagabanpur Decorative Stone Mine. The Bhagabanpur Decorative Stone Mine of over an area of 4.50 Ha or 11.12 acres located at Village-Bhagabanpur, Tehsil-Kukudakhandi, Dist- Ganjam, Odisha, is decided to be granted in favour of Sri Md. Irfan Razzak for a period of 30(thirty) years vide letter of Intent no.6602/SM, Bhubaneswar dated 06.09.2019 of Government of Odisha for mining of decorative stone. Subsequently, the precise area map along with boundary description & land schedule of the area has also been supplied to the lessee vide letter no.7569/DM dated 24.09.2019 of the Directorate of Mines, Odisha, Bhubaneswar.
4. The mining lease area is bounded by latitude 19° 20’ 20.10” N to 19° 20’ 29.20”N & longitude 84° 44’ 8.90” E to 84° 44’ 22.70” E in plot no-705 (part), 711 (part), 714 (part). It is a part of the area covered in the Survey of India Toposheet No. 74A/11. Lease area comes under Kukudakhandi Tahasil which is located at a distance of about 16km. Mining Lease area is accessible from Berhampur city of Ganjam District at a distance of 12 Km on Berhampur- Digapahandi road and 3 Km metal (black top) village road from the village Mahuri Kalua. Nearest railway station is located at Berhampur at a distance of 16 km. The NH-59 is at a distance of 12 Kms, SH-17 is at a distance of 3 kms and public road is accessible at a distance of 3 Kms. Ichhapuram canal is flowing at a distance of 1.50 km from northern boundary of the area which controls the drainage system in the area.

5. The Geological Reserve is 126547 Cum and Mineable Reserve is 92948 Cum. The project will have total excavation of 81,900 Cum of rock zone (ROM) out of which 12,285 Cum shall be Marketable/saleable rock and 36,855 Cum will be waste in nature. Opencast and semi mechanized method will be used for extraction of decorative stone from the quarry through the formation of safe benches which will be on single shift basis. Height and width of the benches will be kept at 6m each. Overall pit slope angle will be 45° with the horizontal. Drilling & wedging will be performed depending upon the production requirement.
6. Out of 4.50 hectares only 2.528 hectares will be use for mining of decorative stone during plan period. During plan period 36855cu.m of waste will be generated. For dumping these waste materials a proposed dump has been suggested covering an area of 0.303 Ha. A retaining wall around the dump will be constructed to prevent the wash off of dumps. Around the retaining wall a garland drain and settling tank will be provided to prevent the possible transportation of mine dust or fines
7. Water Requirement – Water requirement for the project will be 1.3 KLD. For drinking & domestic purpose water requirement will be 0.3 KLD, water requirement for Green belt development and dust suppression will be 0.8 KLD and source from water tankers.
8. Power Requirement - No use of electric power as the operation will be done in day time. However solar lights will be used for day to day living purposes.
9. Green Belt - 500 nos. of saplings along the safety zone boundary over an area of 2000m² during the five years of plan period. Local species like neem, mahaneem, mango, chakunda, acacia, eucalyptus etc will be planted
10. Employment Potential: Total number of employee will be around 32 which includes skilled, semi-skilled & unskilled category in the mine.
11. The project cost is 90 lakhs.
12. The Environment consultant **M/s P&M Solution, Noida -201301 – U.P** along with the proponent has made a presentation on the proposal before the Committee.

Considering the information / documents furnished by the proponent and presentation made by the consultant **M/s P&M Solution, Noida -201301 – U.P**, the SEAC decided to take decision on the proposal after receipt of the following information / documents from the proponent.

- (i) Engineering estimation of quality and quantity of wastes, its storage and usage.
- (ii) Details on how to ensure zero discharge from quarry.
- (iii) Nearest habitation from lease area.
- (iv) Copy of minutes of public hearing.
- (v) Mitigation measures to be undertaken in ecological sensitivity part.
- (vi) Detailed report on CSR & CER activities covered by mine owners.
- (vii) Certificate from the concerned Mining Officer about name and area of other mines located within 500 meter from the periphery of the lease boundary and their operational status.

ITEM NO. 04**PROPOSAL OF ENVIRONMENTAL CLEARANCE FOR BHAGABANPUR DECORATIVE STONE MINES OVER AN AREA OF 24.225 HA AT VILLAGE-BHAGABANPUR, TAHASIL-KUKUDAKHANDI, DISTRICT-GANJAM OF M/S. ILIYAS GRANITES (IN CLUSTER APPROACH TOTAL AREA-28.333 HA) – EC**

1. The proposal is for Environmental Clearance for Bhagabanpur Decorative Stone Mines over an area of 24.225 ha at village-Bhagabanpur, Tahasil - Kukudakhandi, District-Ganjam of M/s. Iliyas Granites (in cluster approach total area-28.333 ha).
2. The project falls under item category 'B' 1(a)-Mining of Minerals in the Schedule of EIA Notification, 2006 & Subsequent amendments thereof. There are three other mines are located within the 500 m radius of this mine, and total area of the mines leases in cluster is more than 25 ha.
3. ToR was issued for the project vide letter no. 127/SEAC-96 dated 03.03.2018.
4. The mining lease area was granted for 20 years period vide letter no. 900, dated 01.02.2016. The mining plan has been approved vide letter no11565/DM Dated 19.12.2016. by Director of Mines Odisha, Bhubaneswar.
5. **Location & Connectivity** - The mine located in village - Bhagabanpur, Tahasil Kukudakhandi, District - Ganjam, Odisha is a part of Survey of India Toposheet bearing No.74A/11 is bounded by the latitudes from 19°20'06.5" N to 19°20'30"N & longitudes from 84°42'54.0" E to 84°43'14.50"E on Plot No 7, 8, Khata No.-215 . Lease area is accessible from Berhampur city of Ganjam District at a distance of 5.5 Km. Nearest railway station is located at Berhampur at a distance of 9.5 km. NH – 217 at 5.5km from lease area. Ramagurha RF at 0.81km. SH-17 is at 3.5km.
6. **Reserves & Method of Mining** – Total Reserves is 2268990 cum. Mining is proposed to be carried out by opencast semi mechanized method with deployment of machines like Excavator, Line Offset, compressor, jack-hammer, wire ropes and drill rod etc. The height of the benches will be 3mtr and width will be 6mtr and overall slope angle will be 45°.
7. Volume of year wise production of decorative stone is computed based on tabulated geo-mining parameters. The proposed year wise Quarry production schedule for decorative stone is as follows:

Summary Proposal for Year wise Excavation

Year	Total Volume of Excavation m ³	Waste Volume @ 35%: m ³	Present non-saleable stone volume: m ³	Vol of Saleable Decorative Stone: m ³		
				Khanda @01 %	Block @14%	Total @15 %
1st Year	13020	2557	6510	130	1823	1953
2nd Year	16660	5381	8330	167	2332	2499
3rd Year	19880	6958	9940	199	2783	2982
4th Year	22260	7791	11130	223	3116	3339
5th Year	25900	9065	12950	259	3626	3885
Total	97720	37202	48860	978	13680	14658

8. The ultimate mineable area will be 11.962 ha. Total 0.803 ha area will be converted in to greenbelt. Total 0.750 hectares has been allocated for waste dumping. This will be temporary dump. The life of mine will be 137 years which is the sum of 5 years of the plan period and the next 132 years beyond the plan period which exceeds the lease

period of 20 years. There is no Top Soil present in the ML area.

9. **Greenbelt:** Total Green belt will be developed over 0.803 ha, at end of plan period with 13000nos of saplings planted within the plan period.
10. **Water Requirement** - Total Water Requirement for different purposes like domestic, Dust suppression, plantation purposes is 4.5KLD sourced from bore well.
11. **Power Requirement** - Total Electricity required is will be sourced from state Grid.
12. **Employment Potential** - A total of 27 persons will be employed in the mine out of which most of the unskilled & semi-skilled labour is sourced from local villages.
13. Baseline data collection was in period March 2018 – May 2018.
14. Public Hearing was conducted on dated 06-08-2019.
15. **Cost of Project** - Capital Cost of the project is estimated to be Rs.85 lakhs.
16. The Environment consultant **M/s P&M Solution, Noida -201301 – U.P** along with the proponent has made a presentation on the proposal before the Committee.

Considering the information / documents furnished by the proponent and presentation made by the consultant **M/s P&M Solution, Noida -201301 – U.P**, the SEAC decided to take decision on the proposal after receipt of the following information / documents from the proponent.

- (i) Borewells to be installed instead of hand pumps.
- (ii) Details of waste management with composition. Details of waste management along with engineering estimation of utilisation.
- (iii) Distance of village road from lease area.
- (iv) Detailed report on measures to be undertaken for Environment protection.
- (v) Maintenance of Biodiversity Register.
- (vi) Trees uprooted in mining area shall be transplanted in safety zone.
- (vii) NOC from village panchayat for using village/public road for transportation and maintenance of it.
- (viii) Plantation in approach road to be undertaken.
- (ix) Details of surface runoff to be managed to ensure zero discharge in monsoon period.
- (x) Highlight the environment issues /concern raised as per MOM of Public Hearing and Action plan is proposed in physical terms with the frame to be submitted.
- (xi) Settling pond design details to be submitted to ensure prevention of overflow during monsoon.

ITEM NO. 05

APPEAL OF PATABEDA IRON ORE MINES FOR AMENDMENT OF ENVIRONMENTAL CLEARANCE FOR EXPANSION OF IRON ORE PRODUCTION FROM 0.8 MTPA TO 1.5 MTPA ALONG WITH CRUSHER AND SCREEN PLANTS OVER AN AREA 28.397 HA AT VILLAGE-PATABEDA, TAHASIL-KOIRA, DIST-SUNDARGARH OF M/S. MGM MINERALS LTD – AMENDEMENT OF EC

1. The proposal was considered for Amendment of Environmental Clearance for Patabeda Iron ore Mines for expansion of iron ore production from 0.8 MTPA to 1.5MTPA along with crusher and screen plants over an area 28.397 ha at village-Patabeda, Tahasil-Koira,

Dist-Sundargarh of M/s. MGM Minerals Ltd.

