

**PROCEEDINGS OF THE MEETING OF STATE LEVEL EXPERT APPRAISAL
COMMITTEE, ODISHA HELD ON 25th SEPTEMBER, 2019**

The SEAC met on 25th September, 2019 at 11:00 AM in the Conference Hall of Odisha State Pollution Control Board, Bhubaneswar under the Chairmanship of Sri. B. P. Singh. The following members were present in the meeting.

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| 1. Sri. B. P. Singh | - | Chairman |
| 2. Dr. D. Swain | - | Member |
| 3. Sri. J. K. Mahapatra | - | Member |
| 4. Prof.(Dr.) B.K. Satpathy | - | Member |
| 5. Prof.(Dr.) P.K. Mohanty | - | Member |

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

ITEM NO. 01

PROPOSAL FOR ENVIRONMENTAL CLEARANCE OF PROPOSED (G+9) AND (G+4) STORIED RESIDENTIAL-CUM-COMMERCIAL WITH MULTIPLEX BUILDING AT- MOUZA – BARAMUNDA, BHUBANESWAR, DIST-KHORDHA (BUILT UP AREA – 26,812.794 SQM) OF M/S. HARASHPRIYA CONSTRUCTIONS PVT LTD. (EC).

1. This is a proposal for Environmental Clearance of M/s. Harashpriya Constructions Pvt Ltd. for proposed proposal of (G+9) and (G+4) Storied Residential-cum-Commercial with Multiplex Building at- Mouza – Baramunda, Bhubaneswar, Dist-Khordha (Built up area – 26,812.794 sqm).
2. Residential-cum-Commercial with Multiplex Building of Sri Chetan Kumar Tekariwal GPA holder and Sri. Vaibhav Agarwal GPA holder and Harshpriya Construction Pvt. Ltd. Represented by director Sri Chetan Kumar Tekariwal over HAL PLOT NO.-1140, 1141, 1142, 1142/2350, 1143, 1146, 1147, 1138 & 1148, Mouza- Baramunda, Bhubaneswar, Dist-Khurda.
3. The proposed site is located at Baramunda, Bhubaneswar, Odisha. The Geographical co-ordinate of the project site is: Latitude - 20° 16' 18.08" N & Longitude - 85° 48' 16.49" E. The project site is well connected with National Highway NH-16. The nearest railway station is Bhubaneswar Railway station at a distance of approx 4.1 Km in East direction. The nearest airport is Biju Patnaik Airport at a distance of approx. 2.4 Km in East direction from project site.
4. Meteorology: The maximum temperature is about 36.0°C and the minimum temperature is 16.0°C felt in the area. The average annual rainfall in the area is 1326.16 mm.
5. The Building Details Of The Project:

Particulars	Proposed
Plot Area	7809.200 sqm
Ground Coverage	3135.373 sqm (40.15 %)
FAR (Floor Area Ratio)	2.446
Built up Area	26812.794 sqm
Maximum Height	30 m
Road Area	2647.32 sqm
Parking Area	7711.111 sqm
Green Belt Area	1590.0 sqm (20.35 %)
Maximum No. of Floor	G+9 and G+4
Power/Electricity Requirement & Sources	CESU - 1422.0 KW Solar – 45.0 KW

Particulars	Proposed
	Total – 1467.0 KW
No. of DG sets	2x500 KVA
Water requirement & Sources	115 KLD (Fresh)
Sewage Treatment & Disposal	STP of Capacity 180 KLD
Estimated Population	2350 nos.

6. Power Requirement: The daily power requirement for the proposed complex is preliminarily assessed as 1467 KW (Solar System- 45 KW & CESU – 1422 KW). 2 nos. of DG set having 500 KVA capacities for power back up in the Commercial-cum-Residential Building Project.
7. Water Requirement: Fresh make up of 115.0 m³/day will be required for the project which will be sourced from Ground water. Waste water of 146.15 KLD will be treated in a STP of capacity 180 KLD.
8. Rain Water will be harvested through 15 no. of recharging pits.
9. Firefighting Installations: Firefighting system will be installed as per recommendation of the Firefighting Officer, Odisha and as per the guideline of NBC (part-4).
10. Solid Waste Management: From the residential complex solid waste will be generated @ 0.4 kg/person/day, will be about 315 kg/day. Waste generated from Commercial people will be @ 0.15 kg/capita/day, which will be about 247.5 kg/day. Waste generation from floating people will be 7.0 kg/day. Solid waste shall be stored in separate garbage bin and send to approved recyclers. Around 73.1 kg/day of STP sludge will be generated.
11. The project cost is ₹ 70 Crores and the Environment Management Cost is ₹12.6 Lakhs
12. The Environment Consultant **M/s Centre for Envotech & Management Consultancy Pvt. Ltd., Bhubaneswar** along with the proponent made a detailed presentation on the proposal before the Committee.

Considering the information / documents furnished by the proponent and presentation made by the consultant, the SEAC decided to take decision on the proposal after receipt of the following information / documents from the proponent followed by visit of Sub-Committee of SEAC to the proposed site.

- (i) Copy of BDA approved plan.
- (ii) Copy of land schedule and conversion of land.
- (iii) Khatiyon of land from Tahasildar mentioning the zone.
- (iv) Detailed calculation of Residential Built up area and Commercial Built up area.
- (v) Parking Area calculation apartment wise.
- (vi) Provision for electric point at each and every parking location for e-vehicle charging etc.
- (vii) Provision for 2 separate entries and exits i.e. one for residential and other for commercial and accordingly, revised layout to be submitted.
- (viii) Traffic Density Study to be carried out by Operational Research (OR) expert and report to be submitted.
- (ix) Percentage of Green Belt in the project area.
- (x) Copy of PH Division water supply Bhubaneswar regarding supply of water to that proposed project.
- (xi) Copy of application applied to State Water Resources Deptt. for drawal of ground water and NoC from CGWA of MoWR, Govt. of India.
- (xii) Copy of BMC permission letter for discharge of treated water to municipality drain.

