

**PROCEEDINGS OF THE MEETING OF STATE LEVEL EXPERT APPRAISAL
COMMITTEE, ODISHA HELD ON 12TH SEPTEMBER, 2018**

The SEAC met on 12th September, 2018 at 11:00 AM in the Conference Hall of Odisha State Pollution Control Board, Bhubaneswar under the Chairmanship of Dr. B.K. Patnaik. The following members were present in the meeting.

1. Dr. B. K. Patnaik	-	Chairman
2. Sri B.P. Singh	-	Member
3. Dr. D. Swain	-	Member
4. Prof. (Dr.) P.K. Mohanty	-	Member
5. Dr. D. K. Rout	-	Member
6. Sri B.C. Prusty	-	Member
7. Dr. S. C. Nayak	-	Member
8. Sri S. Behera	-	Member
9. Dr. R.C. Mohanty	-	Member
10. Sri A. C. Mohanty	-	Member
11. Dr. S.K. Biswal	-	Member

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

ITEM NO. 01:

PROPOSAL FOR ENVIRONMENTAL CLEARANCE FOR PROPOSED EXPANSION FOR CONSTRUCTION OF HOUSING COLONY AND CONVENIENT SHOPPING (PHASE-III) OF M/S. Z-ESTATES PVT. LTD AT KALARAHANGA, BHUBANESWAR WITH BUILT UP AREA 3,95,865.09 M² (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. This is a proposal for expansion for Construction of Housing Colony and Convenient Shopping (Phase-III) at Mouza- Kalarahanga, Bhubaneswar, Odisha.
3. The proposal falls under category 'B', section 8 (b) "Townships and Area Development projects" of Schedule of EIA Notification 2006 and amendment thereafter.
4. The site is located at Kalarahanga, Bhubaneswar, Odisha. The Geographical co-ordinate of the project site is: Latitude - 20° 22' 0.72" N & Longitude - 85° 50' 06.28" E. The project site is well connected with Nandan Kanan road which take towards National Highway-6 (Kolkata-Chennai Road). Nandan Kanan road is 0.1 Km from proposed site. The nearest railway station is Mancheswar Railway station at a distance of approx 5.1 Km in South direction. The nearest airport is Biju Patnaik Airport at a distance of approx. 13.5 Km in South West direction from project site. The site is easily accessible from Nandan Kanan Road.
5. **THE BUILDING DETAILS OF THE PROJECT:**

The proposed project is the Third phase of the building covering a built up area of 2,09,960.21 m² (including parking). The first phase building had a built up area 73,958.9 m² (Occupancy Obtained) & the second phase building had a built up area 1,11,945.98 m²

(which is Under Construction) and the plot area is 1,23,717 m². So total Built up area for Phase-I & Phase-II is 1,85,904.880 m² for which Environmental Clearance was obtained from SEIAA, Odisha vide letter no. **SEIAA/827, dated 23.02.2016**. A comparative statement of the existing and proposed project with respect to built up area as well as other requirements are given below:

Sl. No.	Particular	Existing	Expansion	Total
1	Plot Area	1,23,717.0 m ²	17,873.23 m ²	1,41,590.23 m ²
2	Built up Area	1,85,904.88 m ²	2,09,960.21 m ²	3,95,865.09 m ²
3	Green Belt Area	30,929.22 m ²	20,922.87 m ²	51,852.09 m ²
4	Road Area	20,000 m ²	2,000.00 m ²	22,000.00 m ²
5	Basement Parking Area	43,319.27 m ²	46,001.54 m ²	89,320.81 m ²
6	Water Requirement	985.51 KLD	471.0 KLD	1456.51 KLD
7	Waste Water Requirement	710.84 KLD	602.0 KLD	1312.84 KLD
8	Power Requirement	5200 KW	3045 KW	8245 KW
9	Dwelling Unit	589 Unit	586 Unit 635 Units EWS	1175 Unit 635 Units EWS

6. REQUIREMENT FOR THE PROPOSED PROJECT:

(i) Power requirement:

The daily power requirement for the proposed expansion Project is preliminarily assessed as **3045 KW** source from CESU of Odisha State Electricity Board. In order to meet emergency power requirements during the grid failure, there is provision of 3 nos. of DG set having 500 KVA capacities for power back up in the proposed expansion Project.

For energy conservation, there will be 120 nos. of Solar Lighting poles (@72 Watt) has been proposed for Street & common area solar lighting, so

Energy conservation by using Solar Street Lighting = 120 x 72 = 8640 watt = 8.6 KW

Energy conservation by using Solar lighting for common area = 200 KW

Total Energy Conservation = (200 + 8.6) KW = 208.6 KW

Total Energy saving = 208.6/3045 = 0.0685 x 100 = 6.8 %

(ii) Water requirement:

Fresh make up of 471.0 m³/day will be required for the project which will be sourced from Ground Water Supply. Waste water of 602 KLD will be treated in a STP of 650 KLD capacity, which includes primary, secondary and tertiary treatment. After treatment the treated water will be discharge to the Buri Nalla. Rain Water will be harvested through 41 no. of recharging pits.