2. As per EIA Notification dated 14.09.06 and its subsequent amendments S.O.141 (E) on dated 15.1.2016, the project falls under, Category "B1".
3. MGM Minerals Ltd is operating Patabeda iron ore mines in Patabeda Village, Tahasil Koira, Bonai Sub division, Sundargarh District, Odisha.
4. The lease was executed on 08.03.2006 for 20 years, which is valid up to 07.03.2026. As per MMDR (Amendment) Act 2015, the validity of the lease period is deemed to be extended for a period of fifty years i.e. 07.03.2056.
5. The total lease area is 28.397 Ha. Out of which 27.086 Ha is forest area (DLC area) and balance 1.311 Ha is non-forest land.
6. Forest Clearance obtained for 23.581 Ha excluding the safety zone vide letter no. 8(21)28/2003-FCE dated 30.12.2005. General approval under section 2 (iii), FC Act, 1980 accorded for balance area.
7. Environmental Clearance for production of 1.5 MTPA (ROM) along with Crusher & Screen plants granted vide letter No. 7722/SEIAA on dated 03.01.2020.
8. CTO granted by SPCB for 1.5 MTPA (ROM) along with Crusher & Screen plants on dated 07.03.2020
9. Mine is in operation since 01.11.2006.
10. In the specific condition No. 11, It is mentioned that "the proponent shall install online Ambient Air Quality Monitoring System and there should be a system for display of digital AAQ data within 3 months at least at 3 locations as per wind direction xxxxxxx".
11. But ToR for this project has been issued by SEAC vide letter No. 847/SIA/OR/MIN/28134/2018/SEAC/154 dated 12.10.2018. In the condition no. 22 of specific ToR (Recommendation of CSIR-NEERI carrying capacity study) it is mentioned that "xxxxxxx. Out of the four stations one should be online monitoring stations in the mines having more than 3.00 MTPA EC capacity, xxxxxx". Whereas, EC granted for enhanced iron ore production up to 1.5 MTPA (ROM) only.
12. The proponent made an appeal for amendment in Environmental Clearance for exemption of the specific condition no. 11 of the granted Environmental Clearance.

Considering the information / documents furnished by the proponent and presentation made by the consultant, the SEAC recommended to waive off the specific condition no. 11 of Environmental Clearance granted by SEIAA, Odisha vide letter no. 7722/SEIAA on dated 03.01.2020 for production of Iron Ore upto 1.5 MTPA (ROM) as per recommendation of CSIR-NEERI carrying capacity study.

ITEM NO. 06

PROPOSAL OF ENVIRONMENTAL CLEARANCE OF CHILIKA DISTILLERIES PVT. LTD FOR PROPOSED 110 KLPD GRAIN BASED DISTILLERY AND 5 MW CO-GENERATION POWER PLANT OVER AN AREA 12 61HA/31.16ACRES AT VILLAGE KANAKA, TAHASIL- KHALLIKOTE, DISTRICT- GANJAM (ODISHA) OF SRI. VIKRANT KUMAR SAHU, MD – EC

1. The proposal was considered for Environmental Clearance of M/s Chilika Distilleries Pvt. Ltd for proposed 110 KLPD Grain based distillery and 5 MW co-generation power plant over an area 12 61Ha/31.16acres at Village Kanaka, Tahasil- Khallikote, District- Ganjam (Odisha) of Sri. Vikrant Kumar Sahu, MD - EC.

2. The proposed project falls under the item no. 5 (g) i.e. Distilleries and Category B (<60 KLPD non molasses based industry).
3. Earlier, company obtained Environmental Clearance at the same location for 55 KLPD Grain based distillery along with 2.2 MW Co-generation power plant from SEIAA, Odisha vide letter no. 16765/ 08-NCMB1/ 07- 2016 & reference no. SEIAA/ 2856 dated 17th April, 2017. The company also proposed 30 lakhs cases/annum bottling plant.
4. Due to non - viability of small project of 55 KLPD, the company has not started the construction & installation of the project and now intends to start the project work of proposed enhanced capacity of grain based distillery (55 KLPD to 110 KLPD) & cogeneration power plant (2.2 MW to 5.0 MW).
5. M/s Chilika Distilleries Pvt. Ltd., proposes to establish a State-of-Art Grain based Distillery for the production of 110 KLPD of Alcohol and 5 MW captive power plant at Kanaka, block Khallikote, District Ganjam, Odisha. Geographically, the site is located at 19° 34'43.83 N, 85°06' 42.17' E. NH-5 highway is at a distance of 0.5 km. Chilika Lake, Gopakunda, Haridamula, Hajapata, Kankadakuda and Dalibati are the nearby villages situated at a distance of 0.5, 0.7, 1.5, 2.7, 2.2 and 2.1 km respectively. There are no National Parks, Wildlife Sanctuaries, Biosphere Reserves, Tiger/Elephant Reserves, Wildlife Corridors etc. within 10 km distance from the project site. There are 13 reserved forests and 2 protected forests in study area. Nearest Reserved forests are: Talakhhol RF (Adjacent to the plant site), Karakhhol RF (0.5 km) Sanaghati RF (1.0 km). Protected forests are: Ranibara PF (8.0 km) & Nandighar PF (9.0 km). There are two water bodies in study area: Chilika lake (2.5 km), Khalajhar Nadi (9.5 km). Other places like Nalaban Island- Chilika Bird Sanctuary is situated 22 km away from project boundary.
6. **Process Manufacturing** - The manufacturing of alcohol/spirit takes place in two stages; 1) fermentation and 2) distillation. In the process, after grain milling, the milled raw material is subjected to liquefaction methods which involve heating of aqueous starch slurry wherein the granular starch in the slurry swells and bursts and starch molecules dispersed into the solution. Then this liquefied slurry will be subjected to fermentation. The fermentation will convert the fermentable substrate into alcohol. During fermentation, sugars are broken down into Alcohol, cogenerating Carbon Dioxide with release of significant amount of heat. After fermentation is complete, fermenter wash is taken into distillation system where alcohol will be separated and concentrated using principle of fractional distillation. The slope from distillation will be taken to the decantation section. After decantation, thick wet cake will be sent to dryer and thin slope will be sent for evaporation. Concentrated syrup from evaporation and thick cake from decantation will be dried in dryer and form product known as DDGS.
7. **Raw Materials** - Daily consumption of the raw material required to manufacture are Broken rice, Liquefying Enzyme, Saccharifying Enzyme, Viscosity Reducing Enzyme, Yeast, Anti-Bacterial Agent, Sodium Hydroxide Lye, Sulphuric Acid, Urea, Antifoaming Agent, Sulphamic Acid and Nitric Acid.
8. Products to be manufactured are Ethanol/ Extra Neutral Alcohol (ENA)/ Rectified Spirit (RS) and 60 lakhs cases /annum Bottling Unit of Country Liquor (CL) & Indian Made Foreign Liquor (IMFL) along with power.

9. **Water Requirement** - Total water requirement for the proposed project will be 900 KLPD (725 KLPD for distillery + co-generation power plant+ utilities, 150 KLPD for blending & bottling, 25 KLPD for domestic & others) which will be met from Surface water (Rushikulya River).
10. **Power Requirement** - Total power requirement will be 4.5 MW which will be met from proposed 5.0 MW co-generation power plant. D.G. Sets of 2x750 KVA capacity will be used as standby during power failure. Stack (5 m height) will be provided as per CPCB norms to the proposed DG sets.
11. The company has proposed 35 TPH co-generation power plant and fuel will be rice husk or coal. Electrostatic Precipitator with a stack height of 52 meters will be installed for controlling the particulate emissions within the statutory limit for the proposed boiler.
12. Baseline data collection was carried out at 8 locations during Summer Season (March to May, 2018)
13. **Effluent Generation** - Effluent of 615 KLPD quantity will be treated through Condensate Treatment Plant (Based on Anaerobic, aerobic treatment, filters, UF & RO) of capacity 1000 KLPD. The plant will be based on Zero Liquid discharge system.
14. Details of Process emissions generation and its management.
 - (i) ESP with stack of adequate height (52 m) will be installed with the boiler (35 TPH) to control the particulate and gaseous emissions due to combustion of fuel.
 - (ii) CO₂ will be collected & sold to third parties or in future the company can set up its own unit to produce food/industrial CO₂.
15. Solid waste/ Hazardous waste generation and its management.
 - (i) DDGS generated after concentration and drying of DWGS will be used as cattle, fish, poultry feed due to rich nutrient content. Yeast sludge will be mixed with wet cake.
Ash from the boiler will be given to brick manufacturing unit.
 - (ii) Used oil & grease generated from plant machinery/gear boxes as hazardous waste will be sold out to the CPCB authorized recyclers.
16. Public Hearing for the proposed project has been conducted by Odisha State Pollution Control Board on 23rd February, 2019 at Multipurpose Cyclone Shelter Situated in Village Pana Nuagaon, District Ganjam (Odisha). The main issues raised during the public hearing are related to Ground water depletion, air and water pollution, local development, employment.
17. No Litigation is pending against the proposal.
18. Total Employment will be 613 persons during construction and operation phase on permanent and temporary basis. No. of working days will be 350 days/annum
19. Greenfield project of Chilika Distilleries Pvt. Ltd. proposes to allocate Rs. 1.8 Crores i.e. 2% of total project cost as per Office Memorandum dated 1st May, 2018 towards Corporate Environment Responsibility.
20. The estimated project cost is Rs. 90 Crores for proposed project. Total capital cost earmarked towards environmental pollution control measures is Rs. 14.9 Crores and

the Recurring cost (operation and maintenance) will be about Rs. 241.50 lakhs per annum.

21. The Consultant **J.M. EnviroNet Pvt. Ltd. Gurugram (Haryana)** made a detailed presentation on behalf of the proponent on 13.11.2020.

Considering the information / documents furnished by the proponent and presentation made by the consultant **J.M. EnviroNet Pvt. Ltd. Gurugram (Haryana)**, the SEAC decided to take decision on the proposal after receipt of the following information / documents from the proponent.

- (i) Details of zero discharge with water balance to be adopted in plant.
- (ii) Detailed time schedule for implementation of project.
- (iii) Material flow and balance in the Flowsheet (box diagram) to be given along with units for better understanding.
- (iv) What is the technology source and whether it is proven and approved by appropriate authority? Any other plant in India operating with same technology? Provide details.
- (v) What is the quality control measures for Extra natural alcohol (ENA), Rectified spirit and Ethanol?
- (vi) Uses of Rectified spirit and ENA. If for medical applications, certification of each batch by appropriate authority would be required. Also, the process validation to be certified by appropriate medical authority with regard to safe quality of products and process is required before start-up.
- (vii) Since a boiler (35 tph) will be used to produce steam, permission of Boiler inspector required before start-up.
- (viii) Odour control measures specifically during evaporation and distillation etc.
- (ix) Quantity of DDGS and final effluent (re-used in plant) generation per day along with their Composition.
- (x) Any effluent generation, if so its composition and disposal management
- (xi) If CPU stands for Condensate Polishing Unit, then the details of condensate quality and quantity generation after polishing.
- (xii) If MEE stands for Multi effect evaporation unit, its water balance (input water, how much condensate generate and concentrate liquor) along with quality of each and treatment process.
- (xiii) Why RO is used if CPU is to be used? Elaborate the functions of both.
- (xiv) Since DM water is used, what is the source? Is a DM water generation plant also to be installed?
- (xv) How the CO₂ will be collected, explain.
- (xvi) Can it be ZERO EFFLUENT in rainy season?
- (xvii) Provide details of ETP.
- (xviii) Who are the brick manufacturers with whom tie up has been made to use 60 tpd coal ash and also ash storage facility? Copy of MoU to be provided.