- (xiii) An undertaking from proponent for usage of PH Division water supply at later stage.
- (xiv) Proposal for monitoring of STP waste water periodically.
- (xv) Study of wind direction in that area.
- (xvi) Reference taken for study of traffic density.
- (xvii) Recalculation of energy consumption for each apartment with provision of Air Conditioner in each bed room and living room.
- (xviii) Proper periodically maintenance of Rain Water Harvesting System and increment of Recharging pits to 20 nos.
- (xix) Proposal to increase the percentage (5%) of usage of solar/ renewable energy.
- (xx) Copy of permission of Airport Authority of India.
- (xxi) Revised water balance for discharge of less treated water to drain.

ITEM NO. 02

PROPOSAL FOR ENVIRONMENTAL CLEARANCE OF PROPOSED OCPL MINES COLONY – MANOHARPUR TOWNSHIP PROJECT IN A PLOT AREA OF 98256.92 SQ.MT OVER AN AREA OF 24.28 ACRES WITH BUILT – UP AREA 37622 SQ.MT AT SARBAHAL VILLAGE, TEHSIL HEMGIRI, DISTRICT SUNDARGARH OF M/S. ODISHA COAL AND POWER LIMITED (EC).

1. This is a proposal for Environmental Clearance of M/s. Odisha Coal and Power Limited for OCPL Mines Colony – Manoharpur Township Project in a plot area of 98256.92 sq.mt over an area of 24.28 acres with built – up area 37622 sq.mt at Sarbahal Village, Tehsil Hemgiri, District - Sundargarh.
2. The township Project is located at Khata No 52 (AJA) and 50 (Rakhit) at Village Sarbahal, Tehsil Hemgir and District Sundargarh in Odisha State. The site co-ordinates are as follows: Latitude- 21°57'56.22 "N To 21°58'5.15" N and Longitude- 83°48'26.01"E To 83°48'59.03"E. The nearest airport is Jharsuguda Airport in Jharsuguda which is at an aerial distance of 25.4 km from the project site towards SSE direction. Kanika Railway Station is 14 km away from the project site towards SSW direction which is a station in Raipur-Rourkela Railway line. Along with airways and railways, the site is also well connected through roadways, nearest National Highway is NH 200 at an aerial distance of 15 km in SE Direction.
3. The detailed Area Statement is provided below in Table:

Sl. No.	Particulars	Area (in m ²)
1	Plot Area	98,256.92 m ²
2	Total Proposed Ground Coverage (@ 12 % of plot area)	12,482 m ²
3	Proposed FAR	0.382
4	Built-up Area	37,622 m ²
5	Total Open space (84.7 % of the total area)	83,224.92 Sqm
6	Landscape Area (@ 32 % of the plot area)	31,529
7	Parking Area (2.42 %)	2387 sqm
8	Area of internal roads & pavement (20.76 % of total area)	20,400 sqm
9	Maximum height of building	12 m (G+3)
10	Units proposed	116 units

4. The total water requirement is approximately 217 KLD. The total fresh water requirement is 129 KLD, which will be met from Hirakud Reservoir. Approval for drawal of 5.55 cusec water from Hirakud Reservoir was obtained from Government of Odisha.
5. The STP shall be based on MBBR Technology with Ultra Filtration (aerobic) of 120 KLD (2 nos of STP will be used of capacity – 50 KLD and 70 KLD). Recovery from STP is 88 KLD.
6. Power Requirement: Maximum demand load = 892 KW, Connected load = 1MVA (Source = WESCO). Back Up by DG sets. = 349 KVA (3 nos 63 KVA one 1 nos 160 KVA) silent DG Set.
7. Green/Plantation Area = 31,529 sqm (approx. 32% of the plot area (20 % tree plantation & 12 % lawn and garden)
8. The project cost is ₹ 117.45 Crores.
9. The project proponent along with the environment consultant **M/s Visiontek Consultancy Services Pvt. Ltd., Bhubaneswar** made a detailed presentation before the SEAC.

Considering the information / documents furnished by the proponent and presentation made by the consultant, the SEAC decided to take decision on the proposal after receipt of the following information / documents from the proponent.

1. Increase in percentage of usage solar energy to minimum 5%.
2. Status of land as on 25.10.1980 w.r.t. Forest Conservation Act, 1980.
3. Land schedule and kisam of land.
4. IDCO land agreement copy.
5. Revenue record of the land from concerned Tahasildar.
6. Total parking area (%) with respect to built-up area and in terms of ECS.
7. Detailed calculation of zero discharge in monsoon period particularly.
8. Optimization of number of Rain water Harvesting Recharge pits as per norms of CPCB.
9. DFO certificate that patita land kisam not included in DLC land.
10. Detailed Solid Waste Management Plan.
11. Location of DG sets to be shifted to opposite to habitational area. Accordingly, layout to be modified and submitted.

ITEM NO. 03

PROPOSAL FOR ENVIRONMENTAL CLEARANCE FOR INTEGRATED SOLID WASTE MANAGEMENT FACILITY PROJECT OVER AN AREA OF 20 ACRES AT VILLAGE BHITARGARH. TEHSIL- KUJANGA, DISTRICT- JAGATSINGHPUR OF PARADEEP MUNICIPALITY (EC).