(iii) Fire fighting Installations:

Fire fighting system will be installed as per recommendation of the Fire fighting Officer, Odisha and as per the guideline of NBC (part-4).

(iv) Green Belt Development:

Green belt will be developed over an area of 51,852.09 sqm which is 35.40 % of the plot area; by using the local species like Radhachuda, Nageswar, AkashNeem, Ashok, Polanga, Karang, Bela, Pijilu, Kaniara, Tagar, Hena, etc.

(v) Solid Waste Management:

From the residential complex solid waste in form of food waste from kitchen and miscellaneous waste will be generated @ 0.45 kg/capita/day, which will be about 5225 x 0.45 = 2351.25 kg/day. The generated solid waste from the residential complex will be segregated as biodegradable and non-biodegradable. This will be collected in separate coloured bins. Proper waste management practices will be adopted during the collection, storing and disposal of the generated solid waste.

Waste generated from Floating people will be @ 0.15 kg/capita/day, which will be about 166 x 0.15 = 24.9 kg/day. Solid waste from sweeping and Dry Garbage containing non bio-degradable wastes like polythene bags, metal, ceramic Waste, glass etc. shall be stored in separate garbage bin and send to approved agency for final disposal. The biodegradable waste will be converted to manure by an organic waste convertor, which will be used for landscaping.

Sl. No.	Category	Counts (heads)	Waste generated
1.	Residents	5225 @ 0.45 kg/day	2351.25
2.	Floating	166 @ 0.15 kg/day	24.9
3.	STP sludge		35
TOTAL SOLID WASTE GENERATED			2411.15 kg/day

7. Estimated Project cost:

Total Capital Cost = ₹ 300 Crores

Environment Management Cost = ₹ 2.25 Crores

8. The project proponent along with their consultant **M/s Centre for Envotech & Management Consultancy Pvt. Ltd. N-5/305, IRC Village, Bhubaneswar, Odisha** 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 Centre for Envotech & Management Consultancy Pvt. Ltd., N-5/305, IRC Village, Bhubaneswar, Odisha**, the SEAC prescribed the ToR as per Annexure –I for conducting detailed EIA study.

ITEM NO. 02:

PROPOSAL FOR ENVIRONMENTAL CLEARANCE FOR PATABEDA IRON ORE MINES (28.397 HA) OF M/S. MGM MINERALS LTD FOR EXPANSION OF IRON ORE PRODUCTION FROM 0.8 MTPA TO 1.5 MTPA (ROM) ALONGWITH CRUSHER & SCREEN PLANTS OVER MINING LEASE AREA OF 28.397 HA. LOCATED IN THE VILLAGE PATABEDA, TAHESIL KOIRA IN THE DISTRICT OF SUNDARGARH OF M/S. MGM MINERALS 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. This proposal is for Patabeda Iron ore mines of MGM Minerals Ltd. for expansion of Iron ore production capacity from 0.8 MTPA to 1.5 MTPA of ROM along with crushing and screening unit within the lease area of 28.397 Ha.
3. 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 50 Ha.
4. The lease area is bounded by Latitude 21° 56' 01.53" N - 21° 56' 27.39" N and Longitude 85° 22' 10.88" E - 85° 22' 34.66" E and falls in Survey in India Topo Sheet No. 73 G/5.
5. The area can be approached from Barbil and Joda town through Koira. Area is approachable from Koira covering a distance of 20 Km. The nearest railway station is Jaroli Railway station - 4.84km - E (Aerial). The nearest major airport is Bhubaneswar airport – 190km - SE.
6. The lease area is a prominent hill mound having around 725 mRL in the Southern part and 600 mRL in the NNW portion of the lease area.
7. The mining lease area and the 10 km buffer zone from the periphery of the core zone is devoid of declared ecologically sensitive features like national parks, biospheres, sanctuaries, etc., The area also does not come under CRZ category.
8. The lease was executed on 08.03.2006 for 20 years, which is valid up to 07.03.2026. However, 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. Mine is in operation since 2006.
9. Considering the demand and supply for high grade sized iron ore in the domestic steel sectors, now it is proposed to enhance the iron ore production from 0.8 MTPA to 1.5 MTPA along with crushing and screening plant.
10. Approval of Modification of review of Mining plan for a production of 1.5 MTPA of ROM was obtained from IBM vide letter No. MS/FM/28-ORI/BHU/2017-18/2184, dated 24.11.2017 for a period of 2017-18 to 2020 – 21 which is valid up to 31.03.2021.
11. Out of the total forest area of 27.086 Ha, Forest Clearance obtained for 23.581 Ha vide letter no. 8(21)28/2003-FCE dated 30.12.2005. FRA certification obtained for the entire forest area within the lease area.
12. Environmental Clearance obtained from SEIAA, Odisha for the enhancement of production of iron ore from 0.16 MTPA to 0.8 MTPA vide SEIAA letter no. 33, dated 11.12.2009.
13. Consent to Operate from State Pollution Control Board, Odisha obtained vide letter no 3363/IND-CON-5427 dated 25.02.2016 for 0.8 MTPA valid up to 31.03.2021.
14. Hazardous waste Authorization obtained from State Pollution Control Board, Odisha vide letter no IND-IV-HW- 996/1505, dated 31.01.2017 valid up to 31.03.2021.
15. Site specific wild life conservation plan approved by PCCF, Chief Wild life warden, Odisha vide letter no 3474/1WL-SSP-14/2015 DT,BBSR, 22.04.2015.