- (xix) Sufficient water for safety needs (in case of any leakage) and Fire alarm system need to be provided. Details to be given.
- (xx) Not much about power generation in the presentation. Details of co-generation of power to be provided?
- (xxi) Any acids used in process? If so, how are they handled and disposed?
- (xxii) The condensate COD and BOD are high as per presentation. Will it have impact in process when re-used? Explain.
- (xxiii) Whether molasses is generated at any process step? If so, details to be provided.
- (xxiv) Details of solar energy with percentage of total power used?
- (xxv) Many of the points in public hearing was to fix another date. Details of the reason with compliances proposed/agreed to be given.
- (xxvi) A sub committee of SEAC, will visit the plant at least 6 months after issue of EC inorder to verify the implementation of EC condition and if found not inorder the EC may be suspended/revoked.


Secretary, SEAC


Chairman, SEAC

TERMS OF REFERENCE (ToR) FOR CONDUCTING ENVIRONMENT IMPACT ASSESSMENT STUDY AND INFORMATION TO BE INCLUDED IN EIA/EMP REPORT FOR DALPAHAR IRON AND MANGANESE ORE MINE OF SRI D.C JAIN FOR ENHANCEMENT IN PRODUCTION CAPACITY OF IRON ORE FROM 708 TPA TO 0.31 MTPA AND MANGANESE ORE 0.094MTPA OVER AN MINING LEASE AREA 89.961 HA IN VILLAGE - DALPAHAR, TAHASIL-BARBIL, DISTRICT - KEONJHAR OF SAMARENDRA MOHANTY (GM) – TOR

A. STANDARD TOR FOR MINING PROJECT

1. The Environmental Clearance will not be operational till such time the Project Proponent complies with all the statutory requirements and judgment of Hon'ble Supreme Court dated the 2nd August 2017 in Writ Petition (Civil) No. 114 of 2014 in the matter of Common Cause versus Union of India and Ors..
2. Department of Mining & Geology, State Government shall ensure that mining operation shall not commence till the entire compensation levied, 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 the 2nd August 2017 in Writ Petition (Civil) No. 114 of 2014 in the matter of Common Cause versus Union of India and Ors.
3. Year-wise production details since 1994 should be given, clearly stating the highest production achieved in any one year prior to 1994. It may also be categorically informed whether there had been any increase in production after the EIA Notification 1994 came into force, w.r.t. the highest production achieved prior to 1994.
4. A copy of the document in support of the fact that the Proponent is the rightful lessee of the mine should be given.
5. All documents including approved mine plan, EIA and Public Hearing should be compatible with one another in terms of the mine lease area, production levels, waste generation and its management, mining technology etc. and should be in the name of the lessee.
6. All corner coordinates of the mine lease area, superimposed on a High Resolution Imagery/toposheet, topographic sheet, geomorphology and geology of the area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).
7. Information should be provided in Survey of India Toposheet in 1:50,000 scale indicating geological map of the area, geomorphology of land forms of the area, existing minerals and mining history of the area, important water bodies, streams and rivers and soil characteristics.
8. Details about the land proposed for mining activities should be given with information as to whether mining conforms to the land use policy of the State; land diversion for mining should have approval from State land use board or the concerned authority.
9. It should be clearly stated whether the proponent Company has a well laid down Environment Policy approved by its Board of Directors? If so, it may be spelt out in the EIA Report with description of the prescribed operating process/procedures to bring into focus any infringement/deviation/violation of the environmental or forest norms/ conditions? The hierarchical system or administrative order of the Company to deal with the environmental

issues and for ensuring compliance with the EC conditions may also be given. The system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the Company and/or shareholders or stakeholders at large, may also be detailed in the proposed safeguard measures in each case should also be provided.

10. The study area will comprise of 10 km zone around the mine lease from lease periphery and the data contained in the EIA such as waste generation etc. should be for the life of the mine / lease period.
11. Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.
12. Details of the land for any Over Burden Dumps outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be given.
13. A Certificate from the Competent Authority in the State Forest Department should be provided, confirming the involvement of forest land, if any, in the project area. In the event of any contrary claim by the Project Proponent regarding the status of forests, the site may be inspected by the State Forest Department along with the Regional Office of the Ministry to ascertain the status of forests, based on which, the Certificate in this regard as mentioned above be issued. In all such cases, it would be desirable for representative of the State Forest Department to assist the Expert Appraisal Committees.
14. Status of forestry clearance for the broken up area and virgin forestland involved in the Project including deposition of net present value (NPV) and compensatory afforestation (CA) should be indicated. A copy of the forestry clearance should also be furnished.
15. Implementation status of recognition of forest rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 should be indicated.
16. The vegetation in the RF / PF areas in the study area, with necessary details, should be given.
17. A study shall be got done to ascertain the impact of the Mining Project on wildlife of the study area and details furnished. Impact of the project on the wildlife in the surrounding and any other protected area and accordingly, detailed mitigative measures required, should be worked out with cost implications and submitted.
18. Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger/Elephant Reserves/(existing as well as proposed), if any, within 10 km of the mine lease should be clearly indicated, supported by a location map duly authenticated by Chief Wildlife Warden. Necessary clearance, as may be applicable to such projects due to proximity of the ecologically sensitive areas as mentioned above, should be obtained from the Standing Committee of National Board of Wildlife and copy furnished.
19. A detailed biological study of the study area [core zone and buffer zone (10 km radius of the periphery of the mine lease)] shall be carried out. Details of flora and fauna, endangered, endemic and RET Species duly authenticated, separately for core and buffer zone should be furnished based on such primary field survey, clearly indicating the Schedule of the fauna present. In case of any scheduled-I fauna found in the study area, the necessary plan alongwith budgetary provisions for their conservation should be

prepared in consultation with State Forest and Wildlife Department and details furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost.

20. Proximity to Areas declared as 'Critically Polluted' or the Project areas likely to come under the 'Aravali Range', (attracting court restrictions for mining operations), should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCB or State Mining Dept. Should be secured and furnished to the effect that the proposed mining activities could be considered.
21. Similarly, for coastal Projects, A CRZ map duly authenticated by one of the authorized agencies demarcating LTL, HTL, CRZ area, location of the mine lease w.r.t CRZ, coastal features such as mangroves, if any, should be furnished. (Note: The Mining Projects failing under CRZ would also need to obtain approval of the concerned Coastal Zone Management Authority).
22. R&R Plan/compensation details for the Project Affected People (PAP) should be furnished. While preparing the R&R Plan, the relevant State/National Rehabilitation & Resettlement Policy should be kept in view. In respect of SCs/STs and other weaker sections of the society in the study area, a need based sample survey, family-wise, should be undertaken to assess their requirements, and action programmes prepared and submitted accordingly, integrating the sectoral programmes of line departments of the State Government. It may be clearly brought out whether the village(s) located in the mine (lease area) will be shifted or not. The issues relating to shifting of village(s) including their R&R and socio-economic aspects should be discussed in the Report.
23. One season (non-monsoon) [i.e. March - May (Summer Season); October - December (post monsoon season) ; December - February (winter season)] primary baseline data on ambient air quality as per CPCB Notification of 2009, water quality, noise level, soil and flora and fauna shall be collected and the AAQ and other data so compiled presented date-wise in the EIA and EMP Report. Site-specific meteorological data should also be collected. The location of the monitoring stations should be such as to represent whole of the study area and justified keeping in view the pre-dominant downwind direction and location of sensitive receptors. There should be at least one monitoring station within 500 m of the mine lease in the pre-dominant downwind direction. The mineralogical composition of PM₁₀, particularly for free silica, should be given.
24. Air quality modelling should be carried out for prediction of impact of the project on the air quality of the area. It should also take into account the impact of movement of vehicles for transportation of mineral. The details of the model used and input parameters used for modelling should be provided. The air quality contours may be shown on a location map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The wind roses showing pre-dominant wind direction may also be indicated on the map.
25. The water requirement for the Project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the Project should be indicated.
26. Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided.
27. Description of water conservation measures proposed to be adopted in the Project should

- be given. Details of rainwater harvesting proposed in the Project, if any, should be provided,
28. Impact of the Project on the water quality, both surface and groundwater, should be assessed and necessary safeguard measures, if any required, should be provided.
 29. Based on actual monitored data, it may clearly be shown whether working will intersect groundwater, Necessary data and documentation in this regard may be provided. In case the working will intersect groundwater table, a detailed Hydro Geological Study should be undertaken and Report furnished. The Report inter- alia, shall include details of the aquifers present and impact of mining activities on these aquifers. Necessary permission from Central Ground Water Authority for working below ground water and for pumping of ground water should also be obtained and copy furnished.
 30. Details of any stream, seasonal or otherwise, passing through the tease area and modification / diversion proposed, if any, and the impact of the same on the hydrology should be.
 31. Information on site elevation, working depth, groundwater table etc. Should be provided both in AMSL and BGL. A schematic diagram may also be provided for the same.
 32. A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form (indicating the linear and quantitative coverage, plant species and time frame) and submitted, keeping in mind, the same will have to be executed up front on commencement of the Project. Phase-wise plan of plantation and compensatory afforestation should be charted clearly indicating the area to be covered under plantation and the species to be planted. The details of plantation already done should be given. The plant species selected for green belt should have greater ecological value and should be of good utility value to the local population with emphasis on local and native species and the species which are tolerant to pollution.
 33. Impact on local transport infrastructure due to the Project should be indicated. Projected increase in truck traffic as a result of the Project in the present road network (including those outside the Project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including action to be taken by other agencies such as State Government) should be covered. Project Proponent shall conduct Impact of Transportation study as per Indian Road Congress Guidelines.
 34. Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report.
 35. Conceptual post mining land use and Reclamation and Restoration of mined out areas (with plans and with adequate number of sections) should be given in the EIA report.
 36. Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.
 37. Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.

