

OCM/ENV/9.34/2024

DATE. 29.11.2024

To,

The Joint Director(s)
Ministry of Environment, Forest & Climate Change,
Eastern Regional Office,
Bhubaneswar, Odisha

Sub.: Submission of Six-monthly EC compliance report to the conditions stipulated in the grant order of Environmental Clearance (EC) pertaining to Ostapal Chromite Mines of M/s Ferro Alloys Corporation Limited.

Ref.: Environment Clearance identification No:EC22BO01OR12081, dated 04.04.2022 of Ostapal Chromite Mine of M/s Ferro Alloys Corporation Limited.

Respected Sir,

With reference to the captioned subject & cited reference, we are herewith submitting six monthly compliance report pertaining to Ostapal Chromite Mines of M/s FACOR Ltd for the period from April 2024 to September 2024 for your kind perusal.

Thanking You
Yours faithfully,
For Ferro Alloys Corporation LTD


Mine Manager 29/11/2024.
Ostapal Chromite Mine

CC

1. The Member Secretary, SEIAA, ODISHA Date:
2. The Member Secretary, State Pollution Control Board, ODISHA
3. The Member Secretary, Central Pollution Control Board, ODISHA

M/s. Ferro Alloys Corporation Ltd. (A subsidiary of Vedanta Ltd.)


Registered Office:

D.P.Nagar, PO : Randia, Dist.: Bhadrak, Odisha, India - 756 135



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Website: www.facorgroup.in, CIN: U45201OR1955PLC008400.

Six Monthly Compliance Report to EC of Ostapal Chromite Mines, M/s FACOR LTD
For The Period April 2024 to September 2024
EC Identification No.: EC22B001OR120821, Dated: 04.04.2022

A.SPECIFIC CONDITIONS:		
1	The mine shall explore implementation of membrane-based technology for removing hexavalent chromium from tailing pond, Surface run off and mine drainage water as proposed	<p>Complied.</p> <p>In this connection, NIT, Rourkela has been engaged since Dt 18.12.2021, and the final report had been submitted to the member secretary via letter number OCM/ENV/1593/2023 dated on 03.05.2023.</p> <p>The details along with implementation report has been attached as Annexure - 1</p>
2	The mine shall submit copy of the letter to NIT. Rourkela and their response thereof engaging them for the purpose of reduction of hexavalent chromium from tailing pond, surface run off, and mine drainage to SEIAA within one month time period	<p>Complied.</p> <p>NIT Rourkela has been engaged vide PO No.: 4800020530, dated 13.12.2021.Engagement order to NIT Rourkela and their response is already submitted to SEIAA via letter number OCM/ENV/885/2022 dated on 25.04.2022.</p> <p>Details of Engagement and NIT Rourkela response has been attached at Annexure - 2</p>
3	The mine shall submit copy of study report conducted by NIT, Rourkela for the purpose of reduction of hexavalent chromium iron tailing pond, Source run off and mine drainage water once study is Over and implement the recommendations of the study. The project proponent shall submit implementation and action plan report to SEIAA	<p>Complied.</p> <div data-bbox="828 858 1418 1048">  </div> <p>We have submitted the action plan along with Implementation report of the recommendation report submitted to SEIAA vide letter No. OCM/ENV/1593/2023, dated 03.05.2023.</p> <p>Details regarding the action plan and implementation report and acknowledgement is enclosed as Annexure - 3</p>
4	Since, mining has already intersected the ground water table; the steps proposed augmentation of ground water resources are not adequate. The project proponent shall put adequate number of recharge pits beyond the zone of influence based on a detailed hydro-geological study. The project proponent shall submit the measures to be undertaken for augmentation of ground water resources along with action plan to SEIAA within one month time period.	<p>Complied.</p> <p>Hydrogeological study conducted by CGWA accredited consultant and based upon the comprehensive report on ground water condition we have augmented and implemented the recommendations. As per the study the rain-water harvesting structures are as follows:</p> <ul style="list-style-type: none"> • Check-Dams • Garland Drains • Settling Pit • Roof Top Rainwater Harvesting

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		<p>The measures of the ground water augmentation report already submitted to SEIAA vide ref. No – OCM/ENV/897/2022 dated – 30.04.2022</p> <p>The ground water augmentation report has been attached as Annexure -4</p>
5	The mine shall take adequate measures to minimize the discharge of waste water to Damsala nallah.	<p>Complied.</p> <p>Afforestation are being done more than the proposal, for which treated waste water is being used, as a result discharge to Damsala Nallah is minimized.</p> <p>Treated water is being used for dust suppression and industrial purpose. By adopting all these measures it is minimized the discharge of waste water to Damsala Nallah.</p>
6	All the compliances submitted/ committed by PP shall be strictly adhered to by them.	<p>Complied.</p> <p>It is agreed and strictly followed.</p>
7	Waste should be dumped on the earmarked sites within the mining lease area and no waste should be dumped outside the lease area	<p>Complied.</p> <p>All the generated waste are being disposed inside the Mine only as per approved Mining Plan.</p> <p>There are two designated Overburden dump in which waste is disposed as per the approved mining plan and no waste is dumped outside mines.</p>
8	<p>The Project Proponent shall start the plantation and cover at least 50% of the proposed area under plantation in the next 5 years. The density of the plantation should not be less than 2500 saplings/Ha. The species to be selected for the plantation should be in consultation with local forest department or any other expert agency engaged for the same. The Project Proponent shall keep the record of saplings planted survival rate area covered under plantation location etc In addition to this gap filling needs to be done to as and when require for maintaining the density of plantation. The PP shall submit the drone images of area before and after the plantation.</p> <p>PP shall carry out pilot study for phyto remediation of hexavalent chromium through IMMT CSIR. Bhubaneswar.</p>	<p>Complied.</p> <p>It is an existing project. Presently around 20.41 Ha. of the total area covered with plantation. Density of the plantation is around 2500 /Ha. Species are provided by local Forest Department. All the data of sapling planted and survival rate is being recorded.</p> <p>And IIMT CSIR , Bhubaneswar has been engaged to carry out the Phyto remediation of hexavalent Chromium. Work is started for which interim report is provided by IIMT, BBSR.</p> <p>Details are Attached as Annexure -5</p> <div style="display: flex; justify-content: space-around;">   </div>

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	<p>The budget earmarked for the plantation shall be kept in separate bank account and audited annually. PP shall submit the detail such as photographs (before and after with geo location date and time), details of expert agency engaged details of species planted, number of species planted survival rate density of plantation and outcome of the pilot study etc. to the Regional Office of MoEF and CC Bhubaneswar and SEIAA Odisha before 1st July and 1 December of every year for the activities carried out during previous year</p>	<p>Plantation work by IIMT Bhubaneswar</p> <p>All the budgeted amount and expenses done for plantation is being maintained in a separate ledger account and separate Cost Centre. Audit is being done Annually.</p>
9	<p>Approval/permission of CGWA/SCWMA shall be obtained before drawing ground water for the project activities. State pollution control board (SPCB) concerned shall not issue Consent to Operate (CTO) till the project Proponent obtains such permission.</p>	<p>Complied</p> <p>NOC is already obtained from CGWA. Vide Ref No.: CGWA/NOC/MIN/REN/2/2024/9353</p> <p>The Renewal of NOC Application and the The CGWA NOC is attached as Annexure – 6</p>
10	<p>The amount proposed under Corporate Environment Responsibility (CER) head should be kept in a separate bank account and should be audited annually. The PP should annually submit the audited statement and details of implementation of CER activities along with proof of activities viz. photographs (before and after with geo-location date and time), purchase documents, photographs and Geo-location of the infrastructures facilities developed, etc. to the Regional Office of MoEF and CC Bhubaneswar and SEIAA, Odisha before 1st July and 1 December of every year for the activities carried out during previous year.</p>	<p>Complied.</p> <p>Separate General Ledger Account and separate Cost center for this fund has been maintained and which is also audited annually.</p> <p>Details of the activities for the FY 2023-24 with supporting evidences like photographs and purchase documents been enclosed as Annexure No.- 7</p> <p>Audited statement for Financial Year 2023-24 is submitted to MoEFCC via letter number OCM/ENV/447/2024 dated on 28.05.2023 and the details is enclosed as Annexure - 10</p>
11	<p>The amount (except occupational health) proposed under Environmental Management Plan (EMP) head should be kept in a separate bank account and should be audited annually. The PP should annually submit the audited statement and detailed environment monitoring report along with proof of activities viz photographs (before and after with geo-location date and time), purchase documents, sampling reports, photographs and Geo-location of the infrastructures/facilities developed, details of persons engaged in Environment Management Cell etc. to the Regional Office of MoEF and CC, Bhubaneswar and SEIAA, Odisha before 1st July of every year for the activities carried out during previous year.</p>	<p>Complied.</p> <p>Separate General Ledger Account and separate Cost center for this funds has been maintained and which is also audited annually.</p> <p>Audit report along with all activities with supporting documents are submitted herewith annually.</p> <p>Details of expenses done FY 2023-24 towards EMP is enclosed as Annexure No- 8</p> <p>Audited statement for Financial Year 2023-24 is submitted to MoEFCC via letter number OCM/ENV/447/2024 dated on 28.05.2023 and the details is enclosed as Annexure - 10</p> <p>Details of the Person engaged for updated Environment Management Cell details is already submitted to the Member secretary SEIAA vide letter No.: OCM/ENV/142/2024, dated 16.01.2024, is enclosed as Annexure No.-12</p>
12	<p>The amount proposed under provisions mentioned plan head should be kept in a separate bank account and</p>	<p>Complied.</p>



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	<p>should be audited annually. The PP should annually submit the audited statement and detailed environment monitoring report along with proof of activities viz. photographs (before and after with geo-location date and time), purchase documents, sampling reports, photographs and Geo-location of the infrastructures/facilities developed. details of persons engaged in Environment Management Cell etc. to the Regional Office of MoEF and CC, Bhubaneswar and SEIAA Odisha before 1st July of every year for the activities carried out during previous year</p>	<p>Separate General Ledger Account and separate Cost center for this fund has been maintained and which is also audited annually.</p> <p>Audit report along with all activities with supporting documents will be submitted annually.</p> <p>Details of the Expenses towards Occupational Health for the FY 2023-24 is enclosed as Annexure No.-9</p> <p>Audited statement is submitted to MoEFCC via letter number OCM/ENV/447/2024 dated on 28.05.2023 and the details is enclosed as Annexure – 10</p> <p>Details of the Person engaged for updated Environment Management Cell details is already submitted to the Member secretary SEIAA vide letter No.: OCM/ENV/142/2024, dated 16.01.2024,</p>
13	<p>The Project Proponent shall set up an Environmental Management Cell comprises of persons having qualification and experience in the field of environment along with supporting staff. The details of the same needs to be submitted to the SEIAA Odisha within 3 months of the grant of EC</p>	<p>Complied.</p> <p>Details of the Person engaged for Environment Management Cell is submitted to the Member secretary SEIAA vide letter No.: OCM/ENV/865/2022, dated 16.4.2022, is enclosed as Annexure No.-11</p>
14	<p>The Sub-Committee of SEAC will visit the site within 6 months from the date of issue of Environmental Clearance to ensure implementation of agreed measures. However either during the visit of the SEAC Sub-committee and/or at any time if it noticed that stipulated conditions on which EC is granted is not in place or found otherwise, steps will be taken for revocation of EC granted</p>	<p>All the conditions are strictly complied and being maintained.</p>
15	<p>The Project Proponent shall implement the short term and long-term measures proposed to be taken in order to get rid from the adversity of Cr (V) contamination needs to be implemented and status report of the same along with benefit occurred needs to be submitted to Regional Office of MoEF and CO Bhubaneswar and SEAA Odisha annually.</p>	<p>Complied.</p> <p>NIT, Rourkela and IIMT, CSIR, -Bhubaneswar have been engaged to carry out the study and to suggest the measure to be taken for reduction of contamination.</p> <p>All the measures suggested by NIT Rourkela have been implemented. IIMT, CSIR study is under process, after getting the suggestion, measures will be implemented.</p> <p>Intimation on benefit of implementation of recommendations suggested by NIT, Rourkela</p>



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		has been submitted to Regional Office of MoEF and CC, Bhubaneswar and SEAA Odisha. The details are enclosed as Annexure no 5
16	The Project Proponent shall keep a record of each blasting viz. location, number of holes, delay assigned of each hole, explosive quantity of each hole, blasting pattern etc.	Complied. The record is being kept and maintained. The details are enclosed in Annexure – 13
17	This Environmental Clearance (EC) is subject to orders/ judgment of Hon'ble Supreme Court of India, Hon ble High Court, Hon'ble NGT and any other Court of Law, Common Cause Conditions as may be applicable.	Complied
18	The Project proponent complies with all the statutory requirements and judgment of Hon'ble Supreme Court dated 2nd August,2017 in Writ Pettion (Civil) No. 114 of 2014 in matter of Common Cause versus Union of India and Or before commencing the mining operations, if applicable to the Project.	Complied. Letter submitted to Member secretary , Vide letter No.: FACOR/Bhadrak/Legal/109/2022, Dated: 25.4.2022. The details are enclosed in Annexure – 14
19	The State Government concerned shall ensure that mining operation shall not be commenced till the entire compensation, levied, if any, for illegal mining paid by the Project Proponent through their respective Department of Mining and Geology in strict compliance of Judgment of Hon'ble Supreme Court dated 2nd August, 2017 in Write Petition (Civil) No. 114 of 2014 in matter of Common Cause versus Union of India and Ors as may be applicable.	Complied. Letter submitted to Member secretary, Vide letter No.: FACOR/Bhadrak/Legal/109/2022, Dated: 25.4.2022 The details are enclosed in Annexure - 14
20	This Environmental Clearance shall become operational only after receiving formal NBWL Clearance from MoEF and CC subsequent to the recommendations of the Standing Committee of National Board for Wildlife. if applicable to the Project	It is not applicable as our lease area do not fall under and wildlife area so NBWL clearance is not required.
21	This Environmental Clearance shall become operational only after receiving formal Forest Clearance (FC) under the provision of Forest Conservation Act 1980, if applicable to the project	Complied. We have obtained FC on Dt 07.02.2006, vide letter Ref : F.No 8-86/1996-FC(Vol-II) dtd 07.02.2006 . The details are enclosed in Annexure – 15
22	Project Proponent (PP) shall obtain Consent to Operate after grant of EC and effectively implement all the conditions stipulated therein. The mining activity shall not commence prior to obtaining Consent to Establish/ Consent to Operate from the concerned State Pollution Control Board	Complied CTE obtained on dated 31.03.2022. CTO Obtained on 28.06.2022 and valid till 31.03.2026 The details are enclosed in Annexure - 16
23	The PP shall adhere to the provision of the Mines Act. 1952, Mines and Mineral (Development and Regulation), Act. 2015 and rules and regulations made there under PP shall adhere to various circulars issued by Directorate	Complied. All the applicable statutory provision under Mines Act '1952 and Mineral (Development and Regulation), Act. 2015 and


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	General Mines Safety (DGMS) and Indian Bureau of Mines from time to time	rules, regulations made are being followed and adhered.
24	The Project Proponent shall obtain consents from all the concerned landowner before start of mining operations as per the provisions of MMDR Act 1957 and rules made there under in respect of lands which are not owned by it.	Complied. Consent from all concerned land owners before starting of the mining operations. The details are enclosed in Annexure - 17
25	The Project Proponent shall follow the mitigation measures provided in MoEF and CC's Office Memorandum No 2-1013/57/2014-IA I (M). dated 29 October 2014 titled "Impact of mining activities on Habitations-issues related to the mining Projects wherein Habitations and villages are the part of mine lease areas or habitation and villages are surrounded by the mine lease area"	Complied. There are no villages in the mine lease area. However, EIA study has been carried out by domain expert. And as per the suggestion of EIA study report, mitigative measures have been taken to avoid the "Impact of mining activities on Habitations" and villages in the Buffer one. Mitigative measures taken as follows <ol style="list-style-type: none"> 1. Blasting Carried out only in day time, no blasting in Night Shift 2. Vibration Monitoring is Carried out. 3. Water Sprinkling on Transportation road. 4. Community development work is undertaken by engaging CSR Team on the field of Education ,Health, Drinking Water, Infrastructure and livelihood Support etc.
26	The copies of the environmental clearance shall be submitted by the project proponents to the heads of the local bodies, panchayats and municipal bodies in addition to the relevant offices of the government who in turn has to display the same for 30 days from the date of receipt	Complied. It is Submitted to The Collector and District Magistrate, Jajpur, The Sub-Collector, Jajpur, The Tahasildar, Sukinda and The Sarapanch, Kaliapani on dated 07.04.2022 for information. The details are enclosed in Annexure - 18
27	State Pollution Control Board shall be responsible for display of this EC letter at its Regional office, District Industries Centre and Collector's office/ Tahasildar's Office for 30 days.	NA for PP.
28	The Project Authorities should widely advertise about the grant of this EC letter by printing the same in at least two local newspapers, one of which shall be in vernacular language of the concerned area. The advertisement shall be done within 7 days of the issue of the clearance letter mentioning that the instant project has been accorded EC and copy of the EC letter is available with the State Pollution Control Board and web site of the Ministry of Environment, Forest and Climate Change (www.environmentclearance.nic.in) A copy of the advertisement may be forwarded to the concerned MoEF and CC Regional Office for compliance and record.	Complied. Advertisement have been published in two local newspapers within 7 days of issue of the clearance letter. <div style="display: flex; justify-content: space-around; align-items: flex-end;"> <div style="text-align: center;">  <p>PUBLIC NOTICE It is hereby informed to the general public that the State Environment Impact Assessment Authority (SEIAA), Odisha of the Ministry of Environment, Forest and Climate Change, Government of India has granted Environment Clearance (EC) to Oslapali Chromite Mine of M/s Ferro Alloys Corporation Ltd. (FACOR) on dtd. 04/04/2022 for enhancement of production up to 0.240 MTPA of Chromite Ore (ROM). This EC is also available in the official portal of Ministry of Environment, Forest and Climate Change, i.e http://environmentclearance.nic.in</p> </div> <div style="text-align: center;">  </div> </div> Copy of the advertisement forwarded to the Joint director MoEF and CC via letter number OCM/ENV/854/2022 dated on 11.04.2022 and to

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		member secretary SEIAA via letter number OCM/ENV/848/2022 dated on 09.04.2022. Details are attached as Annexure 19
29	The Project Proponent shall inform the MoEF and CC/SEIAA, Odisha for any change in ownership of the mining lease. In case there is any change in ownership or mining lease is transferred than mining operation shall only be carried out after transfer of EC as per provisions of the para 11 of EIA Notification, 2006 as amended from time to time	There is no change in ownership.
B	Statutory Condition:	
(i)	Air Quality Monitoring and preservation	
30	The Project Proponent shall instal a minimum of 1 (one) online Ambient Air Quality Monitoring Stations to monitor critical parameters relevant for mining operations, of air pollution viz PM10, PM25. NO2 CO and SO2 etc. as per the methodology mentioned in NAAQS Notification No. B-29016/20/90/POCIH dated 18.11. 2009 covering the aspects of transportation and use of heavy machinery in the impact zone. The ambient air quality shall also be monitored at prominent places like office building canteen etc. as per the site condition to ascertain the exposure characteristics at specific places The above data shall be digitally displayed within 03 months in front of the main Gate of the mine site	<p>1 Online AAQMS is installed to monitor the critical parameters relevant for mining operations such as PM10, PM25. NO2 CO and SO2</p> <p>4 AAQ Monitoring station are installed in other place and also digitally displayed board placed in front of the main gate also regular water sprinkling is done.</p> <div style="display: flex; justify-content: space-around;">   </div>
31	Effective safeguard measures for prevention of dust generation and subsequent suppression (like regular water sprinkling. metalled road construction etc.) shall be carried out in areas prone to air pollution wherein high levels of PM10 and PM2.5 are evident such as haul road, loading and unloading point and transfer points. The Fugitive dust emissions from each sources shall be regularly controlled by installation of required equipment/machineries and preventive maintenance. Use of Suitable water-soluble chemical dust suppressing agents may be explored for better effectiveness of dust control system It shall be ensured that air pollution level conform to the standards prescribed by the MoEF and CC/ Central Pollution Control Board	<p>Complied.</p> <p>Following measures have been taken such as</p> <ul style="list-style-type: none"> • Regular haul road maintenance • Use of Road Grader • Wet drilling practice adopted • Transporting vehicle is covered with tarpauline • Wheel washing system provided • Sufficient No of water tanker are engaged for regular sprinkling of water into haul road , loading and unloading point. • Haul Road Plantation has been done • Fugitive dust emission is being monitored regularly and submitted to OSPCB <p>Preventive maintenance is being carried out regularly.</p>
II	Water Quality Monitoring and Preservation	
32	In case, immediate mining scheme envisages intersection of ground water table, then Environmental Clearance shall become operational only after receiving formal clearance from CGWA. In case, mining operation	<p>NOC is already obtained from CGWA. Vide Ref No.: CGWA/NOC/MIN/REN/2/2024/9353</p> <p>The Renewal of NOC Application and the The CGWA NOC is attached as Annexure – 6</p>



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	involves intersection of ground water table at a later stage, then PP shall ensure that prior approval from CGWA and MoEF and CC is in place before such mining operations. The permission for intersection of ground water table shall essentially be based on detailed hydro-geological study of the area.	
33	Regular monitoring of the flow rate of the springs and perennial nallahs flowing in and around the mine lease shall be carried out and records maintain. The natural water bodies and or streams which are flowing in an around the village, should not be disturbed. The Water Table should be nurtured so as not to go down below the pre-mining period. In case of any water scarcity in the area, the Project Proponent has to provide water to the villagers for their use. A provision for regular monitoring of water table in open dug wall located in village should be incorporated to ascertain the impact of mining over ground water table The Report on changes in Ground water level and quality shall be submitted on six-monthly basis to the Regional Office of the Ministry, CGWA and State Groundwater Department/ State Pollution Control Board	<p>Complied.</p> <p>Flow rate of the Perennial Nalla “ Damasallah Nallah” is being Monitored Regularly and Record being maintained. Report is also submitted to OSPCB.</p>  <p>There is no disturbance to any water bodies in around the village.</p> <p>Nos. of rainwater harvesting measures like Garland Drain ,check Dam, Settling pond and Roof Top Rainwater harvesting has been constructedn to augment the water table.</p> <p>There is no scarcity of water, as the water comes under safe category Further, drinking water is provided to the nearby villages.</p> <p>Water level and quality is being Monitored regularly by NABL accredited Laboratory and report is also being submitted the Govt. authority in quarterly.</p> <p>The water level Monitoring report is enclosed as Annexure -Annexure - 20</p>
34	Project Proponent shall regularly monitor and maintain records w.r.t. ground water level and quality in and around the mine lease by establishing a network of existing wells as well as new piezo-meter installations during the mining operation in consultation with Central Ground Water Authority/ State Ground Water Department. The Report on changes in Ground water level and quality shall be submitted on six-monthly basis to the Regional Office of the Ministry. CGWA and State Groundwater Department/ State Pollution Control Board	<p>Complied.</p> <p>Ground water level and quality being monitored regularly. And report also submitted.</p> <p>We have installed 2 peizometer (Digital Water Level Recorder) inside mines</p> <p>The details of GW level and Quality report are enclosed in Annexure - 20</p>
35	The Project Proponent shall undertake regular monitoring of natural water course water resources/ springs and perennial nallahs existing/ flowing in and around the mine lease and maintain its records. The project proponent shall undertake regular monitoring of	<p>Complied.</p> <p>Flow rate of the Perennial Nalla “ Damasallah Nallah” is being Monitored Regularly and Record being maintained. Report is enclosed as Annexure No.-21</p>


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	<p>water quality upstream and downstream of water bodies passing within and nearby/ adjacent to the mine lease and maintain its records. Sufficient number of gullies shall be provided at appropriate places within the lease for management of water PP shall carryout regular monitoring wrt pH and included the same in monitoring plan. The parameters to be monitored shall include their water quality vis a-vis suitability for usage as per CPCB criteria and flow rate. It shall be ensured that no obstruction and/ or alteration be made to water bodies during mining operations without justification and prior approval of MoEF and CC SEIAA Odisha.</p> <p>The monitoring of water courses/ bodies existing in lease area shall be carried out four times in a year viz. pre-monsoon (April-May), monsoon (august), post-monsoon (november) and winter (january) and the record of monitored data be sent regularly to ministry of environment, forest and climate change and its regional office, SEIAA, Odisha, Central Ground Water Board, State Pollution Control Board and central pollution control board.</p> <p>Clearly showing the trend analysis on six-monthly basis.</p>	<p>Upstream and Downstream water quality are being monitored. PH and other parameters as well within the limit. Report is enclosed as Annexure No.-22</p>  <p>Damasala Nalla water sample for Quality Monitoring</p> <p>There is no water body inside the Mine, so there is no chance of obstruction or alteration to the water body.</p> <p>There is no water courses/bodies in the lease area, so trend analysis is not applicable.</p>
36	<p>Quality of polluted water generated from mining operations which include Chemical Oxygen Demand (COD) in mines run-off. acid mine drainage and metal contamination in runoff shall be monitored along with Total Suspended Solids (TDS), Dissolved Oxygen (DO), pH and Total Suspended Solids (TSS). The monitored data shall be uploaded on the website of the company as well as displayed at the project site in public domain, on a display board, at a suitable location near the main gate of the Company. The circular No. J-20012/1 /2006 IA.II (M) dated 27.05.2009 issued by Ministry of Environment, Forest and Climate Change may also be referred in this regard.</p>	<p>Complied.</p> <p>One NABL accredited Lab. M/s G Pvt Ltd is engaged to ensure the quality of the water generated from the mines and treated water discharging to outside the lease. And all the parameters mentioned are being monitored.</p> <p>Monitoring data also uploaded in the Website: https://www.facorgroup.in/esg/compliances/ And displayed through digital display board near main gate.</p> <p>Details of wastewater generated (mine dewatering) and treated by ETP are Attached as Annexure 23</p>
37	<p>The project proponent shall construct retaining wall and settling pond within the lease area. Further. check dams shall be constructed at strategic locations in which rain water passes in rainy season. Quality of the mine drainage water shall be monitored on real-time basis and also monitored through NABL Lab. Mine drainage water shall be used only after treatment through ETP for various industrial uses</p>	<p>Retaining wall is constructed along the periphery of the dump ,Ore Stack Yard, Garland Drain settling pond is there in the lease also check dam is constructed at strategic locations through which rain water passes in rainy season.</p> <p><u>Settling Pond , Retaining wall and Check dam</u></p>

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		 <p>Also the mine drainage water is monitored on real time basis through ETP and along with through NABL Lab and it is used for industrial purpose only after treatment.</p> <p align="center"><u>EFFLUENT TREATMENT PLANT(ETP) FACILITY AT OSTAPAL MINE (600 KL/HR)</u></p>  <p>The NABL report is enclosed as Annexure No-23</p>
38	Detail design of the existing retaining wall and the proposed for the expansion from a chartered Civil Engineer shall be submitted within 6 months from the date of issue of Environmental Clearance to ensure that no silt after wash up and treatment is escaped from the core/ buffer zone of the mines.	<p>Complied.</p> <p>The design of the retaining wall is certified from a chartered civil engineer.</p> <p>Copy of Enclosed is attached as Annexure-24</p>
39	Project Proponent shall plan, develop and implement rainwater harvesting measures on long term basis to augment ground water resources in the area in consultation with Central Ground Water Board/ State Groundwater Department. A report on amount of water recharged needs to be submitted to Regional Office, MoEFand CC annually.	<p>Complied.</p> <p>For the FY 2023-24 report on amount of ground water recharge has been send to Joint director MoEF and CC via letter number OCM/ENV/324/2024 dated 09.04.2024</p> <p>The details have been attached as Annexure-25</p>
40	Industrial waste water(workshop and waste water from the mine) should be properly collected and treated in an ETP as proposed so as to conform to the notified standards prescribed from time to time. The standards shall be prescribed through Consent to Operate (CTO) issued by concerned State Pollution Control Board (SPCB) .The workshop effluent shall be treated after its initial passage through Oil and grease trap.	<p>Complied.</p> <p>All the industrial water are channelized and properly collected and treated in an ETP. Oil and Grease trap is also provided.</p>










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41	The water balance/water auditing shall be carried out and measure for reducing the consumption of water shall be taken up and reported to the Regional Office of the MoEF and CC and State Pollution Control Board.	<p>Complied.</p> <p>The water balance chart is maintained and monitored. And the action plan for the reduction of water is made and submitted to the joint director MoEF and CC via letter number OCM/ENV/1142/2022 dated on 08.08.2022 and SPCB vial letter number OCM/ENV/1145 dated on 08.08.2022.</p> <p>The details has been attached as Annexure No 26</p>
iii	Noise and Vibration Monitoring Prevention	
42	The peak particle velocity at 500m distance or within the nearest habitation whichever is closer shall be monitored periodically as per applicable DGMS guidelines.	<p>Complied. A scientific study on ground vibrational effects of blasting has been done by NIT Rourkela. The same is being carried out periodically by inhouse team by using instrument (Micro Mate).</p> 
43	The illumination and sound at night at project sites disturb the villages in respect of both human and animal population. Consequent sleeping disorders and stress may affect the health in the villages located close to mining operations. Habitations have a right for darkness and minimal noise levels at night. PPs must ensure that the biological clock of the villages is not disturbed; by orienting the floodlights/ masks away from the villagers and keeping the noise levels well within the prescribed limits for day /night hours.	<p>Complied.</p> <p>Noise monitoring is done by NABL Laboratory both in day and night and the noise limit falls under the prescribed standards</p> <p>The Noise Monitoring report is enclosed in Annexure – 27</p> <p>One flood light is present inside mines and is directed towards the mine away from villagers.</p>
44	The Project Proponent shall take measures for control of noise levels below 85 dBA in the work environment The worker engaged in operations of HEMM, etc. should be provided with ear plugs /muffs. All personnel including laborers working in dusty areas shall be provided with protective respiratory devices along with adequate training, awareness and information on safety and health aspects. The PP shall be held responsible in case it has been found that workers/ personals/laborers are working without personal protective equipment.	<p>Complied.</p> <p>Noise level is being monitored and it shows below the prescribed limits. All the workers are working in HEMM are provided with ear plugs and the workers working in dusty are provided with protective respiratory devices.</p> <p>The Noise Monitoring report is enclosed in Annexure – 27</p>
iv	Mining Plan	
45	The Project Proponent shall adhere to the working parameters of mining plan which was submitted at the time of EC appraisal wherein year-wise plan was mentioned for	<p>Complied.</p> <p>Mining activities is being carried out as per the approved mining plan. There is no such changes, and in case of any</p>


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	total excavation ie. quantum of mineral, waste over burden inter burden and top soil etc. No change in basic mining proposal like mining technology total excavation, mineral and waste production, lease area and scope of working (viz method of mining. overburden and dump management, O.B and dump mining, mineral transportation mode. ultimate depth of mining etc) shall not be carried out without prior approval of the Ministry of Environment Forest and Climate Change which entail adverse environmental impacts, even if it is a part of approved mining plan modified after grant of EC or granted by State Govt in the form to Short Term Permit (STP), Query license or any other name.	changes, prior permission/approval will be taken from MoEF and CC.
46	The Project Proponent shall get the Final Mine Closure Plan along with Financial Assurance approved from Indian Bureau of Mines/Department of Mining and Geology as required under the Provision of the MMDR Act 1957 and Rules/Guidelines made there under. A copy of approved final mine closure plan shall be Submitted within 2 months of the approval of the same from the competent authority to the concerned Regional Office of the Ministry of Environment, Forest and Climate Change for record and verification	It is not applicable, as there is no FMCP required now.
47	The land-use of the mine lease area at various Stages of mining scheme as well as at the end-of-life shall be governed as per the approved Mining Plan. The excavation vis-a-vis backfilling vis-à-vis backfilling in the mine lease area and corresponding afforestation to be raised in the reclaimed area shall be governed as per approved mining plan. PP shall ensure the monitoring and management of rehabilitated areas until the vegetation becomes self-sustaining. The compliance status shall be submitted half-yearly to the MoEF and CC and its concerned regional Office/ SEIAA, Odisha	<p>Complied</p> <p>The land use pattern is being followed as per the approved mining plan by IBM</p> <p>The excavation vis-a-vis backfilling in the mine lease area is followed as per mining plan</p>
V	Land Reclamation	
48	The Overburden (O.B.) generated during the mining operations shall be stacked at earmarked OB dump site(s) only and it	<p>Complied.</p> <p>The OB generated during the mining operation is stacked at the OB dump site which is as per the approved Mining Plan.</p>


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	should not be kept active for a long period of time. The physical parameters of the OB dumps like height, width and angle of slope shall be governed as per the approved Mining Plan as per the guidelines/circulars issued by D.G.M.S. w.r.t. safety in mining operations shall be strictly adhered to maintain the stability of top soil/OB dumps. The topsoil shall be used for land reclamation and plantation.	There are two Nos of OB dump inside Mines. OB dumping is as per approved Mining Plan. Study has been done by CIMFR for dump stability report. Currently the both Dumps are Active North Dump (Height 86m , width 280m and angle less than 28 degree) and South Dump (Height 58 m , width 250 m and angle less than 28 degree) Also there is no top soil generation, no top soil dump all the top soil generated has been used for afforestation purposes.							
49	The reject/waste generated during the mining operations shall be stacked at earmarked waste dump site(s) only. The physical parameters of the waste dumps like height, width and angle of slope shall be governed as per the approved Mining Plan as per the guidelines/circulars issued by DGMS w.r. safety in mining operations shall be strictly adhered to maintain the stability of waste dumps.	Complied. The OB generated during the mining operation is stacked at the OB dump site which is as per the approved Mining Plan. There are two Nos of OB dump inside Mines. OB dumping is as per approved Mining Plan. Study has been done by CIMFR for dump stability report. Currently the both Dumps are Active North Dump (Height 86m , width 280m and angle less than 28 degree) and South Dump (Height 58 m , width 250 m and angle less than 28 degree) Also there is no top soil generation, no top soil dump all the top soil generated has been used for afforestation purposes.							
50	The reclamation of waste dump sites shall be done in scientific manner as per the Approved Mining Plan cum Progressive Mine Closure Plan.	It is being followed and complying as per Approved Mining Plan cum Progressive Mine Closure Plan.							
51	The slope of dumps shall be vegetated in scientific manner with stable native species to maintain the slope stability. Prevent erosion and surface run off. The selection of local species regulates local climatic parameters and help in adaptation of plant species to the microclimate. The gullies formed on slopes should be adequately taken care of as it impacts the overall stability of dumps. The dump mass should be consolidated with the help of dozer/ compactors thereby ensuring proper filling/levelling of dump mass. In critical areas, use of geo textiles/geo-membranes / clay liners/ Bentonite etc. shall be undertaken for stabilization of the dump.	Complied. Dump slopes are planted with suitable native species like Chakunda , Mahalimbo , Bahada etc .for stability of the dump and along with that retaining wall provided on the toe of the dump to prevent erosion. <table><tr><td></td><td></td></tr><tr><td>Plantation on Dump slope</td><td>Retaining wall and Garland drain at Toe Dump</td></tr><tr><td></td><td>Care of the gullies on Dump slope</td></tr></table>				Plantation on Dump slope	Retaining wall and Garland drain at Toe Dump		Care of the gullies on Dump slope
									
Plantation on Dump slope	Retaining wall and Garland drain at Toe Dump								
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		<p>There is use of geo-textile and silpaulin to prevent erosion and surface run-off. Also the geo-textile and silpaulin helps to stabilize the dump by preventing the rain water to percolate in the dump. In long term effect these Geo-Textile decompose with the soil and makes the soil more fertile which in turns acts as a manure for the plants planted in the benches of the dump.</p> 
52	<p>The Project Proponent shall carry out slope stability study in case the dump height is more than 30 meters. The slope stability report shall be submitted to concerned regional office of MoEF and CC. Govt. of India, Bhubaneswar as well as SEIAA, Odisha.</p>	<p>Complied. Slope Stability study has been conducted by CIMFR, Dhanbad. And report is already submitted to the MoEF and SEIAA</p> <p>The Study report has been submitted vide letter No:OCM/ENV/1144/2022, dated 08.08.2022 to MoEF and CC and vide letter no.:OCM/ENV/1140/2022, dated 08.08.2022. Details are attached as Annexure :28</p>
53	<p>Catch drains, settling tanks and siltation ponds of appropriate size shall be constructed around the mine working, mineral yards and topsoil/OB /waste dumps to prevent runoff of water and flow of sediments directly into the water bodies (Nallah/ River Pond etc.). The collected water should be utilized for watering the mine area, roads, green belt development, plantation etc. The drains/sedimentation sumps etc. shall be de silted regularly, particularly after monsoon season, and maintained properly.</p>	<p>Complied</p> <p>We have already implemented catch drains and settling ponds of appropriate size has been constructed inside mines and Maintained and desilted as required to prevent runoff of water and flow of sediments directly into the water bodies.</p> <p>All the collected water bodies is being treated in ETP and then utilized for dust suppression and afforestation purpose.</p>
54	<p>Check dams of appropriate size, gradient and length shall be constructed around mine pit and OB dumps to prevent storm run-off and sediment low into adjoining water bodies. A safety margin of 50% shall be kept for designing of sump structures over and above peak rainfall (based on 50 years data) and maximum discharge in the mine and its adjoining area which shall also help in providing adequate retention time period thereby allowing proper settling of sediments/ silt</p>	<p>Complied.</p> <p>Check-dams of appropriate size, gradient and length is constructed around mine pit, OB Dump and garland drain Considering peak rainfall, the surface run off study has been conducted by domain expert.</p> <p>The settling pond has been constructed at the lower level area near ETP of the lease, at the corner of the Garland drains.</p>

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	material. The sedimentation pits/ sumps shall be constructed at the corners of the garland drains.	
55	Storm water and leached water for treatment shall be led in separate pipes and where required, retaining wall, settling pond and check dam shall be constructed within the lease hold area for conservation of rainwater and prevention of soil loss.	<p>Complied.</p> <p>Storm Water drains are there where required and retaining wall, settling pond and check dam are constructed in the lease hold area.</p> <p>Further, garland drain, retaining wall, settling pond and roof top rain water harvesting system is implemented for conservation of rain water.</p> <p>RAINWATER HARVESTING STRUCTURES IN OSTAPAL CHROMITE MINE OF M/S FACOR LTD</p> 
56	The top soil, if any, shall temporarily be stored at earmarked site(s) within the mine lease only and should not be kept unutilized for long. The physical parameters of the top soil dumps like height, width and angle of slope shall be governed as per the approved Mining Plan and as per the guidelines framed by DGMS w.r.t. safety in mining operations shall be strictly adhered to maintain the stability of dumps. The topsoil shall be used for land reclamation and plantation purpose	<p>Complied.</p> <p>There is no generation of topsoil during the period April 2024 to September 2024 . All the earlier generated topsoil is utilized for afforestation purpose.</p>
57	The mining lease holder shall, after ceasing mining operations undertake regressing the mining area and any other area which may have been disturbed due to their mining activities and restore the land to a condition which is fit for growth of fodder, flora, fauna etc.	<p>It is Not Applicable as of now</p> <p>It will be taken care after cession of Mining activities in consultation with competent authority.</p>
58	Slope study by an expert of repute of water dumps to be done and submitted within six months from the date of issue of EC to SEAC/SEIAA	<p>Complied.</p> <p>Slope Stability Study is conducted, and the report already submitted SEIAA via letter number OCM/ENV/1140/2022 dated on 08.08.2022</p> <p>Details are Attached as Annexure 28</p>