SECRETARY, SEAC

16. NOC of CGWA for drawl of 30 m³/day of ground water obtained vide Noc No. CGWA/NOC/MIN/ ORIG / 2018 / 3817 dated 19.07.2018 valid up to 8.7.2020. Agreement for drawl of 150 m³/day from Kakrapani nala valid up to 20.3.2022 executed with Executive Engineer, Sundargarh Irrigation Division.
17. NPV of ₹ 162.35 lakhs demanded upon 27.086 Ha Of Forests Land already Paid.
18. In pursuance of the Supreme Court order dated 02.08.2017 in CWP no. 114/2014, the DDM, Koira has raised the demand notices no. 5098 Dated 02.09.2017 and the project proponent has deposited ₹ 64, 89,953 as directed.
19. The Proponent has made the payment as demand raised based on the Hon'ble Supreme Court order with an amount of INR 64, 89,953 vide online Treasury Challan Ref. No. 27DD37754D dated 16.12.2017.
20. The mine is in operation with due compliance of the Supreme Court Order.
21. The details of past production from 2006-07 (inception of mining operation) till 2017-18

Year	Production
2006-07	67370.000
2007-08	162940.000
2008-09	162510.000
2009-10	150610.000
2010-11	250442 000
2011-12	272600.000
2012-13	290133.798
2013-14	292876.016
2014-15	285480.000
2015-16	41221S.OOO
2016-17	293778.000
2017-18	795118.000
Total	3436072.814

22. In the 10 km buffer zone, water bodies namely Kakarpani Nala – 1.5 km –W, Suna Nadi – 1.5km – N, Teherei Nala – 6.00km – SW, Jalpa Nadi – 7.7km – S, Baitarani River – 6.9km – E and reserved forests like Mendhamaruni RF – 7.9km – W, Siddamath RF – 3.0km – NW, Baitarani RF – less than 1km – N, Chamakpur RF – 7.1km – NE are found in the buffer zone.
23. Total 65 DTH/bore holes have been drilled till date within the lease area. Out of the total bore holes 34 bore holes have been taken into consideration for resource/reserve estimation. Remaining DTH holes are excluded for estimation of resource. The mineable reserves of 11.11 MT of Iron ore are established.
24. The mining operations will be through mechanized opencast mining system, involving drilling and blasting etc. The mined ore will be processed in screening and crushing units to meet its trade value in the market.
25. The present bench height has been kept at 6m. Once the production capacity is enhanced up to 1.5MTPA of ROM, the bench height is proposed to be changed from 6m to 10m. The minimum bench width in the working benches shall be maintained at more than 10m while in

the ultimate stage, the bench width shall be reduced to 10m, thus having a final pit slope of 45°.


26. It is proposed to generate total waste for plan period is 282500cum during scheme period, out of which 30% i.e. 84750cum will be utilized for road maintenance (both public and internal haul road). Remaining 70% i.e. 197750 cum will be dumped at earmarked site. During conceptual period, 687154cum of waste will be generated out of which about 30% i.e. 206146cum will be utilized for road maintenance and balance 481008 cum will be utilized for back-filling in the mined out land.
27. The life of the mine is estimated as 8 years. However the life of mine may vary depending upon the raw material requirement for the steel plant and marketing scenario.
28. The water requirement for the integrated mines is mainly for green belt, dust suppression and drinking water purpose & in processing plant for make-up purpose. The total water requirement will be 180 KLD. Out of the total water requirement, 150 KLD will be sourced from Kakarpani Nalla for which an agreement is made with the Odisha Government. The remaining 30 KLD water required will be met from bore well for which CGWA permission already obtained.
29. A 500 KVA electrical transformer is available inside the lease area. In addition, 500KVA and 50 KVA diesel generators are also available.
30. The various site services such as site office, weigh bridge, rest shed, first aid center, blasting shed, security house, magazine, guard house, workshop etc. are available in the lease area.
31. The total man power on direct basis will be around 217 and on contract basis will be 60 persons.
32. 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**, the SEAC prescribed the ToR as per **Annexure –II** for conducting detailed EIA study.