1. The proposal is for Environmental Clearance of Paradeep Municipality proposed to setup an Integrated Municipal Solid Waste Management system facility for processing facilities and sanitary landfill at Khata No. 01, Plot No. 69,71,82, village-Bhitargarh, Tehsil Kujanga, Dist. Jagatsinghpur, Odisha.
2. The proposed project falls under Item 7(i) (Common Municipal Solid Waste Management facilities) as per Environmental Impact Assessment Notification dated September 14, 2006 and its amendments. The project will fall under Category B and will require Environmental Clearance from State Environment Impact Assessment Authority (SEIAA), Odisha.

3. The Total Area of the site would be 52.6 Acres in which 20 acres area will be utilized for SWM facility and the capacity of processing plant facility will be 55.1TPD in 2018; 56.1TPD in 2019; 57.1TPD in 2020; 58.1TPD in 2023; 73.2 TPD in 2038.
4. Terms of Reference (TOR) was issued vide SEAC letter. No. 122/SEAC-214 on dated 06.02.2014 and Fresh ToR was issued vide letter no: 593/SEAC -120 on dated 22.09.2017.
5. Currently, the site is being used for dumping of waste and no scientific disposal method is being followed. Alienation of land in favour of Housing & Urban Development Department for Solid Waste Management Project at Paradeep Municipality been duly approved by the Administrative Department, Paradip Port Trust.
6. This Municipal Solid Waste Management (Landfill) Project is designed for 20 years (in five phases) from the base year 2018 till year 2038.
7. The Total design capacity of the proposed landfill site will be 188614 cum for 20 years.
8. For the first phase (year 2018 to year 2023) total waste generated in the Year 2018 in Paradeep is 51 MTPD. Bio-degradable waste will be processed by Organic Waste Converter(OWC) at Decentralized Facility. Mechanical Segregation of Mixed Waste at Centralized Facility. Recyclable waste shall be segregated and will be sold to the private agencies. The inert waste/rejects will be disposed at Paradeep landfill site.
9. The water requirement during construction phase, 10 KLD of water will be required that will be met through tankers. During the operational phase, 30 KLD of water will be required that will be abstracted through tankers. Power consumption during the operational phase will be 10 KVA and will be supplied by Central Electricity Supply Company of Odisha Limited.
10. Domestic wastewater generated at the site shall be treated in septic tank followed by soak pits. Sludge from soak pit shall be mixed with compost. Leachate generated at site will be collected in leachate tanks.
11. A green belt of densely planted, tall growing trees is to be developed around the periphery of the project boundary and inside the buffer area. Total Landscape area is 11,905 m². which includes green belt area and green buffer area.
12. Processing facility will be developed in modules in every 5 years. For designing the processing facility, 2018 is considered as a base year. Total cost of the project is ₹ 23.2 Crores which includes the C&T, processing facilities, common facilities, sanitary landfill sharing, bioremediation cost.
13. The Public Hearing has been conducted on 11.09.2018.
14. Baseline study was conducted from October 2017 to December 2017 (Post Monsoon Season).
15. The Environment Consultant **M/s Ascenso Enviro Pvt. Ltd. D-79, 2nd Floor, Sector-6, Noida, Uttar Pradesh** along with the proponent made a detailed presentation on the proposal before the Committee.

Considering the information / documents furnished by the proponent and presentation made by the consultant, the SEAC decided to take decision on the proposal after receipt of the following information / documents from the proponent followed by a visit of the Sub-Committee of SEAC to the proposed site.

1. Status of land as on 25.10.1980 w.r.t. Forest Conservation Act, 1980.

2. Land schedule and kism of land. Certificate from concerned DFO that there is no DLC land involved in the land acquired for Solid Waste Management Facility.
3. Remedial measures to be taken in case of flood as it is a flood prone area.
4. Landfill site should confirm to the siting criteria of Solid Waste Management Rules, 2016.
5. Landfill should be shifted so that the distance of nearest habitation is more than 200 meters and a little far away from Creeks. Boundary of the land fill site to be re-located away from habitational area. Affidavit for no habitation within 200 mtrs.
6. Proper consultation from expert for selecting species for plantation within the greenbelt area, for protection from emission of gases/odour if any from land fill site.
7. Analysis of Ground water around the land fill site and report to be submitted.
8. Installation of machine for non-emission & odourless gas.
9. Study of Mean Sea Level height.
10. Distance of HTL and hazard line.
11. Clarification from the CRZ authority on applicability of CRZ Clearance as the proposed site may fall under CRZ-1.

ITEM NO. 04

PROPOSAL FOR ENVIRONMENTAL CLEARANCE OF RAIKA – KALAPARBAT IRON AND MANGANESE MINE FOR PROPOSED ROM PRODUCTION CAPACITY 53,990 TPA (IRON ORE: 53,040 TPA & MANGANESE ORE: 950 TPA) SETTING UP A CRUSHER & SCREENING PLANT OF 100 TPH CAPACITY OVER AN AREA 9.8136 HA. IN THAKURANI RESERVE FOREST (NEAR VILLAGE RAIKA) SUBDIVISION – CHAMPUA, DIST – KEONJHAR OF M/S. KUSHALESWAR MINERALS (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. Raika-Kalaparbat Iron and Manganese Mine of M/s. Kushaleswar Minerals is spread over an area of 9.8136 hectare in Thakurani Reserve Forest, near Raika village under Champua subdivision of Keonjhar district, Odisha.
3. Raika-Kalaparbat Iron and Manganese Mine was executed initially on 09.04.1981 for 30 years. Later on, the mining lease was transferred to M/s Kushaleswar Minerals vide Govt. of Odisha order no. 1788/III(A)SM-42/91, dated 13.02.1992 and the transfer deed was executed on 12.05.1992.
4. The mining operation has been stopped within the lease area since 19.01.1997 by the DDM, Joda as the mining operation was carried out in the forest land included in the ML area without having required Forest Clearance.
5. 1st renewal of ML area over 9.8136 ha. was applied by the lessee for 20 years w.e.f. 09.04.2011 to 08.04.2031. The period of ML applied for renewal is deemed to have been extended for 50 years in total w.e.f 09.04.1981 to 08.04.2031 as per section 8A(3) of MM(D&R) amendment Act, 2015.
6. The ML area of 9.8136 ha entirely comprises of forest land. Stage –I Clearance for the forest land involved in the lease area has been obtained vide letter no. 5-ORC229/2014-BHU, dated 09.07.2015.