Secretary, SEAC

38. Measures of socio economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.
39. Detailed environmental management plan (EMP) to mitigate the environmental impacts which, should inter-alia include the impacts of change of land use, loss of agricultural and grazing land, if any, occupational health impacts besides other impacts specific to the proposed Project.
40. Public Hearing points raised and commitment of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP Report of the Project.
41. Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.
42. The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.
43. A Disaster management Plan shall be prepared and included in the EIA/EMP Report.
44. Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.
45. The activities and budget earmarked for Corporate Environmental Responsibility (CER) shall be as per MoEF&CC, Govt. of India O.M No 22-65/2017-IA. II (M) dated 01.05.2018 and the action plan on the activities proposed under CER shall be submitted at the time of appraisal of the project included in the EIA/EMP Report.
46. The Action Plan on the compliance of the recommendations of the CAG as per MoEF&CC, Govt. of India Circular No. J-11013/71/2016-IA.I (M), dated 25,10.2017 needs to be submitted at the time of appraisal of the project and included in the EIA/EMP Report.
47. Compliance of the MoEF&CC, Govt. of India Office Memorandum No. F: 3-50/2017-IA.III (Pt.), dated 30.05.2018 on the judgement of Hon'ble Supreme Court, dated the 2nd August, 2017 in Writ Petition (Civil) No. 114 of 2014 in the matter of Common Cause versus Union of India needs to be submitted and included in the EIA/EMP Report.

B. Specific TOR : 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. 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.
2. The expansion or opening of new manganese ore mines may be considered only when the actual production of about 80% is achieved. Further, the mines that have not produced Mn ore for last two years and have no commitment in the current year as well: EC capacity in such cases may be reviewed. The Department of Steel & Mines, Govt. of Odisha shall submit the Annual Report on this issue to the MoEF&CC for further necessary action.
3. Analysis of baseline environmental quality data for the year 2014 and 2016 indicates that existing mining activities appear to have little / no potential impact on environmental quality,

Secretary, SEAC

except on air environment, which was mainly due to re-suspension of road dust. Therefore, all the working mines can continue to operate with strict compliance to monitoring of environmental quality parameters as per EC and CTE/CTO conditions of the respective mine, 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.

4. Considering the existing environmental quality, EC capacity, production rate, iron ore resources availability and transport infrastructure availability, the share of Joda and Koira sector works out to be 70% and 30% respectively for the existing scenario for the year 2015-16. However, for additional EC capacity, it can be 50:50 subject to commensurate infrastructure improvement (viz. SOTM. pollution free road transport, enhancement of rail network etc.) in the respective regions.
5. Continuous monitoring of different environmental quality parameters as per EC and CTE/CTO conditions with respect to air, noise, water (surface and ground water) and soil quality in each region shall be done. The environmental quality parameters should not indicate any adverse impact on the environment. Monitoring within the mines should be done by individual mine lease holders, whereas outside the mine lease area, monitoring should be done by the Govt, of Odisha through various concerned departments/ authorized agencies. Various monitoring/ studies should be conducted through national reputed institutes, NABET/ MoEF&CC accredited laboratories/organizations. The reports submitted by individual mine lease holders and study reports prepared by other concerned departments/agency for each of the regions should be evaluated and examined by SPCB/ MoEF&CC.
6. Construction of 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 minimum 300 m inside the mine should be done. This should be done within one year for existing mines and new mine should have since beginning. The concerned departments should extend full support; wherever the land does not belong to the respective mine lease holders. 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 above.
7. In view of high dust pollution and noise generation due to road transport, it is proposed to regulate/guide the movement of iron and manganese ore material based on the EC capacity of the mines. Accordingly, ore transport mode has been suggested, as given below in Table.

Table : EC Capacity based Suggested Ore Transport Mode (SQTM)

Code	EC	Suggested Ore Transport Mode
SOTM 1	> 5 MTPA	100% by private railway siding or conveyor belt up to public railway siding or pipeline for captive mines and 70% for non-captive mines
SOTM 2	Between 3 and <5 MTPA	Minimum 70% by public railway siding, through conveyor belt and maximum 30% by road - direct to destination or other public railway siding or above option

Code	EC	Suggested Ore Transport Mode
SOTM 3	Between 1 and < 3 MTPA	Minimum 70% by public railway siding and maximum 30% by road - direct to destination or by other public railway siding or above options
SOTM 4	<1 MTPA	100 % by 10/17 Ton Trucks or above options

It is mentioned by State Govt, of Odisha that currently about 45% of the iron ore is despatched using rail network and progressively it will be increased to about 60% by rail/slurry over a period of 5 years, taking into account time required to set up more railway sidings.

In view of present ore transport practices and practical limitations, all the 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. However, 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.

Transportation of iron & manganese ore through river (jetty) to nearest Sea port (Sea cargo option) may be explored or connecting Sea ports with Railway network from the mines to be improved further so that burden on existing road and rail network and also pollution thereof can be minimized. 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 MoEF&CC and SEIAA, Odisha.

Responsibility: Department of Steel & Mines, Govt. of Odisha; Time Period: 5 Years for developing railway/ conveyor belt facilities

8. Development of parking plazas for trucks with proper basic amenities/ facilities should be done inside mine. This should be done within one year for existing mines and new mines should have since beginning. Small capacity mines (in terms of lease area or production) not having enough space within the mine lease areas should develop parking plaza at a common place within the region with requisite facilities. Responsibility: Individual Mine Lease Holders; Time Period: 1 Year
9. 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. Responsibility: Department of Steel & Mines with PWD / NHAI Time Period: 2 Years.
10. Regular vacuum cleaning of all mineral carrying roads aiming at "Zero Dust Resuspension" may be considered. Responsibility: PWD / NHAI/ Mine Lease Holders; Time Period: 3 months for existing roads.
11. Expansion of existing mines and new mines should be considered after conducting recent EIA Study (as per the provisions of EIA Notification 2006, as amended time to time) with proper justification on demand scenario for iron ore requirement and availability of pollution free transport network in the region. Responsibility: IBM, Department of Steel & Mines and MoEF&CC, New Delhi.

Secretary, SEAC

12. **Mine-wise Allocation of Annual Production:** 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 as suggested in Table, so that demand for iron ore can be anticipated, and actual production/dispatch does not exceed the suggested annual production.

**Table: Allocation of Production to Different Mines for 5 Years
(as per approved Mining Plan)**

Mine Lease	EC Capacity (MTPA)	Suggested Annual Production (MT)				
		2016-17	2017- 18	2018-19	2019-20	2020-21
		Yr 1	Yr 2	Yr 3	Yr 4	Yr 5
Mine 1	X1					
Mine 2	X2					
Mine 3	X3					
Mine n	Xn					
Total	160 +	105	129	153	177	201
Next year allocation = Average of EC Capacity and Last year production						

13. **Expansion of Existing Mines having Validity up to 2020:** In view of implementation of MMDR Act 2015, wherein many non-captive mines are expected to be closed by March 2020, total iron ore production scenario has been. It is expected that the non-captive mines having validity till 2020 shall try to maximize their production (limited to EC capacity) in the remaining period. Further, depending upon availability of iron ore resources, these mines may also seek expansion of EC capacity. It may be noted here that total EC capacity of existing 25 working mines having validity upto 2020 is about 85 MTPA, whereas actual production from these mines has been only 44.677 MT (52.6%) during 2015-16 and 57.07 MT (67.1%) during 2016-17. Also, it is expected that these mines would not even be able to achieve ore production as per existing EC capacity till March 2020. Therefore, these existing mines should go for production to the fullest extent to meet the requisite demand from the State. However, where EC limit is exhausted, application for expansion may be considered. Further, the EC process (i.e. Grant of TOR, Baseline data collection, Mining plan/ scheme approval, Public hearing, preparation of EIA/EMP Report. Appraisal by the EAC and grant of EC) takes about one year time. Under such circumstances, it is suggested that further applications for grant of TOR or grant of EC for expansion of production capacity of the mine should be considered for those existing mines, which have exhausted their capacity subject to consideration of all environmental aspects. Responsibility: Department of Steel & Mines and MoEF&CC, New Delhi.
14. **Sustained Iron Ore Production beyond 2020:** Considering the implementation of MMDR Act 2015, total production of iron ore in Odisha State is anticipated to be about 111 MT during 2016-17 (actual production was - 102.663 MT), 136 MT during 2017-18, 146 MT during 2018-19 and 146 MT during 2019-20. Then there will be substantial drop in total production (to the tune of 73 MT during 2020-21 onwards) due to closure of mines, which are valid up to 2020. Therefore, in order to maintain operation/sustained growth of downstream industries, iron ore mining in the region needs to be continued at a sustainable

rate. The State Govt. through Department of Steel and Mines should initiate appropriate action to ensure continued availability of iron ore from the region, as per suggested sustainable annual production

15. **Reserves Estimation**-Mining Plan and Exploration; Appropriate actions (geo- technical investigation for qualitative and quantitative resource estimation & other preparations for auction of mines), may be initiated taken into account the existing working mines, and the mines which were operational at some point of time (but closed presently due to various reasons). The total iron ore reserves/ resources available within the total lease area of each mine should be estimated by State Govt./NMET/ GSI (or any other approved agency) with respect to: (i) Total lease area of mine (surface), (ii) Maximum depth to which resources could be available, (iii) Resources below the ground water table (if intersected), (iv) Reserves are to be estimated as per UNFC code with respect to quantity and quality (% Fe content), (v) Maximum mining rate and area for auction (after 2020) will be calculated based on total resources available and proposed life of mine leading to closure of mine in a stipulated time period. Responsibility: Department of Steel & Mines, IBM and GSI; Time frame: 1 year for the mines to be auctioned for next 2 years. The above mentioned organizations shall ensure the compliance with respect to timelines for implementations.
16. Depending upon availability of extractable iron ore resources within a mine, mining below the ground water table may be permitted after conducting necessary geological and hydro-geological study by GSI and requisite approval from the CGWB/CGWA (Central Ground Water Board/Authority). This can be explored at least in few mines on trial/pilot basis. Further, within a mine, it will be desirable to operate one pit at a time, and next pit should be opened after extracting maximum possible resources from the first pit, so that the exhausted pit can be used for back filling/ storing of low grade iron ore. However, depending upon the quantity and/or quality of iron/ manganese ore, other mine pits in the same mine lease may also be opened for sustainable scientific mining, as per approved mining plan/scheme of mining by IBM. The Department of Steel & Mines, Govt. of Odisha should initiate the pilot project so that minerals are fully utilized.
17. **Commercial Utilization of Low Grade Ore:** 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 as cosmetics, pharmaceutical, paint industry should also be explored. Responsibility: IBM, Dept, of Steel & Mines, Individual Mine Lease Holders.
18. 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.

19. 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.
20. Large and medium mine leases contribute to better implementation of reclamation and rehabilitation plans to sustain the ecology for scientific and sustainable mining. The small leases do not possess scientific capability of environmentally sustainable mining. Therefore, new mine leases having more than 50 ha area should be encouraged, as far as possible. This will ensure inter-generational resource availability to some extent. Responsibility: Dept, of Steel & Mines, Govt, of Odisha.
21. **Mining Operations/Process Related:** (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 wasted 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.
22. **Air Environment Related:** (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 GPCB 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, PM10, PM2.5, SO₂, NO_x 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, PM₁₀, PM_{2.5}, SO₂, NO_x 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. Further, 11 continuous air quality monitoring systems may be installed in Joida and Koira regions and one in Baripada/ Rairangpur region, (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 using 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.