ITEM NO. 03:

PROPOSAL FOR ENVIRONMENTAL CLEARANCE FOR PROPOSED RARBAHAL GRAPHITE MINE FOR PRODUCTION OF GRAPHITE ORE 0.138 MTPA OVER AN AREA OF 20.675 HA AT VILLAGE RARBAHAL, TAHSIL-BELPARA, DIST-BOLANGIR OF SRI ANTARYAMI MISHRA. (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. This is a proposal for graphite mining project with production capacity of 0.138 Million Tonnes/Annum over mining lease of 20.675 ha.


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3. The mine lease is located at Plot No. 46, Village Rarbahal, Tahasil- Belpara, District Balangir, Odisha. The latitude 20° 34' 08" N to 20° 34' 27" N and longitude 83° 02' 10" E to 83° 02' 29" E. The highest altitude is of 258 mRL and the lowest altitude is 252 mRL. The area falls in the Survey of India Topo -sheet no. 64 P/ 2, 64 P/3, 64 L/14 & 64 L/15. The lessee is Sri Antaryami Mishra.
4. The lease area 20.675 ha is Government Non- forest land. The mining lease over an area of 20.675 ha was granted vide order of Dept. of Mines & Steel G.O. No.10334/SM/II(GR)SM - 27/2017 dt.15.12.2017 (expiry on 14.12.2067) for fifty years in favour of Sri Antaryami Mishra. Due to adverse marketing conditions there was no mining in the lease area till the end of first lease period.
5. Thereafter, the renewal of mining lease was granted to the lessee on over an area of only 20.675ha. for a period of 15 years from 05.03.2005 to 04.03.2020. Now, as per Rule 8 A (3) of MMDR (Amendment) Act 2015 lease period is valid up to 04.03.2040.
6. The mining plan of Rarbahal Graphite Mining lease in Village - Rarbahal, District – Balangir, State – Odisha was approved under Rule 23 of MCDR, 2017 by the Regional Controller of Mines, Odisha Region, Indian Bureau of Mines vide letter No. MP/OTFM/04-ORI/BHU/2018-19/518 dated 16.05.2018.
7. The topography of the area represents a mild sloping terrain. General slope of the area is from West to East. Applied M.L area can be approached from Balangir (district head quarter) covering a distance of 64 km which is the sum of 38 km SH between Balangir and Patnagarh, 13 km SH between Patnagarh and Mandal square, 8 km metalled road between Mandal square & Mandal, 4 km metalled road between Mandal & by pass to Rarbahal and 1 km kuchha road between by pass to Rarbahal P.L area via village Rarbahal. Lease area is also approachable from Belpara PS town covering a road distance of 12 km. The nearest railway station is at Kantabanji on the Titlagarh – Raipur rail track of the East-Cost Railway which is 25 km from the lease area. The nearest air port is at Bhubaneswar at a distance 390 K.M from the project site.
8. The total Mineable reserve is 96,799 MT. The ore occurs at shallow depth and rocks are mostly weathered and soft, hard in patches only. Graphite ore exposed in the existing quarry inform of small veins, pockets, lenses & vein etc. Therefore, mining will be done on single shift basis, by open cast semi mechanized method of mining with the help of excavators.
9. Mining will be done in a top downward manner by developing 3m high & 3m wide bench. Graphite from the bench floors will be transported manually by head load to the ore stacking & sorting site. The quarry will be developed between the RL 257.6 m and RL 222.2 m. Overall quarry slope angle will be kept at around 60° with the horizontal.
10. Excavation will be taken up on the north western side of the lease area. Average annual production during the ensuing plan period will be 13023 tonnes. Average working days during the year are about 300 days. Average daily production is about 43.4 tones. No drilling and blasting will be done for loosening of hard rock mass during mining operation.
11. During the development work of 2018-19 to 2022-23, the top soil in the tune of 93874.84 m³ will be spread on the waste dump and preserved for future plantation work.
12. During current scheme of mining (2018-19 to 2022-23), the volume of the waste/ OB generated (including side burden waste) will be 476744.6 m³. Thus the total new volume of waste generated during the coming years that is till the tentative end of the life of the mine,

shall be 544920 m³. Therefore, the ultimate capacity of the waste dump at the end of the life of the mine shall be 544920 m³. The dumps shall be kept in terraces in a regular fashion. It is proposed to dump in south-western of the quarry. The ultimate capacity of proposed dump will be 544920 m³, with a height of 20 m having two terraces. Development of garland drain and retention wall will be done simultaneously with the development of dump.

13. Machinery used for mining purpose will be excavator, loader, tippers, sprinkler, jeep etc. The daily consumption of diesel in the mine will be around 600 liters per day. About 10 KLD water will be required per day at peak demand.
14. The maximum strength of workers will be 26 nos. Most of the workers will be hired from local villages. Besides there will be indirect employment for transportation, canteen, repair shop, security etc. Since there is no habitation in the lease area therefore no resettlement will be necessary. During the plan period 6000 plants will be planted in 10.06 m². The entire plantation will be done on the 7.5 m safety barrier. The project cost is about ₹ 80 Lakhs.
15. The extracted ore will be dispatched to secondary washing plant located at village-Dungripalli, Dist-Balangir at a distance of 25 Km. If in case the plant is not established as per the proposal than the ROM will be sent directly to the washing plant located at Village-Dungripalli of district Balangir.