7. The mine is planned to produce maximum ROM of 53,990 TPA and Setting up a Crusher & Screening Plant of 100 TPH Capacity; maximum production of Iron Ore & Manganese Ore to be 53,040 TPA and 950 TPA respectively.
8. Mining will be carried out by opencast semi-mechanized with drilling and blasting on single shift basis. The float ores and loose strata will be excavated by 0.9 m³ capacity excavator and loaded into 10t tippers. ROM will be fed into 100 TPH crushing & screening unit within the lease area to get saleable ore.
9. The mining activity shall generate direct employment opportunity for 75 nos. and the locals will get priority in appointment.
10. The peak water requirement shall be 17 cum/ day and shall be met from Kundra nala by tanker & ground water source with due permission.
11. The last mining plan was approved by IBM on 09.04.2012. Later review of mining plan was approved by Regional Controller of Mines, IBM, Bhubaneswar on 10th April, 2019 vide letter no. MSOTFM/54-ORI/BHU/2018-19/84. The ML area is featured under the SOI toposheet No. 73 F/8 bounded by latitude 22° 03' 24.96600" to 22° 03' 35.84160" N and longitude 85° 25' 15.12120" to 85° 25' 32.45160" E. All-weather 3.5km long road connects the mines with NH-520. The mining lease area is also accessible from Barbil town through 8.5km long all weather road. The nearest railhead is Bansapani, located at a distance of 6km. Full-fledged market facilities, postal and medical facilities are available at Barbil. Interstate boundary between Odisha and Jharkhand lies at distance of 9.5km in North-East direction from the proposed project site.
12. Earlier Public Hearing was conducted on 05.01.2010 for the project and the final EIA /EMP report was submitted for Environmental Clearance to SEIAA, Odisha. Then, SEIAA, Odisha asked for the original file with all documents from MoEF&CC, Govt. of India (as TOR was issued by them) to consider their case. During this transfer, the file was misplaced and their case could not proceed further. Now after obtaining Stage -1 Forest Clearance, in consultation with SEIAA, Odisha, M/s Kushaleswar Minerals has applied for Environmental Clearance again to produce maximum ROM of 53,990 TPA and Setting up a Crusher & Screening Plant of 100 TPH Capacity; maximum production of Iron ore & Manganese ore to be 53,040 TPA and 950 TPA respectively.
13. The lease hold area displays a rugged mountainous topography with slope towards west having highest altitude of 664.5m AMSL in the south-east part and the lowest altitude of 617.5m AMSL on the south-west side. The mining lease area is located in tropical region where climate is characterized by hot summers and cool winters. There is no human settlement within the applied lease area.
14. Mining shall commence from the southern part of the leasehold, from the existing Quarry- 1 and will develop laterally as well as depth wise to engulf existing Quarry- 2. The quarry may deepen upto 15m (618m AMSL is the pit limit at the end of the life of the mines) from the surface level as the reserve is observed to be available upto that limit. Opencast semi-mechanized method of mining will be adopted with drilling & blasting, on single shift basis with the deployment of 100mm dia DTH drill, 0.9m³ capacity excavator and 10t capacity tippers. Height and width of the benches will be maintained at 3m & 6m respectively; the individual benches will be kept at 75° while overall quarry slope angle will be maintained at around 30° with horizontal. The ROM will be excavated & loaded to tipper and transported to crushing & screening site for breaking & sizing; waste to be shifted to Dump- 4. ROM iron ore from mines

will be crushed and screened or preparation of saleable ore. The entire ROM manganese ore will be broken, sorted & sized manually. Ore to waste ratio was 1:0.22.

15. Based on the rated production of mine and mineable reserve, it is estimated that the life of the mine shall be 7 years (life of iron ore reserve will be 4 years whereas that of manganese ore reserve will be 7 years). Till the end of the life of the mines, an area of 5.701 hectare shall be used in mining related activities out of 9.8136 hectare of ML area. At the end of the conceptual period, 43,906m³ of waste is likely to be generated; out of these, 24,080m³ waste generated in remaining 2years of the plan period will be dumped over 0.301 ha. at 10m height (maximum) in one terrace in north-west part of the lease area as Dump-4 and remaining 19,826 m³ will be utilize for backfilling of 1ha. mined out area at 2m thick average filling. Area under excavation, OB dump, Mineral storage area, Sub grade stack area, Mineral processing area (a total of 9.1536 ha.) will be fully rehabilitated by plantation; leaving road and infrastructure for public use. Backfilling will commence from 5th year onwards. To maintain ecological balance and to check harmful effects imposed on the environment due to proposed mining and allied activities, environmental control measures such as Land use planning, Solid waste management, Air pollution control measures, Water pollution control measures, Noise pollution control measures, Occupational safety health and Socio-economic condition have been envisaged.
16. The capital project cost is estimated to be ₹ 1.73 crores and there is budgetary provision of ₹ 18 lakhs toward environmental protection measures.
17. The Environment Consultant **M/s Centre for Envotech & Management Consultancy Pvt. Ltd., Bhubaneswar** along with the proponent made a detailed presentation on the proposal before the Committee.
18. The proponent made an appeal before the SEAC for waiver of public hearing with a justification that the public hearing has already been conducted earlier for the same proposal in the year 2010. The proponent has also appealed that they have obtained Stage-I Forest Clearance in the year 2015 and the same will be lapsed if they will go for public hearing again as conducting public hearing is a time taking process.