23. **Noise and Vibration Related:** (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 (detailed in Section 5.4) 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.
24. **Water/Wastewater Related :** (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 geotextile 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.

25. **Land/ Soil/ Overburden Related** : (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-mineralised 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 off as per provisions of Hazardous Waste Management Rules, 2016, as amended from time to time. Responsibility: Individual Mine Lease Holders.

26. **Ecology/Biodiversity (Flora-Fauna) Related:** (i) As per the Red List of IUCN (International Union for Conservation of Nature), six floral species and 21 faunal species have been reported to be under threatened, vulnerable & endangered category. Protection of these floral and faunal species should be taken by the State Forest & Wildlife Department on priority, particularly in the mining zones, if any, (ii) The mines falling within 5-10 km of the Karo- Karampada Elephant corridor buffer need to take precautionary measures during mining activities. The forest and existing elephant corridor routes are to be protected and conserved. Improvement of habitat by providing food, water and space for the elephants is required to be ensured to avoid Man- Elephant conflicts. Though as per the records of State Forest Department, movement of elephants in the Karo-Karampada elephant corridor within 10 km distance from the mines in Joda and Koira is not observed, the Forest Department shall further record and ensure that elephant's movement is not affected due to mining activities, (iii) 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, (iv) 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, (v) 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, (vi) Green belt 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,

(vii) Vetiver plantation on inactive dumps may be encouraged as the grass species has high strength of anchoring besides medicinal value, (viii) 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, (ix) Similarly, Wildlife Department is also required to record and document annual status of wildlife in the region and should identify the need for wildlife management on regional level, (x) Maintenance of the ecology of the region is prime responsibility of the State Forest and Wildlife Department. They need to periodically review the status and identify the need for further improvement in the region. The required expenditure may be met from the funds already collected in the form of compensatory afforestation and wildlife management. Further, additional fund, if required can be sought from DMF. Responsibility: Individual Mine Lease Holders and State Forest & Wildlife Department.

27. **Socio-Economic Related:** (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 outtees and land losers/affected people, if any, should be compensated and rehabilitated as per the national/state policy on Resettlement and Rehabilitation, (iii) The socioeconomic development in the region should be focused and aligned with the guidelines/initiatives of Govt, of India/ NITI Aayog / Hon'ble Prime Minister's Vision centring 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-M.VI (Part), dated September 16, 2015. Responsibility: District Administration and Individual Mine Lease Holders.
28. **Road Transport Related:** (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 miner as suggested in Chapter 10. 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, PM₁₀ 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.
29. **Occupational Health Related:** (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),

30. **Reporting of Environmental Sustainability Achievement:** All the mines should prepare annual environmental sustainability report (ESR), highlighting the efforts made towards environmental protection with respect to different environmental components vis-a-vis production performance of the mine on monthly basis. The data collected as per EC and CTE/CTO conditions should be utilized to prepare the annual sustainability report. The mines performing high with effective environmental safeguards may be suitably recognized/rewarded. "Star Rating Format" formulated by the Ministry of Mines along with environmental sustainability report may be used,
31. **Environmental Monitoring Requirements at Regional Level:** Apart from strict compliance and monitoring by individual mine lease holder, there is a need for simultaneous monitoring in each of the regions by competent expert agencies under the guidance/ supervision of concerned regulatory agency. Details of the studies required to be done on regular basis (continuously for 5 years) through responsible agency (organization of national/state repute) and time frame are suggested in Table.

Table: Suggested Environmental Monitoring Requirements and Action Plans at

Sl. No.	Study component / Action Plan	Responsibility	Monitoring and Reporting Time Frame (Approx.)
1.	Environmental Quality Monitoring with respect to Air, Water, Noise and Soil Quality in each region (Joda, Koira and Baripada/Rairangpur) as per specified frequency shall be done by a third party (preferably Govt.) and/or laboratory approved/ recognized by NABET/ CPCB/ SPCB/ MoEF&CC. All the water bodies (rivers, nalias, ponds etc.) shall be monitored. National/State level research/ academic institutes may be involved initially for couple of years to streamline the activity. The report shall be brought out annually by June each year. The study shall be conducted in consultation with MoEF&CC-RO.	SPCB	Continuous Annually

Sl. No.	Study component / Action Plan	Responsibility	Monitoring and Reporting Time Frame (Approx.)
	Installation of online ambient air quality monitor for PM ₁₀ , PMP.S, SO _x and NO _x within the mine having more than 3 MTPA EC Capacity	Respective Mine Lease Holders	Continuous Annually
	Installation of online ambient air quality monitor for PM ₁₀ , PM _{2.5} , SO _x and NO _x in the Joda and Koira Region (total 11 locations).	SPCB	Continuous Annually
2.	Status of flora and fauna in each of the regions shall be assessed on annual basis. Changes, if any, taking place in the region shall be brought out clearly. The study shall be conducted in consultation with State Forest and Wildlife Department.	State Forest & Wildlife Dept.	Annually in mining zone and once in 3 years in the region
3.	Socio-economic study incorporating developments taking place in each of the region, CSR initiatives made by the mining companies shall be conducted on annual basis. Further, micro level developmental needs shall be clearly brought out in the report for each region. The study shall be conducted in consultation with district administration.	Respective District Administration	Annually
4.	A detailed hydro-geological study in each of the regions shall be conducted in an integrated manner in consultation with Regional Director, Central Ground Water Board. Accordingly, all project proponents shall implement suitable conservation measures to augment ground water resources in the area.	SPCB	Once in 2 years
5.	The State Govt. shall ensure construction and maintenance of dust free common roads/ appropriate rail network for transport of ore from mines to the consumer end.	Dept. of Steel & Mines	12 months for road network and 5-7 years for rail network
6.	Construction and maintenance of dust free roads from respective mine to the main road	Respective Mine Lease Holders	Continuous 6 months
7.	Traffic/road inspection study addressing the condition of	Dept. of Steel & Mines	Continuous 6 months

Sl. No.	Study component / Action Plan	Responsibility	Monitoring and Reporting Time Frame (Approx.)
	traffic/roads leading to different mines and connecting to different railway sidings shall be undertaken on annual basis. Further, detailed traffic study shall be undertaken on every 5 yearly basis to ensure adequacy of road/rail infrastructure in each of the regions. The study can be undertaken through national/ state level research/ academic institute (such as CSIR-CRRI, New Delhi).		
8.	Assessment of land use/ land cover changes in each of the regions, with particular focus on mining areas, afforestation activities, variation in flow path of various water bodies etc. using remote sensing data	ORSAC	Annually
9.	R&D Studies for utilization of low-grade iron ore	Dept. of Steel & Mines through R&D / Academic Institutes	Upto 45% by 2020 and upto 40% by 2025

The data so generated for the region should be made available on the website of Department of Steel & Mines and also at MoEF&CC website, so that it can be effectively utilized by Individual Mine Lease Holders for preparing EIA/ EMP reports. This will meet the requirement for separate one season baseline environmental quality data collection by the individual proponents, if the mine proposed is in the same study region. Further, MoEF&CC through EAC1 can also utilize the data base available in evaluating the proposals for expansion of existing mines or new mines while granting ToR or EC to the mine, taking an holistic view of the region. State Govt, of Odisha should bring out an integrated environmental sustainability report for each of the regions (mainly for Joda and Koia region) incorporating ESR of individual mines and data collected in the region through various agencies, once in 5 years, to plan level of scientific and sustainable mining for the next 5 years.

32. Institutional Mechanism for Implementation of Environmentally Sustainable Mining: The present study is not a one-time study, but a process to ensure environmentally sustainable mining activities in the region on long term basis. Looking into the large-scale mining activities and long term perspective for mining vis-a-vis environmentally sustainable mining and upliftment of people of the region, there is a need to create an agency, who will integrate all the aspects relating to sustainable mining in the region on long term basis. It could be a SPV of Govt, of Odisha or a cell within the overall control and supervision of Dept, of Steel & Mines, with members from

IBM, GSI, OSPCCB, MoEF&CC-RO and other concerned Departments and Mine Owners (EZMA), District Administration. It is found that the strong database available for the region needs to be taken into account to map and establish environmental quality of the region on daily, monthly, seasonal and annual basis. Further, the efforts and initiatives of the mines

towards environmental protection as well as upliftment of the people of the region are required to be integrated, and a systematic plan at the block/regional level needs to be framed for the overall benefit of the local society, region, district, state and the country as a whole. It will be desirable to have proper environmental quality data management and analysis by NEERI or any other agency for next 5 years (six monthly compliance reports followed by field verification) ensuring sustainable mining practices in the region leading to an overall development of the region. District Mineral Funds should be utilized appropriately for various developmental activities/needs of the region. Further, an environmental sustainability report incorporating environmental status of region coupled with social upliftment may be brought out by SPCB or any other authorized agency on annual basis. This report can be used for supporting the regional EIA study, and also need for environmental quality monitoring by individual mine seeking environmental clearance for new mine/ expansion of mine, including public hearing. Since, outcome of the above study reports shall be in the overall interest of all the stakeholders (including local population) of the region, further planning for the region shall warrant cooperation and assistance of all the stakeholders (mine operators, industries, transporters, State & Central Government Offices, MoEF&CC, CPCB, SPCB, Dept, of Steel & Mines, IBM, IMD, NGOs and local people) in sharing the relevant data/information/ reports/documents etc. to continuously improve upon the environmentally sustainable development plan for economic growth in mining sector as well as for improvement in quality of life of the people of the region.

C. Besides the above, the below mentioned general points are also to be followed:-

- a) All documents to be properly referenced with index and continuous page numbering.
- b) Where data are presented in the Report especially in Tables, the period in which the data were collected and the sources should be indicated.
- c) Project Proponent shall enclose all the analysis/testing reports of water, air, soil, noise etc. using the MoEF&CC/NABL accredited laboratories. All the original analysis/testing reports should be available during appraisal of the Project.
- d) Where the documents provided are in a language other than English, an English translation should be provided.
- e) The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted.
- f) While preparing the EIA report, the instructions for the Proponents and instructions for the Consultants issued by MoEF vide O.M. No. J-11013/41/2006- IA.II (I) dated 4th August, 2009, which are available on the website of this Ministry, should be followed.
- g) Changes, if any made in the basic scope and project parameters (as submitted in Form-I and the PFR for securing the TOR) should be brought to the attention of MoEF&CC with reasons for such changes and permission should be sought, as the TOR may also have to be altered. Post Public Hearing changes in structure and content of the draft EIA/EMP (other than modifications arising out of the P.H. process) will entail conducting the PH again with the revised documentation.
- h) As per the circular no. J-11011/618/2010-IA.II (I) dated 30.5.2012, certified report of the status of compliance of the conditions stipulated in the environment clearance for the existing operations of the project, should be obtained from the Regional Office of

Secretary, SEAC

Ministry of Environment, Forest and Climate Change, as may be applicable.