Considering the information / documents furnished and presentation made by the proponent, the SEAC prescribed the ToR as per **Annexure –III** for conducting detailed EIA study.

ITEM NO. 04:

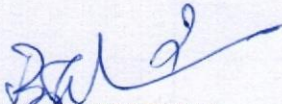
EXTENSION OF VALIDITY PERIOD OF ENVIRONMENTAL CLEARANCE GRANTED TO BABANPUR & PITAMBARAPUR DECORATIVE STONE QUARRY OVER AN AREA OF 4.929 HA AT VILLAGE BABANPUR & PITAMBARAPUR, TAHSIL – PATRAPUR, DIST-GANAJM OF M/S. FREE WORLD EXPORTS (P) LTD.

1. Environmental Clearance was issued by SEIAA, Odisha vide letter No. 6914/SEIAA dtd. 30.08.2013 for 5 years (up to 29.08.2018) to Babanpur & Pitambarapur Decorative Stone Quarry of M/s Free World Exports (P) Ltd. over an area of 4.929 Ha At - Village Babanpur & Pitambarapur, Tahsil – Patrapur, Dist-Ganajm.
2. The mine has obtained Consent to Operate from the State Pollution Control Board, Odisha on dated 30.06.2016, which is valid upto 31.03.2021 for production of decorative stone of 7125 m³/annum.
3. The Joint Director, Mines has approved the scheme of mining along with progressive mine closure plan for the period from 2018-19 to 2022-23 vide letter no. MXXII-(a)-8/2017/3348/DM dated 01.05.2018.
4. Mining lease deed executed on 20.05.2015 and registered on 21.05.2015 for a period of 20 years i.e. 21.05.2015 to 20.05.2035.
5. The EIA notification 14th September, 2006 stipulates the validity period of prior Environmental Clearance granted for project or activity shall be decided by the EAC and SEAC subject to a maximum of 30 years for mining projects. The SEAC, Odisha while recommending grant of environmental clearance fixed the validity period of Environmental Clearance for mining projects as five years for the reason that the mining scheme submitted by the project proponent is valid for a period of five years only.

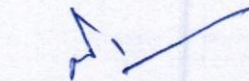
SECRETARY, SEAC

6. The project proponent has applied to SEIAA, Odisha to extend the validity of Environmental Clearance issued earlier upto the lease period. The SEAC opined that similar type of proposals were already discussed and decision have been taken to extend the validity period upto 30 years or life of the mine whichever is less as per order passed by the Hon'ble High Court, Delhi as well as Odisha.

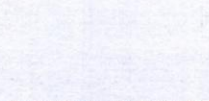
After detailed discussion, the SEAC recommended to extend the validity period of Environmental Clearance granted earlier upto the lease period i.e. upto 20.05.2035.



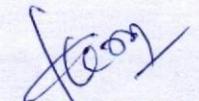
DR. B. K. PATNAIK
CHAIRMAN, SEAC



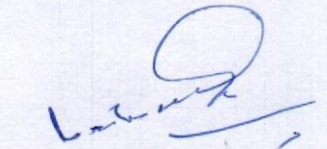
SRI B.P. SINGH
MEMBER, SEAC



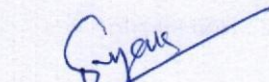
SRI B.C. PRUSTY
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DR. D. K. ROUT
MEMBER, SEAC




DR. R.C. MOHANTY
MEMBER, SEAC




DR. S.C. NAYAK
MEMBER, SEAC



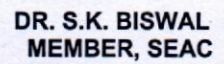
SRI A. C. MOHANTY
MEMBER, SEAC



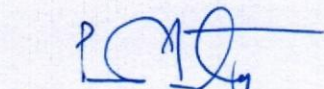
DR. D. SWAIN
MEMBER, SEAC



SRI S. BEHERA
MEMBER, SEAC

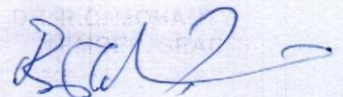


DR. S.K. BISWAL
MEMBER, SEAC




PROF. (DR.) P.K. MOHANTY
MEMBER, SEAC

APPROVED



CHAIRMAN, SEAC




SECRETARY, SEAC

TERMS OF REFERENCE (ToR) FOR CONDUCTING ENVIRONMENT IMPACT ASSESSMENT STUDY AND INFORMATION TO BE INCLUDED IN EIA/EMP REPORT FOR PROPOSED EXPANSION FOR CONSTRUCTION OF HOUSING COLONY AND CONVENIENT SHOPPING (PHASE-III) OF M/S. Z-ESTATES PVT. LTD AT KALARAHANGA, BHUBANESWAR WITH BUILT UP AREA 3,95,865.09 M².