The SEAC after detailed presentation by the project proponent along with consultant noted that the public hearing for the proposal had already been conducted earlier on 05.01.2010 and a copy of which is also furnished with EIA/EMP report earlier and also the justification furnished. For this reason, conducting a fresh Public Hearing may be exempted. The SEAC, after detailed deliberations on the proposal recommended for exemption of fresh public hearing for the proposal as well as **recommended for issuing Standard Term of Reference as per Annexure- I along with additional specific conditions as recommended by CSIR-NEERI on carrying capacity study as per Annexure - II** for undertaking EIA and preparation of Environmental Management Plan (EMP).

ITEM NO. 05

PROPOSAL FOR ENVIRONMENTAL CLEARANCE FOR PROPOSED PRODUCTION OF STEEL STRUCTURE / ROD 2,00,000 TPA & IRON BILLET – 2,00,000 TPA, AT-SARUA INDUSTRIAL ESTATE, KHORDHA OF M/S. NEW LAXMI INDUSTRIES PVT. LTD OF SRI PAWAN KUMAR GUPTA (TOR).

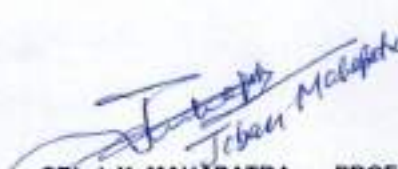
The project proponent didn't attend the meeting and requested to defer the proposal to next meeting.

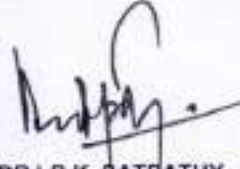
ITEM NO. 06

PROPOSAL FOR ENVIRONMENTAL CLEARANCE FOR PROPOSED PRODUCTION OF STEEL STRUCTURE / ROD 2,00,000 TPA & IRON BILLET – 2,00,000 TPA, AT-SARUA INDUSTRIAL ESTATE, KHORDHA OF M/S. NEW LAXMI STEEL AND POWER PVT. LTD OF SRI PAWAN KUMAR GUPTA (TOR).


The project proponent didn't attend the meeting and requested to defer the proposal to next meeting.


SRI B.P. SINGH
CHAIRMAN, SEAC


SRI J. K. MAHAPATRA
MEMBER, SEAC


PROF.(DR.) B.K. SATPATHY
MEMBER, SEAC


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


DR. D. SWAIN
MEMBER, SEAC

APPROVED

CHAIRMAN, SEAC

TERMS OF REFERENCE (ToR) FOR CONDUCTING ENVIRONMENT IMPACT ASSESSMENT STUDY AND INFORMATION TO BE INCLUDED IN EIA/EMP REPORT OF RAIKA - KALAPARBAT IRON AND MANGANESE MINE FOR PROPOSED ROM PRODUCTION CAPACITY 53,990 TPA (IRON ORE: 53,040 TPA & MANGANESE ORE: 950 TPA) SETTING UP A CRUSHER & SCREENING PLANT OF 100 TPH CAPACITY OVER AN AREA 9.8136 HA. IN THAKURANI RESERVE FOREST (NEAR VILLAGE RAIKA) SUBDIVISION - CHAMPUA, DIST - KEONJHAR OF M/S. KUSHALESWAR MINERALS (TOR).

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 and EIA 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. Map showing Iron and Manganese content present in lease area, dump areas for both Iron and Manganese and backfilling areas for both.
9. 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.
10. 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.
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, 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.
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


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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.
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 tease 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.




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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. 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.
48. 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.

SPECIFIC TOR AS PER 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.


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6. Construction of cement concrete road from mine entrance and exit to the main road with proper drainage system and green belt development along the roads and also construction of road minimum 300 m inside the mine should be done. This should be done within one year for existing mines and new mine should have since beginning. The concerned departments should extend full support, wherever the land does not belong to the respective mine lease holders. The Department of Steel & Mines, Govt, of Odisha should ensure the compliance and should not issue the Mining Permits, if mine lease holder has not constructed proper cement concrete road as suggested above.
7. In view of high dust pollution and noise generation due to road transport, it is proposed to regulate/guide the movement of iron and manganese ore material based on the EC capacity of the mines. Accordingly, ore transport mode has been suggested, as given below in Table.

Table : EC Capacity based Suggested Ore Transport Mode (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



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8. Development of parking plazas for trucks with proper basic amenities/ facilities should be done inside mine. This should be done within one year for existing mines and new mines should have since beginning. Small capacity mines (in terms of lease area or production) not having enough space within the mine lease areas should develop parking plaza at a common place within the region with requisite facilities. Responsibility: Individual Mine Lease Holders; Time Period: 1 Year
9. Construction of NH 215 as minimum 4 lane road with proper drainage system and plantation and subsequent regular maintenance of the road as per IRC guidelines. Construction of other mineral carrying roads with proper width and drainage system along with road side plantation to be carried out. Responsibility: Department of Steel & Mines with PWD / NHAI Time Period: 2 Years.
10. Regular vacuum cleaning of all mineral carrying roads aiming at "Zero Dust Resuspension" may be considered. Responsibility: PWD / NHAI/ Mine Lease Holders; Time Period: 3 months for existing roads.
11. Expansion of existing mines and new mines should be considered after conducting recent EIA Study (as per the provisions of EIA Notification 2006, as amended time to time) with proper justification on demand scenario for iron ore requirement and availability of pollution free transport network in the region. Responsibility: IBM, Department of Steel & Mines and MoEF&CC, New Delhi.
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 Yr 1	2017- 18 Yr 2	2018-19 Yr 3	2019-20 Yr 4	2020-21 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