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vi	TRANSPORTATION	
59	<p>No Transportation of the minerals shall be allowed in case of roads passing through transportation of the minerals leaving an adequate gap (say at least 200 meters) .so that the adverse impact of sound and dust along with chances of accidents could be mitigated. All costs resulting from widening and strengthening of existing public road network shall be borne by the PP in consultation with nodal State Govt. Department. Transportation of minerals through road movement in case of existing village/ rural roads shall be allowed in consultation with nodal State Govt. Department only after required strengthening such that the carrying capacity of roads is increased to handle the traffic load. The pollution due to transportation load on the environment will be effectively controlled and water sprinkling will also be done regularly .Vehicular emissions shall be kept under control and regularly monitored. Project should obtain Pollution Under Control (PUC) certificate for all the vehicles from authorized pollution testing centers</p>	<p>Transportation is being carried out on the same road as used before the expansion i.e TOMKA-MANGALPUR Highway.</p> <p>Road connecting to TOMKA-MANGALPUR highway, is being always maintained to avoid dust generation.</p> <p>Further, water sprinkling is being carried out to mitigate the dust generation.</p> <p>All the vehicle used inside mines have valid PUC.</p>
60	<p>The Main haulage road within the mine lease should be provided with a permanent water arrangement for dust suppression. Other roads within the mine lease should be wetted regular with tanker-mounted water sprinkling system. The other areas of dust generation like crushing zone, material transfer points, material yards etc. should invariably be provided with dust suppression arrangements. The air pollution control equipment like bag filters, vacuum suction hoods, dry fogging system etc. shall be installed at Crushers, belt-conveyors and other areas prone to air pollution. The belt conveyor should be fully covered to avoid generation of dust while transportation. PP shall take necessary measures to avoid generation of fugitive dust emissions.</p>	<p>Complied</p> <p>For dust suppression system, there is provided one fixed water pipe line along with two dedicated permanent water tanker which sprinkles out the water in the haul roads regularly in a scheduled way. The roads are kept in wet condition and mineral stack yard is also kept in wet condition.</p> <p>Belt conveyor is used inside the COB which is wet process technology due to which no chance of dust generation due to that.</p> <p>There is no crushing zone . Bag filters are not installedand Fugitive dust is prevented by plantation and water sprinkling regularly.</p>
61	<p>The pollution due to transportation load on the environment will be effectively controlled and water sprinkling will also be</p>	<p>Complied.</p> <p>It is done effectively and in a controlled manner. Also water sprinkling is done regularly. All vehicle inside mines has also</p>


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	done regularly. Vehicular emissions shall be kept under control and regularly monitored. Project should obtain Pollution under Control (PUC) certificate for all the vehicles from authorized pollution testing centers.	obtained PUC certificate from authorized pollution testing centers.
62	Haulage road shall be developed and maintained perennially and perpetually by the proponent in construction with the concerned authority of the Govt. and to this effect, the proponent shall submit an undertaking in form of a legal affidavit.	<p>Complied.</p> <p>We have constructed approx. 70 m of concrete road within the lease.</p> <p>The haulage road is developed and maintained regularly. Legal affidavit is submitted to Member Secretary SEIAA, Bhubaneswar via letter number OCM/GEO/1377/2023 dated on 08.10.2023.</p> <p>The details are attached as Annexure 29</p>
63	Traffic Density study if not done by domain expert, then the expert to be ratified/ authenticated by domain expert and submitted within a month time.	<p>Complied.</p> <p>Traffic density study has been conducted by domain expert and submitted along with final EIA.</p> <p>Further, the traffic study report submitted to Joint Director MoEF and CC via letter OCM/ENV/904/2022 dated on 02.05.2022</p>
VII	Green Belt	
64	The Project Proponent shall develop greenbelt in 7.5m wide safety zone all along the mine lease boundary as per the guidelines of CPCB in order to arrest pollution emanating from mining operations within the lease. The whole Green belt shall be developed within first 5 years starting from windward side of the active mining area The development of greenbelt shall be governed as per the EC granted by the Ministry irrespective of the stipulation made in approved mine plan.	<p>Complied.</p> <p>Green belt (Plantation) has already been developed all along the mining lease boundary line in 7.5 Mtr distance.</p> <div data-bbox="695 1159 1217 1430" data-label="Image"> <p>The image shows a line of young trees planted along a road or boundary. A Google Maps overlay is present, showing the location in Central Division, Odisha, India, near Ostapal Chromite Mine, Gurusajanga. The coordinates are 80°50'48" E, 21°06'03" N. The date and time of the photo are 12/4/2024 10:33 AM. The text 'GPS Map Camera' is visible in the bottom right corner of the photo.</p> <p style="text-align: center;">Safety zone plantation</p> </div>
65	The Project Proponent shall carryout plantation/ afforestation in backfilled and reclaimed area of mining lease, around water body. Along the roadsides, in Community areas etc. by planting the native species in consultation with the State Forest Department/ Agriculture Department/ Rural development department/ Tribal Welfare Department/ Gram Panchayat such that only those species be selected which are of use to the local people. The CPCB guidelines in this	<p>Complied.</p> <p>Community Plantation program are being carried out with consultation of Forest Department and Gram Panchayat. Adequate funds provision is there to take care of the plantation.</p> <p>Plantation carried out in consultation with Forest department and all around the lease boundary and the report has been submitted to Forest Range Officer, Sukinda Jajpur via letter number and Joint director MoEF and CC via letter number OCM/ENV/579/2024 dated on 11.07.2024</p> <p>The details have been attached as Annexure 30</p>

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	respect shall also be adhered. The density of the trees should be around 2500 saplings per Hectare Adequate budgetary provision shall be made for protection and care of trees.		
66	The Project Proponent shall make necessary alternative arrangements for livestock feed by developing grazing land with a view to compensate those areas which are coming within the mine lease The development of such grazing land shall be done in consultation with the State Government. In this regard, Project proponent should essentially implement the directions of the Hon'ble Supreme Court with regards to acquisition of grazing land. The sparse trees on such grazing ground, which provide mid-day shelter from the scorching sun, should be scrupulously guarded/protected against felling and plantation of such trees should be promoted.	It is not applicable as there is no grazing land within the lease area.	
67	The Project Proponent shall undertake all precautionary measures for conservation and protection of endangered flora and fauna and Schedule-I species during mining operation. A Wildlife Conservation Plan shall be prepared for the same clearly delineating action to be taken for conservation of flora and fauna. The Plan shall be approved by Chief Wildlife Warden of the State Govt. and implemented in consultation with the State Forest and Wildlife Department. A copy of Wildlife Conservation Plan and its implementation status (annual) shall be submitted to the Regional Office of the Ministry.	<p>Complied. Site Specific Wildlife Conservation plan has been prepared by accredited Consultant and It is approved from the office of the principle chief conservation of forest.</p> <p>Approval Ref Vide No.: 10183/CWLW-FDWC-FD-0033-2022, dated 11.11.2022.</p> <p>The copy of the approval is enclosed as Annexure - 31</p>	
VIII	Public Hearing and human health issues		
68	The Project Proponent shall appoint an Occupational Health Specialist for Regular as well as Periodical medical examination of the workers engaged in the mining activities as per the DGMS guidelines. The records shall be maintained properly. PP shall also carryout Occupational health	<p>Complied. One Occupational Health specialist is appointed as per DGMS guideline. Check-ups are undertaken once in six month and necessary preventive measures are taken. Status report is sent to MoEF and DGMS on half-yearly basis. The details of the Medical Check up from April 2024 to September 2024 given in Annexure No. 32</p>	

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	check-ups in respect of workers which are having ailments like BP, diabetes, habitual smoking, etc. The check-ups shall be undertaken once in six months and necessary remedial preventive measures be taken. A status report on the same may be sent to MoEF and CC Regional Office and DGMS on half-yearly basis.	Status report is submitted and submitted copy is enclosed as Annexure No.- 32
69	A commitment in form of an undertaking for periodical occupational health check-up of the employee and the local people shall be done through an occupational health expert.	<p>All the employees and local people are being undertaken for periodical health check up through an occupational health expert.</p> <p>Undertaking is enclosed as Annexure No.-33</p>  
70	The Project Proponent must demonstrate commitment to work towards Zero Harm from their mining activities and carry out Health Risk Assessment (HRA) for identification workplace hazards and assess their potential risks to health and determine appropriate control measure to protect the health and wellbeing of workers and nearby community. The proponent shall maintain accurate and systematic records of the HRA. The HRA for neighbourhood must focus on Public Health Problems like Malaria Tuberculosis. HIV, Anaemia, Diarrhoea in children under five respiratory infections due to bio-mass cooking. The proponent shall also create awareness and educate the nearby community and workers for Sanitation Personal Hygiene, Hand washing not to defecate in open, Women Health and Hygiene (Providing Sanitary Napkins), hazard of tobacco and alcohol use. The Proponent shall carryout base line HRA for all the category of workers and thereafter every five years.	<p>The Mine Management is committed to work for zero harm from the mining activities and carrying out appropriate measures for Risk assessment and identification of workplace hazards and assess the potential risks for health and taking appropriate control measures to protect the health of workers and the nearby community. The PP is conducting HRA among the neighbourhoods to focus on malaria, Dengue, Tuberculosis, HIV, Anaemia, Diarrhoea and ARIs in children and adults. Regular awareness program is being conducted in the nearby villages for sanitization, personal hygiene, hand washing, not to defecate in open places, women health, hazards of smoking tobacco, drinking alcohol. Awareness program are being taken for control of malaria and Dengue and Tuberculosis.</p> <p>Details are attached as Annexure 34</p> 
71	The Proponent shall carry out Occupational health surveillance which be a part of RA and include Biological Monitoring where	<p>Complied.</p> <p>Steps have been taken to carry out occupational health surveillance for workers engaged in mines activities like</p>





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	<p>practical and feasible and the tests and investigations relevant to the exposure (e g for Dust a XRay chest,For Noise Audiometric; for Lead Exposure Blood Lead, For Welders Full Ophthalmologlo Assessment; for Manganese Miners a complete Neurological Assessment by a Certified Neurologist, and Manganese (Mn) estimation in Blood; For Inorganic Chromium-Fortnightly skin inspection of hands and forearme by a responsible person. Except routine teste all tests would be carried out in a Lab accredited by NABH. Records of Health Surveillance must be kept for 30 years, including the results of and the records of Physical examination and tests. The record of exposure due to materials like Asbestos, Hard Rock Mining, Silica, Gold, Kaolin, Aluminium, Iron, Manganese, Chromium, Lead, Uranium need to be handed over to the Mining Department of the State in case the life of the mine is less than 30 years. It would be obligatory for the State Mines Departments to make arrangements for the safe and secure storage of the records including X-Ray. Only conventional X-Ray will be accepted for record purposes and not the digital one). X-Ray must meet ILO criteria (17 xl4 inches and of good quality)</p>	<p>audiometric tests for blasters(noise), x-ray chest for hexavalent chromite exposure, fortnightly skin inspection by Medical officer of our dispensary.</p> <p>The medical report has been attached as Annexure 35</p>
72	<p>The Proponent shall maintained a record of performance indicators for workers which includes</p> <p>(a) there should not be a significant decline in their Body Mass Index and it should stay between 18.5-24.9</p> <p>(b) the Final Chest X-Ray compared with the base line X-Ray should not show any capacities</p> <p>(c) At the end of their leaving job there should be no Diminution in their Lung Functions Forced Expiratory Volume in one second (FEV1),Forced Vital Capacity (FVC), and the ratio) unless they are smokers which has to be adjusted, and the effect of age,</p> <p>(d)their hearing should not be affected. As a proof an Audiogram (first and last need to be presented),</p>	<p>Performance Indicator for workers and employees are being maintained.</p> <p>a) There is no significant decline in their Body Mass Index and it is between 18.5-24.9</p> <p>(b) the Final Chest X-Ray compared with the base line X-Ray does not show any capacities</p> <p>(c) At the end of leaving job there is be no Diminution in their Lung Functions Forced Expiratory Volume in one second (FEV1),Forced Vital Capacity (FVC), and the ratio) unless they are smokers which has to be adjusted, and the effect of age,</p> <p>(d)Their hearing is not affected. As a proof an Audiogram is presented),</p> <p>(e) they have not developed any Persistent Back Pain Neck Pain, and the movement of their Hip, Knee and other joints should have normal range of movement,</p> <p>(f) they have not suffered loss of any body part.</p>


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	<p>(e) they should not have developed any Persistent Back Pain Neck Pain, and the movement of their Hip, Knee and other joints should have normal range of movement,</p> <p>(f) they should not have suffered loss of any body part.</p> <p>The record of the same should be submitted to the Regional Office, MoEF and CC annually along with details of the relief and compensation paid to workers having above indications</p>	<p>Status of the same are given for reference. And the record is also being maintained. For the FY 23-24 Report is also herewith submitted along with the updated report for MoEF and CC, attached as Annexure No.- 36</p>
73	<p>The Project Proponent shall ensure that 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</p>	<p>Complied.</p> <p>Person working in dusty area wears protective respiratory devices during work. Further, all the vehicle engaged in operation are closed door vehicle (Having A/C facilities). Regular training is being provided to all employees on safety and health.</p> <div style="display: flex; justify-content: space-around;">   </div> <div style="display: flex; justify-content: space-around;"> <p>Close door vehicle used</p> <p>Training on safety and Health</p> </div> <p>Further, Monthly Safety Town hall is being conducted for creating more awreness on safety and Health.</p>
74	<p>Project Proponent shall make provision for the housing for workers/labors or shall construct labor camps within/outside (company owned land) with necessary basic infrastructure/ facilities like fuel for cooking, mobile toilets, mobile STP, safe drinking water, medical health care, creche for kids etc. The housing may be provided in the form of temporary structures which can be removed after the Completion of the project related infrastructure. The domestic waste water should be treated with STP in order to avoid contamination of underground water.</p>	<p>All most all the workers/labors are coming from local area. So, colony is not required for them.</p> <p>There are two STP Provided having capacity 30KLD (20 + 10 KLD) for treatment of domestic effluents.</p> <div style="display: flex; justify-content: space-around;">   </div> <div style="display: flex; justify-content: space-around;"> <p>20 KLD STP</p> <p>10 KLD</p> </div>
75	<p>The proponent shall implement the mitigative measures as suggested in the Study Report on effect of chromite mines to nearest human habitation</p>	<p>To prevent contamination of Hexavalent chromium study has conducted by NIT , Rourkela. All the suggestions are implemented.</p> <p>Details of implementation report has been attached as Annexure 37</p>
IX	<p>Corporate Environment Responsibilitiy (CER)</p>	


Six Monthly Compliance Report to EC of Ostapal Chromite Mines, M/s FACOR LTD
For The Period April 2024 to September 2024
EC Identification No.: EC22B001OR120821, Dated: 04.04.2022

76	<p>As per the MoEF and CC, Govt. of India Office Memorandum dated 30.09.2020, the project proponent is enquired to prepare and implement Corporate Environment Responsibility (CER) Plan. The activities proposed under CER shall be restricted to the affected area around the project. The company shall undertake all relevant measures for improving the socio-economic conditions of the surrounding area. CSR activities shall be undertaken by involving local villages and administration. The activities proposed for CER shall be implemented and to be completed within three years and annual report of implementation of the same along with documentary proof viz. photographs, purchase documents, latitude and longitude of infrastructure developed and road constructed needs to be submitted to Regional Office MoEF and CC annually along with audited statement and to the District Collector. It should be posted on the website of the project proponent.</p>	<p>CER action plan has been prepared and submitted in EIA. Activities proposed under CER is restricted to only affected area.</p> <p>All the improvement is being undertaken by involving local community.</p>  <p>All the CER proposal will be completed within the timeline. Work is under progress, and it is a continuous process. The dedicated CSR and EMC team are there to carry out the CER and CSR work. Socio Economic survey done by Domain expert.</p> <p>Details of the CSR Expenses and evidence are enclosed in Annexure No.-7</p> <p>The report is submitted to MoEF and CC and to the District Collector, Jajpur. And the same also posted in website www.facorgroup.in</p> <p>Letter to collector is attached as Annexure No:- 38</p>
77	<p>Action plan for implementing EMP and environmental conditions along with responsibility matrix of the company shall be prepared and shall be duly approved by competent authority. The year wise funds earmarked for environmental protection measures shall be kept in separate account and not to be diverted for any other purpose. Year wise progress of implementation of action plan shall be reported to the Regional Office of MoEF and CC, Bhubaneswar, SPCB Odisha along with the Six Monthly Compliance Report.</p>	<p>EMP action plan is prepared and approved from competent authority and implemented accordingly. Year wise funds earmarked is maintained in separate account provision.</p> <p>The details expenditure towards EMP is enclosed as Annexure - 8</p>
X	<p>Miscellaneous</p>	
78	<p>The Project Proponent shall prepare digital map (land use and land cover of the entire lease area once in five years purpose of monitoring land use pattern and submit a</p>	<p>Complied.</p> <p>We are having a digital map for the entire lease area and submitted to IBM. The details of the land use pattern is already submitted to Regional office MoEF and CC, vide letter No.OCM/ENV/1142/2022, dated 08.08.2022</p>

Six Monthly Compliance Report to EC of Ostapal Chromite Mines, M/s FACOR LTD
For The Period April 2024 to September 2024
EC Identification No.: EC22B001OR120821, Dated: 04.04.2022

	report to concerned Regional Office of the MoEF and CC	
79	The Project Authorities should inform to the Regional Office regarding date of financial closures and final approval of the project by the concerned authorities and the date of start of land development work.	It is Not Applicable as of now. Currently the mines is in running condition and therefore, the final closer is not required.
80	The project proponent shall establish a solar power plant with 30KVA capacity within the lease area as proposed.	<p>Complied.</p> <p>As there is no colony inside the lease, so persons are staying outside the lease area where there in solar power installed of about 40 KVA, for house hold use in place of Electric power.</p> <p>Moreover, at Ostapal Mine there is already installed and using 14 KVA Solar Power plant. On phase wise manner it is being complied.</p> 
81	It shall be mandatory for the project management to submit six 06 monthly compliance reports on post environmental monitoring in respect of the stipulated terms and conditions in this Environmental Clearance to the State Environment Impact Assessment Authority (SEIAA) Odisha. SPCBand Regional Office of the Ministry of Environment and Forest. Odisha in hard and soft copies on 1 June and 1 December of each calendar year. The proponent shall also upload the Compliance report including results of monitored data as applicable in the website of the Ministry for monitoring of EC Conditions	<p>Complied.</p> <p>The six-monthly compliance report is submitted along with all the environment monitoring report. And it is also uploaded in the website.</p> <p>The last six-monthly Environment Compliance report was submitted on 28.05.2024 vide letter number OCM/ENV/445/2024</p> <p>The submitted copy of last six monthly compliance copy is attached in Annexure No-39</p>
82	The environmental statement for each Financial year ending 31 March in Form-V as mandated to be submitted by the project proponent to the Odisha State Pollution Control Board as prescribed under the Environment (Protection) Rules 1986, as amended subsequently, shall also be put on the website of the company along with the status of compliance of EC conditions and shall also be sent to the respective to the MoEF and COC and its concerned Regional Office, Central Pollution	<p>Complied.</p> <p>Environment statement copy is submitted to Odisha State Pollution Control Board, Regional Pollution Control Board and Regional office of MoEF and CC.</p> <p>And It is also uploaded in the website for last FY 2023-24 in the Website link: https://www.facorgroup.in/esg/compliances/</p> <p>Submitted ref. letter copy of Environment Statement vide letter No.:OCM/ENV/745/2024, dated 30.09.2024, is enclosed as Annexure - 40</p>

Six Monthly Compliance Report to EC of Ostapal Chromite Mines, M/s FACOR LTD
For The Period April 2024 to September 2024
EC Identification No.: EC22B001OR120821, Dated: 04.04.2022

	Control Board and State Pollution Control Board.	
83	The proponent shall submit/upload six monthly reports on the status of compliance of the stipulated Environmental Clearance conditions, including results of monitored data on their website and shall update the same periodically. It shall simultaneously be sent to the Regional Office of MoEF andCC, Govt. of India, the respective Zonal Office of CPCB and the SPCB. The criteria pollutant levels namely: SPM, RSPM, SO ₂ , NO _x (ambient levels as well as stack emissions) or critical sectoral parameters, indicated for the project shall be monitored and displayed at a convenient location near the main gate of the company in the public domain	<p>Complied.</p> <p>After Submitting the six monthly compliance report for the period April 2024 to September 2024 ,it is uploaded in the website and it is uploaded periodically, and same is also submitted Regional office, MoEF and CC, Regional Office of the State Pollution Control Board.</p> <p>All the critical parameters are monitored and also displayed near main gate.</p>  <p>Digital display Board Near Mian Gate</p>
84	The Project Proponent shall submit six monthly compliance reports on the status of the implementation of the stipulated environmental safeguards to the MoEF andCC and its concerned Regional Office, SEIAA, Odisha, Central Pollution Control Board and State Pollution Control Board	<p>Complied.</p> <p>Six monthly compliance report is submitted to MoEF and CC and Regional office of the State Pollution Control Board.</p> <p>The last six monthly Environment Compliance report was submitted on 28.05.2024 vide letter number OCM/ENV/445/2024</p>
85	The SEIAA, Odisha may revoke or suspend this EC. if implementation of any of the above conditions is not satisfactory. The SEIAA, Odisha reserves the right to alter modify the above conditions or stipulate any further condition in the interest of environment protection.	<p>Complied.</p> <p>All the implementations are as per the standards and satisfactory.</p>
86	The project proponent shall augment infrastructure on drinking water, health care and education in nearby villages as per time bound action plan submitted	<p>Complied.</p> <p>It is implemented as per action plan.</p> <p>Details of work done in the field of Drinking water , Health and Education is eclosed in Annexure No.-7</p>
87	The project proponent shall obtain permission from DGMS under 106(2b) to carry out blasting operation within the lease area.	<p>Complied.</p> <p>Permission from DGMS under 106(2b) to carry out blasting operation obtained vide permission No.: NO: 180020 SEZ Bhubaneshwar Region Exemp 2021 8922, dated Date: 28/05/2021.</p> <p>Copy of permission is enclosed as Annexure – 41</p>

Six Monthly Compliance Report to EC of Ostapal Chromite Mines, M/s FACOR LTD
For The Period April 2024 to September 2024
EC Identification No.: EC22B001OR120821, Dated: 04.04.2022

88	The site will be visited by the sub-Committee of SEAC after six months to review the progress of recommendations of SEAC on specific conditions	All the condition mentioned are implemented and strictly followed
89	The concerned Regional Office of the MoEF and CC shall randomly monitor compliance of the stipulated conditions. The project authorities should extend full cooperation to the MoEF and CC officer(s) by furnishing the requisite data information / monitoring reports	It is ensured to extend the full support to the authority as per their requirement.
90	The above conditions will be enforced inter alia, under the provisions of the water Prevention and Control of Pollution Act 1974, the Air (Prevention and Control of Pollution) Act 1981, the Environment (Protection) Act 1986 and the Public Liability insurance Act, 1991 along with their amendments and rules made there under and also any other orders passed by the Hon'ble Supreme Court of India High Court and any other Court of Law relating to the subject matter	Complied.
91	This Environmental Clearance (EC) is subject to orders/judgment of Hon'ble Supreme Court of India, Hon'ble High Court. Hon'ble NGT and any other Court of Law, Common Cause Conditions as may be applicable	No appeal filed against this Environment Clearance in the National Green Tribunal. Hence complied.
92	Any appeal against this environmental clearance shall lie with the National Green Tribunal if preferred. within a period of 30 days as prescribed under Section 16 of the National Green Tribunal Act, 2010	No appeal filed against this Environment Clearance in the National Green Tribunal. Hence complied.

OCM/ENV/ 1593/2023

Date:03.05.2023

To
The Member Secretary,
SEIAA, Bhubaneswar,
Bhubaneswar, ODISHA

Sub: Submission of Final Study report on reduction of Hexavalent Chromium conducted by NIT, Rourkela along with action plan & implementation plan in respect of Ostapal Chromite Min of M/s FACOR LTD, Jajpur, ODISHA – Regarding

Ref: EC Special Condition No.-3 of EC identification No.:EC22B001OR120821, dated 0404.2022

Respected Sir,

Referring to the above cited subject, we would like to submit the Final Study report on reduction of Hexavalent Chromium conducted by NIT, Rourkela along with action plan & implementation plan in respect of Ostapal Chromite Min of M/s FACOR LTD, Jajpur, ODISHA

This is for your kind perusal.

Thanking You,

Yours Faithfully
For M/s. Ferro Alloys Corporation Limited



Head- Environment
Ostapal Chromite Mine

Enclosures: As above

OCM/ENV/ 885 /2022

Date: 25/04/2022

To
The member Secretary,
SEIAA, Bhubaneswar.

SUB: Letter/Po handed over to NIT Rourkela to carry out reduction of hexavalent chromium from tailing pond, surface run off and mine discharge water of Ostapal Chromite Mine M/s FACOR Ltd.

Ref: Environment Clearance No - 66461/75-MINB1/02-2022 dated on – 3.02.2022, Special Condition Point No – 2

Dear Sir,

We would like to intimate that we have engaged NIT Rourkela since 13.12.2022 to carry out the reduction of hexavalent chromium from tailing pond, surface run off and mine discharge water vide PO No: 4800020530, PO delivery period is 31.07.2022.

In response to our PO handover/Supply, the work has been carried out by NIT, Rourkela and submitted one interim report. But final result yet to received.

After obtaining the final report we will submit the same.

- Annexure 1 – Purchase Orde (PO)
- Annexure 2 – Response Letter of NIT Rourkela

This is for your kind information

Thanking You

Yours faithfully,
Ferro Alloys Corporation Limited



Head Environment

PURCHASE ORDER

Page : 1 of 96

PO Number : 4800020530
PO Date : 13.12.2021

Vendor Code : 734607
Vendor Name : National Institute of Technology

Vendor Address : SRICCE OFFICE, 2nd floor, NIT C
ROURKELA - Orissa, 769008
India.

Your Reference :
Our Reference :

PO Currency : Indian Rupee

PO Validity : 13.12.2021 To 31.07.2022
Delivery Place : OSTAPAL
: KALIAPANI JAJPUR Orissa 755047 India

VALID FROM : 13.12.2021
VALID TO : 31.07.2022

I) PO CONFIRMATION/ACKNOWLEDGEMENT:

You shall receive an email confirmation after release of each Purchase Order from our end. Email will provide you a link, from which you can log into SRM portal and view and/or download the PO. For downloading or saving the PO, please click on "PRINT" option. Immediately after receipt of PO, you have to provide "CONFIRMATION" to all items. Alternately, you may directly log into your account in SRM portal through our official website <https://sesagoaironore.com/procurement/vendor-e-portal/> and provide "CONFIRMATIONS". In case no confirmation is received from you within 2 days of receipt of PO, then PO shall be deemed accepted to you. However, without giving "CONFIRMATION", ASN as follows, cannot be created, and it has to be done without exception.

Confirmations, acknowledgement and ASN shall not be applicable for Service line items of the PO

II) PRE-DELIVERY CONDITION:

1) At the time of dispatch of material. You have to log into SRM system, open "Create ASN" tab and enter dispatch details, like DC No., DC date, Vehicle No., Quantity, LR No. & LR Date against each proposed delivery item, and saved, when system will generate a unique no. This is called as Advance Shipping Notice (ASN), and same has to be imprinted on every Invoice.

ASN shall not be applicable for Service POs



NATIONAL INSTITUTE OF TECHNOLOGY

Rourkela – 769 008, Odisha

Dr. Angana Sarkar

Assistant Professor

Dept of Biotechnology and Medical Engineering

National Institute of Technology

Rourkela-769008, Orissa

&

Dr S Jayanthu, FIE, C.Eng

PhD, M Tech, BE (Mining)

MS (Counseling & Psychoth

Former Scientist of CM

NATIONAL M

PROFES

De

Website-www.nit

Email: sark

Ph: 0

To

The HOD

Environment Management Dept

Ostapal Chromite Mine

M/s. FACOR-Vedanta

Dear Sir,

Sub: Scientific Report of study for Hexavalent Chromium reduction at Ostapal Chromite Mine of M/s. FACOR-Vedanta

Many thanks for your mail regarding Consultancy service and scientific study for Hexavalent Chromium reduction at Ostapal Chromite Mine of M/s. FACOR-Vedanta dated 18th December, 2021 (PO No. [4800020530](#)).

Sample collection has been collected from the mine site and preliminary study on physicochemical parameters of the samples has been conducted. Screening of chromium reducing bacteria are in process. Kindly find the report on initial study.

Awaiting your favorable response

Thanking you

Sincerely yours

(ANGANA SARKAR-PI)

(SINGAM JAYANTHU-Co-PI)



**NATIONAL
INSTITUTE OF
TECHNOLOGY**
Rourkela – 769 008, Orissa

PABX:0661-2465999

Dr S Jayanthu, FIE, C.Eng

PhD, M Tech, BE (Mining)

MS (Counseling & Psychotherapy)

Former Scientist of CMRI & NIRM

Chief Editor of Indian Mining & Engg Journal

NATIONAL MINERAL AWARDEE

PROFESSOR , and Former HOD

Dept of Mining Engineering

FAX :0661-2472928/2462999

Website-www.nitrkl.ac.in

Email sjayanthu@nitrkl.ac.in

Ph: 0661-2462600-01-11 (Dept)-

2463611 @, 9938303259

<https://www.nitrkl.ac.in/FProfile.aspx?e=sjayanthu>

No. NITR/MN/SJAY/L/2022/

12.04.2022

To,

Sri Muthumari M

Head O & M Mines

FACOR Mines, Ostapal Chromite mine

Vedanta resource limited –Kalayapani (Po)Jajpur (Dist)

Muthumari.M@vedanta.co.in

Sub: Request for endorsement related to collaboration in the project on “Removal of chromium from water contaminated by opencast mining using hybrid constructed wetland”- reg

Dear Sir,

Many thanks for your kind consent on endorsement for the studies to be conducted on above subject, as per our discussions over phone yesterday-11.4.22. Our Transdisciplinary group of faculty including mining engineering, Civil Engineering, Biomedical department etc want to submit a project proposal on chromium removal from water contaminated with chromium by opencast mining activities using a low-cost nature-based system constructed wetland. We are going to use some lab made filler media in our system which has good adsorption ability along with microbes and plants in the system that either bio-remediate or uptake the toxic chromium from the contaminated water. Therefore, system will remove the chromium by physical adsorption, microbial bioremediation and phytoremediation. Altogether they will provide a highly efficient removal system.

In this regard, it is proposed to conduct the studies in two phases. In 1st phase, water will be collected from mine site and all treatments will be carried out in the laboratory. In 2nd phase, a pilot scale system will be setup at the mine site for real water treatment. As discussed before, a copy of endorsement, draft proposal etc are enclosed herewith for your kind perusal inviting Vedanta group to become a collaborator (Industry partner) for this project that we are going to submit to the Ministry of Mines GoI, shortly.

We look forward for your kind consent and endorsement for the above studies to be conducted with the water samples from your mine sites.

Thanking you

Yours Sincerely,

(SINGAM JAYANTHU)

Encl: as above

Susanta Biswal

From: Avijit Bhunia (Facor)
Sent: Tuesday, September 27, 2022 9:10 AM
To: Susanta Biswal
Subject: FW: Timeline for the Consultancy PO-4800020530
Attachments: Consultancy timeline.pptx; Consultancy Report_Vedanta Mine 2nd report.pdf

FYKI

Sensitivity: Internal (C3)

-----Original Message-----

From: Angana Sarkar <sarkara@nitrrkl.ac.in>
Sent: 26 September 2022 16:26
To: Avijit Bhunia (Facor) <Avijit.Bhunia@vedanta.co.in>
Cc: Muthumari M <Muthumari.M@vedanta.co.in>
Subject: Timeline for the Consultancy PO-4800020530

External Sender: Use caution with links/attachments

Dear Sir,

The consultancy work will be completed by the November, 2022. The complete timeline is attached with this mail.

Thank you.

Regards

Dr. Angana Sarkar
Assistant Professor
Department of Biotechnology & Medical Engineering

ACTION PLAN FOR NIT ROURKELA HEXAVALENT CHROMIUM REDUCTION STUDY REPORT

Sr.No	Recommendations	Action Plan
1	Discharge of tailing in separate pond	To be implemented & it will be followed in future This practice is being/will be followed since inception of the COB Plant and this practice will be continued.
2	Impervious layer to be laid at the bottom of the tailing dam to prevent the mixing of tailing water to the ground water.	An impervious layer will be laid down along all tailing ponds which will be constructed which will not allow the water to mix with the ground water. This practice is also been followed from earlier.
3	Proper SOP of tailing management should be maintained	It will maintained as per approved Mining Plan . The SOP for disposal is prepared.


Head Environment
Ostapal Chromite Mine

OCM/ENV/ 897 /2022

Date: 30.04.2022

To
The Member Secretary
SEIAA, Bhubaneswar

SUB: Submission of the measures undertaken for augmentation of the ground water resources along with the action plan Ostapal Chromite Mines M/s FACOR Ltd.

Dear Sir,

With respect to the cited subject mentioned above, we would like to intimate your good office that we have conducted Impact assessment study with Ground water modelling by accredited consultant of CGWA i.e M/s Geoclimate Risk Solutions Pvt Ltd. As per the study report there is no impact on Ground water to withdraw the permitted quantity as Per CGWA NOC.

The rain water harvesting structures considered during the study are as follows:

- Check-Dams
- Garland Drains
- Settling Pit

And further as per the recommendation of the study report, we have implemented roof-top rain water harvesting structure to augment the Ground water recharge.



Garland Drain



Check Dam



Settling Pit



Roof Top Rain Water Harvesting

This is for your kind consideration please.

Thanking You

Yours Faithfully
Ferro Alloys Corporation



Head Environment

**PURCHASE ORDER OF PILOT STUDY FOR REDUCTION OF HEXAVALENT CHROMIUM
THROUGH IIMT- CSIR BHUBANESWAR**

PURCHASE ORDER		Page : 1 of 04
PO Number	: 4920058435	<div>DELIVERY DATE: SEE BELOW</div> <div>WE RESERVE THE RIGHT TO</div> <div>REJECT THE MATERIAL SUPPLIED</div> <div>IF DATE IS LATER THAN</div> <div>DELIVERY DATE SPECIFIED IN</div> <div>THIS PURCHASE ORDER</div>
PO Date	: 11.11.2023	
Vendor Code	: 794070	
Vendor Name	: CSIR-Institute of Minerals and Materials	
Vendor Address	: Near Asharya Vihar, Dist.: Khordha, Bhubaneswar - Orissa, 751013 India.	
Your Reference	: CSIR-IIMT Mail-28.8.22	
Our Reference	: ***** SI00000011	
PO Currency	: Indian Rupee	
PO Validity	: 10.11.2023 To 29.11.2023	
Delivery Place/ Billing Address	: CUTACK BALASORE JALPUR Orissa 755008 India	
<p>1) PO CONFIRMATION/ACKNOWLEDGMENT: You shall receive an email confirmation after release of each Purchase Order from our end. Email will provide you a link, from which you can log into IIMT portal and view and/or download the PO. For downloading or saving the PO, please click on "PRINT" option. Immediately after receipt of PO, you have to provide "CONFIRMATION" to all</p>		

PURCHASE ORDER CONTINUATION		Page : 2 of 04																																																																										
<p>PO NO : 4920058435</p> <p>other details, as above; we reserve the right to reject the material.</p> <p>III) You shall also receive regular mails confirming acceptance of material in stores and invoice posting, from which you can view the details appropriately.</p> <p>Requested to follow the above procedures and co-operate for proper functioning of IIMT and VIM systems and for smooth processing of Bills, from now onwards.</p> <p>Please supply the under mentioned materials / services subject to the prices, terms and conditions mentioned below, "General Terms and Conditions" and "Applicable Standard terms and conditions":</p> <table border="1"> <thead> <tr> <th>Sr. Item code</th> <th>Plant</th> <th>UOM</th> <th>Req. Qty</th> <th>Rate</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td colspan="6">No. Specification</td> </tr> <tr> <td>1</td> <td>Pilot Study for hexavalent chromium</td> <td>CSIR</td> <td>RD</td> <td>1.000</td> <td>1,488,333.00</td> </tr> <tr> <td colspan="6">SI00000011</td> </tr> <tr> <td>2</td> <td>ENVIRONMENTAL CONSULTANCY SERVICES FOR OBTAINING PERMISSION UNDER CRZ RULES</td> <td>LA</td> <td>1.000</td> <td>1,488,333.00</td> <td>1,488,333.00</td> </tr> <tr> <td colspan="6">SI00000011</td> </tr> <tr> <td colspan="6">IIMT/ERC Code :</td> </tr> <tr> <td>Line no</td> <td>A/B code</td> <td>Plant Area</td> <td>Cont. Number</td> <td>Material Code</td> <td>WBS Element</td> <td>Network no</td> <td>Asset id</td> </tr> <tr> <td>01</td> <td>0000</td> <td>PLANT</td> <td>000000</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td colspan="5" style="text-align: right;">Total PO Value</td> <td>1,488,333.00</td> <td colspan="2"></td> </tr> <tr> <td colspan="8"> <p>Price Basis : RTS - At Site Cutackal and Kalarangpattia ML</p> <p>Insurance :</p> </td> </tr> </tbody> </table>			Sr. Item code	Plant	UOM	Req. Qty	Rate	Value	No. Specification						1	Pilot Study for hexavalent chromium	CSIR	RD	1.000	1,488,333.00	SI00000011						2	ENVIRONMENTAL CONSULTANCY SERVICES FOR OBTAINING PERMISSION UNDER CRZ RULES	LA	1.000	1,488,333.00	1,488,333.00	SI00000011						IIMT/ERC Code :						Line no	A/B code	Plant Area	Cont. Number	Material Code	WBS Element	Network no	Asset id	01	0000	PLANT	000000					Total PO Value					1,488,333.00			<p>Price Basis : RTS - At Site Cutackal and Kalarangpattia ML</p> <p>Insurance :</p>							
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Interim report
On
Phytoremediation of Hexa-valent Chromium of Ostapal Chromite
mines of FACOR Ltd. Jajpur, Odisha

Prepared for
FACOR Ltd. Jajpur, Odisha



ENVIRONMENT AND SUSTAINABILITY DEPARTMENT
CSIR-INSTITUTE OF MINERALS & MATERIALS TECHNOLOGY
BHUBANESWAR - 751013

Handwritten signature and date:
10/9/2013
Printed text:
Dr. M. K. Ghosh
Chief Scientist
Environment & Sustainability Dept.
CSIR-IMMT, Bhubaneswar-751013

Summary of Activities During Dec 2023 to Jan 2024

Sl. No.	Activities	Remarks
1	Plantation in 1.0 acre(0.40 ha)	Just started(30-03-23)
2	Development of Nursery	Continuing at CSIR-IMMT experimental garden

Project particulars

Project Title] :

Phytoremediation of Hexa-valent Chromium of Ostapal Chromite mines of FACOR Ltd. Jajpur, Odisha

1. Principal Investigator and Team Members:

Principal investigator: Dr. N.K. Dhal

Co-Investigators: Dr. Manish Kumar, Dr. N.C. Rout

2. Implementing Institution: Institute of Minerals and Materials Technology (CSIR), (formerly Regional Research Laboratory) Bhubaneswar-751013

3. Date of Commencement: NOV'2022

4. Date of Completion: Jan.2024

5. Duration: Around 1 Year

Introduction

Ostapal Chromite mines of M/S. FACOR LTD, Jajpur, Odisha is located at Latitude 21° 02' 37.1" N and Longitude 85° 47' 22.5" E having approximately (28.58) ha. of Overburden dump comprises of two dump namely South Dump & North Dump. Due to the contaminated sites the soils are contaminated as well as affected the natural flora. Hence, Remediation of identified of the site is need of the hour so far environmental pollution is concerned. Hexavalent chromium (Cr^{6+}) is one of the most frequently used metal contaminants and is considered to be one of the top-20 on the superfund priority list of hazardous substances. Hence, the challenge is to develop innovative and cost-effective solutions to reduce the effect of Cr^{6+} in the environment and to make them safe for human habitation. Research into the remediation of Cr^{6+} pollution has attracted widespread attention. Among them Phytoremediation techniques have advantages of causing little disturbance to soil and water, low cost, simple and convenient operation. This technology utilizes biodiversity to reduce or remove contaminants from the air, soil and water.

Objectives

1. Chromite mine overburden dump conditioning for plant growth and eco-restoration.
2. Plantation of Vetiver, Lemon grass, and Palmarosa in over burden areas for carbon sequestration and soil conservation. (9.40 Ha. at Ostapal Chromite mines and 0.40 Ha. at Kalaranglatta Chromite mines of M/s FACOR LTD)
3. Remediation Cr form over burden and tailings through selected indigenous plant species.

Materials and Methods

Selection of plant species

We have visited the mines and based on our preliminary observation, we planned for plantation of some previously reported economically important and fast-growing grass species i.e., Lemon grass [(*Cymbopogon flexuosus*, (Nees ex Steud.) Wats] and Vetiver (*Chrysopogon zizanioides* (L.) Roberty. The selection on plants i.e., Lemon Grass and Vetiver are owing to their erosion-fighting ability and huge spongy mass of roots. These are not only numerous, strong, and fibrous, they tap the soil moisture far below the reach of most allied crops. They

have been measured at depths below 2-3 m and can keep the plant alive long after most surrounding vegetation has succumbed to drought. The massive, deep "ground anchor" also means that even heavy downpours cannot undermine the plant or wash it out. Moreover, because the roots angle steeply downwards, which provides scope of intercropping of desired tree species close to the line of grass. The roots can grow extremely fast, the lemon grass and vetiver grass are having high aromatic/essential oil contents and they are non-edible by animals, so these properties make these plants suitable for mine dump reclamation process.