1. Profile of the project proponent, name and contact address, implementing organization, organizational chart, project consultants etc., should be mentioned clearly.
2. Land description- plot/ survey numbers, Village, Tehsil, District, State and area of the land must be mentioned clearly.
3. Land schedule and kizam of land to be submitted.
4. Certificate from the concerned DFO about the distance of the project site from the Eco-Sensitive Zone of Chandaka-Dampada Wildlife Sanctuary and Nandan Kanan Sanctuary.
5. Description of Centre/State/Local regulations and standards applicable for townships and area development projects should be discussed.
6. Goal and objectives of the proposed project, significance of the project both at local and regional level, relevance of the project in light of the existing development plans of the region are to be mentioned clearly.
7. Background information and overall scenario of the proposed activity in the Indian Context, procedures adopted for selection, Criteria for selection of the site for the proposed activity, such as environmental, socio-economic, minimization of impacts, ecological sensitivity, Impact of existing activities on the proposed activity, etc. should be spelt out.
8. Resource and manpower requirements have to be detailed. Time frame for project initiation, implementation and completion should be detailed.
9. A map of the study area 5 km from the boundary of the project area, delineating the major topographical features such as land use, drainage, locations of habitats, major constructions including roads, railways, pipelines, industries if any in the area are to be mentioned.
10. A map covering aerial distance of 15 kms from the boundary of the proposed project area delineating environmental sensitive areas as specified in Form I of EIA notification dated 14th Sep 06. In the same map the details of environmental sensitive areas present within a radial distance of 1 Km from the project boundary shall be specifically shown
11. Land use map of the study area in 1: 10,000 scale based on high resolution satellite imagery delineating the forest, agricultural land, water bodies, settlements, and other cultural features is to be submitted.
12. Contour map on 1:10000 scale for the study area showing the various proposed breakup of the land.
13. Description of the project site, geology, topography, climate, transport and connectivity, demographic aspects, socio, cultural and economic aspects, villages, settlements should be given.

14. Detailed layout plan of proposed project development, communication facilities, access/approach roads, landscape, sewage disposal facilities, and waste disposal etc. to be given. Layout plan of proposed development of built up areas with covered construction such as DG Set rooms, Administrative buildings, Utilities such as Main and Stand By Power, Water supply installations etc. to be given.
15. The environmental impacts of construction and operation are established during the early phases of site selection and planning. Planning, site selection and design form an important stage in the development of these projects and will determine their environment impact(s).
16. Map of the study area clearly delineating the location of various monitoring stations (air/ water / soil and noise) superimposed with location of habitats are to be shown. Monitoring should be done as per CPCB guidelines. Primary data should be collected for one season except rainy season. Monitoring of the parameters should be carried out within the study area.
17. Study of land use pattern, habitation, cropping pattern, forest cover, environmentally sensitive places etc. employing remote sensing techniques and ground truth and also through secondary data sources.
18. Baseline data of air pollutant parameters extending an area of 5 KMs from the project should be monitored at a number of locations. Description of base line data of ambient air parameters namely RSPM, nitrogen dioxide, Sulphur dioxide, and carbon monoxide are to be collected. One season data is to be monitored other than monsoon as per the CPCB Norms. Sampling locations are to be located as per CPCB norms.
19. Baseline data of noise at the project area and the neighbourhood habitat areas is to be ascertained. Daytime and night time data should be collected.
20. Identify Project activities, including construction phase, which may affect surface water or groundwater. Estimate water intake requirements and identify the source of water to be used. Describe how water will be taken from the surface water / river and conveyed to the site. Ground water budgeting has to be provided. Rainwater harvesting has to be detailed out.
21. Baseline water quality from all sources such as ground water, municipal water, surface water need to be determined and compared to the water quality norms prescribed for drinking water and State PWD specifications for construction water. Quantity of wastewater is to be provided.
22. Baseline data on the flora and fauna for the study area is to be detailed out. An inventory map is to be prepared along with a description of the existing terrestrial, wetland and aquatic vegetation. If there are any rare and endangered species in the study area they are to be clearly mentioned.
23. Impact of the project during construction and operational phases for generation of waste is to be assessed. Options for minimization of solid waste and environmentally compactable disposal are to be given. Management and disposal of temporary structures, made during construction phase are to be addressed. Mitigation measures for handling biomedical wastes, e-wastes, municipal solid waste are to be detailed.
24. Impacts on air quality during the construction and operation phase should be predicted. The existing surrounding features of the study area and impact on them should be addressed separately. Mitigative measures are to be proposed during the construction stage as well as the operational stage of the project.