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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, preparation of EIA/EMP Report. Appraisal by the EAC and grant of EC) takes about one year time. Under such circumstances, it is suggested that further applications for grant of TOR or grant of EC for expansion of production capacity of the mine should be considered for those existing mines, which have exhausted their capacity subject to consideration of all environmental aspects. Responsibility: Department of Steel & Mines and MoEF&CC, New Delhi.

14. **Sustained Iron Ore Production beyond 2020:** Considering the implementation of MMDR Act 2015, total production of iron ore in Odisha State is anticipated to be about 111 MT during 2016-17 (actual production was - 102,663 MT), 136 MT during 2017-18, 146 MT during 2018-19 and 146 MT during 2019-20. Then there will be substantial drop in total production (to the tune of 73 MT during 2020-21 onwards) due to closure of mines, which are valid up to 2020. Therefore, in order to maintain operation/sustained growth of downstream industries, iron ore mining in the region needs to be continued at a sustainable rate. The State Govt. through Department of Steel and Mines should initiate appropriate action to ensure continued availability of iron ore from the region, as per suggested sustainable annual production
15. **Reserves Estimation-Mining Plan and Exploration;** Appropriate actions (geo- technical investigation for qualitative and quantitative resource estimation & other preparations for auction of mines), may be initiated taken into account the existing working mines, and the mines which were operational at some point of time (but closed presently due to various reasons). The total iron ore reserves/ resources available within the total lease area of each mine should be estimated by State Govt./NMET/ GSI (or any other approved agency) with respect to: (i) Total lease area of mine (surface), (ii) Maximum depth to which resources could be available, (iii) Resources below the ground water table (if intersected), (iv) Reserves are to be estimated as per UNFC code with respect to quantity and quality (% Fe content), (v) Maximum mining rate and area for auction (after 2020) will be calculated based on total resources available and proposed life of mine leading to closure of mine in a stipulated time period. Responsibility: Department of Steel & Mines, IBM and GSI; Time frame: 1 year for the mines to be auctioned for next 2 years. The above mentioned organizations shall ensure the compliance with respect to timelines for implementations.
16. Depending upon availability of extractable iron ore resources within a mine, mining below the ground water table may be permitted after conducting necessary geological and hydro-geological study by GSI and requisite approval from the CGWB/CGWA (Central Ground Water Board/Authority). This can be explored at least in few mines on trial/pilot basis. Further, within a mine, it will be desirable to operate one pit at a time, and next pit should be opened after extracting maximum possible resources from the first pit, so that the exhausted pit can be used for back filling/ storing of low grade iron ore. However, depending upon the quantity and/or quality of iron/ manganese ore, other mine pits in the same mine lease may also be opened for sustainable scientific mining, as per approved mining plan/scheme of mining by IBM. The Department of Steel & Mines, Govt. of Odisha should initiate the pilot project so that minerals are fully utilized.

17. **Commercial Utilization of Low Grade Ore:** R&D studies towards utilization of low-grade iron ore should be conducted through research/academic institutes like IMMT, Bhubaneswar, NML, Jamshedpur, and concerned metallurgical departments in IITs, NITs etc., targeting full utilization of low-grade iron ore (Fe content upto 45% by 2020 and upto 40% by 2025). In fact, life cycle assessment of whole process including environmental considerations should be done for techno-economic and environmental viability. R&D studies on utilization of mine wastewater having high concentration of Fe content for different commercial applications in industries such as cosmetics, pharmaceutical, paint industry should also be explored. Responsibility: IBM, Dept, of Steel & Mines, Individual Mine Lease Holders.
18. The mining activity in Joda-Koira sector is expected to continue for another 100 years, therefore, it will be desirable to develop proper rail network in the region. Rail transport shall not only be pollution free mode but also will be much economical option for iron ore transport. The rail network and/or conveyor belt system upto public railway siding needs to be created. The total length of the conveyor belt system/ rail network to be developed from mines to nearest railway sidings by 11 mines in Joda region is estimated to be about 64 km. Similarly, in Koira region, total length of rail network/ conveyor system for 8 mines (under SOTM 1 & 2) is estimated to be around 95 km. Further, it is suggested to develop a rail network connecting Banspani (Joda region) and Roxy railway sidings in Koira region. Responsibility: Dept, of Steel & Mines, Govt, of Odisha and Concerned Mines along with Indian Railways. Time Period: Maximum 7 years (by 2025). The Department of Steel & Mines, Govt, of Odisha should follow-up with the concerned Departments and railways so that proposed proper rail network is in place by 2025.
19. State Govt, of Odisha shall make all efforts to ensure exhausting all the iron & manganese ore resources in the existing working mines and from disturbed mining leases/zones in Joda and Koira region. The criteria suggested shall be applicable while suggesting appropriate lease area and sustainable mining rate. Responsibility: Dept, of Steel & Mines, Govt, of Odisha.
20. Large and medium mine leases contribute to better implementation of reclamation and rehabilitation plans to sustain the ecology for scientific and sustainable mining. The small leases do not possess scientific capability of environmentally sustainable mining. Therefore, new mine leases having more than 50 ha area should be encouraged, as far as possible. This will ensure inter-generational resource availability to some extent. Responsibility: Dept, of Steel & Mines, Govt, of Odisha.
21. **Mining Operations/Process Related:** (i) Appropriate mining process and machinery (viz. right capacity, fuel efficient) should be selected to carry out various mining operations that generate minimal dust/air pollution, noise, wastewater and solid waste, e.g. drills should either be operated with dust extractors or equipped with water injection system, (ii) After commencement of mining operation, a study should be conducted to assess and Quantify emission load generation (in terms of air pollution, noise, waste water and solid 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,