- i) The EIA report should also include (i) surface plan of the area indicating contours of main topographic features, drainage and mining area,(ii) geological maps and sections and (iii) Sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area.
- D. The prescribed TOR would be valid for a period of four years for submission of the EIA/EMP report.**

TERMS OF REFERENCE (ToR) FOR CONDUCTING ENVIRONMENT IMPACT ASSESSMENT STUDY AND INFORMATION TO BE INCLUDED IN EIA/EMP REPORT FOR KALAMANG WEST (NORTHERN PART) IRON ORE MINES FOR MINING OF IRON ORE WITH PRODUCTION CAPACITY OF 2.95 MTPA (ROM) AT VILLAGE- KALAMANG & GHODABUDANI DISTRICT- SUNDERGARH & VILLAGE - GANDALPADA, DISTRICT - KEONJHAR, ODISHA (MLA: 92.875 HA) OF M/S TATA STEEL BSL LTD. - TOR

A. STANDARD TOR FOR MINING PROJECT

1. The Environmental Clearance will not be operational till such time the Project Proponent complies with all the statutory requirements and judgment of Hon'ble Supreme Court dated the 2nd August 2017 in Writ Petition (Civil) No. 114 of 2014 in the matter of Common Cause versus Union of India and Ors..
2. Department of Mining & Geology, State Government shall ensure that mining operation shall not commence till the entire compensation levied, 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 the 2nd August 2017 in Writ Petition (Civil) No. 114 of 2014 in the matter of Common Cause versus Union of India and Ors.
3. Year-wise production details since 1994 should be given, clearly stating the highest production achieved in any one year prior to 1994. It may also be categorically informed whether there had been any increase in production after the EIA Notification 1994 came into force, w.r.t. the highest production achieved prior to 1994.
4. A copy of the document in support of the fact that the Proponent is the rightful lessee of the mine should be given.
5. All documents including approved mine plan, EIA and Public Hearing should be compatible with one another in terms of the mine lease area, production levels, waste generation and its management, mining technology etc. and should be in the name of the lessee.
6. All corner coordinates of the mine lease area, superimposed on a High Resolution Imagery/toposheet, topographic sheet, geomorphology and geology of the area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).
7. Information should be provided in Survey of India Toposheet in 1:50,000 scale indicating geological map of the area, geomorphology of land forms of the area, existing minerals and mining history of the area, important water bodies, streams and rivers and soil characteristics.
8. Details about the land proposed for mining activities should be given with information as to whether mining conforms to the land use policy of the State; land diversion for mining should have approval from State land use board or the concerned authority.
9. It should be clearly stated whether the proponent Company has a well laid down Environment Policy approved by its Board of Directors? If so, it may be spelt out in the EIA Report with description of the prescribed operating process/procedures to bring into focus any infringement/deviation/violation of the environmental or forest norms/ conditions? The hierarchical system or administrative order of the Company to deal with the environmental

issues and for ensuring compliance with the EC conditions may also be given. The system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the Company and/or shareholders or stakeholders at large, may also be detailed in the proposed safeguard measures in each case should also be provided.

10. The study area will comprise of 10 km zone around the mine lease from lease periphery and the data contained in the EIA such as waste generation etc. should be for the life of the mine / lease period.
11. Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.
12. Details of the land for any Over Burden Dumps outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be given.
13. A Certificate from the Competent Authority in the State Forest Department should be provided, confirming the involvement of forest land, if any, in the project area. In the event of any contrary claim by the Project Proponent regarding the status of forests, the site may be inspected by the State Forest Department along with the Regional Office of the Ministry to ascertain the status of forests, based on which, the Certificate in this regard as mentioned above be issued. In all such cases, it would be desirable for representative of the State Forest Department to assist the Expert Appraisal Committees.
14. Status of forestry clearance for the broken up area and virgin forestland involved in the Project including deposition of net present value (NPV) and compensatory afforestation (CA) should be indicated. A copy of the forestry clearance should also be furnished.
15. Implementation status of recognition of forest rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 should be indicated.
16. The vegetation in the RF / PF areas in the study area, with necessary details, should be given.
17. A study shall be got done to ascertain the impact of the Mining Project on wildlife of the study area and details furnished. Impact of the project on the wildlife in the surrounding and any other protected area and accordingly, detailed mitigative measures required, should be worked out with cost implications and submitted.
18. Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger/Elephant Reserves/(existing as well as proposed), if any, within 10 km of the mine lease should be clearly indicated, supported by a location map duly authenticated by Chief Wildlife Warden. Necessary clearance, as may be applicable to such projects due to proximity of the ecologically sensitive areas as mentioned above, should be obtained from the Standing Committee of National Board of Wildlife and copy furnished.
19. A detailed biological study of the study area [core zone and buffer zone (10 km radius of the periphery of the mine lease)] shall be carried out. Details of flora and fauna, endangered, endemic and RET Species duly authenticated, separately for core and buffer zone should be furnished based on such primary field survey, clearly indicating the Schedule of the fauna present. In case of any scheduled-I fauna found in the study area, the necessary plan alongwith budgetary provisions for their conservation should be

prepared in consultation with State Forest and Wildlife Department and details furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost.

20. Proximity to Areas declared as 'Critically Polluted' or the Project areas likely to come under the 'Aravali Range', (attracting court restrictions for mining operations), should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCB or State Mining Dept. Should be secured and furnished to the effect that the proposed mining activities could be considered.
21. Similarly, for coastal Projects, A CRZ map duly authenticated by one of the authorized agencies demarcating LTL, HTL, CRZ area, location of the mine lease w.r.t CRZ, coastal features such as mangroves, if any, should be furnished. (Note: The Mining Projects failing under CRZ would also need to obtain approval of the concerned Coastal Zone Management Authority).
22. R&R Plan/compensation details for the Project Affected People (PAP) should be furnished. While preparing the R&R Plan, the relevant State/National Rehabilitation & Resettlement Policy should be kept in view. In respect of SCs/STs and other weaker sections of the society in the study area, a need based sample survey, family-wise, should be undertaken to assess their requirements, and action programmes prepared and submitted accordingly, integrating the sectoral programmes of line departments of the State Government. It may be clearly brought out whether the village(s) located in the mine (lease area) will be shifted or not. The issues relating to shifting of village(s) including their R&R and socio-economic aspects should be discussed in the Report.
23. One season (non-monsoon) [i.e. March - May (Summer Season); October - December (post monsoon season) ; December - February (winter season)] primary baseline data on ambient air quality as per CPCB Notification of 2009, water quality, noise level, soil and flora and fauna shall be collected and the AAQ and other data so compiled presented date-wise in the EIA and EMP Report. Site-specific meteorological data should also be collected. The location of the monitoring stations should be such as to represent whole of the study area and justified keeping in view the pre-dominant downwind direction and location of sensitive receptors. There should be at least one monitoring station within 500 m of the mine lease in the pre-dominant downwind direction. The mineralogical composition of PM₁₀, particularly for free silica, should be given.
24. Air quality modelling should be carried out for prediction of impact of the project on the air quality of the area. It should also take into account the impact of movement of vehicles for transportation of mineral. The details of the model used and input parameters used for modelling should be provided. The air quality contours may be shown on a location map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The wind roses showing pre-dominant wind direction may also be indicated on the map.
25. The water requirement for the Project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the Project should be indicated.
26. Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided.
27. Description of water conservation measures proposed to be adopted in the Project should

- be given. Details of rainwater harvesting proposed in the Project, if any, should be provided,
28. Impact of the Project on the water quality, both surface and groundwater, should be assessed and necessary safeguard measures, if any required, should be provided.
 29. Based on actual monitored data, it may clearly be shown whether working will intersect groundwater, Necessary data and documentation in this regard may be provided. In case the working will intersect groundwater table, a detailed Hydro Geological Study should be undertaken and Report furnished. The Report inter- alia, shall include details of the aquifers present and impact of mining activities on these aquifers. Necessary permission from Central Ground Water Authority for working below ground water and for pumping of ground water should also be obtained and copy furnished.
 30. Details of any stream, seasonal or otherwise, passing through the tease area and modification / diversion proposed, if any, and the impact of the same on the hydrology should be.
 31. Information on site elevation, working depth, groundwater table etc. Should be provided both in AMSL and BGL. A schematic diagram may also be provided for the same.
 32. A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form (indicating the linear and quantitative coverage, plant species and time frame) and submitted, keeping in mind, the same will have to be executed up front on commencement of the Project. Phase-wise plan of plantation and compensatory afforestation should be charted clearly indicating the area to be covered under plantation and the species to be planted. The details of plantation already done should be given. The plant species selected for green belt should have greater ecological value and should be of good utility value to the local population with emphasis on local and native species and the species which are tolerant to pollution.
 33. Impact on local transport infrastructure due to the Project should be indicated. Projected increase in truck traffic as a result of the Project in the present road network (including those outside the Project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including action to be taken by other agencies such as State Government) should be covered. Project Proponent shall conduct Impact of Transportation study as per Indian Road Congress Guidelines.
 34. Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report.
 35. Conceptual post mining land use and Reclamation and Restoration of mined out areas (with plans and with adequate number of sections) should be given in the EIA report.
 36. Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.
 37. Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.

Secretary, SEAC

38. Measures of socio economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.
39. Detailed environmental management plan (EMP) to mitigate the environmental impacts which, should inter-alia include the impacts of change of land use, loss of agricultural and grazing land, if any, occupational health impacts besides other impacts specific to the proposed Project.
40. Public Hearing points raised and commitment of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP Report of the Project.
41. Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.
42. The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.
43. A Disaster management Plan shall be prepared and included in the EIA/EMP Report.
44. Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.
45. The activities and budget earmarked for Corporate Environmental Responsibility (CER) shall be as per MoEF&CC, Govt. of India O.M No 22-65/2017-IA. II (M) dated 01.05.2018 and the action plan on the activities proposed under CER shall be submitted at the time of appraisal of the project included in the EIA/EMP Report.
46. The Action Plan on the compliance of the recommendations of the CAG as per MoEF&CC, Govt. of India Circular No. J-11013/71/2016-IA.I (M), dated 25,10.2017 needs to be submitted at the time of appraisal of the project and included in the EIA/EMP Report.
47. Compliance of the MoEF&CC, Govt. of India Office Memorandum No. F: 3-50/2017-IA.III (Pt.), dated 30.05.2018 on the judgement of Hon'ble Supreme Court, dated the 2nd August, 2017 in Writ Petition (Civil) No. 114 of 2014 in the matter of Common Cause versus Union of India needs to be submitted and included in the EIA/EMP Report.