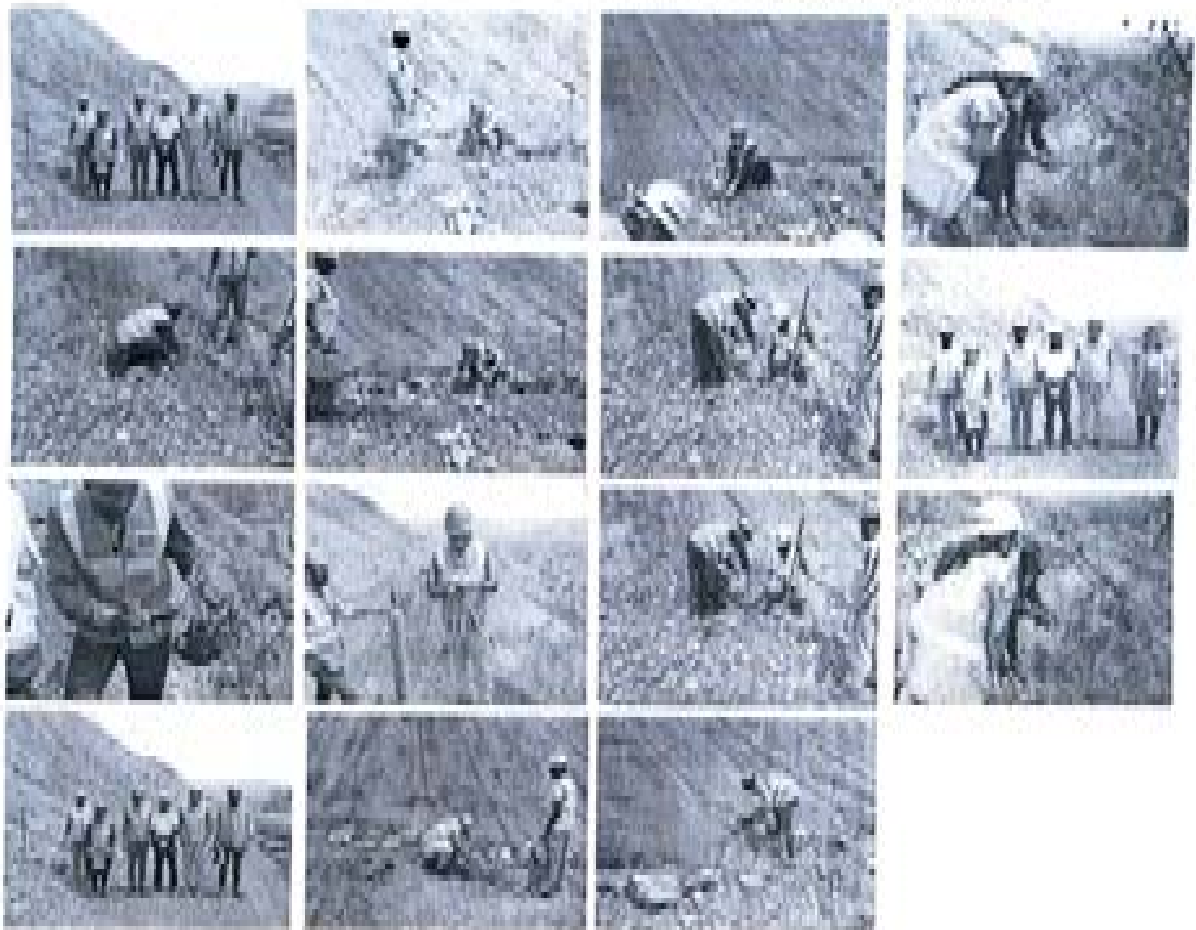
Preparation of planting material for plantation at CSIR-IMMT Nursery Site

The site for nursery were demarcated at the farm field available near raceway pond facility in CSIR-IMMT campus. Planting materials of both lemon grass and vetiver were prepared from their planting stock were maintained. The soil was collected from the garden and mixed with cow dung manure and biochar in the ratio of 10:1:1 respectively. The slips (approx. 25 cm length) were planted in the polythene bag, up to 15 cm. To encourage lemongrass stalks to grow new roots, were placed down in a polythene bag (10 x 8 inch) filled with about 1 kg soil at about 10-15 cm depth. The vetiver and lemon grass slips were maintained/ raised for about 3 weeks' time and were transported to mine over dump sites for planting.



Preparation of planting materials in CSIR-IMMT Nursery

PLANTATION ACTIVITIES CARRIED OUT AT OSTAPAL MINES



*** On trial basis 30 numbers of Lemon Grass saplings were planted on 30/03/2023**

Results

Physico-chemical Analysis of soil sample

The soil collected from OB Dump was analyzed. The parameters like pH, EC, soil organic carbon, water holding capacity, total potassium, available phosphorus, micro and macro nutrient analysis were done. The methods and the results are shown in the table below.

Sl. No.	Parameters	Instruments
01.	pH	pH meter
02.	EC	EC meter
03.	Water holding capacity	Hot air Oven method
04.	TOC	Walkley and black method
05.	Total Nitrogen	Nitrogen analyser
06.	Available Phosphorous	Ascorbic acid method
07.	Analysis of Heavy metal	ICP-OES



[Multi-parameter analyzer]



[Acid digestion of soil samples]

Analysis of soil sample collected on 30/03/23

Soil analysis Parameters	Overburden soil, factor
pH	7.21 \pm 0.27
EC (mS/cm ²)	2.17 \pm 0.10
Soil Organic carbon (%)	0.10 \pm 0.02
Water Holding Capacity (%)	48 \pm 3.46
Total nitrogen (%)	Going on
Available nitrogen (ppm)	Going on
Available Phosphorus (ppm)	Going on
Hexavalent chromium(ppm)	Going on

Future work

- 1- Periodical collection and analysis of collected soil samples.
- 2- Collection of plant samples from OB for periodical analysis.
- 3- Plantation of lemon grass and vetiver on the OB dump areas.

ke
conf 05/05/2023
Dr. H. K. Patel
Chief Scientist
Environment & Sustainability Dept.
CSO, MAIT, Bhujapurwar-751013

From: no-reply-cgwa@gov.in
To: [Susanta Biswal](#)
Subject: Your Renewal Application Submitted Successfully
Date: Thursday, July 25, 2024 12:52:00 PM

CAUTION:- Email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear OSTAPALCHROMITEMINES ,

Your Application Submitted Successfully. Application Details are :

Application Number : 21-4/1456/OR/MIN/2017

Applied for Renewal of NOC Number : CGWA/NOC/MIN/REN/2/2024/9353

Applied For Renewal : 3rd

Name of Industry : OSTAPAL CHROMITE MINES

Please note application number for future reference.

This is system generated mail. Please do not reply.



भारत सरकार
जल शक्ति मंत्रालय
जल संसाधन, नदी विकास
और गंगा संरक्षण विभाग
केन्द्रीय भूमि जल प्राधिकरण
Government of India
Ministry of Jal Shakti
Department of Water Resources,
River Development & Ganga Rejuvenation
Central Ground Water Authority

(भूजल निकासी हेतु अनापत्ति प्रमाण पत्र)

NO OBJECTION CERTIFICATE (NOC) FOR GROUND WATER ABSTRACTION

Project Name:	Ostapal Chromite Mines		
Project Address:	Gurujanga, Sukinda, Jajpur		
Village:	Gurujanga	Block:	Sukinda
District:	Jajapur	State:	Odisha
Pin Code:			
Communication Address:	Gurujanga, Sukinda, Jajpur, , Kendujhar, Odisha - 755028		
Address of CGWB Regional Office :	Central Ground Water Board South Eastern Region, Bhujal Bhawan, Khandagiri Square, Nh-5, Bhubaneshwar, Khordha, Odisha - 751030		

1.	NOC No.:		CGWA/NOC/MIN/REN/2/2024/9353				2.	Date of Issuance		04/04/2024						
3.	Application No.:		21-4/1456/OR/MIN/2017				4.	Category: (GWRE 2023)		Safe						
5.	Project Status:		Existing Ground Water				6.	NOC Type:		Renewal						
7.	Valid from:		02/08/2022				8.	Valid up to:		01/08/2024						
9.	Ground Water Abstraction Permitted:															
Fresh Water				Saline Water				Dewatering				Total				
m³/day		m³/year		m³/day		m³/year		m³/day		m³/year		m³/day		m³/year		
100.00		36500.00						3300.00		1204500.00						
10.	Details of ground water abstraction /Dewatering structures															
Total Existing No.:3								Total Proposed No.:0								
				DW	DCB	BW	TW	MP	MPu	DW	DCB	BW	TW	MP	MPu	
Abstraction Structure*				0	0	2	0	0	0	0	0	0	0	0	0	
Dewatering Structure*				0	0	0	0	1	0	0	0	0	0	0	0	
*DW- Dug Well; DCB-Dug-cum-Bore Well; BW-Bore Well; TW-Tube Well; MP-Mine Pit;MPu-Mine Pumps																
11.	Ground Water Abstraction/Restoration Charges paid (Rs.):								7764750.00							
12.	Environment Compensation (if applicable) paid (Rs.):								0.00							
13.	Number of Piezometers(Observation wells) to be constructed/ monitored & Monitoring mechanism.						No. of Piezometers		Monitoring Mechanism							
								Manual	DWLR**	DWLR With Telemetry						
**DWLR - Digital Water Level Recorder						2		0	1	1						

(Compliance Conditions given overleaf)

This is an auto generated document & need not to be signed.

18/11, जामनगर हाउस, मानसिंह रोड, नई दिल्ली - 110011 / 18/11, Jamnagar House, Mansingh Road, New Delhi-110011

Phone: (011) 23383561 Fax: 23382051, 23386743

Website: cgwa-noc.gov.in

पानी बचाये - जीवन बचाये
SAVE WATER - SAVE LIFE

CENTRAL GROUND WATER AUTHORITY

18/11, जामनगर हाउस, मानसिंह रोड, नई दिल्ली - 110011 / 18/11, Jamnagar House, Mansingh Road, New Delhi-110011

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Validity of this NOC shall be subject to compliance of the following conditions:

Mandatory conditions:

- 1) Installation of tamper proof digital water flow meter with telemetry on all the abstraction structure(s) shall be mandatory for all users seeking No Objection Certificate and intimation regarding their installation shall be communicated to the CGWA within 30 days of grant of No Objection Certificate.
- 2) Proponents shall mandatorily get water flow meter calibrated from an authorized agency once in a year.
- 3) Construction of purpose-built observation wells (piezometers) for ground water level monitoring shall be mandatory as per Section 14 of Guidelines. Water level data shall be made available to CGWA through web portal. Detailed guidelines for construction of piezometers are given in Annexure-II of the guidelines.
- 4) Proponents shall monitor quality of ground water from the abstraction structure(s) once in a year. Water samples from bore wells/ tube wells / dug wells shall be collected during April/May every year and analysed in NABL accredited laboratories for basic parameters (cations and anions), heavy metals, pesticides/ organic compounds etc. Water quality data shall be made available to CGWA through the web portal.
- 5) In case of mining projects, additional key wells shall be established in consultation with the Regional Director, CGWB for ground water level monitoring four (4) times a year (January, May, August and November) in core as well as buffer zones of the mine.
- 6) In case of mining project the firm shall submit water quality report of mine discharge/ seepage from Govt. approved/ NABL accredited lab.
- 7) The firm shall report compliance of the NOC conditions online in the website (www.cgwa-noc.gov.in) within one year from the date of issue of this NOC.
- 8) Industries abstracting ground water in excess of 100 m³/d shall undertake annual water audit through certified auditors and submit audit reports within three months of completion of the same to CGWA. All such industries shall be required to reduce their ground water use by at least 20% over the next three years through appropriate means.
- 9) Application for renewal can be submitted online from 90 days before the expiry of NOC. Ground water withdrawal, if any, after expiry of NOC shall be illegal & liable for legal action as per provisions of Environment (Protection) Act, 1986.
- 10) This NOC is subject to prevailing Central/State Government rules/laws/norms or Court orders related to construction of tube well/ground water abstraction structure / recharge or conservation structure/discharge of effluents or any such matter as applicable.

General conditions:

- 11) No additional ground water abstraction and/or de-watering structures shall be constructed for this purpose without prior approval of the Central Ground Water Authority (CGWA).
- 12) The proponent shall seek prior permission from CGWA for any increase in quantum of groundwater abstraction (more than that permitted in NOC for specific period).
- 13) Proponents shall install roof top rain water harvesting in the premise as per the existing building bye laws in the premise.
- 14) The project proponent shall take all necessary measures to prevent contamination of ground water in the premises failing which the firm shall be responsible for any consequences arising thereupon.
- 15) In case of industries that are likely to contaminate the ground water, no recharge measures shall be taken up by the firm inside the plant premises. The runoff generated from the rooftop shall be stored and put to beneficial use by the firm.
- 16) Wherever feasible, requirement of water for greenbelt (horticulture) shall be met from recycled / treated waste water.
- 17) Wherever the NOC is for abstraction of saline water and the existing wells (s) is /are yielding fresh water, the same shall be sealed and new tubewell(s) tapping saline water zone shall be constructed within 3 months of the issuance of NOC. The firm shall also ensure safe disposal of saline residue, if any.
- 18) Unexpected variations in inflow of ground water into the mine pit, if any, shall be reported to the concerned Regional Director, Central Ground Water Board.
- 19) In case of violation of any NOC conditions, the applicant shall be liable to pay the penalties as per Section 16 of Guidelines.
- 20) This NOC does not absolve the proponents of their obligation / requirement to obtain other statutory and administrative clearances from appropriate authorities.
- 21) The issue of this NOC does not imply that other statutory / administrative clearances shall be granted to the project by the concerned authorities. Such authorities would consider the project on merits and take decisions independently of the NOC.
- 22) In case of change of ownership, new owner of the industry will have to apply for incorporation of necessary changes in the No Objection Certificate with documentary proof within 60 days of taking over possession of the premises.
- 23) This NOC is being issued without any prejudice to the directions of the Hon'ble NGT/court orders in cases related to ground water or any other related matters.
- 24) Proponents, who have installed/constructed artificial recharge structures in compliance of the NOC granted to them previously and have availed rebate of upto 50% (fifty percent) in the ground water abstraction charges/ground water restoration charges, shall continue to regularly maintain artificial recharge structures.
- 25) Industries which are likely to cause ground water pollution e.g. Tanning, Slaughter Houses, Dye, Chemical/ Petrochemical, Coal washeries, pharmaceutical, other hazardous units etc. (as per CPCE list) need to undertake necessary well head protection measures to ensure prevention of ground water pollution as per Annexure III of the guidelines.
- 26) In case of new infrastructure projects having ground water abstraction of more than 20 m³/day, the firm/entity shall ensure implementation of dual water supply system in the projects.
- 27) In case of infrastructure projects, paved/parking area must be covered with interlocking/perforated tiles or other suitable measures to ensure groundwater infiltration/harvesting.
- 28) In case of coal and other base metal mining projects, the project proponent shall use the advance dewatering technology (by construction of series of dewatering abstraction structures) to avoid contamination of surface water.
- 29) The NOC issued is conditional subject to the conditions mentioned in the Public notice dated 27.01.2021 failing which penalty/EC/cancellation of NOC shall be imposed as the case may be.
- 30) This NOC is issued subject to the clearance of Expert Appraisal Committee (EAC) (if applicable).
- 31) In the self-compliance report, the PP shall submit details of Drilling Agency/ Agencies, which has/ have constructed BW(s)/ TW(s) along with undertaking to the effect that all necessary measures have been taken as per directions of Hon'ble Supreme Court provided in Annexure-VII of guidelines dated 24.09.2020 in respect of abandoned/ failed BW(s)/ TW(s)/Piezometer(s), if any. The PP is advised to engage registered drilling agency/ agencies. In the event of any mishap/ unfortunate incident due to negligence in taking measures for prevention of accident due to falling in Bore Well, both PP and concerned drilling agency shall jointly be held responsible and penal action as per extant Government rules shall be taken.

(Non-compliance of the conditions mentioned above is likely to result in the cancellation of NOC and legal action against the proponent.)

CENTRAL GROUND WATER AUTHORITY

Department of Water Resources, River Development and Ganga Rejuvenation
Ministry of Jal Shakti, Govt. of India

18/11, जामनगर हाउस, मानसिंह रोड, नई दिल्ली - 110011 / 18/11, Jamnagar House, Mansingh Road, New Delhi-110011

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Website: cgwa-noc.gov.in

पानी बचाये - जीवन बचाये
SAVE WATER - SAVE LIFE

Receipt

(As per the guideline Gazette Notification S.O. 3281(E) regarding the New Guidelines dated 24.09.2020 of CGWA, MoJS, Govt. of India)
<https://cgwa-noc.gov.in>

Application No.:	21-4/1456/OR/MIN/2017	Date of Issuance:	04/04/2024
Name of Firm:	OSTAPAL CHROMITE MINES		
AppType Category:	Chromite		
Application Type:	Mining		
PAN/GSTIN No. of Firm/Individual:	/		

S N	Description	Amount (Rs.)
1.	Application Processing Fee	5000.00
2.	Ground Water Abstraction /Restoration charges	7764750.00
3.	Environmental Compensation Charges (ECRGW) (Date From to) Days-	
4.	Penalty for non-Compliance of NOC conditions Condition to be mentioned	20000.00
Rs. Rupees Seventy Seven Lakh Eighty Nine Thousand Seven Hundred Fifty Only		7789750.00

This is an system generated invoice, hence, does not require ink signed.

CSR REPORT – OSTAPAL CHROMITE MINES**FY 2023-24**

At FACOR we strongly believe in the Socio-Economic development of our community through structured CSR interventions. Community Development and sustainability are at the core of everything we do. We have a robust mechanism in place to execute our community development programs for the benefit of the community at large. Our CSR programmes are aligned to Sustainable Development Goals and our vision of “Empowering communities, transforming lives and facilitating nation building through sustainable and inclusive growth.”

Spent Details of CSR activities in Ostapal Chromite Mines:

Welfare and socio-economic development programs for local communities	Details of Expenditure & Work done during Reporting Year FY 2023-24 (in Rs.)	No. of Beneficiaries	
Support for Drinking Water & Agriculture			Annexure 1
Water storage tanks, drinking water supply facility & irrigation support to agriculture	28,00,071	1550	
Support to Health & Medical Services			Annexure 2
Preventive measures for mitigation of mine related health problems	10,36,954	9617	
Promotion of Hygiene and Sanitation, public health initiatives	3,93,753	26875	
Support to Skill development & Education			Annexure 3
Skill development & Vocational Training programs for local communities	1,47,295	40	
Promotion of Literacy & Education	17,87,899	652	
Social & Livelihood Support			Annexure 4

Support to social, cultural, recreational activities	9,85,286	400	
Livelihood & Socio-Economic standard improvement support	11,81,743	200	
Support to Transportation Services & Infrastructure			Annexure 5
Improvement of Road connectivity and public transport and other infrastructure facilities	29,99,788	1666	
Total Expenses	1,13,32,788		

Annexure 1

1. FACOR Sathi Nirmal Paribesha

FACOR Sathi Nirmal Paribesha was initiated to provide essential water infrastructure and support to the villages in need. Some of the major works done under this project are:

- (1) Construction of **Ostapal water Pipeline.**
- (2) Installation of **04 Solar water** tower at different villages near Ostapal
- (3) Installation of **02 RO water purifiers** at different schools.

At the same time FACOR is also assisting in the repair of nearby handpumps time to time as per the requirement.






 Date: 22/07/2024

To,

CEO/Principal,

School

Odisha - 751002

Subject: Requesting of 01 No. water purifier for the Primary School, Kallipani

Dear Sir/Madam,

Our school has in dire need of a 01 No. Water Purifier for ensuring safe drinking water for the children in school. I would like to request the authority for providing 01 No. Water purifier to school for clean water. A total of 100 students will be benefited by your support under the School Water Initiative.

Thanking you,

School Name: Govt. P. School, Kallipani
 Name of Headmaster: Pradyumn
 Contact No: 9876543210
 Number of students: 100
 Gram Panchayat: Kallipani



To,
CEO FACOM,
Bhadrak
Talukha, 758105

Date: 08/08/2024

Subject: Requesting of 01 RO water purifier to the Govt. U.P. School, Kariya

Dear Sir/Ma'am,

Our school was in dire need of a 01 RO Water Purifier for ensuring safe drinking water for the children in school. I would like to express my gratitude for providing 01 RO Water purifier in school for clean water. A total of 177 students will be benefitted by your support under the Mission School initiative.

Thanking you,

School Name: Govt. U.P. School, Kariya
 Name of Headmaster: Nalika Bhat
 Contact No: 9557822344
 Number of students: 177
 Gram Panchayat: Kariya

Public Information
Shakti RUP School
Bhadrak

To,
CEO FACOM,
Bhadrak
Talukha, 758105

Date: 08/08/2024

Subject: Requesting of 01 RO water purifier to the Govt. PUP School, Sankarag

Dear Sir/Ma'am,

Our school was in dire need of a 01 RO Water Purifier for ensuring safe drinking water for the children in school. I would like to express my gratitude for providing 01 RO Water purifier in school for clean water. A total of 177 students will be benefitted by your support under the Mission School initiative.

Thanking you,

School Name: Govt. PUP School, Sankarag
 Name of Headmaster: Ravi Kumar Nayak
 Contact No: 9555782234
 Number of students: 177
 Gram Panchayat: Kariya

POWERSHARE ORDER CONFIRMATION

Page: 1 of 1

After Receipt, we advise, we reserve the right to reject the material.

YOU shall also receive regular bills confirming acceptance of material in stores and service points, from which you can raise the details appropriately.

Requested to follow the above provisions and co-operate for proper functioning of MIS and CRM systems and for smooth processing of bills, from now onwards.

Please supply the under mentioned materials / services subject to the prices, terms and conditions mentioned below, "General Terms and Conditions" and "Applicable Standard Terms and Conditions".

Sl. No.	Item Code	Plant / Qty	Rate	Total
1	RO Water Purifier	01	1,000	1,000.00
2	RO Water Purifier	01	1,000	1,000.00
3	RO Water Purifier	01	1,000	1,000.00
4	RO Water Purifier	01	1,000	1,000.00
5	RO Water Purifier	01	1,000	1,000.00
6	RO Water Purifier	01	1,000	1,000.00
7	RO Water Purifier	01	1,000	1,000.00
8	RO Water Purifier	01	1,000	1,000.00
9	RO Water Purifier	01	1,000	1,000.00
10	RO Water Purifier	01	1,000	1,000.00
11	RO Water Purifier	01	1,000	1,000.00
12	RO Water Purifier	01	1,000	1,000.00
13	RO Water Purifier	01	1,000	1,000.00
14	RO Water Purifier	01	1,000	1,000.00
15	RO Water Purifier	01	1,000	1,000.00
16	RO Water Purifier	01	1,000	1,000.00
17	RO Water Purifier	01	1,000	1,000.00
18	RO Water Purifier	01	1,000	1,000.00
19	RO Water Purifier	01	1,000	1,000.00
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77	RO Water Purifier	01	1,000	1,000.00
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79	RO Water Purifier	01	1,000	1,000.00
80	RO Water Purifier	01	1,000	1,000.00
81	RO Water Purifier	01	1,000	1,000.00
82	RO Water Purifier	01	1,000	1,000.00
83	RO Water Purifier	01	1,000	1,000.00
84	RO Water Purifier	01	1,000	1,000.00
85	RO Water Purifier	01	1,000	1,000.00
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87	RO Water Purifier	01	1,000	1,000.00
88	RO Water Purifier	01	1,000	1,000.00
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192	RO Water Purifier	01	1,000	1,000.00
193	RO Water Purifier	01	1,000	1,000.00
194	RO Water Purifier	01	1,000	1,000.00
195	RO Water Purifier	01	1,000	1,000.00
196	RO Water Purifier	01		

PURCHASE ORDER - CONFIRMATION					Page : 1 of 04
PO NO : 0701070401					
<p>CCC has shall also receive periodic mails confirming acceptance of material in stores and service posting, from which you can view the details appropriately.</p> <p>Requested to follow the above procedures and co-operate for proper functioning of CRM and VMS system and for smooth processing of Bills, from now onwards.</p> <p>Please supply the order mentioned materials / services subject to the prices, terms and conditions mentioned below, "General Terms and Conditions" and "Applicable Standard terms and conditions".</p>					
Sl. Item code	Plant / CM	Req. Qty	Rate	Value	
No. Specification					
1. 0000043	CCM - MCB	10.000	4,100.00	41,000.00	
WIRE MESH FOR WIRE MESHING		(IN Integrated MCB(10.000)		11,420.00	
MCR Code : 0000000					
2. 0000047	CCM - MCB	20.000	1,400.00	28,000.00	
ELECTRICITY METER WITH METER, CABLE		(IN Integrated MCB(20.000)		5,600.00	
MCR Code : 0000000					
3. 0000104	CCM - MCB	0.000	97,470.00	0.00	
WATER PURIFIER		(IN Integrated MCB(0.000)		1,00,000.00	
MCR Code : 0000000					
Total PO Value				70,000.00	
<p>Price Basis : FOB - Free on Board</p> <p>WARRANTY PERIOD (YR. MONTH YEAR)</p> <p>Comments :</p> <p>Shipping Instructions :</p> <p>Payment mode : Demand Draft</p> <p>Payment terms : 30 Days Credit</p> <p>WARRANTY TO START FROM THE DATE OF DELIVERY.</p>					
<p>1) In our endeavor to support and serve environment, we have now gone paperless. For which we have introduced Vendor Service Management system (VMS). For this you have to</p>					

Annexure 2

2. SUPPORT FOR HEALTH AND MEDICAL FACILITIES

(1) Preventive measure to mitigate mineral related problems

(a) Health Camps: FACOR organised **102 Health camps** through its Mobile Health Unit, reaching out to **over 6234 community members** with special focus on women and children near Ostapal mines. The health camps provided primary health check-ups, free doctor consultations along with distribution of free medicines.



(b) Awareness sessions: FACOR CSR team is dedicated to disseminating knowledge about Govt health schemes, preventive and curative health measures to community members through awareness sessions. Our team has conducted sessions on Dengue, Malaria, Tuberculosis, and other disease to spread awareness among the commoners to bring them closer to government health schemes. At the same time FACOR also conducted awareness sessions on Menstrual Hygiene Management and Family Planning as well.



Annexure 3

3. Support to Skill Development & Education

(1) Skill development and vocational training programme to local community:

Jivika Centre (Tailoring Training Unit): FACOR has provided tailoring training to **40 women** from the community and gave them certificate along with Jivika kits. This helped women to get new skills and earn their livelihood to support their families.



and TDR systems and for smooth processing of Bills, from now onwards.

Please supply the under mentioned materials / services subject to the prices, terms and conditions mentioned below, "General Terms and Conditions" and "Applicable Standard terms and conditions":

No.	Item code	Plant / TOR	Qty	Rate	Value
1	FACOR EXTRA PRAGATI	CCPL	1.000	3,379,134.73	3,379,134.73
2	Human Improvement	LS	1.000	3,414,418.00	3,414,418.00

DESCRIPTION

Item: 2 Project to improve overall quality of life of community members by multiple interventions in thematic areas of women empowerment and agriculture in nearby operational areas of FACOR.

Objectives:

- To provide skilling support to 120 women members in tailoring training in FY 2023-24.
- To assist 200 farmers for promotion of Kheti-gardha farming in FY 2023-24.
- To promote & strengthen the existing 10 micro-enterprises in nearby operational areas.
- To support 10 micro-enterprises and local businesses of MSME in FY 2023-24.
- To support local handloom of the community for promotion of

FACOR Sathi Shiksha Amrut Pariyojna: This is the major project of FACOR aimed to promote quality education among school children by supporting their education and providing them necessary resources required for their education and overall development. Some of the major works done under this project include:

-
- A photograph of a classroom or workshop. The walls are decorated with colorful, vertical strips of paper. There are two blackboards in the background. A long table is in the foreground, and a shelf with various items is on the left.

PURCHASE ORDER CONFIRMATION

PO NO. : 00000000

Page : 1 of 01

III) You shall also receive regular calls confirming acceptance of material (a, b, c, d, e, f, g, h, i, j, k, l, m, n, o, p, q, r, s, t, u, v, w, x, y, z, aa, ab, ac, ad, ae, af, ag, ah, ai, aj, ak, al, am, an, ao, ap, aq, ar, as, at, au, av, aw, ax, ay, az, ba, bb, bc, bd, be, bf, bg, bh, bi, bj, bk, bl, bm, bn, bo, bp, bq, br, bs, bt, bu, bv, bw, bx, by, bz, ca, cb, cc, cd, ce, cf, cg, ch, ci, cj, ck, cl, cm, cn, co, cp, cq, cr, cs, ct, cu, cv, cw, cx, cy, cz, da, db, dc, dd, de, df, dg, dh, di, dj, dk, dl, dm, dn, do, dp, dq, dr, ds, dt, du, dv, dw, dx, dy, dz, ea, eb, ec, ed, ee, ef, eg, eh, ei, ej, ek, el, em, en, eo, ep, eq, er, es, et, eu, ev, ew, ex, ey, ez, fa, fb, fc, fd, fe, ff, fg, fh, fi, fj, fk, fl, fm, fn, fo, fp, fq, fr, fs, ft, fu, fv, fw, fx, fy, fz, ga, gb, gc, gd, ge, gf, gg, gh, gi, gj, gk, gl, gm, gn, go, gp, gq, gr, gs, gt, gu, gv, gw, gx, gy, gz, ha, hb, hc, hd, he, hf, hg, hh, hi, hj, hk, hl, hm, hn, ho, hp, hq, hr, hs, ht, hu, hv, hw, hx, hy, hz, ia, ib, ic, id, ie, if, ig, ih, ii, ij, ik, il, im, in, io, ip, iq, ir, is, it, iu, iv, iw, ix, iy, iz, ja, jb, jc, jd, je, jf, jg, jh, ji, jj, jk, jl, jm, jn, jo, jp, jq, jr, js, jt, ju, jv, jw, jx, jy, jz, ka, kb, kc, kd, ke, kf, kg, kh, ki, kj, kk, kl, km, kn, ko, kp, kq, kr, ks, kt, ku, kv, kw, kx, ky, kz, la, lb, lc, ld, le, lf, lg, lh, li, lj, lk, ll, lm, ln, lo, lp, lq, lr, ls, lt, lu, lv, lw, lx, ly, lz, ma, mb, mc, md, me, mf, mg, mh, mi, mj, mk, ml, mm, mn, mo, mp, mq, mr, ms, mt, mu, mv, mw, mx, my, mz, na, nb, nc, nd, ne, nf, ng, nh, ni, nj, nk, nl, nm, nn, no, np, nq, nr, ns, nt, nu, nv, nw, nx, ny, nz, oa, ob, oc, od, oe, of, og, oh, oi, oj, ok, ol, om, on, oo, op, oq, or, os, ot, ou, ov, ow, ox, oy, oz, pa, pb, pc, pd, pe, pf, pg, ph, pi, pj, pk, pl, pm, pn, po, pp, pq, pr, ps, pt, pu, pv, pw, px, py, pz, qa, qb, qc, qd, qe, qf, qg, qh, qi, qj, qk, ql, qm, qn, qo, qp, qq, qr, qs, qt, qu, qv, qw, qx, qy, qz, ra, rb, rc, rd, re, rf, rg, rh, ri, rj, rk, rl, rm, rn, ro, rp, rq, rr, rs, rt, ru, rv, rw, rx, ry, rz, sa, sb, sc, sd, se, sf, sg, sh, si, sj, sk, sl, sm, sn, so, sp, sq, sr, ss, st, su, sv, sw, sx, sy, sz, ta, tb, tc, td, te, tf, tg, th, ti, tj, tk, tl, tm, tn, to, tp, tq, tr, ts, tt, tu, tv, tw, tx, ty, tz, ua, ub, uc, ud, ue, uf, ug, uh, ui, uj, uk, ul, um, un, uo, up, uq, ur, us, ut, uu, uv, uw, ux, uy, uz, va, vb, vc, vd, ve, vf, vg, vh, vi, vj, vk, vl, vm, vn, vo, vp, vq, vr, vs, vt, vu, vv, vw, vx, vy, vz, wa, wb, wc, wd, we, wf, wg, wh, wi, wj, wk, wl, wm, wn, wo, wp, wq, wr, ws, wt, wu, wv, ww, wx, wy, wz, xa, xb, xc, xd, xe, xf, xg, xh, xi, xj, xk, xl, xm, xn, xo, xp, xq, xr, xs, xt, xu, xv, xw, xx, xy, xz, ya, yb, yc, yd, ye, yf, yg, yh, yi, yj, yk, yl, ym, yn, yo, yp, yq, yr, ys, yt, yu, yv, yw, yx, yy, yz, za, zb, zc, zd, ze, zf, zg, zh, zi, zj, zk, zl, zm, zn, zo, zp, zq, zr, zs, zt, zu, zv, zw, zx, zy, zz).

Agreed to follow the above procedures and co-operate for proper functioning of ERP and CRM systems and for smooth processing of Bills, from now onwards.

Please supply the order mentioned materials / services subject to the prices, terms and conditions mentioned below, "General Terms and Conditions" and "Applicable Standard terms and conditions".

Sl. Item code	Plant	Item	Qty	Rate	Value
By Specification					
1. 00000000	0000	0000	1.000	\$,000.00	00,000.00
0-00000 00000000 0000 0000 ERP Code : 00000000			00	(Integrated ERP) \$,000.00	00,000.00
Item is A / B / C / D / E / F / G / H / I / J / K / L / M / N / O / P / Q / R / S / T / U / V / W / X / Y / Z / AA / BB / CC / DD / EE / FF / GG / HH / II / JJ / KK / LL / MM / NN / OO / PP / QQ / RR / SS / TT / UU / VV / WW / XX / YY / ZZ					
00000000	0000	000000			
Total B1 Value					00,000.00

Price Basis : 000 - Free on Road
000 000 0000 0000 0000

Incoterms :

Shipping Instruction : In the scope of the master

- Sensitivity: Internal (C3)



Requested to follow the above procedures and co-operate for proper functioning of OMR and VRS systems and for smooth processing of Billa, from now onwards.

Please supply the under mentioned materials / services subject to the prices, terms and conditions mentioned below, "General Terms and Conditions" and "Applicable standard terms and conditions".

No.	Item code	Plant Code	Req. Qty	Rate	Value
Mr. Application					
1	Project Education and Hygiene Management services	0000	01	1,740,851.00	1,740,851.00
2	Protection security services	00	0.000	1,876,820.00	1,876,820.00
3	Protection Project Hygiene management	00	0.000	180,000.00	180,000.00
4	Construction cost	00	0.000	88,831.00	88,831.00

Goal: To improve quality of education among children and create awareness on Hygiene Management in OMR operations areas.

1. To improve access to quality education for the students by supporting to schools functioning in the mine area PT 0000-04.
2. To run essential coaching classes in 05 villages in PT 0000-04.
3. To provide the support to 05 schools.
4. To work with the stakeholders for the promotion of OMR processes.

Annexure 4

4. Social & Livelihood Support

(1) Support to Social, Cultural, Recreational activities

Gram Chaupal and Community Shed: Considering promotion of local culture, FACOR constructed 05 Gram Chaupal and 01 community shed within villages in mines areas along with paintings on general awareness and government programs to awareness generation. These platforms will also serve as local points for community programs and trainings.



Please supply the other mentioned materials / services subject to the prices, terms and conditions mentioned below, "General Terms and Conditions" and "Applicable Standard Terms and Conditions".

[illegible]

(2) Livelihood & Socio-economic Standard Improvement Support

(i) Chappal production and Masala Production unit: FACOR established and supporting Chappal Unit and Masala Production Unit for SHG group in Kansa and Kaliapani GP respectively. The initiative includes support to SHG women with Chappal making raw materials, packaging support, machine maintenance support and training and marketing support. The initiative aims at encouraging our community women to become self-sustained and empowered.



(ii) FACOR-CSR SHG Sammelan: FACOR organized 02 days CSR-SHG Sammelan at Ostapal, Sukinda, Odisha highlighting **13 local SHG** of this region. These 2 days event served as a vibrant platform, showcasing the entrepreneurship skills of SHG women and their pivotal role in bolstering the local economy. This event helped the SHG women to showcase their talent and products in front of large audience broadening their customer reach.



(iii) Support to SHG Groups: FACOR supported **03 existing micro-enterprises** near Ostapal mines benefiting **30 women**. The SHG women of these micro-enterprises were provided training, essential support scaling up production to become self-sustainable.



(iv) Community events: FACOR organized 02 community events for local SHG groups near Ostapal mines. These events aimed to offer vital skill training and knowledge sharing platform to women engaged in different SHGs. The topic covers financial education, leadership enhancement and entrepreneurship skills. At the end of events, a cultural exchange program was organized where members of SHGs celebrated their diversity, through local music, dance, and food.



(v) **HARYALI Project:** FACOR has provided training for nutri garden farming along with Nutri-Garden kits (which includes 14 types of seeds and vermicompost) to **70 women** at the mines location. This initiative is dedicated to promote women farmers of the community and empowering them in this field for earning their livelihood and making them self-independent.



Annexure 5

5. Support to Transportation Services & Infrastructure

(1) **Village Illumination:** To promote safety, and improve quality of life of community people, FACOR installed solar **50 solar streetlights** within internal pockets of villages near mines. Moreover, this initiative promotes use of sustainable sources of energy to move towards reducing carbon emission in the environment.



PURCHASE ORDER CONFIRMATION

PO NO : 430000240 Page : 3 of 30

(iii) You shall also receive regular mails confirming acceptance of material in stores and Service posting, from which you can view the details appropriately.

Requested to follow the above procedures and co-operate for proper functioning of HRM and VSM systems and for smooth processing of bills, from now onwards.

Please supply the under mentioned materials / services subject to the prices, terms and conditions mentioned below, "General Terms and Conditions" and "Applicable Standard terms and conditions".

Sl. Item code	Plant / CM	Req. Qty	Rate	Value
As Specified/Item				
1. CM Civil services of govt school (Ostapal)	HRM - 00	1.000	802,100.00	802,100.00
Itemized				
1. CM related civil services	00	1.000	802,100.00	802,100.00
HRM/CM Code :				
				CM - Central HRM/CM: 81,100.00
				CM - State HRM/CM: 81,100.00
Line no 001 and 002 has been entered/removed from HRM System. Amount is: Amount is:				
01 00000 000 000000				
Total PO Value				1,604,200.00

Order Basis : ☐ B/B - As Rate
☐ B/B - As Quantity
☐ B/B - As Quantity and Rate

Insurance : ☐ Yes ☐ No

Shipping Instructions : ☐ As per Order ☐ As per Invoice

Payment mode : ☐ Demand Draft ☐ Bank Transfer

Payment terms : ☐ 15 Days Credit ☐ 30 Days Credit

(3) In our endeavor to support and save environment, we have now gone paperless. For which we have introduced Vendor Invoice Management system (VIMS). For this you have to

(3) Construction of Ostapal SHG Centre: FACOR constructed SHG centre at Gurujanga village near Ostapal mines to support the community women. It will serve as a space for SHG women's day to day work, meetings, and business plannings to grow.



III) You shall also receive regular mails confirming acceptance of material in stores and invoice posting, from which you can view the details appropriately.

Requested to follow the above procedures and cooperate for proper functioning of SRM and VCM systems and for smooth processing of Bills, from now onwards.

Please supply the under mentioned materials / services subject to the prices, terms and conditions mentioned below, "General Terms and Conditions" and "Applicable Standard terms and conditions".

Sl. Item code	Plant / CM	Req. Qty	Rate	Value
Sl. Specification				
1	Construction of SRM Centre in Gurusajga	1.000	1,300,000.74	1,300,000.74
2	CM related civil services	1.000	1,300,000.74	1,300,000.74
			SR - Central (SRV-004)	127,000.17
			SR - State (SRV-005)	127,000.17
TERMS AND CONDITIONS				
1. Payment after 60th work completion and submission of invoice on the 10th day.				
2. Work should be started on an immediate basis and should be completed within 2 months from the date of receipt of PO.				
3. 10% EMD : 1.0% of the total order value per each of delay or part thereof subject to maximum of 1% of total order value.				
SRM/SC Code :				
Order no. / PO order Head Head (year) period Interval Order SRM Element Network no. Street no.				
PO : 482048 / 24			Total PO Value	
			1,300,000.74	

Project Name : SRM - SR SRM
Near Ostapal Bazaar, FACOR
Department :

- (4) Ostapal School Playground:** For the promotion of sports and extra co-curricular activities FACOR has set up school playground at Ostapal School by installing swings, sliders, and see-saw.