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and their fuel/power consumption should be recorded on monthly basis. Further, inspection and maintenance of all the machineries/ equipment/ transport vehicles should be followed as per manufacturer's instructions/ recommended time schedule and record should be maintained by the respective mine lease holders, (iv) Digital processing of the entire lease area using remote sensing technique should be carried out regularly once in 3 years for monitoring land use pattern and mining activity taken place. Further, the extent of pit area excavated should also be demarcated based on remote sensing analysis. This should be done by ORSAC (Odisha Space Applications Centre, Bhubaneswar) or an agency of national repute or if done by a private agency, the report shall be vetted/ authenticated by ORSAC, Bhubaneswar. Expenses towards the same shall be borne by the respective mine lease holders. Responsibility: Individual Mine Lease Holders.


22. **Air Environment Related:** (i) Fugitive dust emissions from all the sources should be controlled regularly on daily basis. Water spraying arrangement on haul roads, loading and unloading and at other transfer points should be provided and properly maintained. Further, it will be desirable to use water fogging system to minimize water consumption. It should be ensured that the ambient air quality parameters conform to the norms prescribed by the GPCB in this regard, (ii) The core zone of mining activity should be monitored on daily basis. Minimum four ambient air quality monitoring stations should be established in the core zone for SPM, PM10, PM2.5, SO2, NOx and CO monitoring. Location of air quality monitoring stations should be decided based on the meteorological data, topographical features and environmentally and ecologically sensitive targets and frequency of monitoring should be undertaken in consultation with the State Pollution Control Board (based on Emission Load Assessment Study). The number of monitoring locations may be more for larger capacity mines and working in larger area. Out of four stations, one should be online monitoring station in the mines having more than 3 MTPA EC Capacity, (iii) Monitoring in buffer zone should be carried out by SPCB or through NABET accredited agency. In addition, air quality parameters (SPM, PM10, PM2.5, SO2, NOx and CO) shall be regularly monitored at locations of nearest human habitation including schools and other public amenities located nearest to source of the dust generation as applicable. 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



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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 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


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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 Koiria is not observed, the Forest Department shall further record and ensure that elephant's movement is not



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affected due to mining activities, (iii) All precautionary measures should be taken during mining operation for conservation and protection of endangered fauna namely elephant, sloth bear etc. spotted in the study area. Action plan for conservation of flora and fauna should be prepared and implemented in consultation with the State Forest and Wildlife Department within the mine lease area, whereas outside the mine lease area, the same should be maintained by State Forest Department, (iv) Afforestation is to be done by using local and mixed species saplings within and outside the mining lease area. The reclamation and afforestation is to be done in such a manner like exploring the growth of fruit bearing trees which will attract the fauna and thus maintaining the biodiversity of the area. As afforestation done so far is very less, forest department needs to identify adequate land and do afforestation by involving local people in a time bound manner, (v) Green belt development carried out by mines should be monitored regularly in every season and parameters like area under vegetation/plantation, type of plantation, type of tree species /grass species/scrubs etc., distance between the plants and survival rate should be recorded, (vi) Green belt is an important sink of air pollutants including noise. Development of green cover in mining area will not only help reducing air and noise pollution but also will improve the ecological conditions and prevent soil erosion to a greater extent. Further, selection of tree species for green belt should constitute dust removal/dust capturing plants since plants can act as efficient biological filters removing significant amounts of particulate pollution. Thus, the identified native trees in the mine area may be encouraged for plantation. Tree species having small leaf area, dense hair on leaf surface (rough surface), deep channels on leaves should be included for plantation, (vii) Vetiver plantation on inactive dumps may be encouraged as the grass species has high strength of anchoring besides medicinal value, (viii) Details of compensatory afforestation done should be recorded and documented by respective forest divisions, and State Forest Department should present mine-wise annual status, along with expenditure details, (ix) Similarly, Wildlife Department is also required to record and document annual status of wildlife in the region and should identify the need for wildlife management on regional level, (x) Maintenance of the ecology of the region is prime responsibility of the State Forest and Wildlife Department. They need to periodically review the status and identify the need for further improvement in the region. The required expenditure may be met from the funds already collected in the form of compensatory afforestation and wildlife management. Further, additional fund, if required can be sought from DMF. Responsibility: Individual Mine Lease Holders and State Forest & Wildlife Department.

27. **Socio-Economic Related:** (i) Public interaction should be done on regular basis and social welfare activities should be done to meet the requirements of the local communities. Further, basic amenities and infrastructure facilities like education, medical, roads, safe drinking water, sanitation, employment, skill development, training institute etc. should be developed to alleviate the quality of life of the people of the region, (ii) Land outees and land losers/affected people, if any, should be compensated and rehabilitated as per the national/state policy on Resettlement and Rehabilitation, (iii) The 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



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prioritized as per Pradhan Mantri Khanij Kshetra Kalyan Yojna (PMKKKY), notified by Ministry of Mines, Govt. of India, vide letter no. 16/7/2017-M.VI (Part), dated September 16, 2015. Responsibility: District Administration and Individual Mine Lease Holders.