B. Specific TOR : 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. 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.
2. The expansion or opening of new manganese ore mines may be considered only when the actual production of about 80% is achieved. Further, the mines that have not produced Mn ore for last two years and have no commitment in the current year as well: EC capacity in such cases may be reviewed. The Department of Steel & Mines, Govt. of Odisha shall submit the Annual Report on this issue to the MoEF&CC for further necessary action.
3. Analysis of baseline environmental quality data for the year 2014 and 2016 indicates that existing mining activities appear to have little / no potential impact on environmental quality,

Secretary, SEAC

except on air environment, which was mainly due to re-suspension of road dust. Therefore, all the working mines can continue to operate with strict compliance to monitoring of environmental quality parameters as per EC and CTE/CTO conditions of the respective mine, 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.

4. Considering the existing environmental quality, EC capacity, production rate, iron ore resources availability and transport infrastructure availability, the share of Joda and Koira sector works out to be 70% and 30% respectively for the existing scenario for the year 2015-16. However, for additional EC capacity, it can be 50:50 subject to commensurate infrastructure improvement (viz. SOTM. pollution free road transport, enhancement of rail network etc.) in the respective regions.
5. Continuous monitoring of different environmental quality parameters as per EC and CTE/CTO conditions with respect to air, noise, water (surface and ground water) and soil quality in each region shall be done. The environmental quality parameters should not indicate any adverse impact on the environment. Monitoring within the mines should be done by individual mine lease holders, whereas outside the mine lease area, monitoring should be done by the Govt, of Odisha through various concerned departments/ authorized agencies. Various monitoring/ studies should be conducted through national reputed institutes, NABET/ MoEF&CC accredited laboratories/organizations. The reports submitted by individual mine lease holders and study reports prepared by other concerned departments/agency for each of the regions should be evaluated and examined by SPCB/ MoEF&CC.
6. Construction of 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 minimum 300 m inside the mine should be done. This should be done within one year for existing mines and new mine should have since beginning. The concerned departments should extend full support; wherever the land does not belong to the respective mine lease holders. 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 above.
7. In view of high dust pollution and noise generation due to road transport, it is proposed to regulate/guide the movement of iron and manganese ore material based on the EC capacity of the mines. Accordingly, ore transport mode has been suggested, as given below in Table.

Table : EC Capacity based Suggested Ore Transport Mode (SQTM)

Code	EC	Suggested Ore Transport Mode
SOTM 1	> 5 MTPA	100% by private railway siding or conveyor belt up to public railway siding or pipeline for captive mines and 70% for non-captive mines
SOTM 2	Between 3 and <5 MTPA	Minimum 70% by public railway siding, through conveyor belt and maximum 30% by road - direct to destination or other public railway siding or above option

Code	EC	Suggested Ore Transport Mode
SOTM 3	Between 1 and < 3 MTPA	Minimum 70% by public railway siding and maximum 30% by road - direct to destination or by other public railway siding or above options
SOTM 4	<1 MTPA	100 % by 10/17 Ton Trucks or above options

It is mentioned by State Govt, of Odisha that currently about 45% of the iron ore is despatched using rail network and progressively it will be increased to about 60% by rail/slurry over a period of 5 years, taking into account time required to set up more railway sidings.

In view of present ore transport practices and practical limitations, all the 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. However, 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.

Transportation of iron & manganese ore through river (jetty) to nearest Sea port (Sea cargo option) may be explored or connecting Sea ports with Railway network from the mines to be improved further so that burden on existing road and rail network and also pollution thereof can be minimized. 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 MoEF&CC and SEIAA, Odisha.

Responsibility: Department of Steel & Mines, Govt. of Odisha; Time Period: 5 Years for developing railway/ conveyor belt facilities

8. Development of parking plazas for trucks with proper basic amenities/ facilities should be done inside mine. This should be done within one year for existing mines and new mines should have since beginning. Small capacity mines (in terms of lease area or production) not having enough space within the mine lease areas should develop parking plaza at a common place within the region with requisite facilities. Responsibility: Individual Mine Lease Holders; Time Period: 1 Year
9. 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. Responsibility: Department of Steel & Mines with PWD / NHAI Time Period: 2 Years.
10. Regular vacuum cleaning of all mineral carrying roads aiming at "Zero Dust Resuspension" may be considered. Responsibility: PWD / NHAI/ Mine Lease Holders; Time Period: 3 months for existing roads.
11. Expansion of existing mines and new mines should be considered after conducting recent EIA Study as per the provisions of EIA Notification 2006, as amended time to time¹⁾ with proper justification on demand scenario for iron ore requirement and availability of pollution free transport network in the region. Responsibility: IBM, Department of Steel & Mines and MoEF&CC, New Delhi.

12. **Mine-wise Allocation of Annual Production:** 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 as suggested in Table, so that demand for iron ore can be anticipated, and actual production/dispatch does not exceed the suggested annual production.

**Table: Allocation of Production to Different Mines for 5 Years
(as per approved Mining Plan)**

Mine Lease	EC Capacity (MTPA)	Suggested Annual Production (MT)				
		2016-17	2017- 18	2018-19	2019-20	2020-21
		Yr 1	Yr 2	Yr 3	Yr 4	Yr 5
Mine 1	X1					
Mine 2	X2					
Mine 3	X3					
Mine n	Xn					
Total	160 +	105	129	153	177	201
Next year allocation = Average of EC Capacity and Last year production						

13. **Expansion of Existing Mines having Validity up to 2020:** In view of implementation of MMDR Act 2015, wherein many non-captive mines are expected to be closed by March 2020, total iron ore production scenario has been. It is expected that the non-captive mines having validity till 2020 shall try to maximize their production (limited to EC capacity) in the remaining period. Further, depending upon availability of iron ore resources, these mines may also seek expansion of EC capacity. It may be noted here that total EC capacity of existing 25 working mines having validity upto 2020 is about 85 MTPA, whereas actual production from these mines has been only 44.677 MT (52.6%) during 2015-16 and 57.07 MT (67.1%) during 2016-17. Also, it is expected that these mines would not even be able to achieve ore production as per existing EC capacity till March 2020. Therefore, these existing mines should go for production to the fullest extent to meet the requisite demand from the State. However, where EC limit is exhausted, application for expansion may be considered. Further, the EC process (i.e. Grant of TOR, Baseline data collection, Mining plan/ scheme approval, Public hearing, preparation of EIA/EMP Report. Appraisal by the EAC and grant of EC) takes about one year time. Under such circumstances, it is suggested that further applications for grant of TOR or grant of EC for expansion of production capacity of the mine should be considered for those existing mines, which have exhausted their capacity subject to consideration of all environmental aspects. Responsibility: Department of Steel & Mines and MoEF&CC, New Delhi.
14. **Sustained Iron Ore Production beyond 2020:** Considering the implementation of MMDR Act 2015, total production of iron ore in Odisha State is anticipated to be about 111 MT during 2016-17 (actual production was - 102.663 MT), 136 MT during 2017-18, 146 MT during 2018-19 and 146 MT during 2019-20. Then there will be substantial drop in total production (to the tune of 73 MT during 2020-21 onwards) due to closure of mines, which are valid up to 2020. Therefore, in order to maintain operation/sustained growth of downstream industries, iron ore mining in the region needs to be continued at a sustainable

rate. The State Govt. through Department of Steel and Mines should initiate appropriate action to ensure continued availability of iron ore from the region, as per suggested sustainable annual production

15. **Reserves Estimation**-Mining Plan and Exploration; Appropriate actions (geo- technical investigation for qualitative and quantitative resource estimation & other preparations for auction of mines), may be initiated taken into account the existing working mines, and the mines which were operational at some point of time (but closed presently due to various reasons). The total iron ore reserves/ resources available within the total lease area of each mine should be estimated by State Govt./NMET/ GSI (or any other approved agency) with respect to: (i) Total lease area of mine (surface), (ii) Maximum depth to which resources could be available, (iii) Resources below the ground water table (if intersected), (iv) Reserves are to be estimated as per UNFC code with respect to quantity and quality (% Fe content), (v) Maximum mining rate and area for auction (after 2020) will be calculated based on total resources available and proposed life of mine leading to closure of mine in a stipulated time period. Responsibility: Department of Steel & Mines, IBM and GSI; Time frame: 1 year for the mines to be auctioned for next 2 years. The above mentioned organizations shall ensure the compliance with respect to timelines for implementations.
16. Depending upon availability of extractable iron ore resources within a mine, mining below the ground water table may be permitted after conducting necessary geological and hydro-geological study by GSI and requisite approval from the CGWB/CGWA (Central Ground Water Board/Authority). This can be explored at least in few mines on trial/pilot basis. Further, within a mine, it will be desirable to operate one pit at a time, and next pit should be opened after extracting maximum possible resources from the first pit, so that the exhausted pit can be used for back filling/ storing of low grade iron ore. However, depending upon the quantity and/or quality of iron/ manganese ore, other mine pits in the same mine lease may also be opened for sustainable scientific mining, as per approved mining plan/scheme of mining by IBM. The Department of Steel & Mines, Govt. of Odisha should initiate the pilot project so that minerals are fully utilized.
17. **Commercial Utilization of Low Grade Ore:** 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 as cosmetics, pharmaceutical, paint industry should also be explored. Responsibility: IBM, Dept, of Steel & Mines, Individual Mine Lease Holders.
18. 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.

19. 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.
20. Large and medium mine leases contribute to better implementation of reclamation and rehabilitation plans to sustain the ecology for scientific and sustainable mining. The small leases do not possess scientific capability of environmentally sustainable mining. Therefore, new mine leases having more than 50 ha area should be encouraged, as far as possible. This will ensure inter-generational resource availability to some extent. Responsibility: Dept, of Steel & Mines, Govt, of Odisha.
21. **Mining Operations/Process Related:** (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 wasted 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.
22. **Air Environment Related:** (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 GPCB 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, PM10, PM2.5, SO₂, NO_x 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, PM₁₀, PM_{2.5}, SO₂, NO_x 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. Further, 11 continuous air quality monitoring systems may be installed in Joida and Koira regions and one in Baripada/ Rairangpur region, (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 using 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.

23. **Noise and Vibration Related:** (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 (detailed in Section 5.4) 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.
24. **Water/Wastewater Related :** (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 geotextile 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.

25. **Land/ Soil/ Overburden Related** : (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-mineralised 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 off as per provisions of Hazardous Waste Management Rules, 2016, as amended from time to time. Responsibility: Individual Mine Lease Holders.