Please supply the under mentioned materials / services subject to the prices, terms and conditions mentioned below, "General Terms and Conditions" and "Applicable Standard terms and conditions".				
Sl. Item code	Plant / CM	Req. Qty	Rate	Value
Sl. Specification				
1	Supply of SRM Centre	1.000	1,300,000.74	1,300,000.74
TERMS AND CONDITIONS				
1. Payment after 60th work completion and submission of invoice on the 10th day.				
2. Work should be started on an immediate basis and should be completed within 2 months from the date of receipt of PO.				
3. 10% EMD : 1.0% of the total order value per each of delay or part thereof subject to maximum of 1% of total order value.				
SRM/SC Code :				
Order no. / PO order Head Head (year) period Interval Order SRM Element Network no. Street no.				
PO : 482048 / 24			Total PO Value	
			1,300,000.74	

OCM/ENV/1447/2024

Annexure 10

Date: 28.05.2024

To,
The Joint Director(s)
Ministry of Environment, Forest & Climate Change,
Eastern Regional Office,
Bhubaneswar

Sub.: Submission of Audited Statement connection with EC Condition no. -10, 11 & 12 of Ostapal Chromite Mines of M/s FACOR LTD.

Ref.: (I) EC Identification No. EC22800120821, Dated: 04.04.2022
(II) Submitted Six Monthly Compliance Report Vide Letter No.
OCM/ENV/2172/2023, Dated 28.11.2023

Respected Sir,

With reference to the captioned subject & cited reference, we are herewith submitting audit statement pertaining to Expenses towards CER & revised expenses amount towards EMP and Expenses towards Occupational Health, FY 2023-24 in respect of Ostapal Chromite Mine of M/s FACOR LTD.

This is for your Kind consideration, Please.

Thanking You
Yours faithfully,

For Ferro Alloys Corporation LTD



Head Environment
Ostapal Chromite Mine

Encl.: A/a

M/s. Ferro Alloys Corporation Ltd. (A subsidiary of Vedanta Ltd.)

Registered Office:

D.P.Nagar, PO : Randia, Dist. : Bhadrak, Odisha, India - 756 135

T +91-6784 240820/240847, Email: facor.mines@vedanta.co.in / facor.ccp@vedanta.co.in

Website: www.facorgroup.in, CIN: U45201OR1955PLC008400



TO WHOM SO EVER IT MAY CONCERN

Sl No.	Particulars	Amount in (INR)
1	Environment Management Expenses	1,32,67,560
2	Occupational Health & Safety	16,27,459
3	Corporate Environment Responsibility	1,13,32,788
	Total	2,62,27,807

Spandych



Plot No N3/289, IRC Village, Bhubaneswar-751015, Odisha
Ph: +91- 8270367253
• Email: satyajeetpanigrahi@vsc.co.in • Website : www.vsc.co.in
(Registered under the Limited Liability Partnership Act, 2008 on Conversion from
Vineel Sengupta & Co. w.e.f. 04.07.2019 with LLPIN : AAP-7985)

Annexure -8

ENVIRONMENTAL MANAGEMENT EXPENSES FOR THE FY 2023-24 OSTAPAL CHROMITE MINE,M/s FACOR LTD			
Sl. No.	I T E M	(in Rupees ₹)	REMARKS
1	AFFORESTATION FY 2023-24		
I	Inside Mines 2770 Nos. planted for 2023-24		
a)	Seedlings /Sapling	99,000	Annexure No.-1
b)	Fertilizer	23,422	
c)	Digging of Pits/Planting (Laborcost)	115,192	
d)	Post Plantation care(Watering, Weeding, basin making etc.)	665,280	
e)	Supervising	221,760	
	Sub-Total	1,124,654	
II.	Outside Mine for Community Plantation		
a)	2150 Nos.Fruit Bearing distributed & Planted	121,700	Annexure No.-2
	(A) Total	1,246,354	
2	WATER MANAGEMENT & TREATMENT		
a)	ETP Operation (Manpower engaged)	1,817,820	Annexure No.-3
b)	ETP CMC For water quality monitoring	356,250	Annexure No.-4
c)	Cost of Chemical (ETP)	671,618	Annexure No.-5
e)	Sludge disposal	214,905	Annexure No.-6
f)	Water sample analysis	126,496	Annexure No.-7
g)	Ground water level & quantity Monitoring	43,798	Annexure No.-8
h)	Scientific Study through IIMT, Bhubanesewar for Hexavalent Reduction	401,850	Annexure No.-9
	(B)Sub-Total	3,632,737	
3	AIR MONITORING & DUST SUPPRESSION		
a)	CMC for Air Qaulity Monitoring	347,420	Annexure No.-10
b)	Water spraying at dust generating points by water tanker 2921 No. trip	4,493,850	Annexure No.-11
c)	Air monitoring charges	1,027,563	Annexure No.-7
d)	Digital Display Board for Public Information	3,987	Annexure No.-12
	(C) Sub-Total	5,872,820	
4	NOISE MONITORING (D)	9,368	Annexure No.-7
5	USED OIL ANALYSIS (E)	14,379	Annexure No.-7
6	SOILCONSERVATION & MONITORING		
a)	Soil Analysis	21,144	Annexure No.-7
b)	Used of Geotextile	1081000	Annexure No.-13
c)	Grass Seeds	330000	Annexure No.-14
d)	Silpauline	544320	Annexure No.-15
e)	Retaining wall 73 mtrs construction	294448	Annexure No.-16
	(F) Sub-Total	2,270,912	
7	Awareness programme Conducted		
a)	MEMC & Safety Week celebration	221,023	Annexure No.-17
	(G)Sub-Total	221,023	
	Grand Total	13,267,593	



Head Environment- Mines

M/s FACOR LTD

OCM/ENV/ 447/2024

Date: 28.05.2024

To,
The Joint Director(s)
Ministry of Environment, Forest & Climate Change,
Eastern Regional Office,
Bhubaneswar

Sub.: Submission of Audited Statement connection with EC Condition no. -10, 11 & 12 of Ostapal Chromite Mines of M/s FACOR LTD.

Ref.: (I) EC Identification No. EC22800120821, Dated: 04.04.2022
(II) Submitted Six Monthly Compliance Report Vide Letter No.
OCM/ENV/2172/2023, Dated 28.11.2023

Respected Sir,

With reference to the captioned subject & cited reference, we are herewith submitting audit statement pertaining to Expenses towards CER & revised expenses amount towards EMP and Expenses towards Occupational Health, FY 2023-24 in respect of Ostapal Chromite Mine of M/s FACOR LTD.

This is for your Kind consideration, Please.

Thanking You
Yours faithfully,

For Ferro Alloys Corporation LTD



Head Environment
Ostapal Chromite Mine

Encl.: A/a

M/s. Ferro Alloys Corporation Ltd. (A subsidiary of Vedanta Ltd.)

Registered Office:

D.P.Nagar, PO : Randia, Dist. : Bhadrak, Odisha, India - 756 135

T +91-6784 240320/240347, Email: facor.mines@vedanta.co.in / facor.ccp@vedanta.co.in

Website: www.facorgroup.in, CIN: U45201OR1955PLC008400



TO WHOM SO EVER IT MAY CONCERN

Sl No.	Particulars	Amount in (INR)
1	Environment Management Expenses	1,32,67,560
2	Occupational Health & Safety	16,27,459
3	Corporate Environment Responsibility	1,13,32,788
	Total	2,62,27,807

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(Registered under the Limited Liability Partnership Act, 2008 on Conversion from
Vineet Singh & Co. w.e.f. 04.07.2019 with LLPIN : AAP-7985

OCM/ENV/142/2024

Date: 16.01.2024

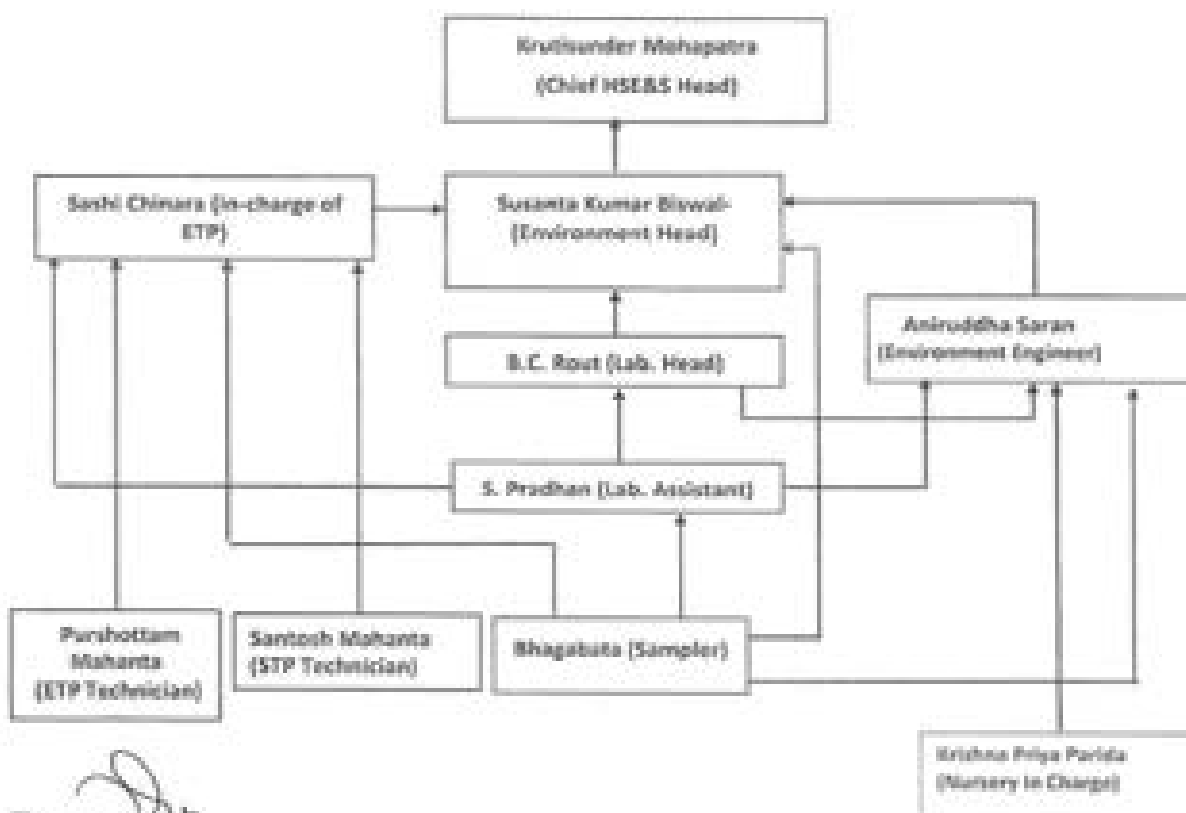
To,
Member Secretary,
SEIAA, Bhubaneswar

SUB : Submission of the details of Updated Environmental Management Cell comprises of person having Qualification & Experience in field of Environment of Ostapal Chromite Mine, M/s FACOR Ltd

Respected Sir,

We respect to above cited subject mentioned above, we would like to intimate your good office about the updated details and organisational chart of Environment Management Cell of Ostapal Chromite Mine M/s FACOR Ltd

The details of the Organizational Chart of mentioned Below with details



[Signature]
16.01.2024
[FACOR] (FACOR)
Head Environment
Ostapal Chromite Mines

M/s. Ferro Alloys Corporation Ltd. (A subsidiary of Vedanta Ltd.)

Registered Office:-

D.P.Nagar, PO : Randia, Dist.: Bhadrak, Odisha, India - 756 135

T +91-6784 240320/240347, Email: facor.mines@vedanta.co.in / facor.ccp@vedanta.co.in

Website: www.facorgroup.in, CIN: U45201OR1995PLC008400.

EXPENSES TOWARDS OCCUPATIONAL HEALTH & SAFETY
FOR THE YEAR 2023-24
OSTAPAL CHROMITE MINE, M/S FACOR LTD

SI No	Months	EXPENSES (in Rs)		
		Manpower in Mines	Medicine in Mines	Total Cost
1	April'23	164869.00	7492.00	172492.00
2	May'23	164869.00	7709.00	172709.00
3	June'23	164869.00	6065.00	345201.00
4	July'23	164869.00	18592.00	183592.00
5	Aug'23	164869.00	12694.00	177694.00
6	Sep'23	164869.00	16104.00	181104.00
7	Oct'23	164869.00	9130.00	174130.00
8	Nov'23	190000.00	0.00	140000.00
9	Dec'23	190000.00	22105.00	162105.00
10	Jan'24	190000.00	10980.00	202980.00
11	Feb'24	190000.00	21854.00	213854.00
12	Mar'24	190000.00	15500.00	192000.00
Total: -		2011000.00	132725.00	1627459.00



In Charge (Health & Safety)
Ostapal Chromite Mine
M/s FACOR LTD

OCM/ENV/1447/2024

Date: 28.05.2024

To,
The Joint Director(s)
Ministry of Environment, Forest & Climate Change,
Eastern Regional Office,
Bhubaneswar

Sub.: Submission of Audited Statement connection with EC Condition no. -10, 11 & 12 of Ostapal Chromite Mines of M/s FACOR LTD.

Ref.: (I) EC Identification No. EC22800120821, Dated: 04.04.2022
(II) Submitted Six Monthly Compliance Report Vide Letter No.
OCM/ENV/2172/2023, Dated 28.11.2023

Respected Sir,

With reference to the captioned subject & cited reference, we are herewith submitting audit statement pertaining to Expenses towards CER & revised expenses amount towards EMP and Expenses towards Occupational Health, FY 2023-24 in respect of Ostapal Chromite Mine of M/s FACOR LTD.

This is for your Kind consideration, Please.

Thanking You
Yours faithfully,

For Ferro Alloys Corporation LTD



Head Environment
Ostapal Chromite Mine

Encl.: A/a

M/s. Ferro Alloys Corporation Ltd. (A subsidiary of Vedanta Ltd.)

Registered Office:

D.P.Nagar, PO : Randia, Dist. : Bhadrak, Odisha, India - 756 135

T +91-6784 240820/240847, Email: facor.mines@vedanta.co.in / facor.ccp@vedanta.co.in

Website: www.facorgroup.in, CIN: U45201OR1955PLC008400



TO WHOM SO EVER IT MAY CONCERN

Sl No.	Particulars	Amount in (INR)
1	Environment Management Expenses	1,32,67,560
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Spandych



(Registered under the Limited Liability Partnership Act, 2008 on Conversion from
Vineet Singh & Co. w.e.f. 04.07.2019 with LLPIN : AAP-7985

OCM/ENV/ 865 /2022

Date: 16.04.2022

To
The Member Secretary,
SEIAA, Bhubaneswar

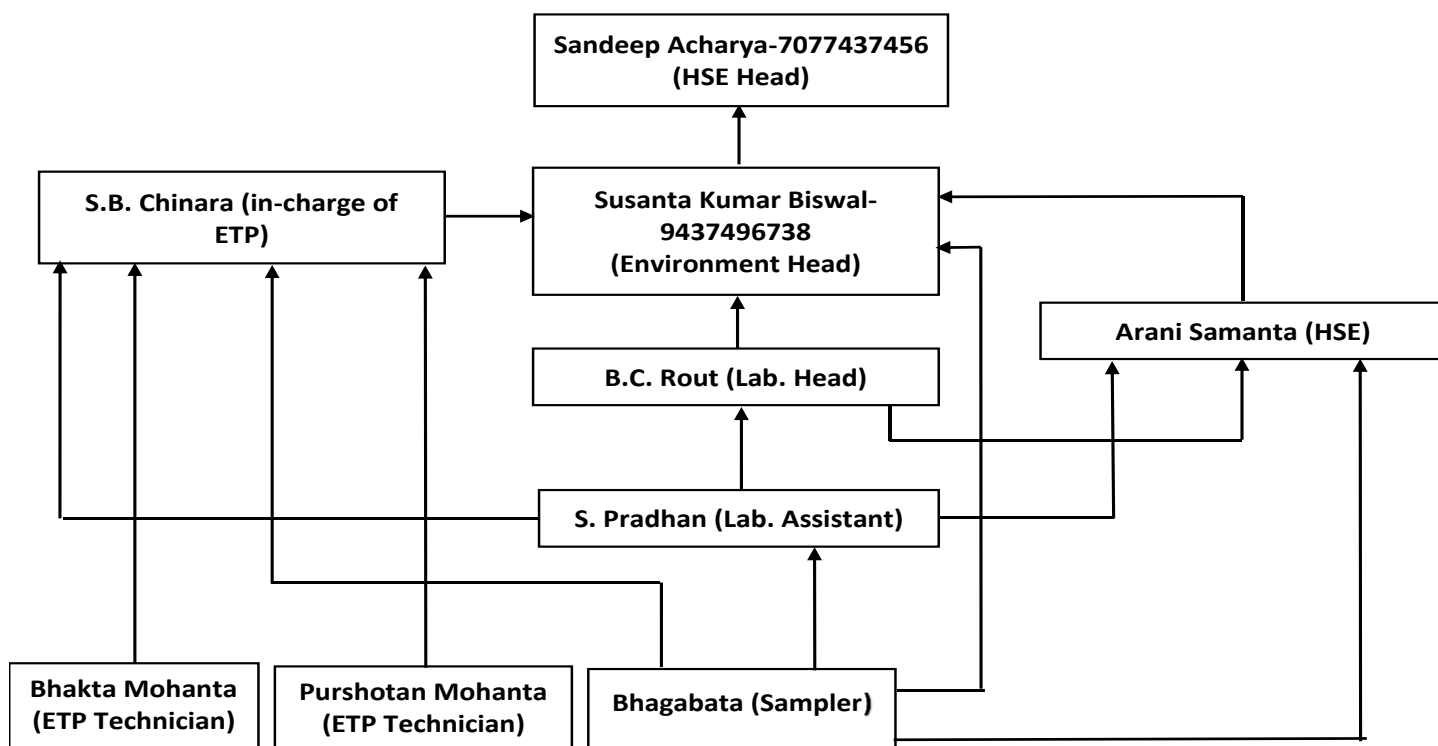
SUB: Submission of the details of the Environment Management Cell comprises of person having qualification & experience in the field of environment of Ostapal Chromite Mine M/s FACOR Ltd.

Dear Sir,

With respect to the cited subject mentioned above, we would like to intimate your good office about the details and organizational chart of the environment management cell of Ostapal Chromite Mine M/s FACOR Ltd.

The details of the Organizational Chart is mentioned Below with details:

Organizational Chart of Environment Management Cell




**Head Environment
Ostapal Chromite Mines
Ferro Alloys Corporation**

OCM/ENV/142/2024

Date: 16.01.2024

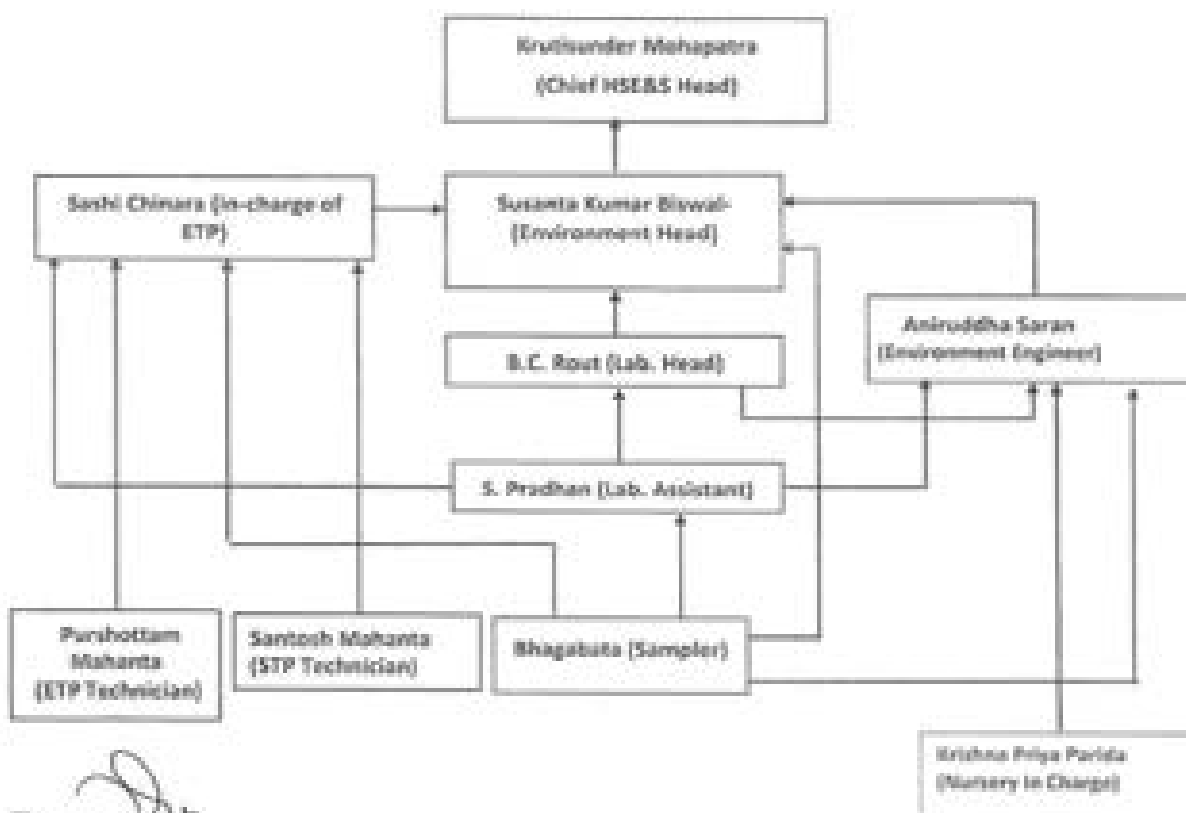
To,
Member Secretary,
SEIAA, Bhubaneswar

SUB : Submission of the details of Updated Environmental Management Cell comprises of person having Qualification & Experience in field of Environment of Ostapal Chromite Mine, M/s FACOR Ltd

Respected Sir,

We respect to above cited subject mentioned above, we would like to intimate your good office about the updated details and organisational chart of Environment Management Cell of Ostapal Chromite Mine M/s FACOR Ltd

The details of the Organizational Chart of mentioned Below with details



[Signature]
16.01.2024
[FACOR Logo]
Head Environment
Ostapal Chromite Mines

M/s. Ferro Alloys Corporation Ltd. (A subsidiary of Vedanta Ltd.)

Registered Office:-

D.P.Nagar, PO : Randia, Dist.: Bhadrak, Odisha, India - 756 135

T +91-6784 240320/240347, Email: facor_mines@vedanta.co.in / facor_opp@vedanta.co.in

Website: www.facorgroup.in, CIN: U45201OR1995PLC008400.

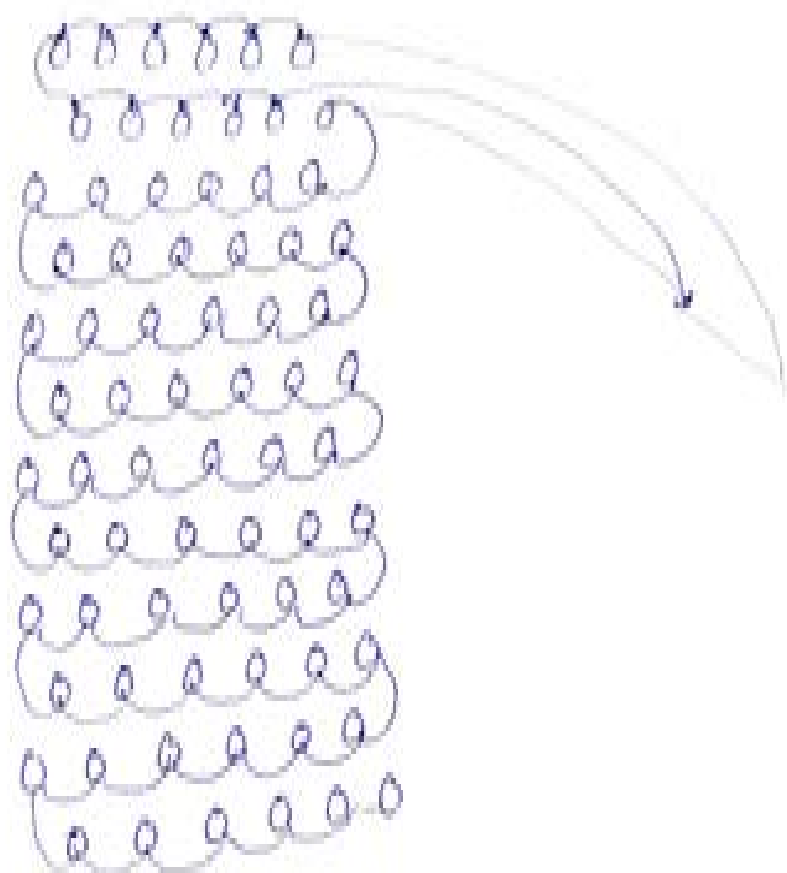
FACOR

CHROME ORE MINING DIVISION

M/s. FERRO ALLOYS CORPORATION LTD.
OSTAPAL CHROMITE MINES
BLASTING REPORTDATE 23/02/23TIME : 3.55 PM

- | | | | |
|-----|-------------------------------|---|--------------------------|
| 1. | Place of Blasting | : | N. Side RL-74 |
| 2. | Size of Holes (DIA) | : | 120 mm |
| 3. | No. of Holes Blasted | : | 72 |
| 4. | No. Of Rounds | : | 01 |
| 5. | No. of Holes fired in a Round | : | 72 |
| 6. | Charge per Hole | : | 5.56 |
| 7. | Charge per Delay | : | 5.56 |
| 8. | Charge per Round | : | 400 kg |
| 9. | Type of explosives used | : | Bolan prime |
| 10. | Spacing | : | 2.5' |
| 11. | Burden | : | 2.0' |
| 12. | Depth | : | 3.0' |
| 13. | Toe Burden | : | 2.0' |
| 14. | Vibration | : | Normal |
| 15. | Throw | : | 2.0' |
| 16. | Charge Ratio | : | 27 m ³ / 1 kg |
| 17. | Blast Pattern | : | Staggered |

18. Rough Sketch showing the Drilling & firing Pattern :-




Bladfer


Foreman


Asst. Mines Manager


Mines Manager

FACOR/ Bhadrak/ Legal /109 /2022

Dtd. 25.04.2022

To

Dr. K. Murugesan,
Member Secretary,
State Environment Impact Assessment Authority (SEIAA), Odisha,
Ministry of Environment, Forest and Climate Change, (MOEF&CC),
Government of India,

Ref : EC Identification No, EC22B001OR120821, dtd. 04/04/2022.

Sub : Requisition to delete Specific Condition no.18 and 19 from the Environment Clearance dtd. 04.04.2022 granted to Ostapal Chromite Mines of M/s. Ferro Alloys Corporation Limited in compliance to the various Court Orders.

Dear Sir,

At the outset, the management of, Ferro Alloys Corporation Ltd. ("FACOR") wish to thank the State Environment Impact Assessment Authority (SEIAA), Odisha for grant of Environment Clearance to our Ostapal Chromite Mines vide EC Identification No, EC22B001OR120821 dtd. 04/04/2022 for enhancement of production from 0.2 MTPA to 0.240 MTPA of Chromite Ore (ROM).

We also do hereby assure and undertake before your good office that we shall comply all the terms and conditions stipulated in the aforesaid Environment Clearance (EC) dtd. 04.04.2022 within due time.

On a perusal of the above-referred EC document, there are 2 conditions viz. Specific Conditions no.18 and 19, requiring us to comply with directions of the Hon'ble Supreme Court in WP 114/2014 as below:

Specific Condition No. 18:

"The Project proponent complies with all the statutory requirements and judgements of the Hon'ble Supreme Court dated 2nd August 2017 in Writ Petition (Civil) No. 114 of 2014 in matter of Common Cause versus Union of Indian & ors. Before commencing the mining operations, if applicable to the project."

Specific Condition No. 19:

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

We humbly submit that the these two conditions, are not applicable to the present Project Proponent as the liabilities arising out of the said judgement has been extinguished consequent to the Corporate Insolvency Resolution Process ("CIRP") which FACOR underwent recently; the same has been later reiterated by the Hon'ble High Court of Odisha in W.P. (C) 20286 of 2020 (FACOR Vs. State of Odisha), as below:

Page 1 of 3

1. That, pursuant to an application U/s-7 of the Insolvency and Bankruptcy Code (IBC) - 2016 filed by Rural Electrification Corporation Limited ("REC") FACOR, the Hon'ble National Company Law Tribunal, Kolkata Bench (NCLT, Kolkata), vide its order dated 6th July, 2017 initiated Corporate Insolvency Resolution Process ("CIRP") against FACOR and declared moratorium under Section-14 of the Insolvency and Bankruptcy Code, 2016 (IBC- 2016). Copy of the NCLT order dt.06-07-2017 is enclosed herewith as Annexure-1.
2. That subsequently, Hon'ble National Company Law Tribunal ("NCLT") Cuttack Bench, vide Para no.19 of its order dt. 30.01.2020 has approved the Resolution Plan submitted by M/s. Sterlite Power Transmission Limited (a group of Vedanta Ltd.) under IBC-2016. Copy of the NCLT order dt.30.01.2020 is enclosed herewith as Annexure-2.
3. That, according to the provisions of IBC-2016, r/w the Approved Resolution Plan ("ARP") of FACOR, all statutory dues owed by the company to various Government Authorities prior to the Plan Effective Date i.e the date on which the Approved Resolution Plan was accepted and approved by Hon'ble NCLT Cuttack, has been extinguished.
4. That Hon'ble NCLT Cuttack bench vide Para -19 of the said order has also instructed that the Approved Resolution Plan of FACOR shall be binding on the Corporate Debtor and its employees, members all creditors including Central and State Government and local authorities, guarantors and other stake holders.
5. That subsequent to the judgment dt. 02.08.2017 passed by Hon'ble Supreme Court of India in W.P. no.114 of 2014 in the matter of Common Cause Vs. Union of India and others, Deputy Director of Mines, Jajpur Road Circle has demanded Ra. 200,56,57,434/- vide notice no.555 dt. 10.04.2018, towards payment for compensation of u/s 21(5) of MMDR Act 1957 for excess mining in violation to the Environment Clearance granted by Ministry of Environment and Forest (MOEF). MOEF for the period from 2000-2001 upto 2010-2011.
6. That being aggrieved by the said demand notice we have filed Revision application before the Revisional Authority of Ministry of Mines, Govt. of India, New Delhi on dt.24.04.2018 vide R.A no. 22(40) /2018/RC-I. After hearing, the Revisional Authority, Ministry of Mines had granted interim-stay vide its order dt.10.05.2018 to the impugned demand notice of DDM till further order.
7. That meanwhile relying upon the order dt.30.01.2020 passed by Hon'ble NCLT Cuttack, supported by various Supreme Court Judgments and the express provisions of IBC-2016, FACOR has raised the issue before the Hon'ble High Court of Orissa vide W.P. (C) No. 20286 of 2020 in the matter of Ferro Alloys Corporation Ltd Vs. State of Odisha regarding various statutory/ mining dues demanded by Government Authorities related to periods prior to the 'plan effective date'. We had also prayed before Hon'ble High Court to quash those demands pertaining to prior period of plan effective date.
8. That after hearing both the parties, Hon'ble High Court of Odisha vide its judgement dt. 10.12.2021 in WP 20286 of 2020 (FACOR Vs. State of Odisha), has held that, "In terms of



Section 31 of the IBC, the ARP is binding on all creditors including Central Government and the State Government. Since all of the impugned demands raised against FACOR pertain to the period prior to the Plan Effective date i.e. 31st January 2020, all such demands stand automatically extinguished in terms of the ARP".

9. That, consequently, vide para 33 of the said Judgement, Hon'ble Court has decided that, "The demand raised against the Petitioner (FACOR) by the Deposite Parties on the strength of the decision of the Supreme Court in Common Cause are unsustainable in law and are hereby set aside". Copy of the High Court order dt.10.12.2021 is enclosed herewith for your ready reference as Annexure-3.

10. That subsequently the matter with respect to demand notice issued against Ostapal chromite Mines U/s- 21 (5) of MMDR Act, 1957 for production in excess of EC in pursuance of the Common Cause Judgement was heard by the Revisional Authority Ministry of Mines, Govt. of India New Delhi in Revision application No.22/40/2018/RC-1.

11. That vide its order dated 23.12.2021 the Revisional Authority has expressly declared the said demand notice of DDM Jajpur as infructuous. Further it was held that, "In view of the above, it appears that the amounts mentioned in the demand notices are not included in the resolution plan and stand extinguished. Hence, the State Government cannot take any steps to recover the amounts.". Copy of the said order dt.23.12.2021 is enclosed herewith as Annexure-4 for your kind perusal and reference.

Thus, it is abundantly clear from the above-stated facts, provisions of law and orders of Hon'ble High Court of Odisha and Revisional Authority, Ministry of Mines that there is no further requirement for FACOR to comply with the directions of Hon'ble Supreme Court in WP 114/2014.

Hence, we would like to request your good office to kindly delete Specific Condition No. 18 & 19 from the Environment Clearance (EC) dt.04.04.2022 granted by your good office, since these two conditions are not applicable to Ostapal Chromite Mines of M/s. Ferro Alloys Corporation Ltd.

Thanking You
Yours faithfully

For Ferro Alloys Corporation Ltd



Authorised Signatory

Copy : Ministry of Environment and Forest, New Delhi.

F. No. 3-46/1998-FC (Vol. II)
Government of India
Ministry of Environment & Forests
(F.C. Division)

Parmanand Bhawan,
C.G.O. Complex, Lodi Road,
New Delhi-110003

Dated: 27 February 2004

To
The Secretary (Forests),
Government of Orissa,
Bhubaneswar.

Sub: Diversion of 64,354 ha of forest land for let renewal of mining lease for mining of Chromite Ore in Ostapal Chromite Mine in favour of M/s Ferro Alloys Corporation Limited (FACOR) in Jaipur District, Orissa.

Sir,

Kindly refer to your letter No. 10F(Cons) 67/2003/13539/F&E dated 02.09.2003 whereunder the above proposal was forwarded to this office seeking prior approval of the Central Government in accordance with the Section-2 of the Forest (Conservation) Act, 1980 and to say that the above proposal was examined by the Forest Advisory Committee (FAC) constituted under Section-3 of the Act.

2. After careful consideration of the proposal of the State Government and on the basis of the recommendation of the Forest Advisory Committee, the Central Government granted in principle approval vide F.O. No. 10F(Cons) 67/2003/13539/F&E dated 04.10.2003 subject to certain conditions. The compliance of these conditions was submitted vide State Government's letter No. 10F(Cons) 67/2003/13539/F&E dated 19.01.2004. After consideration of the proposal and compliance of various conditions by the State Government, the Central Government hereby conveys its approval under Section-2 of the Forest (Conservation) Act, 1980 for diversion of 64,354 ha of forest land for let renewal of mining lease for mining of Chromite Ore in Ostapal Chromite Mine in favour of M/s Ferro Alloys Corporation Limited (FACOR) in Jaipur District, Orissa, subject to the fulfilment of following conditions :-

- (i) Legal status of the forest land shall remain unchanged.
- (ii) The non-forest land identified for Compensatory Afforestation shall be declared as Protected Forest under Indian Forest Act, 1927, as directed while granting approval on 04.05.1998. Compliance report in this regard may be sent to this office within 3 months.
- (iii) The mining lease period under the Forest (Conservation) Act, 1980 shall be co-terminus with the current lease granted under MMRD Act, 1957.
- (iv) The State Government shall transfer amount of NPV and other funds to Compensatory Afforestation Fund Management and Planning Authority (CAMPA), which has already been constituted and notified by the Central Government on 23.04.2004. Till such time, the CAMPA intimates the Head of Accounts for deposition of funds, the funds will be maintained in the form of fixed deposits in the name of Nodal Officer or concerned Divisional Forest Officer of the State Government. The funds realized towards the NPV shall not be utilized by the State Government.
- (v) RCC pillars of 4 feet height shall be erected to demarcate the area by the user agency at the project cost and will be marked with forward and back bearings.
- (vi) The user agency shall raise, fence and maintain a safety zone around the mining area and will also raise and maintain the plantation over an area one and half times in extent

P.T.

to that of the safety zone at the project cost. The condition of raising safety zone and raising plantation on forest land 1.3 times the area of safety zone as stipulated earlier should be complied with immediately and a compliance report should be sent to this office within 3 months.

- (vii) The concurrent reclamation plan shall be executed by the user agency from the very 1st year and an annual report shall be sent to the Nodal Officer and the RCCF, Bhubaneswar. If it is found from the annual report that the concurrent reclamation plan is not being adhered to by the user agency, the mining activities shall remain suspended till such time, the annual programme is completed for that year.
- (viii) The top soil shall be protected at the project cost.
- (ix) The comprehensive Wildlife Management Plan of conservation of wildlife and their habitat for Sukinda mining belt shall be implemented at the project cost.
- (x) No labour camps shall be established on the forest land.
- (xi) All necessary measures should be taken by the user agency to protect the environment.
- (xii) Sufficient firewood shall be provided by the user agency to the labourers at the project cost after purchase from the State Forest Department/Forest Development Corporation.
- (xiii) The user agency shall ensure that there should be no damage to the available wildlife.
- (xiv) The forest land shall not be used for any purpose other than that specified in the proposal and the land use shall be as mentioned in the State Government's letter No. 10F(Coos)/67/2005/1037/F&E dated 19.01.2006.
- (xv) The State Government shall ensure that Compensatory Afforestation as stipulated for the State should be taken up and the targets are achieved. The amount to be deposited by the different user agencies should be realised from them immediately. A compliance report may be sent to this office in this regard.
- (xvi) The forest land thus diverted shall be non-transferable. Whenever and wherever extent of the forest land not required, shall be surrendered to the State Forest Department under intimation to this Ministry.

Yours faithfully,

(Pankaj Asthana)
Assistant Inspector General of Forests

Copy to:-

1. The Principal Chief Conservator of Forests, Government of Orissa, Bhubaneswar.
2. The Nodal Officer, Forest Department, Government of Orissa, Bhubaneswar.
3. The Chief Conservator of Forests (Central), Regional Office, Bhopal.
4. User Agency.
5. Guard File.
6. Monitoring Cell.
7. PS to IGF (FC).

(Pankaj Asthana)
Assistant Inspector General of Forests



FAX : 2562822/2560955
Tel : 2564033/2563824
EPABX : 2561909/2562847
E-mail: paribesh1@ospcbboard.org
Web site : www.ospcbboard.org



OFFICE OF THE STATE POLLUTION CONTROL BOARD, ODISHA

[Forest, Environment & Climate Change Department, Govt. of Odisha]
Parivesh Bhawan, A/118, Nilakantha Nagar, Unit-VIII,
Bhubaneswar - 751 012

BY SPEED POST/
THROUGH ONLINE

No. 5181

IND-B-CTE - 6642

Date 31-03-2022

CONSENT TO ESTABLISH ORDER

In consideration of the online application no. **3907466** for obtaining Consent to Establish for **Ostapal Chromite Mines of M/s FACOR Ltd.**, the State Pollution Control Board is pleased to convey its Consent to Establish under section 25 of Water (Prevention & Control of Pollution) Act, 1974 and section 21 of Air (Prevention & Control of Pollution) Act, 1981 for increase in production from 0.2 MTPA to 0.240 MTPA Chromite Ore (ROM) with maximum excavation of 0.579 Million cum per Annum through opencast mining method over a mining lease area of 72.843 ha., At - village Gurujanga, Tahasil-Sukinda in the district of Jajpur with the following conditions.

GENERAL CONDITIONS:-

1. This Consent to Establish is valid for the product, method of mining and capacity mentioned in the application form. This order is valid for five years, which means the proponent shall commence mining activities for the proposal within a period of five years from the date of issue of this consent to establish order. If the proponent fails to commence mining activities for the proposal within five years then a renewal of this consent to establish shall be sought by the proponent.
2. The mine shall comply to the provisions of Environment Protection Act, 1986 and the rules made there under with their amendments from time to time such as the Hazardous and Other Wastes (Management and Trans boundary Movement) Rules, 2016, Hazardous Chemical Rules /Manufacture, Storage and Import of Hazardous Chemical Rules, 1989 etc. and amendments there under. The mine shall also comply to the provisions of Public Liability Insurance Act, 1991, if applicable.
3. The mine shall apply for grant of Consent to operate under section 25/26 of Water(Prevention & Control of Pollution)Act, 1974 & under section 21 of Air (Prevention & Control of Pollution)Act, 1981 at least 3 (three) months before the commencement of production and obtain Consent to Operate from this Board.
4. This Consent to Establish is subject to statutory and other clearances from Govt. of Odisha and/or Govt. of India, as and when applicable.