28. **Road Transport Related:** (i) All the mine lease holders should follow the suggested ore transport mode (SOTM) based on its EC capacity within next 5 years, (ii) The mine lease holders should ensure construction of cement road of appropriate width from and to the entry and exit gate of the miner as suggested in Chapter 10. Further, maintenance of all the roads should be carried out as per the requirement to ensure dust free road transport, (iii) Transportation of ore should be done by covering the trucks with tarpaulin or other suitable mechanism so that no spillage of ore/dust takes place. Further, air quality in terms of dust, PM₁₀ should be monitored near the roads towards entry & exit gate on regular basis, and be maintained within the acceptable limits. Responsibility: Individual Mine Lease Holders and Dept. of Steel & Mines.
29. **Occupational Health Related:** (i) Personnel working in dusty areas should wear protective respiratory devices and they should also be provided with adequate training and information on safety and health aspects periodically, (ii) Occupational health surveillance program for all the employees/workers (including casual workers) should be undertaken periodically (on annual basis) to observe any changes due to exposure to dust, and corrective measures should be taken immediately, if needed, (iii) Occupational health and safety measures related awareness programs including identification of work related health hazard, training on malaria eradication, HIV and health effects on exposure to mineral dust etc., should be carried out for all the workers on regular basis. A full time qualified doctor should be engaged for the purpose. Periodic monitoring (on 6 monthly basis) for exposure to respirable minerals dust on the workers should be conducted, and record should be maintained including health record of all the workers. Review of impact of various health measures undertaken (at an interval of 3 years or less) should be conducted followed by follow-up of actions, wherever required. Occupational health centre should be established near mine site itself. Responsibility: Individual Mine Lease Holders and District Administration (District Medical Officer),
30. **Reporting of Environmental Sustainability Achievement:** All the mines should prepare annual environmental sustainability report (ESR), highlighting the efforts made towards environmental protection with respect to different environmental components vis-a-vis production performance of the mine on monthly basis. The data collected as per EC and CTE/CTO conditions should be utilized to prepare the annual sustainability report. The mines performing high with effective environmental safeguards may be suitably recognized/rewarded. "Star Rating Format" formulated by the Ministry of Mines along with environmental sustainability report may be used,
31. **Environmental Monitoring Requirements at Regional Level:** Apart from strict compliance and monitoring by individual mine lease holder, there is a need for simultaneous monitoring in each of the regions by competent expert agencies under the guidance/ supervision of concerned regulatory agency. Details of the studies required to be done on regular basis (continuously for 5 years) through responsible agency (organization of national/state repute) and time frame are suggested in Table.

Table: Suggested Environmental Monitoring Requirements and Action Plans at

Sl. No.	Study component / Action Plan	Responsibility	Monitoring and Reporting Time Frame (Approx.)
1.	Environmental Quality Monitoring with respect to Air, Water, Noise and Soil Quality in each region (Joda, Koira and Baripada/Rairangpur) as per specified frequency shall be done by a third party (preferably Govt.) and/or laboratory approved/ recognized by NABET/ CPCB/ SPCB/ MoEF&CC. All the water bodies (rivers, nalias, ponds etc.) shall be monitored. National/State level research/ academic institutes may be involved initially for couple of years to streamline the activity. The report shall be brought out annually by June each year. The study shall be conducted in consultation with MoEF&CC-RO.	SPCB	Continuous Annually
	Installation of online ambient air quality monitor for PM ₁₀ , PMP.S, SO _x and NO _x within the mine having more than 3 MTPA EC Capacity	Respective Mine Lease Holders	Continuous Annually
	Installation of online ambient air quality monitor for PM ₁₀ , PM _{2.5} , SO _x and NO _x in the Joda and Koira Region (total 11 locations).	SPCB	Continuous Annually
2.	Status of flora and fauna in each of the regions shall be assessed on annual basis. Changes, if any, taking place in the region shall be brought out clearly. The study shall be conducted in consultation with State Forest and Wildlife Department.	State Forest & Wildlife Dept.	Annually in mining zone and once in 3 years in the region
3.	Socio-economic study incorporating developments taking place in each of the region, CSR initiatives made by the mining companies shall be conducted on annual basis. Further, micro level developmental needs shall be clearly brought out in the report for each region. The study shall be conducted in consultation with district administration.	Respective District Administration	Annually


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Sl. No.	Study component / Action Plan	Responsibility	Monitoring and Reporting Time Frame (Approx.)
4.	A detailed hydro-geological study in each of the regions shall be conducted in an integrated manner in consultation with Regional Director, Central Ground Water Board. Accordingly, all project proponents shall implement suitable conservation measures to augment ground water resources in the area.	SPCB	Once in 2 years
5.	The State Govt. shall ensure construction and maintenance of dust free common roads/ appropriate rail network for transport of ore from mines to the consumer end.	Dept. of Steel & Mines	12 months for road network and 5-7 years for rail network
6.	Construction and maintenance of dust free roads from respective mine to the main road	Respective Mine Lease Holders	Continuous 6 months
7.	Traffic/road inspection study addressing the condition of 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 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. 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.

33. 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



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analysis/testing reports should be available during appraisal of the Project.

- d) Where the documents provided are in a language other than English, an English translation should be provided.
- e) The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted.
- f) While preparing the EIA report, the instructions for the Proponents and instructions for the Consultants issued by MoEF vide O.M. No. J-11013/41/2006- IA.II (I) dated 4th August, 2009, which are available on the website of this Ministry, should be followed.
- g) Changes, if any made in the basic scope and project parameters (as submitted in Form-I and the PFR for securing the TOR) should be brought to the attention of MoEF&CC with reasons for such changes and permission should be sought, as the TOR may also have to be altered.
- 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.