25. Impact of project construction/operation on the noise on account of construction equipment and road traffic is to be studied. Site plan and details for construction management showing the layout of noise and dust barriers should be given.
26. Impact of construction and operational phases on the surface and ground water on account of the building construction is to be estimated. Prediction of ground water contamination and suggested mitigating measures to minimize the pollution level.
27. Impact of project during construction and operational phases on the biological environment on account of project activity is to be detailed.
28. Predicted impact on the communities of the proposed activity is to be given. Impact on surroundings on socio-economic status is to be detailed. Mitigation measures to reduce adverse effects are to be given.
29. Describe the project energy requirements, infrastructure requirements needed for this activity. Discuss the steps taken to integrate the needs of other stakeholders into the location and design of access infrastructure to reduce and manage overall environmental impacts from resource development.
30. Estimate any environmental implications from transportation (rail, road) related emissions associated with the construction and operational phases and suggest suitable options. Provide a site plan showing the details of connectivity existing and proposed road and rail transport.
31. Provide a site plan showing buildings, roads, and open spaces, confirming the hierarchy of roads.
32. Discuss any expected change in traffic volume by Average Annual Daily Traffic (AADT) and any seasonal variability in traffic volume (include mitigation measures) prior to construction, during construction and at full site operation.
33. Discuss the impact of increased vehicle traffic and requirements for access improvements on roads in the site development area as a result of the Project, considering other existing and planned developments and operations in the region including what measures will be taken to reduce traffic and enhance vehicle safety on external roads.
34. Use of alternate renewable resources such as solar / wind power etc. is to be discussed. Discuss the options considered for supplying the power required for the Project and the environmental implications, including opportunities to increase the energy efficiency of the Project.
35. Details of the renewable energy systems (sizing and design), building costs and integration details are to be provided.
36. Emergency plans for any environmental risks and such as earthquakes is to be included.
37. Plan of action for conservation of natural resources and recycle waste materials due to the project activity in the construction and operational phase of the project is to be discussed.
38. Detailed EMP may be formulated to mitigate the residual impacts which should inter alias include the impact due to change in land use; due to loss of agricultural land and grazing land besides other impacts of the projects. Budgeting of the EMP may be included in EIA.
39. Any litigation(s) pending against the proposed project and / or any directions or orders passed by any court of law/ any statutory authority against the project is to be detailed out.



Secretary, SEAC

40. Copy of all the Environmental Clearance(s) including Amendments thereto obtained for the project from MoEF&CC/SEIAA shall be attached as an Annexure. A certified copy of the latest Monitoring Report of the Regional Office of the MoEF&CC, Bhubaneswar as per circular dated 30th May, 2012 on the status of compliance of conditions stipulated in all the existing environmental clearances including Amendments shall be provided. In addition, status of compliance of Consent to Operate for the ongoing existing operation of the project from State Pollution Control Board, Odisha shall be attached with the EIA-EMP report.
41. The following general points should be noted:
- (i) All documents should be properly indexed, page numbered.
 - (ii) Period/date of data collection should be clearly indicated.
 - (iii) The letter/application for environmental clearance should quote the SEAC file no and also attach a copy of the letter as an annexure to the final EIA-EMP Report.
 - (iv) The index of the final EIA-EMP report must indicate the specific chapter and page no. of the EIA-EMP Report.
 - (v) 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 MoEF&CC, Govt. of India should also be followed.
 - (vi) The consultants involved in the preparation of EIA/EMP report should be an accredited with Quality Council of India (QCI) / National Accreditation Board of Education and Training (NABET) and a certificate in this regard should be annexed in the EIA/EMP reports. Data provided by other organization/Laboratories including their status of approvals etc. should be specified. The consultant, while presenting the project should be equipped with relevant data and information relating to the project and make a qualitative presentation.
42. **The prescribed TOR would be valid for a period of three years for submission of the EIA/EMP report, as per the O.M. No. J-11013/41/2006-IA.II (I) (Part) dated 29.08.2017.**

TERMS OF REFERENCE (ToR) FOR CONDUCTING ENVIRONMENT IMPACT ASSESSMENT STUDY AND INFORMATION TO BE INCLUDED IN EIA/EMP REPORT FOR PATABEDA IRON ORE MINES (28.397 HA) OF M/S. MGM MINERALS LTD FOR EXPANSION OF IRON ORE PRODUCTION FROM 0.8 MTPA TO 1.5 MTPA (ROM) ALONGWITH CRUSHER & SCREEN PLANTS OVER MINING LEASE AREA OF 28.397 HA. LOCATED IN THE VILLAGE PATABEDA, TAHESIL KOIRA IN THE DISTRICT OF SUNDARGARH.


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


Secretary, SEAC


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


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
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 falling 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



Secretary, SEAC

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.


Secretary, SEAC

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.
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.


Secretary, SEAC

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, 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



Secretary, SEAC

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 (SOTM)

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
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


Secretary, SEAC

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.
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/EEMP Report.