BY REGD. POST WITH AD

STATE POLLUTION CONTROL BOARD, ODISHA

[DEPARTMENT OF FOREST, ENVIRONMENT & CLIMATE CHANGE, GOVERNMENT OF ODISHA]

A/118, Nilakantha Nagar, Unit-VIII, Bhubaneswar-751012

Phone-2561909, Fax: 2562822, 2566955 E-mail: paribesh1@spcbodisha.org, Website: www.spcbodisha.org

CONSENT ORDER

No. 11221 /

IND-I-CON- 1163

Dt. 28.06.2022 /

CONSENT ORDER NO. 366

Sub: Consent for discharge of sewage and trade effluent under section 25/26 of Water (PCP) Act, 1974 and for existing / new operation of the plant under section 21 of Air (PCP) Act, 1981.

Ref: Your online application No.4076086, dated 13.03.2022, online reply dated 05.04.2022 and your letter No. OCMM/ENV/961/2022, dated 30.05.2022.

Consent to operate is hereby granted under section 25/26 of Water (Prevention & Control of Pollution) Act, 1974 and under section 21 of Air (Prevention & Control of Pollution) Act, 1981 and rules framed thereunder to

Name of the Industry: OSTAPAL CHROMITE MINES OF M/S. FACOR LTD.

Name of the Occupier & Designation: SRI AJAYA KUMAR PATRA, MINES MANAGER

Address: AT: GURUJANG, PO: KALIAPANI, DIST: JAJPUR

This consent order is valid for the period up to 31.03.2026.

This consent order supersedes the earlier consent order issued vide letter No.4047, dated 16.03.2022.

Details of Products Manufactured:

Sl. No	Product	Quantity
01.	Chrome ore(ROM)	0.24 MTPA [Maximum excavation of 0.579 million cum per annum excavation]

Details of Mineral Handling Plants/Units:

01.	Operation of COB Plant of capacity	0.1 MTPA (chrome ore concentrate)
-----	------------------------------------	-----------------------------------

This consent order is valid for the specified outlets, discharge quantity and quality, specified chimney/stack, emission quantity and quality of emissions as specified below. This consent is granted subject to the general and special conditions stipulated therein.

DISTRICT FOREST OFFICE, RAIPUR, OUTPOST 753 012.

26/3/83
 No. 2714 /Minn, Dt. 3-62-83
 From: Smt. A. K. Das, I.A.S.,
 Collector, Cuttack.

To: M/s. Ferro Alloys Corporation Ltd.,
 55 Forest Park, Shreeharipur.

Subject: Grant of surface right permission over 48.43 acres
 or land out of the total area of land 100 acres in
 village Gurjara and Outpost in Cuttack district in
 favour of M/s. Ferro Al.

Reference: Your letter No. 26/80/2763 dt. 29.5.81.

Sir,

With reference to your letter cited above, you are
 hereby granted with permission for surface right over an area of
 48.43 acres land, the detailed land particulars are enclosed herewith
 as per the terms and conditions under clause 2 of Part III of the
 Forest Lease Deed, in the old worked out area where fresh clearance
 of forest vegetation is not involved subject to payment of the
 cost of compensatory plantation and the following conditions
 of lease deed without prejudice to the final decision on the writ
 petition.

1. You shall indemnify and reimburse Govt. and third
 party as laid down in clause 2 of part VIII, clause
 3 and 10 of part VII and clause 4 and 6 of part III
 of the main lease deed.
2. You shall pay compensatory plantation cost for
 the area under surface right and value of the
 forest growth to the Divisional Forest Officer,
 Raipur.

LAND PARTICULARS

Village	Katha No.	Plot No.	Total Area.	Classification of the land as per R.O.R.	Area required
1	2	3	4	5	6
Gurjara	52	1	Ac. 222.90	Soil Bangle	Ac. 1.43
Outpost	1	30	Ac. 157.60	ndw	Ac. 43.00
Totals					Ac. 48.43

Yours faithfully,

COLLECTOR, CUTTACK.

DISTRICT OFFICE(MINING SECTION)
JAIPUR ROAD, DIST-JAIPUR

OFFICE ORDER No. 7850/Mines Dt. 19.12/98

Surface right permission over an area of Ac.10.66 of 4.314 hec. within the mining lease hold of Ootapal Chromite Mines is hereby accorded in favour of M/s. FACOR Ltd. for mining operation is applied for subject to the following terms and conditions. The details of the land schedule of the surface right granted area are given below.

LAND SCHEDULE

Village	Name of the tenants	Khata No.	Visam	Plot No.	Area in Acs.
Gurujang	Ananta Mohanta	1	Sarada-II	317	0.34
-do-	-do-	1	Sarada-II	320	0.18
-do-	Kailash Ch. Mohanta	3	-do-	318	0.26
-do-	-do-	3	-do-	321	0.53
-do-	Gura Dehuri /	7	-do-	230	0.04
-do-	Gouranga Mohanta and others,	8	-do-	316	0.13
-do-	-do-	8	-do-	319	0.39
-do-	Darshan Mohanta	12	-do-	307	0.06
-do-	-do-	12	-do-	308	0.06
-do-	-do-	12	-do-	312	0.06
-do-	Dhruveswar Mohanta	14	-do-	304	0.07
-do-	-do-	14	-do-	306	0.04
-do-	-do-	14	-do-	311	0.12
-do-	Naba Pradhan /	15	-do-	334	0.23
-do-	Pala Dehuri /	16	-do-	328	0.56
-do-	Banawali Mohanta	19	-do-	305	0.07
-do-	-do-	19	-do-	308	0.05
-do-	-do-	19	-do-	310	0.09
-do-	-do-	19	-do-	313	0.02
-do-	Bhika Dehuri /	23	-do-	253	1.77
-do-	Kangali Pradhan /	24	-do-	302	0.09
-do-	Kacha Dehuri /	27	-do-	226	3.04
-do-	-do-	27	-do-	229	3.07
-do-	-do-	27	-do-	329	3.54

Barujanga	Surya Deburi	20	Sarada-II	217	0.04
-do-	-do-	20	-do-	232	0.05
-do-	Lexmidhar Deburi	30	-do-	217	0.05
-do-	and others.				
-do-	-do-	30	-do-	228	0.05
-do-	-do-	30	-do-	233	0.05
-do-	Sujan Deburi	32	-do-	234	0.07
-do-	Madibandhu Deburi	34	-do-	336	0.04
-do-	-do-	34	-do-	337	1.71
-do-	Madibandhu Pradhan	35	-do-	335	0.01
-do-	-do-	35	-do-	337	0.37
-do-	-do-	35	-do-	216	0.03

Total : 10.65 Acs.

or
4,310

1. Surface right granted area within the P.L. area should be properly demarcated by in the field before handing over possession to the lessee.
2. Forest growth if any within the surface right granted area should not be disturbed without obtaining permission from the concerned forest authority.
3. The lessee shall indemnify and reimburse to Govt. and third parties as laid down in Clause-2 of Part-VIII, Clause-3 and 14 of Part- VII and Clause- 4 to 6 of Part-III of the lease deed.

Copy to Chief Executive, Mines, M/s. P.A.M. Ltd.,
Laxmi Narain, Tumkur, Madras for information with reference
to their letter No. 3725 dt. 25.8.97.

Copy to the Divisional Forest Officer, Athagurni,
Bhindar, Sakinda, Jaipur Road for information.

OFFICE OF THE DEPUTY DEPARTMENT MINES / JAJPUR ROAD CIRCLE
JAJPUR ROAD

WIND LIFTED No. 1000 / Mines, Dated the 21st January, 1979
 I, Shri H.N. Mahanty, Dy. Director Mines, Jajpur Road Circle do
 hereby deliver the possession of an of 10.66 ac. or 4.381 Hect.
 of land for Chromite in Vill-Gurjanga in Okinda Tahasil of
 Jajpur District to-day the 21st January, 1979 to
 Shri C. Sharma, Asst. General Manager-on-Mines Manager, Original
 Chromite Mines, M/s. FAMES Ltd., as granted by the Collector,
 Jajpur vide Order No. 7850 dtd. 12-12-66 for Surface Operation
 in presence of witnesses from both sides.

RECEIVED

(H.N. MAHANTY)
 Dy. Director Mines
 JAJPUR ROAD
 21-1-79

01. 10.66 ac. land with
 5000 sq. ft. area
 21-1-79

02. 10.66 ac. land with
 5000 sq. ft. area
 21-1-79

RECEIVED

(MUNISH MAHANTY)
 Dy. Asst. General Manager
 1000 AC. CHROMITE MINES
 M/S. FAMES LTD.

01.

02.

(Jajpur Road Circle)
 Manager
 FAMES

S/late Narinder Mahanta
 Vill Gurjanga

1993年12月17日 09:25:56 111.11.11.11 111.11.11.11

NO. 2312 / 2003-2004 DO NOT HIT 29th April 03

PRODUCTIONS

Pursuant to the letter No. 6/88 96-PU dt. 4.5.88 of Govt. of India Ministry of Environment & Forests, New Delhi for division of forest land over 40,424 bales under Section 2 of F.C. Act 1980 addressed to Secretary, Forest Dept. of Orissa, Bhubaneswar and subsequently;

Approved by Ministry of Environment and Forest
the said visit letter no. 986/74 to G.S.P. 200 assigned to
Secretary Forest Dept., of India, and similar to sent to the
ministers forest land.

11/29/1982: Initial interview conducted for the purpose of character review of H/P. Prior Alleged Misconduct L-3, L-4, L-5, L-6, L-7, L-8, L-9, L-10, L-11, L-12, L-13, L-14, L-15, L-16, L-17, L-18, L-19, L-20, L-21, L-22, L-23, L-24, L-25, L-26, L-27, L-28, L-29, L-30, L-31, L-32, L-33, L-34, L-35, L-36, L-37, L-38, L-39, L-40, L-41, L-42, L-43, L-44, L-45, L-46, L-47, L-48, L-49, L-50, L-51, L-52, L-53, L-54, L-55, L-56, L-57, L-58, L-59, L-60, L-61, L-62, L-63, L-64, L-65, L-66, L-67, L-68, L-69, L-70, L-71, L-72, L-73, L-74, L-75, L-76, L-77, L-78, L-79, L-80, L-81, L-82, L-83, L-84, L-85, L-86, L-87, L-88, L-89, L-90, L-91, L-92, L-93, L-94, L-95, L-96, L-97, L-98, L-99, L-100, L-101, L-102, L-103, L-104, L-105, L-106, L-107, L-108, L-109, L-110, L-111, L-112, L-113, L-114, L-115, L-116, L-117, L-118, L-119, L-120, L-121, L-122, L-123, L-124, L-125, L-126, L-127, L-128, L-129, L-130, L-131, L-132, L-133, L-134, L-135, L-136, L-137, L-138, L-139, L-140, L-141, L-142, L-143, L-144, L-145, L-146, L-147, L-148, L-149, L-150, L-151, L-152, L-153, L-154, L-155, L-156, L-157, L-158, L-159, L-160, L-161, L-162, L-163, L-164, L-165, L-166, L-167, L-168, L-169, L-170, L-171, L-172, L-173, L-174, L-175, L-176, L-177, L-178, L-179, L-180, L-181, L-182, L-183, L-184, L-185, L-186, L-187, L-188, L-189, L-190, L-191, L-192, L-193, L-194, L-195, L-196, L-197, L-198, L-199, L-200, L-201, L-202, L-203, L-204, L-205, L-206, L-207, L-208, L-209, L-210, L-211, L-212, L-213, L-214, L-215, L-216, L-217, L-218, L-219, L-220, L-221, L-222, L-223, L-224, L-225, L-226, L-227, L-228, L-229, L-230, L-231, L-232, L-233, L-234, L-235, L-236, L-237, L-238, L-239, L-240, L-241, L-242, L-243, L-244, L-245, L-246, L-247, L-248, L-249, L-250, L-251, L-252, L-253, L-254, L-255, L-256, L-257, L-258, L-259, L-260, L-261, L-262, L-263, L-264, L-265, L-266, L-267, L-268, L-269, L-270, L-271, L-272, L-273, L-274, L-275, L-276, L-277, L-278, L-279, L-280, L-281, L-282, L-283, L-284, L-285, L-286, L-287, L-288, L-289, L-290, L-291, L-292, L-293, L-294, L-295, L-296, L-297, L-298, L-299, L-300, L-301, L-302, L-303, L-304, L-305, L-306, L-307, L-308, L-309, L-310, L-311, L-312, L-313, L-314, L-315, L-316, L-317, L-318, L-319, L-320, L-321, L-322, L-323, L-324, L-325, L-326, L-327, L-328, L-329, L-330, L-331, L-332, L-333, L-334, L-335, L-336, L-337, L-338, L-339, L-340, L-341, L-342, L-343, L-344, L-345, L-346, L-347, L-348, L-349, L-350, L-351, L-352, L-353, L-354, L-355, L-356, L-357, L-358, L-359, L-360, L-361, L-362, L-363, L-364, L-365, L-366, L-367, L-368, L-369, L-370, L-371, L-372, L-373, L-374, L-375, L-376, L-377, L-378, L-379, L-380, L-381, L-382, L-383, L-384, L-385, L-386, L-387, L-388, L-389, L-390, L-391, L-392, L-393, L-394, L-395, L-396, L-397, L-398, L-399, L-400, L-401, L-402, L-403, L-404, L-405, L-406, L-407, L-408, L-409, L-410, L-411, L-412, L-413, L-414, L-415, L-416, L-417, L-418, L-419, L-420, L-421, L-422, L-423, L-424, L-425, L-426, L-427, L-428, L-429, L-430, L-431, L-432, L-433, L-434, L-435, L-436, L-437, L-438, L-439, L-440, L-441, L-442, L-443, L-444, L-445, L-446, L-447, L-448, L-449, L-450, L-451, L-452, L-453, L-454, L-455, L-456, L-457, L-458, L-459, L-460, L-461, L-462, L-463, L-464, L-465, L-466, L-467, L-468, L-469, L-470, L-471, L-472, L-473, L-474, L-475, L-476, L-477, L-478, L-479, L-480, L-481, L-482, L-483, L-484, L-485, L-486, L-487, L-488, L-489, L-490, L-491, L-492, L-493, L-494, L-495, L-496, L-497, L-498, L-499, L-500, L-501, L-502, L-503, L-504, L-505, L-506, L-507, L-508, L-509, L-510, L-511, L-512, L-513, L-514, L-515, L-516, L-517, L-518, L-519, L-520, L-521, L-522, L-523, L-524, L-525, L-526, L-527, L-528, L-529, L-530, L-531, L-532, L-533, L-534, L-535, L-536, L-537, L-538, L-539, L-540, L-541, L-542, L-543, L-544, L-545, L-546, L-547, L-548, L-549, L-550, L-551, L-552, L-553, L-554, L-555, L-556, L-557, L-558, L-559, L-560, L-561, L-562, L-563, L-564, L-565, L-566, L-567, L-568, L-569, L-570, L-571, L-572, L-573, L-574, L-575, L-576, L-577, L-578, L-579, L-580, L-581, L-582, L-583, L-584, L-585, L-586, L-587, L-588, L-589, L-590, L-591, L-592, L-593, L-594, L-595, L-596, L-597, L-598, L-599, L-600, L-601, L-602, L-603, L-604, L-605, L-606, L-607, L-608, L-609, L-610, L-611, L-612, L-613, L-614, L-615, L-616, L-617, L-618, L-619, L-620, L-621, L-622, L-623, L-624, L-625, L-626, L-627, L-628, L-629, L-630, L-631, L-632, L-633, L-634, L-635, L-636, L-637, L-638, L-639, L-640, L-641, L-642, L-643, L-644, L-645, L-646, L-647, L-648, L-649, L-650, L-651, L-652, L-653, L-654, L-655, L-656, L-657, L-658, L-659, L-660, L-661, L-662, L-663, L-664, L-665, L-666, L-667, L-668, L-669, L-670, L-671, L-672, L-673, L-674, L-675, L-676, L-677, L-678, L-679, L-680, L-681, L-682, L-683, L-684, L-685, L-686, L-687, L-688, L-689, L-690, L-691, L-692, L-693, L-694, L-695, L-696, L-697

[illegible]

Local Agriculture

查正、理明其片印与温度、湿度等关系。

addition, class 79/1
from Fig 4's point of view, line 29.3

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http://jiv.sagepub.com

10	20	30	40	50	60	70	80	90	100
10	20	30	40	50	60	70	80	90	100

	76-99 Acres	Jungle	187-14 acres
			43-159 ha.

SAO: Quchinaga

Data No.	Name of the Tenant	Plot No.		Kissan Area in Acres.	Remarks.
		1	2		
36	Abada Jogy Anabadi	377/2	Patika	0.03	Part
36	-do-	396/	-do-	0.60	
36	-do-	400	-do-	0.38	
36	-do-	409	-do-	0.11	
39	Makhina	314	Jungle	0.11	Part
39	-do-	315	-do-	0.17	
39	-do-	323	-do-	0.10	
39	-do-	324	-do-	0.11	
39	-do-	325	-do-	0.10	
39	-do-	326	-do-	0.33	
39	-do-	327	-do-	0.05	
39	-do-	330	-do-	0.04	
39	-do-	338	-do-	0.08	Part
39	-do-	339	-do-	0.03	Part
39	-do-	340	-do-	0.03	-do-
39	-do-	342	Makhana	0.02	-do-
39	-do-	343	Jungle	0.09	-do-
39	-do-	344	-do-	0.16	
39	-do-	345	-do-	1.39	
39	-do-	347	-do-	1.03	
39	-do-	349	-do-	0.18	
39	-do-	350	-do-	1.56	Part
39	-do-	351	-do-	0.18	
39	-do-	352	-do-	2.32	Part
39	-do-	353	-do-	0.41	
39	-do-	354	-do-	1.91	
39	-do-	355	-do-	0.35	
39	-do-	356	-do-	0.34	
39	-do-	357	-do-	0.20	
39	-do-	361	-do-	0.70	
39	-do-	370	-do-	0.28	Part
39	-do-	380	-do-	0.70	
39	-do-	381	-do-	0.15	
39	-do-	383	-do-	0.15	
39	-do-	383	-do-	0.15	
39	-do-	384	-do-	0.12	

(4)

Terms and Conditions

The Surface right granted over ^{107.14} acres within the H.L. area should be demarcated in the field before handing over possession to lessee.

The forest growth if any within the surface right granted area should not be disturbed without prior permission of the forest Authority.

No activity what so ever shall be done by the lessee over 4.07 Hects. of forest land which is earmarked for safty zone.

The lessee shall observe all such terms and conditions as laid down in model form K of H.L. deed.

The surface right is granted till the subsistence of the lease period.

54/-
COLLECTOR, JAIPUR

Memo No. 2713/2003 Mines

Dated. 29-4-03

Copy to M/s FACOR Ltd for information and necessary action with reference to their letter No.408 dt.4.6.2002.


COLLECTOR, JAIPUR

Memo No. _____/2003-Mines

Dated.

Copy forwarded to the Joint Secretary to Govt. Steel & Mines Deptt, Orissa, Bhubaneswar for information and necessary action.

COLLECTOR, JAIPUR

Memo No. _____/2003- Mines

Dated.

Copy forwarded to the D.F.O, Athagarh and Tahsildar Sukinda, Jaipur-road for information and necessary action.

COLLECTOR, JAIPUR.

DISTRICT OFFICE (MINING SECTION)
JAIPUR ROAD

No. 8271 / Mines Date: 3/8/11

From The District Magistrate and
Collector, Jaipur.

To M/s. Ferro Alloys Corporation Ltd.
Owner of Ostapal Chromite Mines
At: Laxmi Bhawan, PO: Kuans,
Dist: Bhadrak

Sub: Grant of surface right permission over 3.25 Acre. or
1.315 hect. of forest land of Ostapal Chromite Mines
of M/s. FACOR Ltd. under Sukinda Tahasil in Jaipur
District.

Sir,

With reference to your application dt: 16.07.11 and revised application dt: 22.07.2011 on the subject indicated above, the surface right permission is hereby accorded over an area of 1.315 hect. or 3.25 Acre. of forest land coming within 64.354 hect. of forest area approved by MOEF, Govt. of India vide order No. F No. 8-86/1996-FC (Vol-II) dt: 07.02.2006 within total lease hold area over 180 Acre. or 72.843 hect. in respect of Ostapal Chromite Mines of M/s. FACOR Ltd. as marked on the map and land schedule detailed below.

The surface right permission is granted as per Clause-2 of Part-III of Mining lease deed executed on dt: 13.08.1985 to 12.08.2005 for 20 years and extended under deemed extension as per rule 24 (A) (6) of MCR 1960 subject to the following condition and observance of terms and condition of lease covenants, Mines & Minerals (D&R) Act. 1957 and relevant rules made there under.

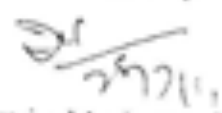
1. Surface right area within the Mining lease shall be demarcated in the field before handing over possession to the lessee.
2. All conditions stipulated by MOEF, Govt. of India vide letter No. F No. 8-86/1996-FC (Vol-II) dt: 07.02.2006 in forest clearance over 64.354 Hect. shall be observed by the lessee in respect of the forest area.
3. Surface rent as prescribed in MM (D&R) Act. 1957 and M.C. Rules 1960 shall be paid from the date of issue.

Contd...P/2

**Granted area land schedule as per Sabik settlement and
Corresponding to Hal settlement records.**

As per sabik Settlement Record					As per Hal Settlement Record				
Village Name	Khata No.	Plot No.	Kisam	Name of Tenants	Khata No.	Plot No.	Kisam	Name of Tenants	Area (in Acre.)
Gurujanga No. 16	13	1/P	Sal Jungle	Arabadi Govt.	39	331	Jungle-1	Rakhit	0.25
					39	332	Jungle-1	Rakhit	0.18
					39	333	Jungle-1	Rakhit	0.13
					38	358 P	Jungle	Sarbasadharana	0.30
					39	359 P	Jungle	Rakhit	2.21
					38	360 P	Jungle	Sarbasadharana	0.18
								Total Area	3.25 Acre.


Yours faithfully


District Magistrate &
Collector, Jajpur

Memo No. _____ / Mines

Date: _____ /11

Copy forwarded to the Divisional Forest Officer,
Cuttack Forest Division, Cuttack/ the Tahasildar, Sukinda for information and
necessary action.


District Magistrate &
Collector, Jajpur

In pursuance of District office order No. 8271/Mines dt: 03.08.2011 of the Collector, Jajpur regarding surface right permission over 3.25 Acres. or 1.315 Hects. in village Gurujanga under Sukinda Tahasil in Jajpur District granted in favour of M/s. FACOR Ltd. within lease hold area of 72.843 hecets. of Ostapal Chromite Mines. I do hereby hand over the possession of above granted surface right area over 3.25 Hects. or 3.25 Acres. to M/s. Ferro Alloys Corporation Ltd. and by Sri. Anil Kumar Pati, AGM of Ostapal Chromite Mines of aforesaid date in 17.0.11 in presence of the following witness.


Deputy Director Mines
Jajpur District.

Taken over the possession of granted surface right area of 3.25 Hects. in village Gurujanga under Sukinda Tahasil in Jajpur District within lease hold area of Ostapal Chromite Mines over 72.843 hecets. for the day of 03.08.2011.


ASST. GENERAL MANAGER
M/s. FACOR
OSTAPAL CHROMITE LTD.

ABSTRACT

Sl.No.	Letter Ref. No. & Date	AREA	
		Acre	Hectares
(A)	<u>SURFACE RIGHT GRANTED</u>		
1.	Letter No.8271 Dtd.03.08.2011	3.25	1.315
2.	Letter No. 2712 Dtd. 29.04.2003	107.14	43.359
3.	Letter No. 7850 Dtd.19.12.1998	10.66	4.314
4.	Letter No. 2718 Dtd. 02.12.1985	48.63	19.680
	TOTAL:	169.68	68.668
(B)	<u>SURFACE RIGHT NOT GRANTED</u>		
5.	Safety Zone	10.06	4.07
6.	Debasthali	0.26	0.105
	TOTAL :	10.32	4.175
	GRAND TOTAL :	180.00	72.843

OCM / ENV / 836 / 2022

Date: 05.04.2022

To

1. The Collector and District Magistrate,
Dist.-Jajpur, Odisha.
2. The Sub-Collector, Jajpur,
Dist.-Jajpur, Odisha.
3. The Tahasildar, Sukinda,
Dist.-Jajpur, Odisha.
4. The Sarpanch, Kaliapani Gram Panchayat,
Tahasil- Sukinda, District -Jajpur, Odisha.

Ref: EC Identification No. EC22B001OR120821, dtd. 04/04/2022.

Sub.: Intimation regarding Grant of Environmental Clearance (EC) by SEIAA Odisha under the provisions of EIA Notification-2006 for increase in production from 0.20 MTPA to 0.24 MTPA Chromite Ore (ROM) with maximum excavation of 0.579 Million Cub Mt per Annum and Beneficiated Chrome Ore 0.10 MTPA from Ostapal Chromite Mine of M/s Ferro Alloys Corporation Ltd, Jajpur, ODISHA.

Respected Sir,

We would like to intimate your good office vide this letter that the State Environment Impact Assessment Authority (SEIAA), Odisha, coming under the Ministry of Environment, Forest and Climate Change, Government of India has granted the Environment Clearance (EC) to Ostapal Chromite Mine of M/s Ferro Alloys Corporation Ltd. (FACOR) vide EC Identification No. EC22B001OR120821 on dtd. 04/04/2022 for enhancement of production from 0.2 MTPA to 0.240 MTPA of Chromite Ore (ROM) with maximum excavation of 0.579 Million Cub Mt per Annum and Beneficiated Chrome Ore 0.10 MTPA from Ostapal Chromite Mine. This EC is also available in the official portal of Ministry of Environment, Forest and Climate Change, i.e. <http://environmentclearance.nic.in>.

The said Environment Clearance has been issued by SEIAA, Odisha to our Ostapal Chromite Mines under the provisions of EIA Notification-2006. In compliance to the Specific Condition no.26 of this EC, we are furnishing herewith the copies of the Environment Clearance No. EC22B001OR120821, dtd. 04/04/2022 for the kind perusal and records of the Government offices and Heads of the local

Received of this copy of EC may kindly be acknowledged herewith.

Thanking You

Yours faithfully,
for Ferro Alloys Corporation Ltd

Agent
Ostapal Chromite Mine

Encl: As above

Received LHO. 836
dt. 5.4.2022

For
05.04.2022

Received
PR Section
Collector Jajpur

OCM/ENV/ 848 /2022

Date:09.04.2022

To

The Member Secretary,
SEIAA,Bhubaneswar

Sub.: Advertise about the Grant of EC in respect of Ostapal Chromite Mine of M/s FACOR Ltd ,Jaipur of Odisha.

Ref.: (i). EC Identification No.:EC728001OR120821, SEIAA File No.:66461/75-MINB1/02-2022,
Date 4.04.2022
(ii). EC Specific Condition No.:28

Dear Sir,

We would like to submit the reference copy of advertisement of Grant of EC for enhancement in production from 0.2 MTPA to 0.340 MTPA of Chromite Ore(ROM) with Maximum Excavation of 0.579 Million Cum per Annum and Beneficiated Chrome Ore of 0.1 MTPA from the Ostapal Chromite Mine of M/s. FACOR Ltd.,Jaipur,Odisha.

Reference of Advertisement has been enclosed as Annexure No.-1.

This is for your kind information.

Thanking You,

Yours faithfully,
For Ferro Alloys Corporation Limited


(Authorized Signatory)
MUTHUMARI M

Encl: A/a

- [illegible]

The image shows the FACOR logo at the top, which consists of the word "FACOR" in a stylized font inside an oval. Below the logo, the text "PUBLIC NOTICE" is written in a bold, serif font. Underneath this, a paragraph of text in a serif font states: "It is hereby informed to the general public that the State Environment Impact Assessment Authority (SEIAA), Odisha of the Ministry of Environment, Forest and Climate Change, Government of India has granted Environment Clearance (EC) to Ostapal Chromite Mine of M/s Ferro Alloys Corporation Ltd. (FACOR) on dtd. 04/04/2022 for enhancement of production up to 0.240 MTPA of Chromite Ore (ROM). This EC is also available in the official portal of Ministry of Environment, Forest and Climate Change, i.e. <http://environmentclearance.nic.in>".

Link : <http://odisha.panchajanya.com/mrgh/444147.aspx?image/3>

OCM/ENV/ B54 /2022

Date:11.04.2022

To

The Joint Director,
Ministry of Environment, Forest & Climate Change,
Eastern Regional Office,
Bhubaneswar

Sub.: Advertise about the Grant of EC in respect of Ostapal Chromite Mine of M/s FACOR Ltd, Jaipur of Odisha.

Ref.: (i) EC Identification No.:EC228001OR120821, SEIAA File No.:66461/75-MINB1/02-2022, Date 4.04.2022
(ii) EC Specific Condition No.:28

Dear Sir,

We would like to submit the reference copy of advertisement of Grant of EC for enhancement in production from 0.2 MTPA to 0.240 MTPA of Chromite Ore(ROM) with Maximum Excavation of 0.579 Million Cum per Annum and Beneficiated Chrome Ore of 0.1 MTPA from the Ostapal Chromite Mine of M/s FACOR Ltd, Jaipur, Odisha.

Reference of Advertisement has been enclosed as Annexure No.-1.

This is for your kind information.

Thanking You,

Yours faithfully,
For Ferro Alloys Corporation Limited


11/04/2022
(MUTHUMARI.M)
(Authorized Signatory)

Encl: A/a

PAPER ADVERTISEMENT

1. Publication in Odia: Daily Paper Pragatiwadi Dated 08.04.2022

ପ୍ରଗତିବାଦୀ

ପୃଷ୍ଠା : ୨

ଶ୍ରବଣପୁର • ଖୁର୍ଦ୍ଧାପୁର • ବସ୍ତର II • ୭୦୭୭

FACOR **ବାଧାରଣ ବିଜ୍ଞପ୍ତି**

ବସ୍ତରର ଉପବାସୀଙ୍କର ସମସ୍ତ ସ୍ୱାଧୀନ ଚରାଧର୍ମିତାପାଇଁ ଯେ ଫେରେ ଏକାଧିକ ବର୍ଦ୍ଧିତକାରୀ ଡିମାଣ୍ଡ (ଫେରଡ଼) କମଳା ଟାଙ୍ଗର ଉପାସନା କୋମ୍ପାନୀ ଲିମିଟେଡ୍, ଖୁରା-ଖୁରୁଆ, ଫେ-କଲିଆପାଣି, ଲେପିଆ ପୁରୁଣା, ଚିତ୍ର-କାଳପୁର, ଚିତ୍ରା ଡୁ ୭ ପାଣି, ଏବଂ ଉଚ୍ଚତମ ମୋଡ଼ିଫ ଇନ୍ ଫ୍ରେମ୍‌ସାଇଟ୍ ଉପାସନା ବ୍ଲକ୍ ମିନିଷ୍ଟ୍ର ପରିବେଶ ଓ ଜଙ୍ଗଲ ମନ୍ତ୍ରାଳୟ, ଭାରତ ଉପକାରେ ପରିସେବ ପ୍ରଦାନ ପ୍ରଦାନର କର୍ତ୍ତବ୍ୟ ଚିହ୍ନିତ। ଏହି ଡିମାଣ୍ଡ ପ୍ରାପ୍ତି ପରେ ପରିବେଶ ଓ ଜଙ୍ଗଲ ମନ୍ତ୍ରାଳୟ ଭାରତ ଉପକାରେ ଫେରାଉଛି <http://environmentclearance.nic.in> ଓ ଲେପିଆପାଣି।

ଶ୍ରୀ ପରିଚାଳକ
ଫେରେ ଏକାଧିକ ବର୍ଦ୍ଧିତକାରୀ ଡିମାଣ୍ଡ (ଫେରଡ଼)

Link is: <http://pragatiwadi.com/odpaper/ପ୍ରଗତିବାଦୀ/08042022-04-08>

2. Published in English daily paper Orissa Postdated 08.04.2022

FACOR

PUBLIC NOTICE

It is hereby informed to the general public that the State Environment Impact Assessment Authority (SEIAA), Odisha of the Ministry of Environment, Forest and Climate Change, Government of India has granted Environment Clearance (EC) to Ostapal Chromite Mine of M/s Ferro Alloys Corporation Ltd. (FACOR) on dtd. 04/04/2022 for enhancement of production up to 0.240 MTPA of Chromite Ore (ROM). This EC is also available in the official portal of Ministry of Environment, Forest and Climate Change, i.e. <http://environmentclearance.nic.in>

Link : <http://odishapostnews.com/odpaper/08042022/orissapost/08042022>



GREEN FORCE ASSOCIATES PRIVATE LIMITED

Plot No.-1666, Phase-II, Delta Colony, Nilakantheshwar Marg,
Baramunda, Bhubaneswar, Dist - Khurda
Mail Id: greenforceassociates@gmail.com

Report No-GFAPL/24-25/OCNE/023

Issued Date-07.10.2024

TEST REPORT

Client Name & Address	M/s Ferro Alloys Corporation Limited, Ostapal Chromite Mines, Kaliapani, Jajpur		
Nature of Sampling	Ground Water Level Monitoring		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per CPCB Guidelines
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Water
Date of Sampling	24.09.2024		

Sl. No.	Parameters	Result
1	GWL1- Near Mechanical Garage; Lat: 21°2'10.46"N and Long: 85°46'5.18"E;	2.7 m
2	GWL2- Near Temple; Lat: 21°3'27.91"N and Long: 85°48'9.51"E;	3.9 m
3	GWL3- Borewell Near Telling Point; Lat: 21°2'10.46"N and Long: 85°46'5.18"E;	3.5 m
4	GWL4- Kaliapani Village; Lat: 21°2'15.68"N and Long: 85°46'53.38"E;	3.2 m
5	GWL5- Ostapal Village; Lat: 21°3'53.63"N and Long: 85°48'3.15"E;	3.5 m
6	GWL6- Gurujang Village; Lat: 21°3'36.26"N & Long: 85°46'52.32"E	4.1 m
7	GWL7- Ostia Village; Lat: 21°3'23.00"N and Long: 85°46'25.32"E;	3.7 m
8	GWL8- Kapoli Village; Lat: 21°3'53.82"N and Long: 85°48'3.22"E;	2.4 m
9	GWL9-Talangi Village; Lat: 21° 48.60"N and Long: 85°49'27.34"E;	2.6 m

Reviewed By

Authorized Signatory

ANALYST
GREENFORCE ASSOCIATES PRIVATE LIMITED
Bhubaneswar, Odisha

TECHNICAL MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
Bhubaneswar, Odisha

Note:

- The results listed refer only to tested samples and applicable parameters. Endorsement of products is neither inferred nor implied.
- Total liability of our lab is limited to the invoiced amount.
- Samples will be destroyed after 30 days from the date of test report unless otherwise specified.
- This report is not to be reproduced wholly or in part and cannot be used as evidence in the court of law and should not be used in any advertising media without our special permission in writing.
- Report refers to the sample submitted to us and not drawn by unless mentioned otherwise.

"END OF REPORT"



GREEN FORCE ASSOCIATES PRIVATE LIMITED



Plot No.-1666, Phase-II, Delta Colony, Nilakantheswar Marg,
Baramunda, Bhubaneswar, Dist - Khurda

Mail info@greenforceassociates.com

Report No- GFAPL/24-25/OCM/029

Issued Date-07.10.2024

TEST REPORT

Client Name & Address	M/s Ferro Alloys Corporation Limited, Ostapal Chromite Mines, Kaliapani, Jajpur		
Nature of Sampling	Ground Water (GW)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per APHA 24 th ED 1060 B: 2023
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Water
Date of Sampling	24.09.2024	Date of Receiving	25.09.2024
Date of Analysis	25.09.2024	Date of Completion	28.09.2024
Sampling Location & Coordinates	GW1- Borewell Near Mechanical Garage; Lat: 21°2'10.46"N and Long: 85°46'5.18"E; GW2- Borewell near Shiv Temple; Lat: 21°3'27.91"N and Long: 85°47'9.51"E; GW3- Borewell Near Tailing Point; Lat: 21°2'10.46"N and Long: 85°46'5.18"E;		

Sl. No.	Parameter	Testing Methods	Unit	Standard as per IS: 10500, 2012		GW1	GW2	GW3
				AL	PL			
1	Colour	IS 3025: (Part 4)- 1983	Hazen	5	15	<5.0	<5.0	<5.0
2	Turbidity	APHA 24th ED: 2130-B -2023	NTU	1	5	<1	<1	<1
3	pH Value @25°C	APHA 24th ED 4500- H-B:2023	--	6.5-8.5	NR	7.02	7.09	7.01
4	Total Dissolved Solids(TDS)	APHA 24th ED 2540-C: 2023	mg/l	500	2000	209	188	192
5	Chloride (as Cl)	APHA 24th Ed 4500- Cl-B:2023	mg/l	250	1000	31	28	27
6	Total Hardness	APHA 24th ED 2340-C: 2023	mg/l	200	600	120	102	105
7	Calcium	APHA 24th Ed 3500- Ca-B:2023	mg/l	75	200	29.3	24.9	25.3
8	Magnesium	APHA 24th ED 3500-Mg-B: 2023	mg/l	30	100	11.4	9.7	10.2
9	Total Alkalinity	APHA 24th ED 2320-B: 2023	mg/l	200	600	112	94	96
10	Residual Free Chlorine	APHA 24th ED 4500 CL-B:2023	mg/l	0.2	1.0	<0.2	<0.2	<0.2
11	Cyanide	APHA 24th ED 4500 CN-F:2023	mg/l	0.05	NR	<0.02	<0.02	<0.02
12	Hexavalent Chromium	APHA 24th ED 3500-Cr-B: 2023	mg/l	0.05	NR	0.04	0.03	0.03
13	Iron	APHA 24th ED 3500-Fe-B: 2023	mg/l	0.3	NR	0.24	0.22	0.19
14	Sulfate	APHA 24th ED 4500-SO4 D: 2023	mg/l	200	400	5.1	4.6	4.9

--1 of 5--



GREEN FORCE ASSOCIATES PRIVATE LIMITED



Plot No.-1666, Phase-II, Delta Colony, Nilakantheswar Marg,
Baramunda, Bhubaneswar, Dist - Khurda

Email: greenforceassociates@gmail.com

Sl. No.	Parameter	Testing Methods	Unit	Standard as per IS: 10500, 2012		GW1	GW2	GW3
				AL	PL			
15	Fluoride	APHA 24th ED 4500-F-C: 2023	mg/l	1.0	1.5	<0.05	<0.05	<0.05
16	Boron	APHA 24th ED 4500 B-B:2023	mg/l	0.5	1.0	<0.01	<0.01	<0.01
17	Manganese	IS 3025 PART-59 :2006 RA 2012	mg/l	0.1	0.3	<0.05	<0.05	<0.05
18	Sodium as Na	APHA 24th ED 3500- Na-B	mg/l	—	—	19.8	17.8	17.1
19	Potassium as K	APHA 24th ED 3500- K-B	mg/l	—	—	1.8	1.7	1.7
20	Ammonical Nitrogen	APHA 24th ED 4500- NH3-C	mg/l	0.5	0.5	<0.5	<0.5	<0.5

REMARKS: NR- not relaxable; AL-Acceptable Limit; PL- Permissible Limit; BDL-Below Detection Limit

Reviewed By

Authorized Signatory

[Signature]
CHIEF ANALYST
GREEN FORCE ASSOCIATES PRIVATE LIMITED
BARAMUNDA, ODISHA

[Signature]
TECHNICAL MANAGER
GREEN FORCE ASSOCIATES PRIVATE LIMITED
BARAMUNDA, ODISHA

Note:

- The results listed refer only to tested samples and applicable parameters Endorsement of products is neither inferred nor implied.
- Total liability of our lab is limited to the invoiced amount.
- Samples will be destroyed after 30 days from the date of test report unless otherwise specified.
- This report is not to be reproduced wholly or in part and cannot be used as evidence in the court of law and should not be used in any advertising media without our special permission in writing.
- Report refers to the sample submitted to us and not drawn by unless mentioned otherwise.