26. **Ecology/Biodiversity (Flora-Fauna) Related:** (i) As per the Red List of IUCN (International Union for Conservation of Nature), six floral species and 21 faunal species have been reported to be under threatened, vulnerable & endangered category. Protection of these floral and faunal species should be taken by the State Forest & Wildlife Department on priority, particularly in the mining zones, if any, (ii) The mines falling within 5-10 km of the Karo- Karampada Elephant corridor buffer need to take precautionary measures during mining activities. The forest and existing elephant corridor routes are to be protected and conserved. Improvement of habitat by providing food, water and space for the elephants is required to be ensured to avoid Man- Elephant conflicts. Though as per the records of State Forest Department, movement of elephants in the Karo-Karampada elephant corridor within 10 km distance from the mines in Joda and Koira is not observed, the Forest Department shall further record and ensure that elephant's movement is not affected due to mining activities, (iii) 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, (iv) 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, (v) 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, (vi) Green belt 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,

(vii) Vetiver plantation on inactive dumps may be encouraged as the grass species has high strength of anchoring besides medicinal value, (viii) 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, (ix) Similarly, Wildlife Department is also required to record and document annual status of wildlife in the region and should identify the need for wildlife management on regional level, (x) Maintenance of the ecology of the region is prime responsibility of the State Forest and Wildlife Department. They need to periodically review the status and identify the need for further improvement in the region. The required expenditure may be met from the funds already collected in the form of compensatory afforestation and wildlife management. Further, additional fund, if required can be sought from DMF. Responsibility: Individual Mine Lease Holders and State Forest & Wildlife Department.

27. **Socio-Economic Related:** (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 outtees and land losers/affected people, if any, should be compensated and rehabilitated as per the national/state policy on Resettlement and Rehabilitation, (iii) The socioeconomic development in the region should be focused and aligned with the guidelines/initiatives of Govt, of India/ NITI Aayog / Hon'ble Prime Minister's Vision centring 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-M.VI (Part), dated September 16, 2015. Responsibility: District Administration and Individual Mine Lease Holders.
28. **Road Transport Related:** (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 miner as suggested in Chapter 10. 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, PM₁₀ 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.
29. **Occupational Health Related:** (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),

30. **Reporting of Environmental Sustainability Achievement:** All the mines should prepare annual environmental sustainability report (ESR), highlighting the efforts made towards environmental protection with respect to different environmental components vis-a-vis production performance of the mine on monthly basis. The data collected as per EC and CTE/CTO conditions should be utilized to prepare the annual sustainability report. The mines performing high with effective environmental safeguards may be suitably recognized/rewarded. "Star Rating Format" formulated by the Ministry of Mines along with environmental sustainability report may be used,
31. **Environmental Monitoring Requirements at Regional Level:** Apart from strict compliance and monitoring by individual mine lease holder, there is a need for simultaneous monitoring in each of the regions by competent expert agencies under the guidance/ supervision of concerned regulatory agency. Details of the studies required to be done on regular basis (continuously for 5 years) through responsible agency (organization of national/state repute) and time frame are suggested in Table.

Table: Suggested Environmental Monitoring Requirements and Action Plans at

Sl. No.	Study component / Action Plan	Responsibility	Monitoring and Reporting Time Frame (Approx.)
1.	Environmental Quality Monitoring with respect to Air, Water, Noise and Soil Quality in each region (Joda, Koira and Baripada/Rairangpur) as per specified frequency shall be done by a third party (preferably Govt.) and/or laboratory approved/ recognized by NABET/ CPCB/ SPCB/ MoEF&CC. All the water bodies (rivers, nalias, ponds etc.) shall be monitored. National/State level research/ academic institutes may be involved initially for couple of years to streamline the activity. The report shall be brought out annually by June each year. The study shall be conducted in consultation with MoEF&CC-RO.	SPCB	Continuous Annually

Sl. No.	Study component / Action Plan	Responsibility	Monitoring and Reporting Time Frame (Approx.)
	Installation of online ambient air quality monitor for PM ₁₀ , PMP.S, SO _x and NO _x within the mine having more than 3 MTPA EC Capacity	Respective Mine Lease Holders	Continuous Annually
	Installation of online ambient air quality monitor for PM ₁₀ , PM _{2.5} , SO _x and NO _x in the Joda and Koira Region (total 11 locations).	SPCB	Continuous Annually
2.	Status of flora and fauna in each of the regions shall be assessed on annual basis. Changes, if any, taking place in the region shall be brought out clearly. The study shall be conducted in consultation with State Forest and Wildlife Department.	State Forest & Wildlife Dept.	Annually in mining zone and once in 3 years in the region
3.	Socio-economic study incorporating developments taking place in each of the region, CSR initiatives made by the mining companies shall be conducted on annual basis. Further, micro level developmental needs shall be clearly brought out in the report for each region. The study shall be conducted in consultation with district administration.	Respective District Administration	Annually
4.	A detailed hydro-geological study in each of the regions shall be conducted in an integrated manner in consultation with Regional Director, Central Ground Water Board. Accordingly, all project proponents shall implement suitable conservation measures to augment ground water resources in the area.	SPCB	Once in 2 years
5.	The State Govt. shall ensure construction and maintenance of dust free common roads/ appropriate rail network for transport of ore from mines to the consumer end.	Dept. of Steel & Mines	12 months for road network and 5-7 years for rail network
6.	Construction and maintenance of dust free roads from respective mine to the main road	Respective Mine Lease Holders	Continuous 6 months
7.	Traffic/road inspection study addressing the condition of	Dept. of Steel & Mines	Continuous 6 months

Sl. No.	Study component / Action Plan	Responsibility	Monitoring and Reporting Time Frame (Approx.)
	traffic/roads leading to different mines and connecting to different railway sidings shall be undertaken on annual basis. Further, detailed traffic study shall be undertaken on every 5 yearly basis to ensure adequacy of road/rail infrastructure in each of the regions. The study can be undertaken through national/ state level research/ academic institute (such as CSIR-CRRI, New Delhi).		
8.	Assessment of land use/ land cover changes in each of the regions, with particular focus on mining areas, afforestation activities, variation in flow path of various water bodies etc. using remote sensing data	ORSAC	Annually
9.	R&D Studies for utilization of low-grade iron ore	Dept. of Steel & Mines through R&D / Academic Institutes	Upto 45% by 2020 and upto 40% by 2025

The data so generated for the region should be made available on the website of Department of Steel & Mines and also at MoEF&CC website, so that it can be effectively utilized by Individual Mine Lease Holders for preparing EIA/ EMP reports. This will meet the requirement for separate one season baseline environmental quality data collection by the individual proponents, if the mine proposed is in the same study region. Further, MoEF&CC through EAC1 can also utilize the data base available in evaluating the proposals for expansion of existing mines or new mines while granting ToR or EC to the mine, taking an holistic view of the region. State Govt, of Odisha should bring out an integrated environmental sustainability report for each of the regions (mainly for Joda and Koia region) incorporating ESR of individual mines and data collected in the region through various agencies, once in 5 years, to plan level of scientific and sustainable mining for the next 5 years.

32. Institutional Mechanism for Implementation of Environmentally Sustainable Mining: The present study is not a one-time study, but a process to ensure environmentally sustainable mining activities in the region on long term basis. Looking into the large-scale mining activities and long term perspective for mining vis-a-vis environmentally sustainable mining and upliftment of people of the region, there is a need to create an agency, who will integrate all the aspects relating to sustainable mining in the region on long term basis. It could be a SPV of Govt, of Odisha or a cell within the overall control and supervision of Dept, of Steel & Mines, with members from

IBM, GSI, OSPCB, MoEF&CC-RO and other concerned Departments and Mine Owners (EZMA), District Administration. It is found that the strong database available for the region needs to be taken into account to map and establish environmental quality of the region on daily, monthly, seasonal and annual basis. Further, the efforts and initiatives of the mines

towards environmental protection as well as upliftment of the people of the region are required to be integrated, and a systematic plan at the block/regional level needs to be framed for the overall benefit of the local society, region, district, state and the country as a whole. It will be desirable to have proper environmental quality data management and analysis by NEERI or any other agency for next 5 years (six monthly compliance reports followed by field verification) ensuring sustainable mining practices in the region leading to an overall development of the region. District Mineral Funds should be utilized appropriately for various developmental activities/needs of the region. Further, an environmental sustainability report incorporating environmental status of region coupled with social upliftment may be brought out by SPCB or any other authorized agency on annual basis. This report can be used for supporting the regional EIA study, and also need for environmental quality monitoring by individual mine seeking environmental clearance for new mine/ expansion of mine, including public hearing. Since, outcome of the above study reports shall be in the overall interest of all the stakeholders (including local population) of the region, further planning for the region shall warrant cooperation and assistance of all the stakeholders (mine operators, industries, transporters, State & Central Government Offices, MoEF&CC, CPCB, SPCB, Dept, of Steel & Mines, IBM, IMD, NGOs and local people) in sharing the relevant data/information/ reports/documents etc. to continuously improve upon the environmentally sustainable development plan for economic growth in mining sector as well as for improvement in quality of life of the people of the region.

C. Besides the above, the below mentioned general points are also to be followed:-

- a) All documents to be properly referenced with index and continuous page numbering.
- b) Where data are presented in the Report especially in Tables, the period in which the data were collected and the sources should be indicated.
- c) Project Proponent shall enclose all the analysis/testing reports of water, air, soil, noise etc. using the MoEF&CC/NABL accredited laboratories. All the original analysis/testing reports should be available during appraisal of the Project.
- d) Where the documents provided are in a language other than English, an English translation should be provided.
- e) The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted.
- f) While preparing the EIA report, the instructions for the Proponents and instructions for the Consultants issued by MoEF vide O.M. No. J-11013/41/2006- IA.II (I) dated 4th August, 2009, which are available on the website of this Ministry, should be followed.
- g) Changes, if any made in the basic scope and project parameters (as submitted in Form-I and the PFR for securing the TOR) should be brought to the attention of MoEF&CC with reasons for such changes and permission should be sought, as the TOR may also have to be altered. Post Public Hearing changes in structure and content of the draft EIA/EMP (other than modifications arising out of the P.H. process) will entail conducting the PH again with the revised documentation.
- h) As per the circular no. J-11011/618/2010-IA.II (I) dated 30.5.2012, certified report of the status of compliance of the conditions stipulated in the environment clearance for the existing operations of the project, should be obtained from the Regional Office of

Secretary, SEAC

Ministry of Environment, Forest and Climate Change, as may be applicable.

- i) The EIA report should also include (i) surface plan of the area indicating contours of main topographic features, drainage and mining area,(ii) geological maps and sections and (iii) Sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area.
- D. The prescribed TOR would be valid for a period of four years for submission of the EIA/EMP report.**