Secretary, SEAC

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


Secretary, SEAC

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 waste) from each of the mining activity (Including transportation) on annual basis. Efforts should be made to further eliminate/ minimize generation of air pollution/dust, noise, wastewater, solid waste generation in successive years through use of better technology. This shall be ensured by the respective mine lease holders, (iii) Various machineries/equipment selected (viz. dumpers, excavators, crushers, screen plants etc.) and transport means should have optimum fuel/power consumption, and their fuel/power consumption should be recorded on monthly basis. Further, inspection and maintenance of all the machineries/ equipment/ transport vehicles should be followed as per manufacturer's instructions/ recommended time schedule and record should be maintained by the respective mine lease holders, (iv) Digital processing of the entire lease area using remote sensing technique should be carried out regularly once in 3 years for monitoring land use pattern and mining activity taken place. Further, the extent of pit area excavated should also be demarcated based on remote sensing analysis.



Secretary, SEAC

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 atleast 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



Secretary, SEAC

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 through 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


Secretary, SEAC

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, PMin 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	SPCB	Continuous Annually

Secretary, SEAC

Sl. No.	Study component / Action Plan	Responsibility	Monitoring and Reporting Time Frame (Approx.)
	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.		
	Installation of online ambient air quality monitor for PM10, PMP.S, SOx and NOx within the mine havina more than 3 MTPA EC Caoacitv	Respective Mine Lease Holders	Continuous Annually
	Installation of online ambient air quality monitor for PM ₁₀ , PM _{2.5} , SOx and NOx 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

Sl. No.	Study component / Action Plan	Responsibility	Monitoring and Reporting Time Frame (Approx.)
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 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).	Dept. of Steel & Mines	Continuous 6 months
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

Secretary, SEAC

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




Secretary, SEAC

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 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 three years for submission of the EIA/EMP report, as per the O.M. No. J-11013/41/2006-IA.II (I) (Part) dated 29.08.2017.



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TERMS OF REFERENCE (ToR) FOR CONDUCTING ENVIRONMENT IMPACT ASSESSMENT STUDY AND INFORMATION TO BE INCLUDED IN EIA/EMP REPORT FOR PROPOSED RARBAHAL GRAPHITE MINE FOR PRODUCTION OF GRAPHITE ORE 0.138 MTPA OVER AN AREA OF 20.675 HA AT VILLAGE RARBAHAL, TAHSIL-BELPARA, DIST-BOLANGIR OF SRI ANTARYAMI MISHRA.

1. The TOR 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 1993-94 should be given, clearly stating the highest production achieved in any one year prior to 1993-94. 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. The production details need to submit since inception of mine duly authenticated by Department of Mines & Geology, State Government.
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



Secretary, SEAC

- large, may also be detailed in the proposed safeguard measures in each case should also be provided.
10. Issues relating to Mine Safety, including subsidence study in case of underground mining and slope study in case of open cast mining, blasting study etc. should be detailed. The proposed safeguard measures in each case should also be provided.
 11. 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.
 12. 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.
 13. 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.
 14. 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.
 15. 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.
 16. 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.
 17. The vegetation in the RF / PF areas in the study area, with necessary details, should be given.
 18. 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.
 19. 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.
 20. 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,


Secretary, SEAC


clearly indicating the Schedule of the fauna present. In case of any scheduled-I fauna found in the study area, the necessary plan along with 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.

21. 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.
22. 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 falling under CRZ would also need to obtain approval of the concerned Coastal Zone Management Authority).
23. 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.
24. 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.
25. 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.
26. 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.
27. Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided.


Secretary, SEAC

28. 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.
29. 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.
30. 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.
31. Details of any stream, seasonal or otherwise, passing through the lease area and modification/ diversion proposed, if any, and the impact of the same on the hydrology should be.
32. 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.
33. 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.
34. 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.
35. Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report.
36. 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.
37. 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.
38. 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.

39. 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.
40. 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.
41. 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.
42. Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.
43. The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.
44. A Disaster Management Plan shall be prepared and included in the EIA/EMP Report.
45. 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.
46. The activities and budget earmarked for Corporate Environmental Responsibility (CER) shall be as per Ministry's 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.
47. The Action Plan on the compliance of the recommendations of the CAG as per Ministry's 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.
48. Compliance of the Ministry's Office Memorandum No. F: 3-50/2017-IA.III (Pt.), dated 30.05.2018 on the 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 needs to be submitted and included in the EIA/EMP Report.
49. Mitigation measures as per the Ministry's OM no Z-11013/57/2014-IA.II(M) dated 29.10.2014-Impact of mining activities on Habitations-Issues related to the mining projects wherein Habitations and villages are the part of mine lease areas or Habitations and villages are surrounded by the mine lease area.
50. 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.


Secretary, SEAC

- environment clearance for the existing operations of the project obtained from the Regional Office of Ministry of Environment, Forest and Climate Change, as may be applicable.
- f) While preparing the EIA report, the instructions for the Proponents and instructions for the Consultants issued by MoEF&CC 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 Ministry of Environment, Forest and Climate Change, as may be applicable.
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51. **The prescribed TOR would be valid for a period of three years for submission of the EIA/EMP report, as per the O.M. No. J-11013/41/2006-IA.II (I) (Part) dated 29.08.2017.**