END OF REPORT



GREEN FORCE ASSOCIATES PRIVATE LIMITED

Plot No.-1666, Phase-II, Delta Colony, Nilakantheswar Marg,
Baramunda, Bhubaneswar, Dist - Khurda

Mail Id: greenforceassociates@gmail.com
(An ISO 14001, 9001, 45001 certified Consulting Organization & NABL Accredited Laboratory)

Report No- GFAPL/24-25/OCM/029

Issued Date-07.10.2024

TEST REPORT

Client Name & Address	M/s Ferro Alloys Corporation Limited, Ostapal Chromite Mines, Kaliapani, Jajpur		
Nature of Sampling	Ground Water (GW)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per APHA 24 th ED 1060 B: 2023
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Water
Date of Sampling	24.09.2024	Date of Receiving	25.09.2024
Date of Analysis	25.09.2024	Date of Completion	28.09.2024
Sampling Location & Coordinates	GW1- Borewell Near Mechanical Garage; Lat: 21°2'10.46"N and Long: 85°46'5.18"E; GW2- Borewell near Shiv Temple; Lat: 21°3'27.91"N and Long: 85°47'9.51"E; GW3- Borewell Near Tailing Point; Lat: 21°2'10.46"N and Long: 85°46'5.18"E;		

Sl. No.	Parameter	Testing Methods	Unit	Standard as per IS: 10500, 2012		GW1	GW2	GW3
				AL	PL			
1	Odour	APHA 24 th ED: 2150-B - 2023	---	Agreeable	Agreeable	U/O	U/O	U/O
2	Taste	APHA 24 th ED: 2160-B-2023	---	Agreeable	Agreeable	AL	AL	AL
3	Nitrate	APHA 24 th ED 4500-NO3-E: 2023	mg/l	45	NR	1.78	1.68	1.94
4	Cadmium (as Cd)	IS: 3025(Part 41)	mg/l	0.003	NR	<0.001	<0.001	<0.001
5	Copper (as Cu)	IS: 3025(Part 42)	mg/l	0.05	1.5	<0.02	<0.02	<0.02
6	Zinc (as Zn)	APHA 24 th ED 3500 Zn: 2023	mg/l	5	15	<0.02	<0.02	<0.02
7	Lead (as Pb)	APHA 24 th ED 3500 Pb: 2023	mg/l	0.01	NR	<0.01	<0.01	<0.01
8	Selenium (as Se)	APHA 24 th ED 3500 B: 2023	mg/l	0.01	NR	<0.001	<0.001	<0.001
9	Mercury (as Hg)	APHA 24 th ED 3500Hg: 2023	mg/l	0.001	NR	<0.001	<0.001	<0.001
10	Arsenic (as As)	APHA 24 th ED 3500As: 2023	mg/l	0.01	0.05	<0.001	<0.001	<0.001
11	Aluminum (as Al)	APHA 24 th ED 3500Al: 2023	mg/l	0.03	0.2	<0.01	<0.01	<0.01
12	Mineral Oil	APHA 24 th ED 5220B: 2023	mg/l	0.5	NR	ND	ND	ND
13	Anionic Detergents (as MBAS)	APHA 24 th ED 5540 C: 2023	mg/l	0.2	1.0	ND	ND	ND
14	Phenolic Compound (as C6H5OH)	APHA 24 th ED 5530 B,D: 2023	mg/l	0.001	0.002	<0.001	<0.001	<0.001



GREEN FORCE ASSOCIATES PRIVATE LIMITED



Plot No.-1666, Phase-II, Delta Colony, Nilakantheswar Marg,
Baramunda, Bhubaneswar, Dist - Khurdha



Mail Id: greenforceassociates@gmail.com

(An ISO 14001, 9001, 45001 certified Consulting Organization & NABL Accredited Laboratory)

Sl. No.	Parameter	Testing Methods	Unit	Standard as per IS: 10500, 2012		GW1	GW2	GW3
				AL	PL			
15	Barium (Ba)	APHA 24th ED 3111 B: 2023	mg/l	0.7	0.7	<0.02	<0.02	<0.02
Bacteriological Parameters								
16	Total Coliforms	APHA 24th ED 9222-H: 2023	MPN/100 ml	—	—	<1.8	<1.8	<1.8
17	Chloramines (as Cl ₂)	APHA 24th ED 4500 CL G: 2023	mg/l	4.0	4.0	ND	ND	ND
18	Silver (as Ag)	APHA 24th ED 3500 Ag: 2023	mg/l	0.1	0.1	<0.1	<0.1	<0.1
19	Sulphide (as H ₂ S)	APHA 24th ED 4500 S ²⁻ D: 2023	mg/l	0.05	0.05	ND	ND	ND
20	Nickel (as Ni)	IS 5185 (Part-22)	mg/l	0.02	0.02	<0.02	<0.02	<0.02
21	Polychlorinated biphenyls	APHA 24th ED 6440 B: 2023	mg/l	0.0005	0.0005	ND	ND	ND
22	Polyaromatic Hydrocarbons (PAH)	APHA 24th ED 6440 B: 2023	mg/l	0.0001	0.0001	ND	ND	ND
23	Bromoform	APHA 24th ED 6232 B: 2023	mg/l	0.1	0.1	ND	ND	ND
24	Dibromochloromethane	APHA 24th ED 6232 B: 2023	mg/l	0.1	0.1	ND	ND	ND
25	Bromodichloromethane	APHA 24th ED 6232 B: 2023	mg/l	0.06	0.06	ND	ND	ND
26	Chloroform	APHA 24th ED 6232 B: 2023	mg/l	0.2	0.2	ND	ND	ND
27	Molybdenum (Mo)	IS 3025 (Part-2)	mg/l	0.07	0.07	<0.05	<0.05	<0.05
PESTICIDE								
28	Endosulfan α	APHA 24th ED 6630 C: 2023	μg/l	0.4		<0.005	<0.005	<0.005
29	Endosulfan β	APHA 24th ED 6630 C: 2023	μg/l	0.4		<0.005	<0.005	<0.005
30	Endosulfan sulphate	APHA 24th ED 6630 C: 2023	μg/l	0.4		<0.005	<0.005	<0.005
31	Alachlor	APHA 24th ED 6630 C: 2023	μg/l	20		<0.01	<0.01	<0.01
32	Atrazine	APHA 24th ED 6630 C: 2023	μg/l	2.0		<0.01	<0.01	<0.01
33	Aldrin	APHA 24th ED 6630 C: 2023	μg/l	0.03		<0.01	<0.01	<0.01
34	Alpha HCH	APHA 24th ED 6630 C: 2023	μg/l	0.01		<0.01	<0.01	<0.01
35	Beta HCH	APHA 24th ED 6630 C: 2023	μg/l	0.04		<0.01	<0.01	<0.01



GREEN FORCE ASSOCIATES PRIVATE LIMITED



Plot No.-1666, Phase-II, Delta Colony, Nilakantheswar Marg,
Baramunda, Bhubaneswar, Dist - Khurdha



Mail Id: greenforceassociates@gmail.com

(An ISO 14001, 9001, 45001 certified Consulting Organization & NABL Accredited Laboratory)

PESTICIDE							
36	Delta HCH	APHA 24th ED 6630 C: 2023	µg/l	0.04	<0.01	<0.01	<0.01
37	Butachlor	APHA 24th ED 6630 C: 2023	µg/l	125.0	<0.01	<0.01	<0.01
38	Chloropyrifos	APHA 24th ED 6630 C: 2023	µg/l	30.0	<0.01	<0.01	<0.01
39	2,4-Dichlorophenoxyacetic acid	APHA 24th ED 6630 C: 2023	µg/l	30.0	<0.05	<0.05	<0.05
40	p p DDE	APHA 24th ED 6630 C: 2023	µg/l	1.0	<0.05	<0.05	<0.05
41	p p DDD	APHA 24th ED 6630 C: 2023	µg/l	1.0	<0.05	<0.05	<0.05
42	p p DDT	APHA 24th ED 6630 C: 2023	µg/l	1.0	<0.05	<0.05	<0.05
43	o p DDE	APHA 24th ED 6630 C: 2023	µg/l	1.0	<0.05	<0.05	<0.05
44	o p DDD	APHA 24th ED 6630 C: 2023	µg/l	1.0	<0.05	<0.05	<0.05
45	o p DDT	APHA 24th ED 6630 C: 2023	µg/l	1.0	<0.05	<0.05	<0.05
46	Ethion	APHA 24th ED 6630 C: 2023	µg/l	3.0	<0.01	<0.01	<0.01
47	Lindane	APHA 24th ED 6630 C: 2023	µg/l	2.0	<0.01	<0.01	<0.01
48	Isoproturon	APHA 24th ED 6630 C: 2023	µg/l	9.0	<0.01	<0.01	<0.01
49	Malathion	APHA 24th ED 6630 C: 2023	µg/l	190.0	<0.01	<0.01	<0.01
50	Methyl parathion	APHA 24th ED 6630 C: 2023	µg/l	0.3	<0.01	<0.01	<0.01
51	Monocrotophos	APHA 24th ED 6630 C: 2023	µg/l	1.0	<0.01	<0.01	<0.01
52	Phorate	APHA 24th ED 6630 C: 2023	µg/l	2.0	<0.01	<0.01	<0.01

REMARKS: NR- not relaxable; AL-Acceptable Limit; PL- Permissible Limit; BDL-Below Detection Limit

Reviewed By

Authorized Signatory

CHIEF ANALYST

TECHNICAL MANAGER

GREENFORCE ASSOCIATES PRIVATE LIMITED
Bhubaneswar, Odisha

GREENFORCE ASSOCIATES PRIVATE LIMITED
Bhubaneswar, Odisha

Note:

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END OF REPORT

--5 of 5--

Plot No- 1363-3892, Baibhab Realcon, Fulnakhara,
Cuttack, Odisha, India 754001



GREEN FORCE ASSOCIATES PRIVATE LIMITED



Plot No.-1666, Phase-II, Delta Colony, Nilakantheswar Marg,
Baramunda, Bhubaneswar, Dist - Khurda

Mail Id: greenforceassociates@gmail.com

Report No- GFAPL/24-25/OCM/030

Issued Date-07.10.2024

TEST REPORT

Client Name & Address	M/s Ferro Alloys Corporation Limited, Ostapal Chromite Mines, Kaliapani, Jajpur		
Nature of Sampling	Ground Water (GW)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per APHA 24 th ED 1060 B: 2023
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Water
Date of Sampling	24.09.2024	Date of Receiving	25.09.2024
Date of Analysis	25.09.2024	Date of Completion	28.09.2024
Sampling Location & Coordinates	GW4- Kaliapani Village; Lat: 21°3'15.68"N and Long: 85°46'53.38"E; GW5- Ostapal Village; Lat: 21°3'53.63"N and Long: 85°48'3.15"E; GW6- Gurujang Village; Lat: 21°3'36.26"N& Long: 85°46'52.32"E;		

Sl. No.	Parameter	Testing Methods	Unit	Standard as per IS: 10500, 2012		GW4	GW5	GW6
				AL	PL			
1	Colour	IS 3025: (Part 4)- 1983	Hazen	5	15	<5.0	<5.0	<5.0
2	Turbidity	APHA 24th ED: 2130-B -2023	NTU	1	5	<1	<1	<1
3	pH Value @25°C	APHA 24th ED 4500- H+B:2023	--	6.5-8.5	NR	7.12	7.15	7.07
4	Total Dissolved Solids(TDS)	APHA 24th ED 2540-C: 2023	mg/l	500	2000	219	213	216
5	Chloride (as Cl)	APHA 24th Ed 4500- Cl-B:2023	mg/l	250	1000	30	28	27
6	Total Hardness	APHA 24th ED 2340-C: 2023	mg/l	200	600	123	121	124
7	Calcium	APHA 24th Ed 3500- Ca-B:2023	mg/l	75	200	30.9	30.5	30.9
8	Magnesium	APHA 24th ED 3500-Mg-B: 2023	mg/l	30	100	11.2	10.9	11.4
9	Total Alkalinity	APHA 24th ED 2320-B: 2023	mg/l	200	600	116	112	119
10	Residual Free Chlorine	APHA 24th ED 4500 CL-B:2023	mg/l	0.2	1.0	<0.2	<0.2	<0.2
11	Cyanide	APHA 24th ED 4500 CN-F:2023	mg/l	0.05	NR	<0.02	<0.02	<0.02
12	Hexavalent Chromium	APHA 24th ED 3500-Cr-B: 2023	mg/l	0.05	NR	0.03	0.03	0.05
13	Iron	APHA 24th ED 3500-Fe-B: 2023	mg/l	0.3	NR	0.18	0.2	0.21
14	Sulfate	APHA 24th ED 4500-SO4 D: 2023	mg/l	200	400	5.6	4.7	5.1



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Plot No.-1666, Phase-II, Delta Colony, Nilakantheswar Marg,
Baramunda, Bhubaneswar, Dist - Khurdha

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Sl. No.	Parameter	Testing Methods	Unit	Standard as per IS: 10500, 2012		GW4	GW5	GW6
				AL	PL			
15	Fluoride	APHA 24th ED 4500-F-C: 2023	mg/l	1.0	1.5	<0.05	<0.05	<0.05
16	Boron	APHA 24th ED 4500 B-B:2023	mg/l	0.5	1.0	<0.01	<0.01	<0.01
17	Manganese	IS 3025 PART-59 :2006 RA 2012	mg/l	0.1	0.3	<0.05	<0.05	<0.05
18	Sodium as Na	APHA 24th ED 3500- Na-B	mg/l	—	—	18.8	17.8	18.6
19	Potassium as K	APHA 24th ED 3500- K-B	mg/l	—	—	1.9	1.8	1.8
20	Ammonical Nitrogen	APHA 24th ED 4500- NH3-C	mg/l	0.5	0.5	<0.5	<0.5	<0.5

REMARKS: NR- not relaxable; AL-Acceptable Limit; PL- Permissible Limit; BDL-Below Detection Limit

Reviewed By

Authorized Signatory

CHIEF ANALYST

TECHNICAL MANAGER

GREENFORCE ASSOCIATES PRIVATE LIMITED
BHUBANESWAR, ODISHA

GREENFORCE ASSOCIATES PRIVATE LIMITED
BHUBANESWAR, ODISHA

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END OF REPORT



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Baramunda, Bhubaneswar, Dist - Khurda

Mail Id: greenforceassociates@gmail.com

(An ISO 14001, 9001, 45001 certified Consulting Organization & NABL Accredited Laboratory)

Report No- GFAPL/24-25/OCM/030

Issued Date-07.10.2024

TEST REPORT

Client Name & Address	M/s Ferro Alloys Corporation Limited, Ostapal Chromite Mines, Kaliapani, Jajpur		
Nature of Sampling	Ground Water (GW)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per APHA 24 th ED 1060 B: 2023
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Water
Date of Sampling	24.09.2024	Date of Receiving	25.09.2024
Date of Analysis	25.09.2024	Date of Completion	28.09.2024
Sampling Location & Coordinates	GW4- Kaliapani Village; Lat: 21°3'15.68"N and Long: 85°46'53.38"E; GW5- Ostapal Village; Lat: 21°3'53.63"N and Long: 85°48'3.15"E; GW6- Gurujang Village; Lat: 21°3'36.26"N & Long: 85°46'52.32"E;		

Sl. No.	Parameter	Testing Methods	Unit	Standard as per IS: 10500, 2012		GW4	GW5	GW6
				AL	PL			
1	Odour	APHA 24th ED: 2150-B - 2023	---	Agreeable	Agreeable	U/O	U/O	U/O
2	Taste	APHA 24th ED: 2160-B-2023	---	Agreeable	Agreeable	AL	AL	AL
3	Nitrate	APHA 24th ED 4500-NO3-E: 2023	mg/l	45	NR	2.12	1.86	1.84
4	Cadmium (as Cd)	IS: 3025(Part 41)	mg/l	0.003	NR	<0.001	<0.001	<0.001
5	Copper (as Cu)	IS: 3025(Part 42)	mg/l	0.05	1.5	<0.02	<0.02	<0.02
6	Zinc (as Zn)	APHA 24th ED 3500 Zn: 2023	mg/l	5	15	<0.02	<0.02	<0.02
7	Lead (as Pb)	APHA 24th ED 3500 Pb: 2023	mg/l	0.01	NR	<0.01	<0.01	<0.01
8	Selenium (as Se)	APHA 24th ED 3500 B: 2023	mg/l	0.01	NR	<0.001	<0.001	<0.001
9	Mercury (as Hg)	APHA 24th ED 3500 Hg: 2023	mg/l	0.001	NR	<0.001	<0.001	<0.001
10	Arsenic (as As)	APHA 24th ED 3500 As: 2023	mg/l	0.01	0.05	<0.001	<0.001	<0.001
11	Aluminum (as Al)	APHA 24th ED 3500 Al: 2023	mg/l	0.03	0.2	<0.01	<0.01	<0.01
12	Mineral Oil	APHA 24th ED 5220 B: 2023	mg/l	0.5	NR	ND	ND	ND
13	Anionic Detergents (as MBAS)	APHA 24th ED 5540 C: 2023	mg/l	0.2	1.0	ND	ND	ND



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Sl. No.	Parameter	Testing Methods	Unit	Standard as per IS: 10500, 2012		GW4	GW5	GW6
				AL	PL			
14	Phenolic Compound (as C ₆ H ₅ OH)	APHA 24th ED 5530 B,D: 2023	mg/l	0.001	0.002	<0.001	<0.001	<0.001
15	Barium (Ba)	APHA 24th ED 3111 B: 2023	mg/l	0.7	0.7	<0.5	<0.5	<0.5
Bacteriological Parameters								
16	Total Coliforms	APHA 24th ED 9222-H: 2023	MPN/100 ml	—	—	<1.8	<1.8	<1.8
17	Chloramines (as Cl ₂)	APHA 24th ED 4500 CL G: 2023	mg/l	4.0	4.0	ND	ND	ND
18	Silver (as Ag)	APHA 24th ED 3500 Ag: 2023	mg/l	0.1	0.1	<0.1	<0.1	<0.1
19	Sulphide (as H ₂ S)	APHA 24th ED 4500 S ²⁻ D: 2023	mg/l	0.05	0.05	ND	ND	ND
20	Nickel (as Ni)	IS 5185 (Part-22)	mg/l	0.02	0.02	<0.02	<0.02	<0.02
21	Polychlorinated biphenyls	APHA 24th ED 6440 B: 2023	mg/l	0.0005	0.0005	ND	ND	ND
22	Polyaromatic Hydrocarbons (PAH)	APHA 24th ED 6440 B: 2023	mg/l	0.0001	0.0001	ND	ND	ND
23	Bromoform	APHA 24th ED 6232 B: 2023	mg/l	0.1	0.1	ND	ND	ND
24	Dibromochloromethane	APHA 24th ED 6232 B: 2023	mg/l	0.1	0.1	ND	ND	ND
25	Bromodichloromethane	APHA 24th ED 6232 B: 2023	mg/l	0.06	0.06	ND	ND	ND
26	Chloroform	APHA 24th ED 6232 B: 2023	mg/l	0.2	0.2	ND	ND	ND
27	Molybdenum (Mo)	IS 3025 (Part-2)	mg/l	0.07	0.07	<0.05	<0.05	<0.05
PESTICIDE								
28	Endosulfan α	APHA 24th ED 6630 C: 2023	μg/l	0.4		<0.005	<0.005	<0.005
29	Endosulfan β	APHA 24th ED 6630 C: 2023	μg/l	0.4		<0.005	<0.005	<0.005
30	Endosulfan sulphate	APHA 24th ED 6630 C: 2023	μg/l	0.4		<0.005	<0.005	<0.005
31	Alachlor	APHA 24th ED 6630 C: 2023	μg/l	20		<0.01	<0.01	<0.01
32	Atrazine	APHA 24th ED 6630 C: 2023	μg/l	2.0		<0.01	<0.01	<0.01
33	Aldrin	APHA 24th ED 6630 C: 2023	μg/l	0.03		<0.01	<0.01	<0.01
34	Alpha HCH	APHA 24th ED 6630 C: 2023	μg/l	0.01		<0.01	<0.01	<0.01
35	Beta HCH	APHA 24th ED 6630 C: 2023	μg/l	0.04		<0.01	<0.01	<0.01



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PESTICIDE							
36	Delta HCH	APHA 24th ED 6630 C: 2023	µg/l	0.04	<0.01	<0.01	<0.01
37	Butachlor	APHA 24th ED 6630 C: 2023	µg/l	125.0	<0.01	<0.01	<0.01
38	Chloropyriphos	APHA 24th ED 6630 C: 2023	µg/l	30.0	<0.01	<0.01	<0.01
39	2,4-Dichlorophenoxyacetic acid	APHA 24th ED 6630 C: 2023	µg/l	30.0	<0.05	<0.05	<0.05
40	p p DDE	APHA 24th ED 6630 C: 2023	µg/l	1.0	<0.05	<0.05	<0.05
41	p p DDD	APHA 24th ED 6630 C: 2023	µg/l	1.0	<0.05	<0.05	<0.05
42	p p DDT	APHA 24th ED 6630 C: 2023	µg/l	1.0	<0.05	<0.05	<0.05
43	o p DDE	APHA 24th ED 6630 C: 2023	µg/l	1.0	<0.05	<0.05	<0.05
44	o p DDD	APHA 24th ED 6630 C: 2023	µg/l	1.0	<0.05	<0.05	<0.05
45	o p DDT	APHA 24th ED 6630 C: 2023	µg/l	1.0	<0.05	<0.05	<0.05
46	Ethion	APHA 24th ED 6630 C: 2023	µg/l	3.0	<0.01	<0.01	<0.01
47	Lindane	APHA 24th ED 6630 C: 2023	µg/l	2.0	<0.01	<0.01	<0.01
48	Isoproturon	APHA 24th ED 6630 C: 2023	µg/l	9.0	<0.01	<0.01	<0.01
49	Malathion	APHA 24th ED 6630 C: 2023	µg/l	190.0	<0.01	<0.01	<0.01
50	Methyl parathion	APHA 24th ED 6630 C: 2023	µg/l	0.3	<0.01	<0.01	<0.01
51	Monocrotophos	APHA 24th ED 6630 C: 2023	µg/l	1.0	<0.01	<0.01	<0.01
52	Phorate	APHA 24th ED 6630 C: 2023	µg/l	2.0	<0.01	<0.01	<0.01

REMARKS: NR- not relaxable; AL-Acceptable Limit; PL- Permissible Limit; BDL-Below Detection Limit

Reviewed By

Authorized Signatory

CHIEF ANALYST

TECHNICAL MANAGER

GREENFORCE ASSOCIATES PRIVATE LIMITED
BARAMUNDA, BHUBANESWAR, ODISHA

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BARAMUNDA, BHUBANESWAR, ODISHA

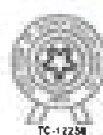
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Plot No.-1666, Phase-II, Delta Colony, Nilakantheswar Marg,
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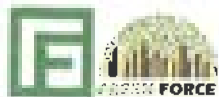
Report No- GFAPL/24-25/OCM/031

Issued Date-07.10.2024

TEST REPORT

Client Name & Address	M/s Ferro Alloys Corporation Limited, Ostapal Chromite Mines, Kaliapani, Jajpur		
Nature of Sampling	Ground Water (GW)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per APHA 24 th ED 1060 B: 2023
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Water
Date of Sampling	24.09.2024	Date of Receiving	25.09.2024
Date of Analysis	25.09.2024	Date of Completion	28.09.2024
Sampling Location & Coordinates	GW7- Ostia Village; Lat: 21°3'23.00"N and Long: 85°46'25.32"E; GW8- Kaposi Village; Lat: 21°3'53.82"N and Long: 85°48'3.22"E;		

Sl. No.	Parameter	Testing Methods	Unit	Standard as per IS: 10500, 2012		GW7	GW8
				AL	PL		
1	Colour	IS 3025: (Part 4)- 1983	Hazen	5	15	<5.0	<5.0
2	Turbidity	APHA 24th ED: 2130-B -2023	NTU	1	5	<1	<1
3	pH Value @25°C	APHA 24th ED 4500- H+B:2023	--	6.5-8.5	NR	7.14	7.05
4	Total Dissolved Solids(TDS)	APHA 24th ED 2540-C: 2023	mg/l	500	2000	208	217
5	Chloride (as Cl)	APHA 24th Ed 4500- Cl-B:2023	mg/l	250	1000	26	28
6	Total Hardness	APHA 24th ED 2340-C: 2023	mg/l	200	600	121	125
7	Calcium	APHA 24th Ed 3500- Ca-B:2023	mg/l	75	200	28.9	30.1
8	Magnesium	APHA 24th ED 3500-Mg-B: 2023	mg/l	30	100	11.9	12.2
9	Total Alkalinity	APHA 24th ED 2320-B: 2023	mg/l	200	600	114	117
10	Residual Free Chlorine	APHA 24th ED 4500 CL-B:2023	mg/l	0.2	1.0	<0.2	<0.2
11	Cyanide	APHA 24th ED 4500 CN-F:2023	mg/l	0.05	NR	<0.02	<0.02
12	Hexavalent Chromium	APHA 24th ED 3500-Cr-B: 2023	mg/l	0.05	NR	0.18	0.19
13	Iron	APHA 24th ED 3500-Fe-B: 2023	mg/l	0.3	NR	0.18	0.16
14	Sulfate	APHA 24th ED 4500-SO4 D: 2023	mg/l	200	400	4.2	4.5



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Sl. No.	Parameter	Testing Methods	Unit	Standard as per IS: 10500, 2012		GW7	GW8
				AL	PL		
15	Fluoride	APHA 24th ED 4500-F-C: 2023	mg/l	1.0	1.5	<0.05	<0.05
16	Boron	APHA 24th ED 4500 B-B:2023	mg/l	0.5	1.0	<0.01	<0.01
17	Manganese	IS 3025 PART-59 :2006 RA 2012	mg/l	0.1	0.3	<0.05	<0.05
18	Sodium as Na	APHA 24th ED 3500- Na-B	mg/l	—	—	16.6	17.8
19	Potassium as K	APHA 24th ED 3500- K-B	mg/l	—	—	1.5	1.7
20	Ammonical Nitrogen	APHA 24th ED 4500- NH3-C	mg/l	0.5	0.5	<0.5	<0.5

REMARKS: NR- not relaxable; AL-Acceptable Limit; PL- Permissible Limit; BDL-Below Detection Limit

Reviewed By

Authorized Signatory


CHIEF ANALYST
GREENFORCE ASSOCIATES PRIVATE LIMITED
Bhubaneswar, Odisha


TECHNICAL MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
Bhubaneswar, Odisha

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Report No- GFAPL/24-25/OCM/031

Issued Date-07.10.2024

TEST REPORT

Client Name & Address	M/s Ferro Alloys Corporation Limited; Ostapal Chromite Mines, Kaliapani, Jaipur		
Nature of Sampling	Ground Water (GW)		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per APHA 24 th ED 1060 B: 2023
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Water
Date of Sampling	24.09.2024	Date of Receiving	25.09.2024
Date of Analysis	25.09.2024	Date of Completion	28.09.2024
Sampling Location & Coordinates	GW7- Ostia Village; Lat: 21°3'23.00"N and Long: 85°46'25.32"E; GW8- Kaposi Village; Lat: 21°3'53.82"N and Long: 85°48'3.22"E;		

Sl. No.	Parameter	Testing Methods	Unit	Standard as per IS: 10500, 2012		GW7	GW8
				AL	PL		
1	Odour	APHA 24th ED: 2150-B - 2023	—	Agreeable	Agreeable	U/O	U/O
2	Taste	APHA 24th ED: 2160-B-2023	—	Agreeable	Agreeable	al	al
3	Nitrate	APHA 24th ED 4500-NO3-E 2023	mg/l	45	NR	1.44	1.56
4	Cadmium (as Cd)	IS: 3025(Part 41)	mg/l	0.003	NR	<0.001	<0.001
5	Copper (as Cu)	IS: 3025(Part 42)	mg/l	0.05	1.5	<0.02	<0.02
6	Zinc (as Zn)	APHA 24th ED 3500 Zn: 2023	mg/l	5	15	<0.02	<0.02
7	Lead (as Pb)	APHA 24th ED 3500 Pb: 2023	mg/l	0.01	NR	<0.01	<0.01
8	Selenium (as Se)	APHA 24th ED 3500 B: 2023	mg/l	0.01	NR	<0.001	<0.001
9	Mercury (as Hg)	APHA 24th ED 3500Hg: 2023	mg/l	0.001	NR	<0.001	<0.001
10	Arsenic (as As)	APHA 24th ED 3500As: 2023	mg/l	0.01	0.05	<0.001	<0.001
11	Aluminum (as Al)	APHA 24th ED 3500Al: 2023	mg/l	0.03	0.2	<0.01	<0.01
12	Mineral Oil	APHA 24th ED 5220B: 2023	mg/l	0.5	NR	ND	ND
13	Anionic Detergents (as MBAS)	APHA 24th ED 5540 C: 2023	mg/l	0.2	1.0	ND	ND

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Plot No.-1666, Phase-II, Delta Colony, Nilakantheswar Marg,
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Sl. No.	Parameter	Testing Methods	Unit	Standard as per IS: 10500, 2012		GW7	GW8
				AL	PL		
14	Phenolic Compound (as C ₆ H ₅ OH)	APHA 24th ED 5530 B,D: 2023	mg/l	0.001	0.002	<0.001	<0.001
15	Barium (Ba)	APHA 24th ED 3111 B: 2023	mg/l	0.7	0.7	<0.5	<0.5
Bacteriological Parameters							
16	Total Coliforms	APHA 24th ED 9222-H: 2023	MPN/100 ml	—	—	<1.8	<1.8
17	Chloramines (as Cl ₂)	APHA 24th ED 4500 CL G: 2023	mg/l	4.0	4.0	ND	ND
18	Silver (as Ag)	APHA 24th ED 3500 Ag: 2023	mg/l	0.1	0.1	<0.1	<0.1
19	Sulphide (as H ₂ S)	APHA 24th ED 4500 S ²⁻ D: 2023	mg/l	0.05	0.05	ND	ND
20	Nickel (as Ni)	IS 5185 (Part-22)	mg/l	0.02	0.02	<0.02	<0.02
21	Polychlorinated biphenyls	APHA 24th ED 6440 B: 2023	mg/l	0.0005	0.0005	ND	ND
22	Polycyclic Aromatic Hydrocarbons (PAH)	APHA 24th ED 6440 B: 2023	mg/l	0.0001	0.0001	ND	ND
23	Bromoform	APHA 24th ED 6232 B: 2023	mg/l	0.1	0.1	ND	ND
24	Dibromochloromethane	APHA 24th ED 6232 B: 2023	mg/l	0.1	0.1	ND	ND
25	Bromodichloromethane	APHA 24th ED 6232 B: 2023	mg/l	0.06	0.06	ND	ND
26	Chloroform	APHA 24th ED 6232 B: 2023	mg/l	0.2	0.2	ND	ND
27	Molybdenum (Mo)	IS 3025 (Part-2)	mg/l	0.07	0.07	<0.05	<0.05
PESTICIDE							
28	Endosulfan α	APHA 24th ED 6630 C: 2023	µg/l	0.4		<0.005	<0.005
29	Endosulfan β	APHA 24th ED 6630 C: 2023	µg/l	0.4		<0.005	<0.005
30	Endosulfan sulphate	APHA 24th ED 6630 C: 2023	µg/l	0.4		<0.005	<0.005
31	Alachlor	APHA 24th ED 6630 C: 2023	µg/l	20		<0.01	<0.01
32	Atrazine	APHA 24th ED 6630 C: 2023	µg/l	2.0		<0.01	<0.01
33	Aldrin	APHA 24th ED 6630 C: 2023	µg/l	0.03		<0.01	<0.01
34	Alpha HCH	APHA 24th ED 6630 C: 2023	µg/l	0.01		<0.01	<0.01
35	Beta HCH	APHA 24th ED 6630 C: 2023	µg/l	0.04		<0.01	<0.01



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PESTICIDE						
36	Delta HCH	APHA 24th ED 6630 C: 2023	µg/l	0.04	<0.01	<0.01
37	Butachlor	APHA 24th ED 6630 C: 2023	µg/l	125.0	<0.01	<0.01
38	Chloropyrifos	APHA 24th ED 6630 C: 2023	µg/l	30.0	<0.01	<0.01
39	2,4-Dichlorophenoxyacetic acid	APHA 24th ED 6630 C: 2023	µg/l	30.0	<0.05	<0.05
40	p p DDE	APHA 24th ED 6630 C: 2023	µg/l	1.0	<0.05	<0.05
41	p p DDD	APHA 24th ED 6630 C: 2023	µg/l	1.0	<0.05	<0.05
42	p p DDT	APHA 24th ED 6630 C: 2023	µg/l	1.0	<0.05	<0.05
43	o p DDE	APHA 24th ED 6630 C: 2023	µg/l	1.0	<0.05	<0.05
44	o p DDD	APHA 24th ED 6630 C: 2023	µg/l	1.0	<0.05	<0.05
45	o p DDT	APHA 24th ED 6630 C: 2023	µg/l	1.0	<0.05	<0.05
46	Ethion	APHA 24th ED 6630 C: 2023	µg/l	3.0	<0.01	<0.01
47	Lindane	APHA 24th ED 6630 C: 2023	µg/l	2.0	<0.01	<0.01
48	Isoproturon	APHA 24th ED 6630 C: 2023	µg/l	9.0	<0.01	<0.01
49	Malathion	APHA 24th ED 6630 C: 2023	µg/l	190.0	<0.01	<0.01
50	Methyl parathion	APHA 24th ED 6630 C: 2023	µg/l	0.3	<0.01	<0.01
51	Monocrotophos	APHA 24th ED 6630 C: 2023	µg/l	1.0	<0.01	<0.01
52	Phorate	APHA 24th ED 6630 C: 2023	µg/l	2.0	<0.01	<0.01

REMARKS: NR- Not Relaxable; AL-Acceptable Limit; PL- Permissible Limit; BDL-Below Detection Limit

Reviewed By

CHIEF ANALYST

GREENFORCE ASSOCIATES PRIVATE LIMITED
Bhubaneswar, Odisha

Authorized Signatory

TECHNICAL MANAGER

GREENFORCE ASSOCIATES PRIVATE LIMITED
Bhubaneswar, Odisha

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Plot No.-1666, Phase-II, Delta Colony, Nilakantheswar Marg,
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Mail Id: greenforceassociates@gmail.com

Report No-GFAPL/24-25/OCM/024

Issued Date-07.10.2024

TEST REPORT

Client Name & Address	M/s Ferro Alloys Corporation Limited: Ostapal Chromite Mines, Kaliapani, Jagpur		
Nature of Sampling	Surface Water Flow Rate		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per CPCB Guidelines
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Water
Date of Sampling	24.09.2024		

Sl. No.	Sampling Location	Result (in m/sec)
1	Damsala Nala	15.32

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Authorized Signatory

CHIEF ANALYST

TECHNICAL MANAGER

GREENFORCE ASSOCIATES PRIVATE LIMITED

GREENFORCE ASSOCIATES PRIVATE LIMITED

Bhubaneswar, Odisha

Bhubaneswar, Odisha

Chief Analyst

Miss. Arti Sahoo

Mr. S.K. Parhi

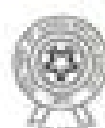
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Email Id: greenforceassociates@gmail.com

Report No-GFAPL/24-25/OCM/032

Issued Date-07.10.2024

TEST REPORT

Client Name & Address	M/s Ferro Alloys Corporation Limited, Ostapal Chromite Mines, Kaliapani, Jajpur		
Nature of Sampling	Surface Water		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per APHA 24 th ED 1060 B: 2023
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Water
Date of Sampling	24.09.2024	Date of Receiving	25.09.2024
Date of Analysis	25.09.2024	Date of Completion	28.09.2024
Sampling Location & Coordinates	SW1: Damsala Nala Upstream; Lat: 21°3'18.43"N and Long: 85°47'10.79"E; SW2: Damsala Nala Downstream; Lat: 21°3'17.12"N and Long: 85°47'5.33"E;		

Sl. No.	Parameter	Testing Methods	Unit	Standard as per IS-2296 Class-C	SW1	SW2
1.	Colour	IS 3025: (Part 4)- 1983	Hazen	300	<5.0	<5.0
2.	Turbidity	APHA 24th ED: 2130-B -2023	NTU	—	<1.0	<1.0
3.	pH	APHA 24th ED 4500- H+B:2023	—	6.0-9.0	7.18	7.24
4.	Conductivity	APHA 24th ED 2510-B: 2023	µS/cm	—	216.5	235.2
5.	Total Dissolved Solid	APHA 24th ED 2540-C: 2023	mg/l	1500	132	144
6.	Chloride (as Cl)	APHA 24th ED 4500- Cl-B:2023	mg/l	600	24	28
7.	Cyanide (as CN)	APHA 24th ED 4500-CN-F	mg/l	0.05	<0.02	<0.02
8.	Hexavalent Chromium(asCr+6)	APHA 24 th ED 3500-Cr-B: 2023	mg/l	0.05	<0.05	<0.05
9.	Iron (as Fe)	APHA 24th ED 3500-Fe-B: 2023	mg/l	50	0.29	0.32
10.	Sulfate (as SO ₄)	APHA 24th ED 4500-SO ₄ D: 2023	mg/l	400	6.8	7.1
11.	Fluoride (as F)	APHA 24th ED 4500-F-C: 2023	mg/l	1.5	0.08	0.09
12.	Oil & Grease	IS 3025 PART 39-1991 RA-2003	mg/l	0.1	<1.0	<1.0
13.	Dissolved oxygen	APHA 24th ED 4500 O-C:2023	mg/l	4 (min)	6.6	6.5
14.	BOD (3) days at 27°C	IS 3025 (PART 44): 1993 REA-2009	mg/l	3.0	<2.0	<2.0
15.	Chemical Oxygen Demand as COD	APHA 24th ED 5220 C:2023	mg/l	—	14	18

Reviewed By

Authorized Signatory

CHIEF ANALYST
GREENFORCE ASSOCIATES PRIVATE LIMITED
BHUBANESWAR, ODISHA

TECHNICAL MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
BHUBANESWAR, ODISHA

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Plot No- 1363-3892, Baibhab Realcon, Fulnakhara,
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Report No-GFAPL/24-25/OCM/021

Issued Date-07.10.2024

TEST REPORT

Client Name & Address	M/s Ferro Alloys Corporation Limited, Ostapal Chromite Mines, Kaliapani, Jaipur		
Nature of Sampling	Surface Water		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per APHA 24 th ED 1060 B: 2023
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Water
Date of Sampling	24.09.2024	Date of Receiving	25.09.2024
Date of Analysis	25.09.2024	Date of Completion	28.09.2024
Sampling Location & Coordinates	SW1: Damsala Nala Upstream (100 mt); Lat: 21°3'18.43"N and Long: 85°47'10.79"E; SW2: Damsala Nala Downstream (100 mt); Lat: 21°3'17.12"N and Long: 85°47'5.33"E;		

Sl. No.	Parameter	Testing Methods	Unit	Standard as per IS-2296 Class-C	SW1	SW2
1.	Nitrate (as NO ₃)	APHA 24th ED 4500-NO ₃ -E: 2023	mg/l	50	1.72	1.98
2.	Phenolic Compounds as C ₆ H ₅ OH	APHA 24th ED 5530 B,D:2023	mg/l	---	<0.001	<0.001
3.	Copper (as Cu)	IS: 3025(Part 42)	mg/l	0.05	<0.02	<0.02
4.	Lead (as Pb)	APHA 24th ED 3500 Pb: 2023	mg/l	0.01	<0.01	<0.01
5.	Zinc (as Zn)	APHA 24th ED 3500 Zn: 2023	mg/l	5	<0.02	<0.02
6.	Arsenic as As	IS: 3025 (Part 37)	mg/l	---	<0.001	<0.001
7.	Selenium (as Se)	APHA 24th ED 3500 B: 2023	mg/l	0.001	<0.001	<0.001
8.	Cadmium (as Cd)	IS: 3025(Part 41)	mg/l	0.003	<0.001	<0.001
9.	Total Coliform	APHA 24th ED 9222-H: 2023	MPN/100ml	---	900	900

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Authorized Signatory

CHIEF ANALYST

TECHNICAL MANAGER

GREENFORCE ASSOCIATES PRIVATE LIMITED
Bhubaneswar, Odisha

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Bhubaneswar, Odisha

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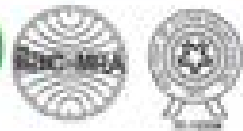
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Annexure 23

Report No-GFAPL/24-25/OCM/032

Issued Date-07.10.2024

TEST REPORT

Client Name & Address	M/s Ferro Alloys Corporation Limited, Ostapal Chromite Mines, Kaliapani, Jajpur		
Nature of Sampling	ETP Water		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per APHA 24 th ED 1060 B: 2023
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Environment & Pollution
Date of Sampling	23.09.2024	Date of Receiving	24.09.2024
Date of Analysis	24.09.2024	Date of Complete	27.09.2024
Sampling Location & Coordinates	ETP1- ETP Inlet: Lat: 21°2'10.46"N and Long: 85°46'5.18"E; ETP2- ETP Outlet; Lat: 21°2'10.46"N and Long: 85°46'5.18"E;		

Sl. No.	Parameter	Testing Methods	Unit	As per the Standard of CTO	ETP 1	ETP 2
1.	Colour	APHA 24th ED 2120-B,C: 2023	Hazen	Colourless	10	<5.0
2.	pH	APHA 24th ED 4500- H+B:2023	—	5.5-9.0	8.56	7.22
3.	Conductivity	APHA 24 th ED 2510-B:2023	µs/cm	—	287.6	231.4
4.	Total Dissolved Solid	APHA 24th ED 2540-C: 2023	mg/l	—	198	138
5.	TSS	APHA 24th ED 2540-D: 2023	mg/l	100	156	18
6.	Hexavalent Chromium	APHA 24th ED 3500-Cr-B: 2023	mg/l	0.1	<0.05	<0.05
7.	Total Chromium as Cr	APHA 24 th ED 3500-Cr-B: 2023	mg/l	2.0	0.26	<0.05
8.	Iron as Fe	APHA 24th ED 3500-Fe-B: 2023	mg/l	3	0.38	0.30
9.	Sulphate as SO ₄	APHA 24th ED 4500-SO ₄ D: 2023	mg/l	—	8.2	7.6
10.	Fluoride as F	APHA 24th ED 4500-F-C: 2023	mg/l	2.0	<0.05	0.12
11.	Phosphate(asPO ₄)	APHA 24 th ED 4500-P-D: 2023	mg/l	5.0	<0.03	0.05
12.	Oil & Grease	APHA 24th ED 5520 B:2023	mg/l	10	2.9	<2.0



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Sl. No.	Parameter	Testing Methods	Unit	As per the Standard of CTO	ETP 1	ETP 2
13.	Chemical Oxygen Demand	APHA 24th ED 5220 B:2023	mg/l	250	60	16
14.	Ammonical Nitrogen	APHA 24th ED 4500-NH3-B & C:2023	mg/l	50	3.2	1.4
15.	Total Residual Chlorine	APHA 24th ED 4500-Cl,B:2023	mg/l	1.0	0.24	ND
16.	Manganese (as Mn)	IS 3025 PART-59 :2006 RA 2012	mg/l	2.0	0.3	<0.05
17.	Cyanide	APHA 24th ED 4500 CN-F:2023	mg/l	0.2	NR	<0.02
18.	Temperature	APHA 24th ED 2550-B: 2023	°C	Shall not exceed 5°C above the receiving water temperature	32	33
19.	Dissolved Oxygen	APHA 24th ED 4500 O-C:2023	mg/l	—	4.8	6.8
20.	Biochemical Oxygen Demand (3days at 270C)	IS 3025 (PART 44) : 1993 REA-2009	mg/l	30	16	BDL

Remark- BDL-Below Detection Limit

Reviewed By

CHIEF ANALYST

GREENFORCE ASSOCIATES PRIVATE LIMITED

Bhubaneswar, Odisha
Mina, Arti Sahoo

Authorized Signatory

TECHNICAL MANAGER

GREENFORCE ASSOCIATES PRIVATE LIMITED
Bhubaneswar, Odisha

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Report No-GFAPL/24-25/OCM/033

Issued Date-07.10.2024

TEST REPORT

Client Name & Address	M/s Ferro Alloys Corporation Limited; Ostapal Chromite Mines, Kaliapani, Jajpur		
Nature of Sampling	ETP Water		
Sampling By	GFAPL's Representative		
Environmental Condition	Good	Sampling Method	As per APHA 24th ED 1060 B: 2023
Location of performance of Laboratory activities	Laboratory Permanent Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Environment & Pollution
Date of Sampling	23.09.2024	Date of Receiving	24.09.2024
Date of Analysis	24.09.2024	Date of Complete	27.09.2024
Sampling Location & Coordinates	ETP1- ETP Inlet; Lat: 21°2'10.46"N and Long: 85°46'5.18"E; ETP2- ETP Outlet; Lat: 21°2'10.46"N and Long: 85°46'5.18"E;		

Sl. No.	Parameter	Testing Methods	Unit	As per the Standard of CTO	ETP1	ETP2
21.	Odour	APHA 24 th ED 2150-B: 2023	-	-	Pungent Smell	Agrecable
22.	Nitrate as NO ₃	APHA 24 th ED 4500-NO ₃ -B: 2023	mg/l	10	6.21	3.24
23.	Total Kjeldahl Nitrogen	APHA 24 th ED 4500-Norg B, NH ₃ -B & C:2023	mg/l	100	5.8	4.2
24.	Copper (as Cu)	IS: 3025(Part 42)	mg/l	3	<0.02	<0.02
25.	Phenolic Compound (as C ₆ H ₅ Oh)	APHA 24th ED 5530 B,D: 2023	mg/l	1	<0.001	<0.001
26.	Cadmium (as Cd)	IS: 3025(Part 41)	mg/l	2.0	<0.001	<0.001
27.	Zinc (as Zn)	APHA 24th ED 3500 Zn: 2023	mg/l	5	<0.02	<0.02
28.	Lead (as Pb)	APHA 24th ED 3500 Pb: 2023	mg/l	0.1	<0.01	<0.01
29.	Selenium (as Se)	APHA 24th ED 3500 B: 2023	mg/l	0.05	<0.001	<0.001
30.	Mercury (as Hg)	APHA 24th ED 3500Hg: 2023	mg/l	0.01	<0.001	<0.001
31.	Arsenic (as As)	APHA 24th ED 3500As: 2023	mg/l	0.2	<0.001	<0.001
32.	Nickel (as Ni)	IS 5185 (Part-22)	mg/l	3	<0.02	<0.02



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Sl. No.	Parameter	Testing Methods	Unit	As per the Standard of CTO	ETP1	ETP2
33.	Vanadium (as V)	APHA24th ED 3500V: 2023	mg/l	0.2	<0.02	<0.02
34.	Sulphide (H ₂ S)	APHA 24th ED 4500 S ²⁻ D: 2023	mg/l	2	<0.02	<0.02
35.	Free Ammonia (as NH ₃)	By Calculation	mg/l	5	10.5	0.62
36.	Bio Assay Test	IS 6582 (Part-2)2001, Ed-2.1 (2002-12)	%	90% fish survived after 96 hrs in 100% effluent	No fish survived after 96 hrs in 100% effluent	96% fish survived after 96 hrs in 100% effluent
37.	Particulate Size of Suspended Solids	APHA 24th ED 2540 D 2023	μ	Shall pass 850 micron IS Sieve	<850	<850

Remark- BDL-Below Detection Limit

Reviewed By

CHIEF ANALYST

GREENFORCE ASSOCIATES PRIVATE LIMITED
Bhubaneswar, Odisha

Authorized Signatory

TECHNICAL MANAGER

GREENFORCE ASSOCIATES PRIVATE LIMITED
Bhubaneswar, Odisha

Note:

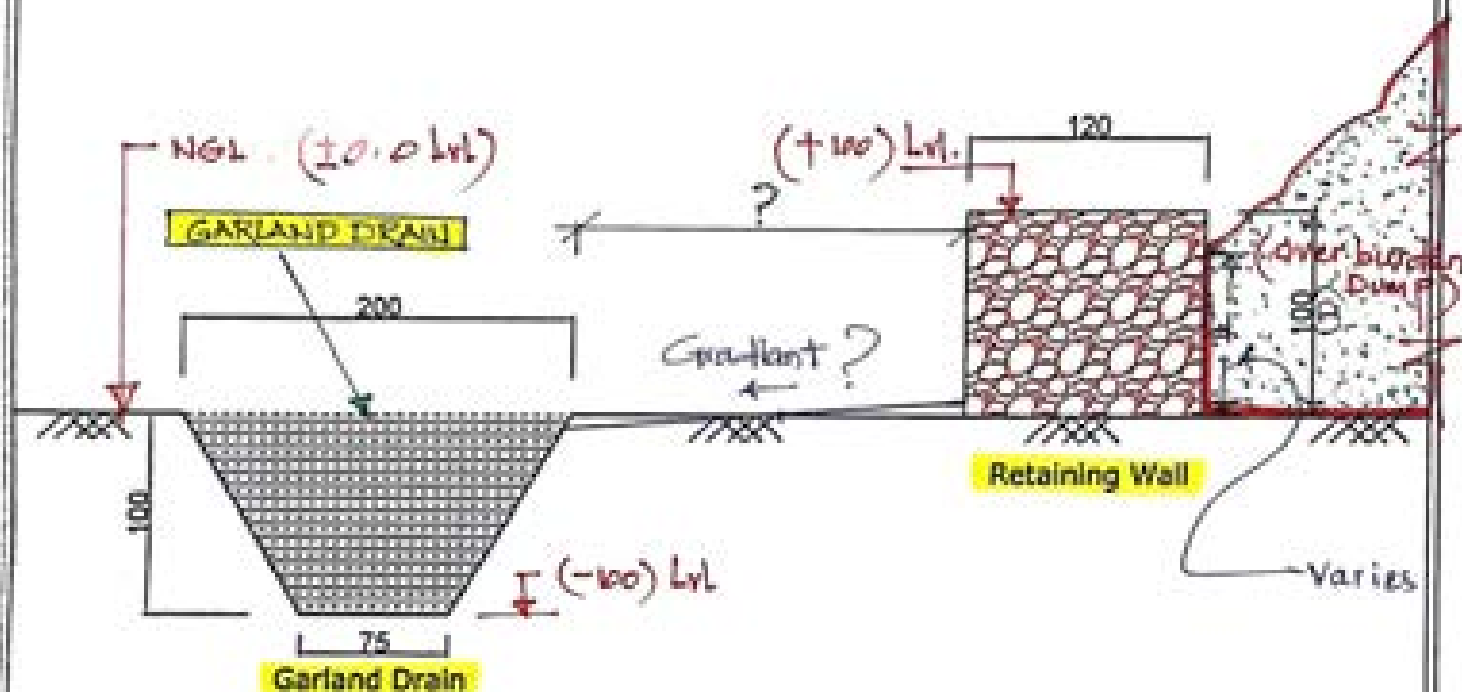
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- > Total liability of our lab is limited to the invoiced amount.
- > Samples will be destroyed after 30 days from the date of test report unless otherwise specified.
- > This report is not to be reproduced wholly or in part and cannot be used as evidence in the court of law and should not be used in any advertising media without our special permission in writing.
- > Report refers to the sample submitted to us and not drawn by unless mentioned otherwise.

END OF REPORT

30 NOV 2022

OSTAPAL CHROMITE MINE M/S FACOR LTD.

CROSS SECTIONAL DIMENSION OF GARLAND DRAIN AND RETAINING WALL



[Signature]
MINES MANAGER
M/S FACOR LTD.
OSTAPAL CHROMITE MINE
PO. KALIAPADA, JHARKHAND
DIST. JHARKHAND (JHARKHAND)

NOT TO SCALE

ALL DIMENSIONS ARE IN CM

30 NOV 2022



AGE CONSULTANT
E. S. C. B. V. VATTANAYAK
M. TECH. IN CIVIL ENGRG.
REGISTERED ENGINEER & LICENSED TAX VALUER
Regd. No. AM-30670/19 & 25/2003-04-CAT-1

To
The Joint Director
Ministry of Environment, Forest & Climate Change
Eastern Regional Office,
Bhubaneswar

SUB: Report on amount of ground water recharged at Ostapal Chromite Mine, M/s Ferro Alloys Corporation Limited for the FY 2023-24

REF: EC Statutory Condition A. 39 of Ostapal Chromite Mine M/s Ferro Alloys Corporation Limited

Respected Sir,

With respect to the cited subject mentioned above, we would like to intimate your good office that we have constructed various ground water recharge structure in Ostapal Chromite Mine, M/s Ferro Alloys Corporation Limited. The details of the ground water recharge report are mentioned below table.

Sr. No	Type of Ground Water Recharge Structure	Quantity in KL
1.	Check Dam	16875
2.	Garland Drain	5635
3.	Settling Pond	1125
TOTAL		23625

This is for your kind information.

Thanking You

Yours Faithfully


09.04.2024

HEAD ENVIRONMENT
OSTAPAL CHROMITE MINES
M/s FACOR LTD

M/s. Ferro Alloys Corporation Ltd. (A subsidiary of Vedanta Ltd.)

Registered Office:

D.P.Nagar, PO : Randia, Dist.: Bhadrak, Odisha, India - 756 135

T :+91-6784 240320/240347, Email: facor.mines@vedanta.co.in / facor.cco@vedanta.co.in

Website: www.facorgroup.in, CIN: U45201OR1955PLC008400.

OCM/ENV/W42022

Date: 08.08.2022

To
The Joint Director (s)
Ministry of Environment, Forest & Climate Change
Govt. of India
Eastern Regional Office
Bhubaneswar - 751023

SUB: Submission of Measures taken for the reduction of consumption of water for Ostapal Chromite Mines M/s Ferro Alloys Corporation Limited.

Ref: EC Statutory Condition B.41 of Ostapal Chromite Mines M/s Ferro Alloys Corporation Limited.

Dear Sir,

With respect to the cited subject mentioned above, we would like to intimate your good office that we are maintaining & monitoring the water balance chart of every month and also we have planned some measures for the reduction of water consumption of Ostapal Chromite Mines M/s Ferro Alloys Corporation Limited.

The Details of the water consumption action plan is attached in the annexure - 1

This is for your kind consideration please.

Thanking You

Yours Faithfully



**Mines Manager
Ostapal Chromite Mines
Ferro Alloys Corporation**

OCM/ENV/1146/2022

Date: 08.08.2022

To
The Member Secretary
Odisha State Pollution Control Board
A/118, Nilakanthanagar, Unit-VIII
Bhubaneswar

SUB: Submission of Measures taken for the reduction of consumption of water for Ostapal Chromite Mines M/s Ferro Alloys Corporation Limited.

Ref: EC Statutory Condition B-41 of Ostapal Chromite Mines M/s Ferro Alloys Corporation Limited.

Dear Sir,

With respect to the cited subject mentioned above, we would like to intimate your good office that we are maintaining & monitoring the water balance chart of every month and also we have planned some measures for the reduction of water consumption of Ostapal Chromite Mines M/s Ferro Alloys Corporation Limited.

The Details of the water consumption action plan is attached in the annexure - 1

This is for your kind consideration please.

Thanking You

Yours Faithfully



**Mines Manager
Ostapal Chromite Mines
Ferro Alloys Corporation**

ACTION PLAN FOR WATER REDUCTION PLAN

Water savings can be achieved in mining through a combination of different

- (1) Changing behaviour,
- (2) Modifying and/or replacing equipment with water saving equipment to reduce overall water consumption
- (3) To assure the strategies, optimize water and minimize costs, it is important to assess current water use and set goals.
- (4) Water Recycle & Re-use practice to be adopted

Changing User Behaviour

- Awareness raising among operators to use water-efficient strategies and/or equipment to optimize water use helps in changing the user behaviour.
- Display poster for awareness
- Build understanding among employees and co-workers about the importance of water conservation. Make them aware of water scarcity issues and the impact of water conservation practices.
- Educate employees so that they will be able to identify problems and innovate solutions to reduce water use within the company.

Modifying and/or replacing equipment with water saving equipment to reduce water consumption

- Typical operational changes for reducing water consumption at the operational level are developing a regular inspection programme for piping and hoses.
- Install water saving toilet systems (low flush, vacuum, dehydration, adjust flush valves).
- Install tap aerators and high efficiency showerheads
- Choose conveying systems that use water efficiently
- Replace high-volume hoses with high-pressure, low-volume cleaning systems

To assure the strategies, optimize water and minimize costs, it is important to assess current water use and set goals

- Apply/Installation of water meter in all intakes point to access the use.
- Using of NALCO Chemicals in tailing pond for maximum recovery of water
- Reducing water consumption for cleaning finding multiple uses for water.
- Record keeping for water abstraction & use for domestic & industrial use for Mine individually.
- Specific water consumption target set for Mine individually.

Water Recycle & Re-use practice to be adopted for Reduces Water Use:

- Wastewater treatment plant i.e ETP & STP installation & Operation practice to be made
- Treated water should be used for Industrial use instead of fresh water.
- Surplus discharge treated water shall be used for Agriculture as required by local community instead of fresh water from Borewell.



Mines Manager
Ostapal Chromite Mines
Ferro Alloys Corporation



GREEN FORCE ASSOCIATES PRIVATE LIMITED



Plot No.-1666, Phase-II, Delta Colony, Nilakantheswar Marg,
Baramunda, Bhubaneswar, Dist - Khurda

Mail Id: greenforceassociates@gmail.com

Report No- GFAPL/24-25/OCM/018

Issued Date-07.10.2024

TEST REPORT

Client Name & Address	M/s Ferro Alloys Corporation Limited, Ostapal Chromite Mines, Kaliapani, Jaipur		
Nature of Sampling	Workzone Noise Monitoring		
Sampling By	GFAPL's Representative		
Location of performance of Laboratory activities	Site Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Environmental Condition	Good	Time Integration	1 second
Time Weighing	Fast	Frequency Weighing	A- Weighing
Sampling Duration	24 hrs	Area categorization	Industrial Area
Date of Sampling	24.09.2044	Date of Completion	25.09.2024
Instrument Used	Noise Meter	Sampling Method	As per IS: 9989

S. No.	Locations	Latitude	Longitude	Day Time	Night Time
				Results in dB(A)	
1	AN1- Kaliapani Village	21°3'15.68"N	85°46'53.38"E	52.7	41.2
2	AN2- Ostia Village	21°3'23.00"N	85°46'25.32"E	48.6	38.6
3	AN3- Ostapal Village	21°3'53.63"N	85°48'3.15"E	50.2	39.8
4	AN4- Kaposi Village	21°3'53.78"N	85°48'3.20"E	49.5	37.2
5	AN5- Near Temple	21°3'27.91"N	85°47'9.51"E	53.6	47.9
6	AN6- Gurujang Village	21°3'36.26"N	85°46'52.32"E	54.9	40.8
7	AN7- Tala TSML	21°3'27.45"N	85°47'9.42"E	56.3	43.8
8	AN8- Talangi Village	21° 4'8.60"N	85°49'27.34"E	48.4	38.2
9	AN9- Sukurangi Village	21° 2'33.69"N	85°48'7.14"E	49.1	37.8
10	AN10- Kaliapani Colony	21° 2'57.40"N	85°46'32.33"E	48.5	37.8

Noise permissible limits as per CPCB Norms in dB(A) Leg

Category of Area	Day Time	Night Time
Industrial Area	75	70
Commercial Area	65	55
Residential Area	55	45
Sensitive Area/ Silence Zone	50	40

Reviewed By

CHIEF ANALYST
GREENFORCE ASSOCIATES PRIVATE LIMITED
Bhubaneswar, Odisha

Authorized Signatory

TECHNICAL MANAGER
GREENFORCE ASSOCIATES PRIVATE LIMITED
Bhubaneswar, Odisha

Note:

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- Report refers to the sample submitted to us and not drawn by unless mentioned otherwise.

END OF REPORT

Plot No- 1363-3892, Baibhab Realcon, Fulnakhara,
Cuttack, Odisha, India 754001



GREEN FORCE ASSOCIATES PRIVATE LIMITED



Plot No.-1666, Phase-II, Delta Colony, Nilakantheswar Marg,
Baramunda, Bhubaneswar, Dist - Khurda

Mail Id: greenforceassociates@gmail.com

Report No- GFAPL/24-25/OCM/019

Issued Date-07.10.2024

TEST REPORT

Client Name & Address	M/s Ferro Alloys Corporation Limited; Ostapal Chromite Mines, Kaliapani, Jaipur		
Nature of Sampling	Workzone Noise Monitoring		
Sampling By	GFAPL's Representative		
Location of performance of Laboratory activities	Site Facility	Deviation from the method (if any)	NO
Discipline	Chemical	Group	Atmospheric Pollution
Environmental Condition	Good	Time Integration	1 second
Time Weighing	Fast	Frequency Weighing	A- Weighing
Sampling Duration	24 hrs	Area categorization	Industrial Area
Date of Sampling	25.09.2024	Date of Completion	26.09.2024
Instrument Used	Noise Meter	Sampling Method	As per IS: 9989

S. No.	Locations	Latitude	Longitude	Day Time	Night Time
				Results in dB(A)	
1	WN1- Near Admin Office	21°3'15.68"N	85°46'9.75"E	52.6	52.1
2	WN2- Near OMPL Mech. Garage	21°3'25.81"N	85°46'8.03"E	51.8	45.4
3	WN3- Near Mine View Point	21°3'35.42"N	85°46'24.54"E	59.3	45.2
4	WN4- Near ETP	21°3'32.19"N	85°46'23.20"E	62.1	53.5
5	WN5- Near Rest Shelter	21°3'29.23"N	85°46'18.74"E	55.9	40.4
6	WN6- Loading Point	21°3'34.45"N	85°46'24.23"E	63.4	56.3
7	WN7- Near COBP	21°3'45.82"N	85°46'31.21"E	60.6	52.4
8	WN8- Haul Road	21°3'33.54"N	85°46'22.32"E	54.1	46.7
9	WN9- COP Hopper	21°3'25.17"N	85°46'8.43"E	65.8	58.2
10	WN10- COB Hammer Mill	21°3'35.30"N	85°46'24.48"E	62.6	49.2
11	WN11- Washing Plant	21°3'32.17"N	85°46'23.15"E	56.5	51.7
12	WN12- UG Project Site	21°3'29.20"N	85°46'18.66"E	54.6	45.2

Noise permissible limits as per CPCB Norms in dB(A) Leq

Category of Area	Day Time	Night Time
Industrial Area	75	70
Commercial Area	65	55
Residential Area	55	45
Sensitive Area/ Silence Zone	50	40

Reviewed By

Authorized Signatory

CHIEF ANALYST

GREENFORCE ASSOCIATES PRIVATE LIMITED

BARAMUNDA, BHUBANESWAR, ODISHA

TECHNICAL MANAGER

GREENFORCE ASSOCIATES PRIVATE LIMITED

BHUBANESWAR, ODISHA

Note:

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- > Report refers to the sample submitted to us and not drawn by unless mentioned otherwise.

END OF REPORT

--1--

Plot No- 1363-3892, Baibhab Realcon, Fulnakhara,
Cuttack, Odisha, India 754001

OCM/ENV/ 1141 /2022

Date: 08.08.2022

To
The Joint Director (s)
Ministry of Environment, Forest & Climate Change
Govt. of India
Eastern Regional Office
Bhubaneswar - 751023

SUB: Submission of Slope Stability Study Report of Ostapal Chromite Mines M/s Ferro Alloys Corporation Limited.

Ref: EC Statutory Condition B.52 of Ostapal Chromite Mines M/s Ferro Alloys Corporation Limited.

Dear Sir,

With respect to the cited subject mentioned above, we would like to intimate your good office that we have conducted a slope stability study by CSIR Central Institute of Mining & Fuel Research as our dump height is more than 30 meters.

The Report is attached in the PDF file.

This is for your kind consideration please.

Thanking You

Yours Faithfully



**Mines Manager
Ostapal Chromite Mines
Ferro Alloys Corporation**

OCM/ENV/ 1140 /2022

Date: 08.08.2022

To
The Member Secretary
SELAA, Bhubaneswar

SUB: Submission of Slope Stability Study Report of Ostapal Chromite Mines M/s FACOR Ltd.

Ref: EC Statutory Condition B.52 of Ostapal Chromite Mines M/s FACOR Ltd.

Dear Sir,

With respect to the cited subject mentioned above, we would like to intimate your good office that we have conducted a slope stability study by CSIR Central Institute of Mining & Fuel Research as our dump height is more than 30 meters.

The Report is attached in the PDF file.

This is for your kind consideration please.

Thanking You

Yours Faithfully
Ferro Alloys Corporation



Mines Manager
Ostapal Chromite Mines



CSIR-CENTRAL INSTITUTE OF MINING AND FUEL RESEARCH,
BARWA ROAD, DHANBAD

REPORT ON

**SCIENTIFIC STUDY FOR OPTIMAL DESIGN AND
STABILITY ANALYSIS OF PIT AND OVERBURDEN DUMP AT
OSTAPAL CHROMITE MINE, VEDANTA (FACOR MINES) LTD**



SPONSORED BY:
M/s VEDANTA (FACOR MINES) LTD

JUNE 2021

OCM/GEO/ 1377/2023

Annexure 29

Date:08.10.2023

To
The Member Secretary,
SEIAA,
Bhubaneswar, ODISHA

Sub: Submission of affidavit in connection with compliance to the EC Condition No.-62 in respect of Ostapal Chromite Mine of M/s FACOR LTD

Ref: Condition No. 62 of EC identification No.: EC22B001OR120821, dated 04.04.2022

Respected Sir,

Referring to the above cited subject, we would like to submit the affidavit for the compliance of EC Condition no-62 vide EC identification No.: EC22B001OR120821, dated 04.04.2022 of M/s Ferro Alloys Corporation Limited.

This is for your kind perusal.

Thanking You,

Yours Faithfully
For M/s. Ferro Alloys Corporation Limited



Susanta Kumar Biswal
Head-Environment

Enclosures: As above

1474
23/09/2022



ଓଡ଼ିଶା ଆଇନ ODISHA

BEFORE THE NOTARY PUBLIC, BHADRAK

58AA 478672

AFFIDAVIT

I Sri Muthumari M, S/o Sri Malaichami aged about 37 years R/o D.P Nagar, P.O- Randia, P.S, Dist- Bhadrak of Odisha by occupation -Service do hereby solemnly affirm and state as under:

1. That I am the mining agent of Ostapal Chromite Mines of M/s. Ferro Alloys Corporation Ltd. (FACOR) under the provisions of Metalliferous Mines Regulations, 1961 which is situated at- Gurujang, Po-Kaliapani, Tahasil- Sukinda, Dist.- Jajpur of Odisha.
2. That by virtue of the power and right conferred upon me by the management of the company and under the capacity of mining agent, I am eligible to sworn in this affidavit.
3. That the State Environment Impact Assessment Authority (SEIAA), Orissa, MOEF & CC, Government of India vide EC Identification No. EC22B001OR120821 dt.04.04.2022 has granted Environment Clearance in favour of Ostapal Chromite Mines for increase in production from 0.20 MTPA to 0.240 MTPA Chromite ore (ROM).
4. That vide Stipulated Conditions no.62 of the said Environment Clearance, SEIAA has instructed that the haulage road shall be developed and maintained perennially and perpetually by the proponent in construction with the concerned authority of the Govt. and to this effect, the proponent shall submit an undertaking in form of a legal affidavit.
5. That in compliance to the said Condition No.62 of the Environment Clearance I do hereby undertake and assure that the haulage road shall be developed and maintained perennially and perpetually by the proponent in consultation with the concerned authority of the Government of Odisha.
6. That this affidavit has been sworn for the purpose of submitting before the office of State Environment Impact Assessment Authority (SEIAA), Orissa, MOEF & CC, Govt. of India. The facts stated above are true and correct to the best of my knowledge and belief.

Identified by

[Signature]
ADVOCATE

Identified by

[Signature] B.K.
Sahel

[Signature]
B.K. Sahel 23/9/22
Notary, Bhadrak

[Signature]
[MUTHUMARI M.]
DEPONENT



Vedanta

Transforming for good



OCM/ENV/579/2024

Dated: 11.07.2024

To
The Range Officer,
Govt. of Odisha Forest, Environment &
Climate Change Department
Sukinda, Jaipur

Sub.: Native species /forestry Plants to be planted in the Mine Lease of Ostapal Chromite Mine of M/s FACOR LTD- Regarding

Ref.: Specific Condition No.-8 of EC Identification No.: EC22B001OR120821, Dated: 04.04.2022

Dear Sir,

We would like to inform you that as likewise every year, we are planting various native sapling/forestry Plants inside our Ostapal Chromite Mine of M/s FACOR LTD for the Year 2024-25 as follows:

1. Arjuna
2. Nimba
3. Kathabadam
4. Sirisha
5. Dhauranga
6. Shishu
7. Piasala
8. Fasi
9. Patuli
10. Baunsha
11. Mahula
12. Karanja
13. Jamun
14. Tentuli

In this Context, we need your kind suggestion to add more native species for plantation purpose at above mentioned location, if anymore there available in your good Nursery, please.

Thanking You

Yours faithfully,

for Ferro Alloys Corporation LTD

Susanta K. Biswal

Head- Environment

Mine- Division

M/s FACOR Ltd

CC: The Forester, Ransol Section, Under Sukinda Range.

P. K. Singh
Officer
Forester
Ransol section

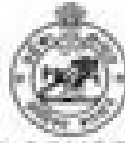
M/s. Ferro Alloys Corporation Ltd. (A subsidiary of Vedanta Ltd.)

Registered Office:

D.P. Nagar, PO : Raxwala, Dist.: Bhadrak, Odisha, India - 756 135

T : +91-6784 240330/240347, Email: facor.mines@vedanta.co.in / facor.csa@vedanta.co.in

Website: www.facorgroup.in, CIN: U45201OR1955PLC008400.



**OFFICE OF THE PRINCIPAL CHIEF CONSERVATOR OF FORESTS (WILDLIFE)
& CHIEF WILDLIFE WARDEN, ODISHA**

Government of Odisha, Forest, Environment & Climate Change Department

PRAKRUTI BHAWAN, PLOT NO.1459, SAHEED NAGAR, BHUBANESWAR- 751007

Phone: 0674-2602250, Website: www.wildlife.odisha.gov.in, Email: odishawildlife@gmail.com

No. 10189 / CWLW-FDWC-FD-0033-2022
Bhubaneswar, Dated the 11 November, 2022

To

The Director (Mines)
M/s FACOR Ltd.
Laomi Bhawan, Kuans, Bhadrak – 756100

Sub: Mining of Chromite ore in Ostapal Chromite Mines of M/s Ferro Alloys Corporation Limited in Jajpur District - Approval of Site Specific Wildlife Conservation Plan

Sir,

It is to intimate that you have to implement mitigation measures as per the Site Specific Wildlife Conservation Plan approved in compliance to Standard ToR No.(xviii) for Mining Project prescribed by SEIAA, Odisha in their letter No.3883/SEIAA dt 28.01.2022.

2. I am directed to convey the approval of PCCF (WL) & CWLW, Odisha for the Site Specific Wildlife Conservation Plan in respect of the above project at financial outlay of ₹522.284 lakh (Rupees five crore twenty-two lakh twenty-eight thousand four hundred) only as detailed below -

Sl. No.	Name of the Division	Cost of approved activities
i.	In project impact area in Cuttack Division	₹227.642 lakh
ii.	In project impact area in Dhenkanal Division	₹128.003 lakh
iii.	In project impact area in Keonjhar WL Division	₹166.639 lakh
Total cost:		₹522.284 lakh

3. Activities in the project area will be executed by the project proponent under the guidance of DFO, Cuttack Division. A sum of ₹522.284 lakh only shall be deposited in State CAMPA fund only through e-portal (<https://parivesh.nic.in/>) for implementation of various activities within the project impact area by the Forest Department through concerned DFOs.

4. The following conditions may be noted for future compliance.

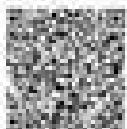
- If there would be need for Site Specific Wildlife Conservation Plan after expiry of the present plan period, the User agency will have to submit another such plan at least one year before the expiry of the existing Conservation Plan and deposit the amount upon its approval. In case of delay, it will be dealt as per law for violations of Forest (Conservation) Act, 1980 and Environment (Protection) Act, 1986.
- The User agency has to give an undertaking to bear the differential cost in case of enhancement of wage rate during implementation of this plan.

Enc: Copy of approved Plan

Yours faithfully

Conservator of Forests (Wildlife)

P.T.O.



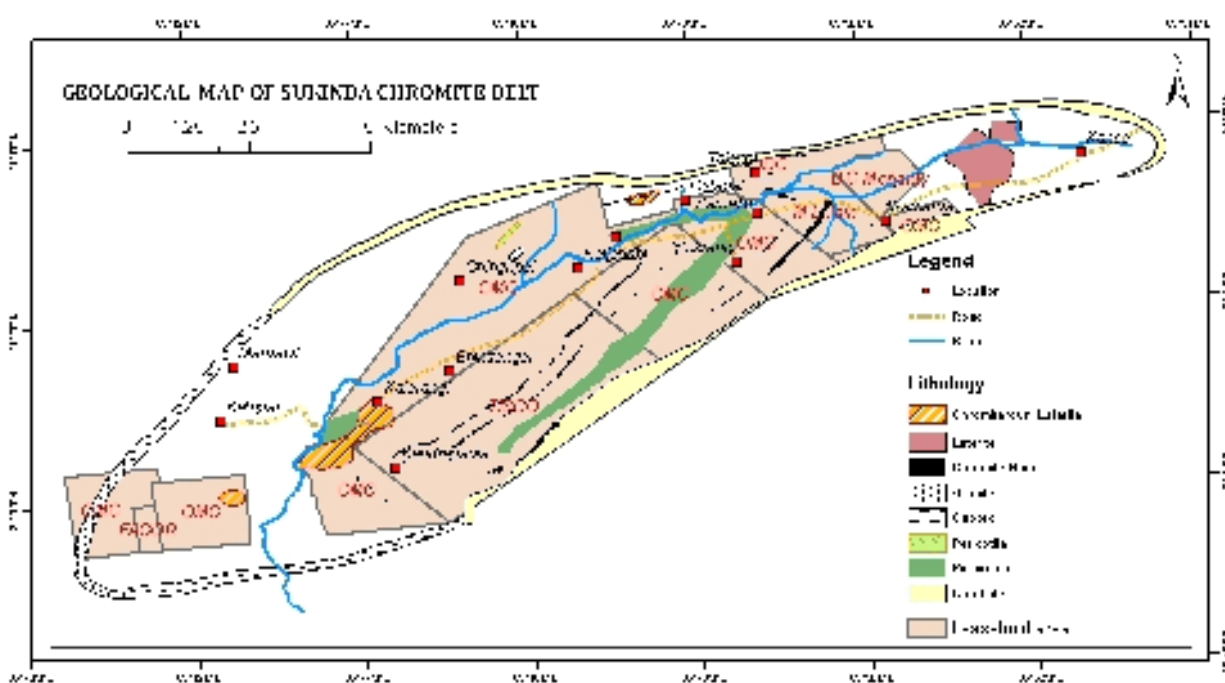
Memo No. 10174 dt. 8/11/2022
Copy forwarded for information and necessary action to -

1. OSD-cum-Special Secretary to Government of Odisha, FE&CC Department
2. PCCF (FD & NO, FC Act), O/o the PCCF & HoFF, Odisha
3. Regional Chief Conservator of Forests, Angul Circle with reference to Memo No.6765 dt 13.10.2022 of DFO, Cuttack Division
4. Regional Chief Conservator of Forests, Baripada Circle with reference to this office Memo No.8391 dt 19.09.2022
5. Divisional Forest Officer(s), Cuttack/ Dhenkanal/ Keonjhar WL Division alongwith copies of approved SSWLCP



Conservator of Forests (Wildlife)

**SITE SPECIFIC WILDLIFE CONSERVATION PLAN
FOR EXPANSION OF OSTAPAL CHROMITE
MINING PROJECT OF M/S FERRO ALLOYS
CORPORATION LTD. (FACOR) AT VILLAGE
GURUJANGA, TAHASIL: SUKINDA , DISTRICT:
JAIPUR , ORISSA**



By

Divisional Forest Officer,

Cuttack Division



Preface

Ferro Alloys Corporation Limited (FACOR) is the oldest and most reputed producer of High Carbon Ferro Chrome/Charge Chrome in India. It has three Captive Chromite Mines i.e. Kalarangiatta, Ostapal and Kathapal at Sukinda Chromite Valley. The FACOR has applied for enhancement of Chrome Ore production from Ostapal Chromite Mine from present production level 0.20 MTPA to 0.240 MTPA to meet the requirement of its Ferro Alloys Plant at Randia, Bhadrak. In Compliance to the ToR conditions Issued by State Environment Impact Assessment Authority (SEIAA), Odisha this plan has been prepared.

I sincerely thank the Divisional Forest Officer, Dhenkanal and Divisional Forest Officer, Keonjhar Wildlife Division, Anandapur for providing required inputs for preparation of this Plan. My thanks also goes to M/s FACOR for providing required information on Mining activities in Ostapal Chromite Mine at Gurujang for reference and incorporating in the Wildlife Conservation Plan.

On implementation of this plan prescription it is expected that the flora and fauna of this Sukinda valley and surroundings will improve.

Thanking all.

Place: Cuttack.

Dated the 15th March, 2022

Divisional Forest Officer,

Cuttack Division



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Executive summary

- M/s Ferro Alloys Corporation Limited (FACOR) is the oldest and most reputed producer of High Carbon Ferro Chrome/Charge Chrome in India.
- FACOR has three Captive Chromite Mines i.e. Kalarangiatta, Ostapal and Kathapal at Sukinda Chromite Valley.
- Ostapal Chromite mining lease over an area of 72.843 ha was granted in favour of M/s Ferro Alloys Corporation Limited for 20 years from 13.08.1985 to 12.08.2005.
- After expiry of lease the mining operation continued under deemed extension provisions of the MMDR Act, 1957 and the Mineral Concession Rule-1964 till 21.08.2016.
- As per “The Mines and Mineral (Development and Regulation) Amendment Ordinance, 2015, the lease period has been deemed to be extended for 50 years from the date of execution of Lease i.e. 13.08.1985.
- The supplementary lease deed has been executed on 22.08.2016 and the life of the lease is extended up to 12.08.2035.
- The Lessee has applied for Environment Clearance for enhancement of production from 0.2 MTPA to 0.240 MTPA Chrome Ore (ROM) with maximum excavation of 0.579 Million cum / annum and beneficiation of Chrome Ore of 0.1 MTPA through Opencast Mining method vide online Application no SIA/OR/MIN/66461/2021.
- The State Environment Impact Assessment Authority, (SEIAA) has issued the ToR (Terms of Reference) for preparation of EIA/ EMP Report as per EIA Notification 2006 vide letter no 3883/SEIAA dated 28.01.2022.
- The project is located at Village Gurjang under Sukinda Tahasil of district Jajpur.
- The Latitude & Longitude of the project is 21°03'26.65"N to 21°04'0.98"N & 85°47'4.39"E to 85°47'34.29"E.
- The Mine location finds place in Survey of India Topo Sheet no F45N16 (73G/16).
- The entire project comes within the jurisdiction of Cuttack Division, Sukinda Range.



Site Specific wildlife Conservation Plan for Ostapal Chromite Mine of M/s Ferro Alloys Corporation Ltd



- The total ML area is 72.843ha out of which 68.424ha is of Forest Kisam and Rest is Non forest Land.
- The Project is Non Linear and its estimated cost is Rs 88.85 Crores.
- The Site Specific Wildlife Conservation Plan is being prepared with reference to the stipulated condition outlined in the Terms of Reference (ToR) issued by SEIAA, Odisha
- The total Forest land involved in the Mining Lease is 68.424 ha. Out of 68.424 ha, Forest Clearance has been obtained for 64.354 ha vide Order F.No-8-86/1996-FC (Vol-II) dated 07.02.2006.
- The balance area 4.070 ha is involved in Safety Zone of the Mine.
- In the Zone of Impact there are 44 villages (Jajpur District-31, Dhenkanal District- 9 and in Keonjhar District-4 villages).
- As per 2011 census, the total population is 52779 in 11046 numbers House Hold. The Male Female Ratio is 974 female per 1000 male. The SC population is 4498 (8.52%) and ST Population is 26642 (50.48%). The area is mostly a tribal belt.
- The literacy percentage is 54.68%.
- There is no Rare, Endangered & Threatened (RET) species (both Flora & Fauna) in the zone of impact. The Schedule-I animals as per Wildlife Protection Act, 1972 indicates presence of Elephant, Peafowl, Python etc.
- The forests of the study area as per Champion & Seth Classification belong to 3B Northern Tropical Moist Mixed Deciduous Forests and 5B Northern Tropical Dry Mixed Deciduous Forests.
- The common associates are Sal with *Terminalia tomentosa*, *Lagerstomia parviflora*, *Gmelina arboria*, *Anogeisus latifolia*, *Bridelia retusa* and *Pterocarpus marsupium*. The middle story contains *Careya arborea*, *Oogenia oojensis*, *Syzygium cumini*, *Dyospyros melanoxydon*. *Helecteris ixora*, *Indigofera pulchra* and *Woodfordia fruticosa*, *Clerodendron* are commonly found as under growth.
- Common climbers seen are *Bauhinia*, *Smilax*, *Butea* and *Combretum decandrum*. Presence of *Cleistanthus collinus*, *Chloroxylon swietenia*, and *Phyllanthus emblica*



indicates forest marching to words a drier tract. The forest floor which is quite open (density less than 30%) is now invaded by Eupatorium & Dinanath grass.

- There are no elephant corridors within the Project impact area. Elephant movement in Daitari DPF is frequently noticed. They take a route to Kansa area and crossed the Mangalpur- Tamka Road near Kansa. Due to stiff ridge there after the elephant returns back to Daitary DPF/ Rabana RF.
- Human- Animal Conflict in Sukinda Range of Cuttack Division is moderate but due to Maulabhanja- Jiridamal- Anantapur Corridor being disturbed, the elephant movement is very erratic in Kamakhyanagar East Range of Dhenkanal Division.
- Public view is against occurrence of Human- Animal Conflict. Dhenkanal division is always in limelight for this conflict. It is very urgently required to reduce Human-Wildlife Conflict in this area.
- There are 21 Chromite mines in this locality.
- The forest department is taking adequate steps for Improving Habitat, Extensive Soil & Moisture Conservation Measures, Fire Protection Measures and Steps to reduce Man-Animal Conflict. Compassionate grant for life & property losses / damaged due to man-animal conflict is being paid regularly. Extensive Awareness program on Forest Fire, Tree planting, Wildlife Conservation and related matters are being taken up by Forest Department.
- The mining Lease is over 72.843 ha. The mine is categorized as “A” FM (Opencast). This is a captive mine and its product is being utilized at Ferro Alloys Plant at Randia, Bhadrak.
- The Ore Production is projected at 0.240 MTPA from the present level of 0.20 MTPA. During this enhancement of production, the total ROM 0.579MCum/ Annum from the present level 0.546MCum / Annum are proposed to be excavated.
- The Reserve Resource has been updated and estimated as per UNFC Guidelines.
- Considering present 28⁰ overall slope of Quarry wall, the bottom of the quarry around 30m RL the reserve of (111) category has been estimated around 15.3 Lakh Tonnes.
- The production level projected in current mining plan is 12 Lakh Tonnes.



- The opencast mining of chromite ore is being carried out by removing the overburden, side burden/ intermediate burden by making suitable benches in all direction of the quarry.
- Waste materials removed from the quarry directly by Shovel / Dumper /Dozer combination to the dump yard.
- Ores are removed from quarry to the ore plot but the hard portion of the quarry which cannot be directly excavated by machines being required drilling and blasting with large diameter holes.
- The benches are kept at 7-8 m height, 10-12m width and overall slope 26° to 30° .
- Drains and barriers are constructed all along the longitudinal direction of one side of the bench edge for smooth flow of water to next lower bench and safe running of vehicles on the quarry benches.
- Benches are connected with each other with short ramps of 1:10 gradients. The main ramp on benches is kept at 1:14 gradient.
- At Present irrespective of grade, ore is being sent to Charge Chrome Plant of FACOR at Randia, Bhadrak.
- Materials above 40% Cr_2O_3 are directly dispatched to CCP and below 40% grade are primarily being sent to Chrome Beneficiation Plant for up-gradation of concentrate production.
- The mine is being worked by mechanical drilling & blasting method.
- About 40% of hard surface has already been exposed and hence it is required long hole Drilling & Blasting.
- The Indian School of Mines, Dhanbad has designed the blasting parameters. In order to maintain a balance between the safety and production a blast design, and all undesirable side effects are to be kept at minimum.
- Tyre mounted DTH drill machine having 110 mm dia are being used to drill blast holes. The hole are made 15° to 20° inclined from vertical for maintaining uniform burden all



along the hole apart from reducing fly rocks and toe formation due to effective utilization of free face.

- All the rocks are not very hard, only 30-40% of the in situ requires drilling & blasting.
- Explosive charge length is limited to $2/3^{\text{rd}}$ depth of hole and quantity of explosive is around 13-16.70 kg per delay depending upon the nature of the rock formation.
- Power Gel-C explosive is used for blasting purpose. Cordex, Nonel are used for initiating the charges. Delay detonators are used for different row of blasting. Powder factor varies from 2.5 -4.5cum / kg.
- The update reserve estimation up to the conceptual period is about 15.3 Lac Ton.
- Considering 2.40 Lakh Ton annual ore production as per EC application, the life of Opencast Mine in Ostapal Chromite Mine will be more than current plan period i.e. more than 5 years (Life calculated to be 7 years).
- The final depth of opencast mine pit working will be +5mRL. At present the total life of mine is expected to be around 10 years i.e. from 2021-22 to 2030-31.
- The depth of Water table based on observations from nearby wells and water bodies is at a depth of 5.40m to 8.52m BGL during monsoon. It goes down to a depth of 9.2m to 16.4m BGL in dry season.
- The current extraction level of mining pit is 30m RL and likely to go up to 13mRL during current Mining plan period. As the Water table is about 12 to 15m BGL, there is no possibility of puncture of water table during mining.
- During quarry development the overburden and Ore estimated to be excavated from opencast quarry is 11.783 L Cum and 3.5 L Ton respectively.
- During conceptual plan period about 4.045L Cum of overburden will be accommodated over south dump and North Dump.
- To handle the remaining waste i.e. 7.738 L cum will be handled in the following manners.



- Waste Rocks to be sent & use outside the lease area as per requirement of any community work or manufacturing or any other industrial construction purpose with due permission from competent authority.
- Management is planning to acquire additional land for dumping waste in conceptual period.
- There is no reclamation of excavated area within the conceptual period mining.
- The mined out area of the quarry during the conceptual period will be 34.53 ha and the average depth of the quarry will be 130m. Top two to three benches of the quarry will be reclaimed by afforestation.
- Dump will be properly terraced and each terrace height will be within 15m.
- Peripheral dumping process will be followed so that dead faces will be available for plantation and quick Stabilization.
- The overall slope of the dump will be 28° and individual bench slope of 37.5°
- Dump bench slope will be vegetated properly so that no erosion will take place.
- Construction of garland drains all around the periphery of the dump yard.
- Plantation of grass and bushes over the dump area / slope area to stabilize the dead face of the dump from erosion.
- Stone barriers across the drains at regular interval to check the water current and to arrest the solid particles washed out from dump yard.
- Stone pitching will be done on the drains to restrict collapse of drain walls during flow of water.
- Chromite is one of the important Chrome Ore. It is an oxide of Iron & Chromium. The chemical formula is $(\text{Mg Fe}^{+2}) (\text{Cr, Al, Fe}^{+3})_2 \text{O}_4$. The Ferrous Oxide (Fe^{+2}) is often replaced by Mg and Cr_2O_3 and Alumina. Therefore variation in Cr / Fe ratio in chromite is observed.
- The ROM is upgraded through manual shorting & picking to remove the waste rock pieces from the ore stack yard to suit the requirement of the captive industry.



- The average grade of Ore dispatch to captive plant is +44% . Ore of - 40% Cr_2O_3 grade is primarily send for beneficiation and the concentrate generated are being send to the Captive Plant at Bhadrak.
- The beneficiation process is a wet process. In the process of beneficiation the mineral reject (20-30% of Cr_2O_3) is being concentrated to 45-50% of Cr_2O_3 .
- Primarily 10-40% of chrome ore is sent for beneficiation. The beneficiation plant is mainly operated by gravity separation process.
- Major equipments are Hopper, Hammer Mill, Screw Classifier, vibrating Screen, Shaking table, slurry pump, belt conveyer and tailing ponds etc.
- The final concentrate is about 45-50% of Cr_2O_3 .
- The Weight to Weight recovery percentage is about 45%.
- The beneficiation plant capacity is 20 TPH. The average hours per month for working are 600 hrs. Feeding / processing of ore in benifeciation plant is 12000 Tons per Month.
- The beneficiated ore i.e. concentrate is 5400 Tons per month. The capacity of concentrate Ore production per annum is 64800 TPA.
- The tailings generated in the beneficiation process are discharged through pipelines in to the tailing pond through gravity and after settling down the solids in the telling pond, the clean water is pumped back to the intake pond.
- The tailings will be discharged one by one into three ponds in a cascading manner. Clear supernatant water will pass to the 3rd pond from where it will be pumped back to intake pond.
- The thickness of the earthen dam is 15m at bottom, 5m at top and height from 5m to 8m with side slope from 45° to 60° . Any seepage water from tailing pond will be collected in a sump and pumped back to intake point. No seepage water is allowed to flow down to the natural drainage system.
- The quantity of water required in the COB plant is 120 M^3 / hour. Out of 120 M^3 of water 100 M^3 is recycled back to the beneficiation system. Hence the makeup water is



only 20 M³ per hour. The plant will function for 20 hours per day. Hence the water requirement is 400M³ per day after initial charging the plant.

- The water requirement of mine for dust suppression, afforestation, Wheel washing etc is estimated to be 150M³ , 50M³ , 50M³ per day and for domestic use around 100m³ per day. So the total water requirement per day is 750M³ (750 KLD)
- At the present system of mining i.e. opencast mining and treatment of effluent, the threats to flora and fauna is feared.
- Lower recharging of ground water table may lower moisture availability and result in stunted growth, reduced site quality, disappearing colony of moisture loving vegetation, replacement of moisture loving species by thorny, hardy & low quality species.
- Excess biotic pressure over a long period may result visit of unpalatable, dwarf vegetation.
- More and more open forest will be covered by Eupatorium, Lantena, Combretum (Atandi).
- Bahunia (Siali) may be completely vanished from the region.
- Disappearance of many species may lead to loss of Biodiversity of the locality.
- Plants may be affected by heart rot (especially Sal), Canker and top dying phenomena.
- Accumulation of dust on leaf surface for a long period may reduce photosynthesis hence reduced oxygen generation. It may also affect growth rate of plants, especially planted on road sides.
- Movement of available fauna species may be gradually restricted and finally seized from this tract.
- Scarcity of food stock and water in forest may force them to come to habitations, agricultural field.
- More and more Human- Wildlife Conflict resulting repelling attitude of locals' towards wildlife.



- More respiratory, digestive disease may affect animals.
- Presence of Cr^{+6} (Chromium hexavalent) a carcinogenic substance in water & dust particle may induce health hazard.
- Presence of iron, Nickel and other heavy metals on grass, fodder foliage surface may adversely affect herbivorous & health.
- Animal behavior may change due to constant effect of noise & light of traffic.
- Reptiles may be affected seriously due to light and ground vibration.
- Food and Water may become a limiting factor and seriously affecting the carrying capacity of the area.
- Compact soil without good vegetation will accelerate soil erosion.
- Nocturnal animals may have extremely a hard time.
- Rising temperature in summer may induce sun stroke.
- At present 96 regular employee and 441 contractual workers are working at the mine. On enhancement of production, it may be required to enhance engagement of Contractual labour. It may be enhanced by 10-20% and additional employment will be provided to the local people.
- The production level for which EC is in process by which production level will be enhanced from 0.200MTPA to 0.240 MTPA i.e. 20% increases in production.
- The ore produced is being transported by Road to Randia, Bhadrak. The truck capacity is mostly 16 ton. Hence for 200000 TPA, about 12500 trip truck load is required at present. Taking 300 working days about 42 trucks is engaged per day.
- In enhance production condition, about 50-52 trucks will be engaged per day. (Enhancement of truck by 8-10 number)
- This traffic load has been taken in to account while making traffic study by NHAI at Mangalpur crossing. All the ore will be transported by Road to Randia, Bhadrak i.e. Ferro chrome / charge chrome plant of FACOR.



- There is no movement of mega animals neither within the ML area nor at immediate road alignment up to Magalpur – Chandikhol – Bhadrak.
- The Tamka- Mangalpur road experiences elephant movement from Daitari DPF to Mahagiri DPF via Kansa. The ores from the Mine will be transported via Mangalpur hence it is not affecting the movement of animals.
- The excavation is being carried out at 30mRL and Ore is at wet condition. Drilling & Blasting is required hence fugitive dust generation at pit level, transportation up to pit head.
- Transportation from Pit head to Stock yard and un-loading is associated with dust generation. From stock yard to outside the ML area is also associated with transport relation dust pollution.
- Sprinkling of water on haul road frequently (thrice in December to March and four times in summer). The frequency of water sprinkling depends upon weather condition and moisture on the road surface.
- Ore containing moisture <10% will be avoided for transporting outside to prevent any fall out.
- The truck will be fully covered with tarpaulin to avoid air pollution during transportation and ore fallout from trucks.
- The nearest water body is Damsala nalla flowing in Sukinda Valley and joins with Brahmani River. Any contamination of Damsala nalla water will affect aquatic fauna of River Brahmani.
- The water analysis result indicates pH: 7.81, Total suspended solid: 18, Cyanide: <0.05, Lead: <0.01 and other parameters below the standard norm prescribed by CPCB.
- The ETP established within the ML area takes care of Hexavalent Chromium (Cr^{+6} and reduce it to trivalent chromium (Cr^{+3}).
- The treated water is used for mining dust suppression and irrigation purpose. The residual treated water is being discharged to outside water bodies to Damsala Nala.
- As the water is treated and found pollutants within the prescribed Range, water contamination from this mine is negligible.



- The mining activities will disturb the land surface. After mining the area will be reclaimed.
- To check the soil erosion from dumps, planting of local tree species is being carried out. There is gap in between Row to Row and line to line (about 2m spacing). It is suggested to take up plantation on a staggered spacing.
- Due to lot of mines in the area and planting activities by them, the tree covers though improved on Safety zone and other vacant land the mining excavation area has lost its green cover.
- Bio diversity of the area is at a degradation path.
- Man- Animal Conflict is experienced in Kamakshyanagar East Range and Sukinda Range to a greater extent. In order to reduce the conflict, it is proposed to provide additional man power (Squad Members) in Sukinda Range and in Kamashyanager East range in each Range. Elephant driving equipments are also to be provided to strengthen the damage control measures.
- The user agency will plant of trees on Dump surface on staggered manner.
- Planting of rows of *Vetiveria zizanioides* (bena) along the contour and in double row (1/2m apart to filter the runoff and check soil erosion has been suggested. It is to be planted at a vertical interval of 5meter on dump surface.
- The user agency is to assist Forest staff in fire control measures. Mock drill on forest fire control, fire fighting and corresponding training will be organized by the User agency through subject experts every year in consultation with Forest staffs.
- Where ever plantations will be taken up not only tree species will be planted, other varieties i.e grasses, herbs, shrubs, climbers etc are also to be planted to maintain bio diversity of the area and maintain a ground flora.
- As indicated in ToR, the user agency will take up plantation in periphery and Gap outside the Lease area as well as within Lease area will be planted with 4-6ft height seedlings with 90% survival ensured.
- Project Proponent shall develop a good nursery in nearby village for production of saplings of 4-6ft height for planting in safety zone, side of external haulage roads and distribution among villagers for planting in their private land / community land.
- The proponent shall ensure to use organic fertilizer in the nursery.
- The forest department will take up eradication of Invasive Alien Species, Soil & Moisture Conservation, Construction of Subsurface Dyke, Graded bond (Contour bonding), Integrated Fire management, Provisions for Control Burning,



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- Protection & Surveillance, Provisions for Anti depredation equipments / materials, Skill up gradation & Public awareness Camps, alternate Livelihood for tribals will be organized by the forest department.
- This plan is valid for 5 years i.e. from 2022-23 to 2026-27.
- **The cumulative Plan Cost is projected at Rs 518.518 lakh (Cuttack Division: Rs 226.420 Lakh; Dhenkanal Division: Rs 126.98 lakh; Keonjhar WL Division: Rs 165.118 lakh.)**
- The interventions described will be implemented by Cuttack Division, Dhenkanal Division and Keonjhar WL Forest Division.



CHAPTER-I LOCATION OF PROJECT & ITS AREA





CHAPTER-I

LOCATION OF PROJECT & ITS AREA

1.0 Introduction:

Ferro Alloys Corporation Limited (FACOR) is the oldest and most reputed producer of High Carbon Ferro Chrome/Charge Chrome in India known for its consistent supply, best-in-class quality and Service in domestic as well as Global Market for 4-5 decades. M/s FACOR has three Captive Chromite Mines i.e. Kalarangiatta, Ostapal and Kathapal at Sukinda Chromite Valley. Ostapal Chromite mining lease over an area of 72.843 ha was granted in favour of M/s Ferro Alloys Corporation Limited for 20 years from 13.08.1985 to 12.08.2005. After expiry of lease the mining operation continued under deemed extension provisions of the MMDR Act, 1957 and the Mineral Concession Rule-1964 till 21.08.2016.

As per “The Mines and Mineral (Development and Regulation) Amendment Ordinance, 2015, the lease period has been deemed to be extended for 50 years from the date of execution of Lease i.e. 13.08.1985. The supplementary lease deed has been executed on 22.08.2016 and the life of the lease is extended up to 12.08.2035. The lessee has obtained Environment Clearance for production of 0.2 MTPA vide MoEF, Government of India letter no. J-11015/38/2006-IA.II (M) dated 6th December, 2006.

The Lessee has applied for Environment Clearance for enhancement of production from 0.2 MTPA to 0.240 MTPA chrome Ore (ROM) with maximum excavation of 0.579 Million cum / annum and beneficiation of Chrome Ore of 0.1 MTPA through Opencast Mining method vide online Application no SIA/OR/MIN/66461/2021. Considering the application the State Environment Impact Assessment Authority, (SEIAA) has issued the ToR (Terms of Reference) for preparation of EIA/ EMP Report as per EIA Notification 2006 vide letter no 3883/SEIAA dated 28.01.2022. The ToR is at **Annexure-I**.

In the said Terms of Reference (ToR) for conducting Environment Impact Assessment study” sub head B. Standard ToR for Mining Project there are stipulated conditions need to be complied with. The conditions no (xvi), (xvii) and (xviii) read as follows.

“xvi). A Study shall be got done to ascertain the impact of Mining Project on Wildlife of the study area and details furnished. Impact of the project on the wildlife in



surrounding and any other protected area and accordingly detailed mitigative measures required should be worked out with cost implications and submitted.

- xvii) *Location of National Parks, Sanctuaries, Biosphere Reserves, wildlife corridors, Ramsar Site, Tiger / Elephant Reserve /(existing as well as proposed) if any, within 10 km of the mining 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.*
- xviii) *A detailed biological study of the study area [core zone and buffer zone (10 kilometer 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 survey clearly indicating the Schedule of the fauna present. In case of any Schedule –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.”*

This Plan is being prepared in compliance to these above conditions.

Location of the Project:

The project is located at Village Gurjang under Sukinda Tahasil of district Jajpur. The Latitude & Longitude of the project is as follows.

Latitude $21^{\circ}03'26.65''\text{N}$ to $21^{\circ}04'0.98''\text{N}$

Longitude $85^{\circ}47'4.39''\text{E}$ to $85^{\circ}47'34.29''\text{E}$

The Mine location finds place in Survey of India Topo Sheet no F45N16 (73G/16).

The location map is at **Plate No-I.**



Site Specific wildlife Conservation Plan for Ostapal Chromite Mine of M/s Ferro Alloys Corporation Ltd



Forest / Civil Administrative Jurisdiction:

The entire project comes within the jurisdiction of Cuttack Division, Sukinda Range. The Forest / Civil administrative jurisdiction is as given below.

Forest Administrative Jurisdiction		Civil Administrative Jurisdiction:	
Description	Name	Description	Name
Beat	Kaliapani	Village	Gurjang
Section	Kaliapani	Tahasil	Sukinda
Range	Sukinda	District	Jajpur
Division	Cuttack	Division	Central, Cuttack
Circle	Angul		

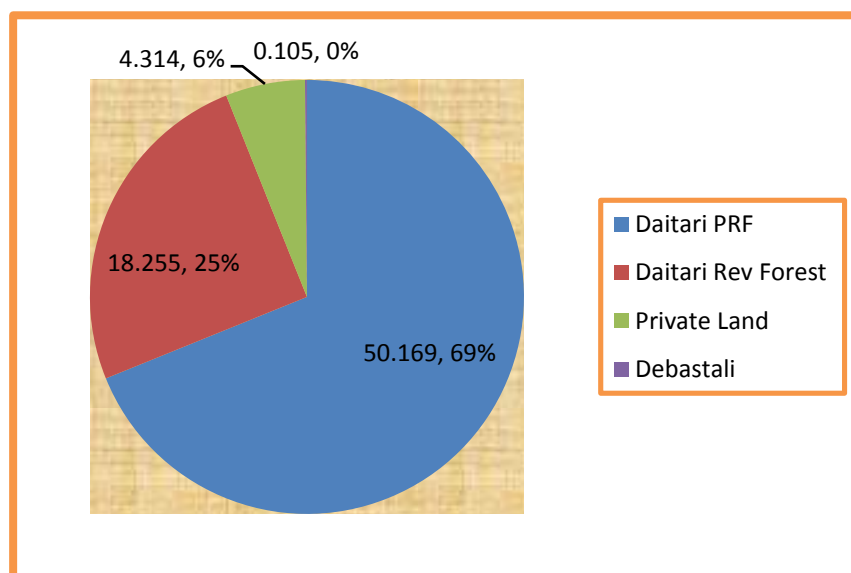
Table 1 Forest/Civil Administrative jurisdiction

1.1 Extent of Project Area & Land Schedule:

The total ML area is 72.843ha out of which 68.424ha is of Forest Kisam and rest is Non forest Land. The broad Land Schedule is furnished below.

Sl No	Description	Area in ha	Percentage
1	Daitari DPF	50.169	68.87
2	Daitari Rev Forest	18.255	25.06
3	Private Land	4.314	5.92
4	Debastali	0.105	0.14
5	Total	72.843	100.00

Table 2 Details of Land schedule





1.2 Cost of the Project:

The project cost is **Rs 88.85 Crores**. The copy of the Report Part-I (Form B) i.e. Application online for Environment Clearance is at **Annexure-II**.

1.3 Nature & Land involved in the Project:

1.3.1 Nature of the Project:

The Project is Non Linear.

1.3.2 Land details of the Project:

The land Schedule attached to the Lease deed is at **Annexure-III**. The same is reproduced below for ready reference.

Plot No	Khata No	Name of the tenant	Kisam	Area in Acre	Remarks
1/1	13	Anabadi Govt.	Anabadi Sal Jungle	45.11	Part
5	11	Bhobitra Pradhan S/o Bhotu Pradhan	Passi-2/46	0.01	Part
9	1	Sri Kanduri Thakurani	Nutan Padla Passi-2	0.15	Part
10	2	Kirtan Dehury S/o Madhu Dehury	Passi-2/5	0.17	Full
11	2		Nutan Padla Passi-2	1.3	Part
12	2		Passi-2/3	0.2	Full
13	11	Bhobitra Pradhan S/o	Passi-2/8	0.4	Full
14	11	Bhotu Pradhan	Nutan Padla Passi-2	0.05	Full
15	8	Nekula Dehury S/o Madha Dehury	Nutan Padla Passi-2	0.25	Full
16	6	Narendra Dehury S/o Dutiya Dehury	Nutan Padla Passi-2/11	0.28	Full
17	8	Nekula Dehury S/o Madha Dehury	Passi-2/4	0.19	Full
18	6	Narendra Dehury S/o Dutiya Dehury	Passi-2/6	0.3	Full
19	10	Bhobitra Pradhan S/o Bhotu Pradhan	Passi-2/30	1.17	Full
20	10	Bhobitra Pradhan S/o Bhotu Pradhan	Nutan Padia, Passi-2/7	0.37	Full
21	10	Bhobitra Pradhan S/o Bhotu Pradhan	Passi-2/26	0.79	Full



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22	3	Golapi Dehury S/o Sagar Dehury	Passi-2/23	0.84	Full
23	3	Golapi Dehury S/o Sagar Dehury	Nutan Padla Passi-2/11	0.33	Full
24	12	Manguli Patra S/o Bholu Patra	Nutan Padla Passi-2/31	1.01	Full
25	7	Naga Dehury & Jaga Dehury S/o Dhani Dehury	Nutan Padla Passi-2/13	0.28	Full
26	4	Goutam Dehury S/o Bhima Dehury	Passi-2/16	0.63	Part
27	10	Bhobitra Pradhan S/o Bhotu Pradhan	Passi-2/13	0.13	Part
29	9	Banchha Dehury S/o Abtar Dehury	Nutan Padla, Passi-2/41	0.05	Part
30	9	Banchha Dehury S/o Abtar Dehury	Passi-2/10	0.13	Part
31	7	Naga Dehury & Jaga Dehury S/o Dhani Dehury	passi-2/48	1.5	Part
35	5	Nanda Dehury S/o Dasa Dehury	passi-2/125	0.39	Part
		Total		56.03	
Forest Block					
Jungle Block No 27/1				123.97Acre	Part
	Abstract				
	1	Village -Gurujang No. 16	56.03 Acre		
	2	Forest Block no . 27/1	123.97 Acre		
		Total	180 Acre or 72.843ha		

Table 3 Land detils of the project

1.4 Stipulated Condition under which plan to be prepared:

The Site Specific Wildlife Conservation Plan is being prepared with reference to the stipulated condition outlined in the ToR issued by SEIAA and communicated vide Letter No 3883/ SEIAA dated 28.01.2022 (**Annexure-II**).



1A.5 Statutory Clearances:

1A.5 (i) Status of Forest Clearance:

The total Forest land involved in the Mining Lease is 68.424 ha. Out of 68.424 ha, Forest Clearance has been obtained for 64.354 ha vide Order vide F.No-8-86/1996-FC (Vol-II) dated 07.02.2006 (**Annexure-IV**). The balance area 4.070ha is involved in Safety Zone of the Mine for which Forest Clearance has not yet been accorded.

1A.5 (ii) Status of Wildlife Clearance:

The Project is not forming a part of Wildlife Sanctuary / National Park / Protected Area nor passing through any Eco Sensitive Zone of any Wildlife Sanctuary / National Park / Protected area. Hence Clearance under section 29 of the Wildlife (Protection) Act, 1972 is not required.

1A.6 Status of Environmental Clearance:

The project has obtained Environment Clearance for production of 0.240 MTPA Chrome Ore (ROM) with maximum excavation of 0.579Million Cum / Annum and beneficiated Chrome Ore of 0.1 MTPA through Opencast Mining method vide EC Identification no EC228001OR120821 of MoEF&CC, dated 4th April,2022 (**Annexure-V**)





CHAPTER-II

Project & Its Impact Area





CHAPTER-II

PROJECT & ITS IMPACT AREA

2.0 Description of Project Area & its Impact Area:

The entire lease area is a flat terrain having a gentle slope of 2° from North to South. The highest ground elevation in this area is laying in North Part of the lease area at an altitude of 158 mRL and lowest relief is this area is 135mRL laying in the Southern Part. Due to mining activities topography has been changed considerable due to quarry bottom, Waste Dumps and shorting yard. The average lowest elevation of the quarry bottom at present is +30 mRL and highest leveled area is located in Northern Part of the Lease which is due to waste Dump. The average top RL of the dump is +242 mRL

The total Lease area is 72.843ha.

2.1 Location:

The project is located at Village Gurjang under Sukinda Tahasil of district Jajpur. The Latitude & Longitude of the project is as follows.

Latitude **21°03'26.65"N to 21°04'0.98"N**

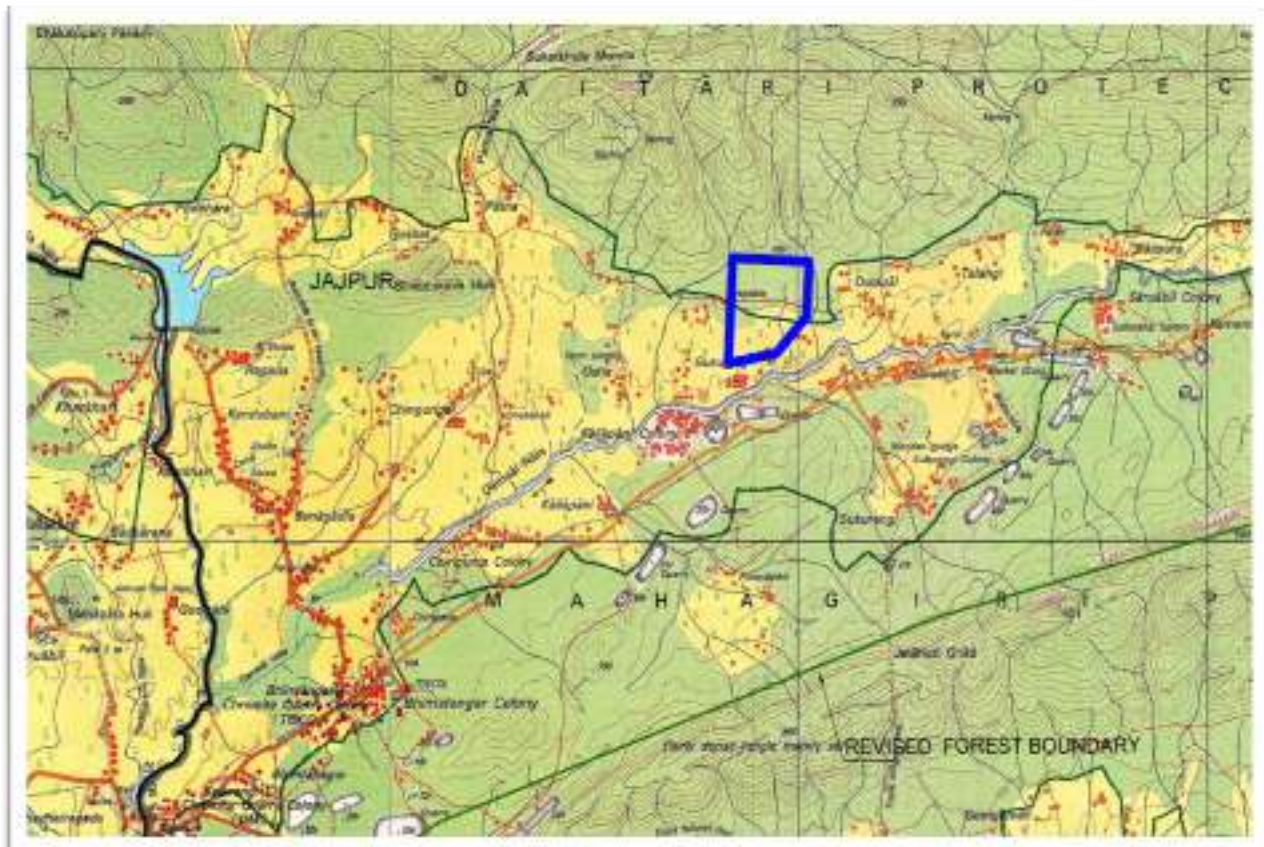
Longitude **85°47'4.39"E to 85°47'34.29"E**

The Mine finds place in Survey of India Topo Sheet noF45N16 (73G/16)

The Mine is approachable from NH-200 Chandikhol- Talcher National Highway from Mangalpur on Mangalpur- Tamka Road (ODR).



Site Specific wildlife Conservation Plan for Ostapal Chromite Mine of M/s Ferro Alloys Corporation Ltd



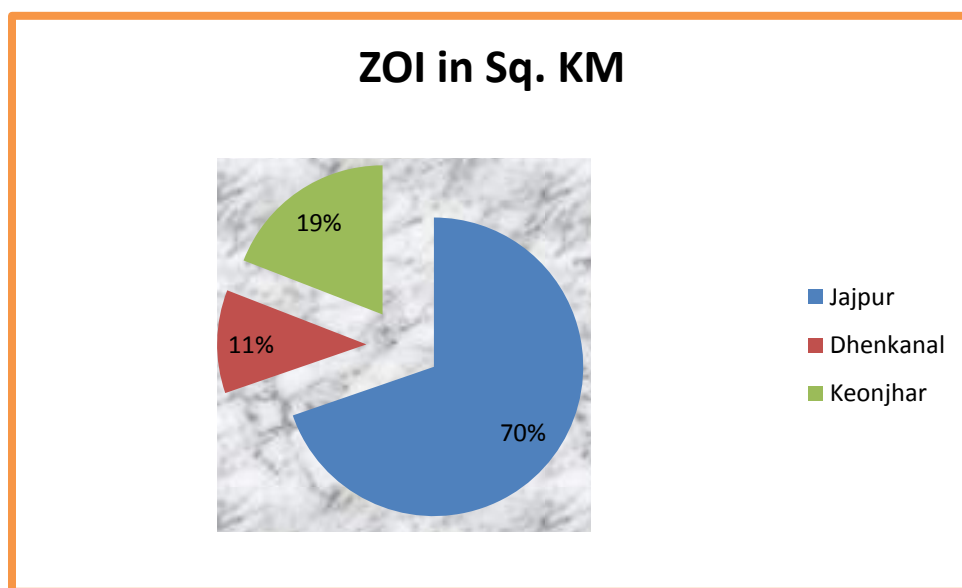
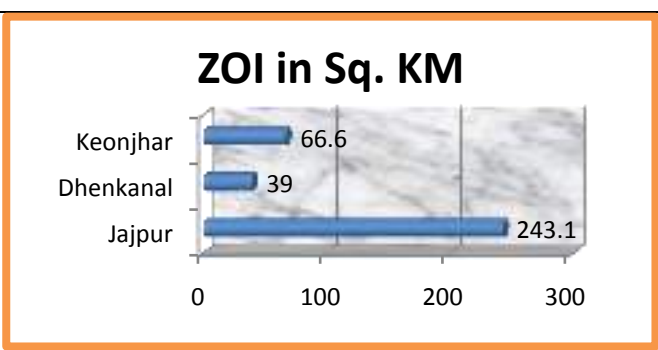


2.2 Zone of Impact:

The Zone of Impact is considered to be 10km on all sides of the Project layout. The Zone of impact comes within Cuttack Division, Dhenkanal Division and Keonjhar WL Division, Anandapur. The Zone of Impact computed to be 348.70 Sq.Km. The District/ division wise breakup is as follows.

District / Division	ZOI in Sq. Km	Percentage
Jajpur / Cuttack	243.10	69.72
Dhenkanal / Dhenkanal	39.0	11.18
Keonjhar / Keonjhar WL	66.60	19.10
Total	348.70	100.00

Table 4 Area break up District wise



2.2.1 Status of Overlapping Zone of Impact with other projects:

Sukinda Kaliapani area along the Mahagiri DPF is the largest Chrome Ore deposit in Asia. The chrome ore belt locally named as “Chrome Valley” accounts for about 98% of the total proved chromite (chromium ore) reserves of the country, of which **about 97%** occur in the Sukinda Valley. This study area is found to be very near to many other chromite projects. But the locality was found to be economically and socially backward. Following table lists all projects within or near the study area.



Site Specific wildlife Conservation Plan for Ostapal Chromite Mine of M/s Ferro Alloys Corporation Ltd



Sl No	Name of Mine	Name of Lessee	Ore	Remark
1	Kamarda Chromite Block	M/s Tata Steel Mining Ltd.	Chromite	Operative
2	Kaliapani Chromite Mine	Balasore Alloys Ltd.	Chromite	Operative
3	Ostapal Chromite Mine	Ferro Alloys Corporation Ltd.	Chromite	Operative
4	Kalarangiatta Chromite Mine	Ferro Alloys Corporation Ltd.	Chromite	Operative
5	Mahagiri mines Chromite	M/s IMFA Ltd.	Chromite	Operative
6	Tailangi Chromite Mine	IDC of Odisha Ltd	Chromite	Operative
7	Chingudipal Chromite Mine	IMFA Ltd.	Chromite	Lapsed and handed over to Govt.
8	Sukinda Mines (Chromite)	IMFA Ltd	Chromite	Operative
9	Jindal Chromite Mine	Jindal Stainless Ltd.	Chromite	Non Operative
10	Saruabil Chromite Block	M/s Tata Steel Mining Ltd.	Chromite	Operative
11	South kaliapani Chromite Mine	OMC Ltd.	Chromite	Operative
12	Kaliapani Chromite Mine	OMC Ltd	Chromite	Operative
13	Sukrangi Chromite Mine	OMC Ltd	Chromite	Operative
14	Daitari Chromite Mine	OMC Ltd	Iron	Operative
15	Sukinda Chromite Mine	M/s Tata Steel Mining Ltd.	Chromite	Operative
16	Kathpal Chromite Mine	OMC Ltd	Chromite	Non-Operative
17	Birasal Chromite Mine	OMC Ltd	Chromite	Non-Operative
18	Kathpal Chromite Mine	Ferro Alloys Corporation Ltd.	Chromite	Lease renewal under process
19	Kalrangi Chromite Mines	OMC	Chromite	Non Operative
20	Chromite Mines in Mahagiri DPF	M/s Balasore alloys	Chromite	Non Operative
21	Balipada Chromite Mines	OMC Ltd	Chromite	Non Operative

Table 5 Projects within or near the study area

The relative location of other mines near to Ostapal Chromite Mine is indicated in **Plate-II**.

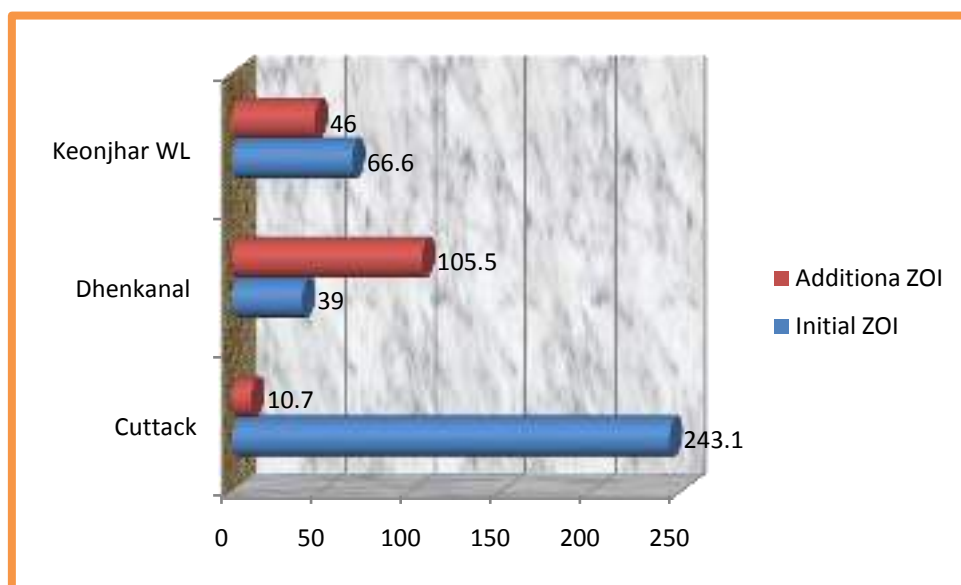


2.2.2 Additional Zone of Impact Considered:

Due to overlapping nature of Zone of Impact, additional Zone of Impact has been considered towards North and North West mostly coming in Keonjhar WL and Dhenkanal Division. The zone of impact and additional zone of impact considered is as follows.

District / Division	ZOI in Sq. Km	Additional ZOI in Sq.Km	Total in Sq. Km	Percentage	% of Add.ZOI considered
Jajpur / Cuttack	243.10	10.70	253.8	49.68	4.40
Dhenkanal / Dhenkanal	39.0	105.5	144.5	28.28	270.51
Keonjhar / Keonjhar WL	66.60	46.00	112.6	22.04	69.07
Total	348.70	162.20	510.9	100.00	46.52

Table 6 Additional ZOI Computed



2.3 Land Use Pattern:

The land use pattern is an important indicator of Core & Buffer Zone to decide the nature of threat and probable interventions required. Core area land use pattern and Buffer zone (10 km Radius area) are furnished below.



2.3.1 Core Zone:

The Mining Plan has been approved vide letter no MRMP/A-16-ORI/BHU/2020-21 dated 05.08.2021 of Regional Controller of Mines, Bhubaneswar. The Existing land use pattern as indicated in the Mining Plan for the Mine is as follows.

Sl No	Description	Area in ha (Existing)	Area in ha (End of Plan Period)	Conceptual up to 2031	Percentage at Present
1	Area under Mining	30.179	34.539	34.539	41.4
2	Storage of Top Soil	0	0	0	0.0
3	Overburden / Dump	27.048	28.585	30.551	37.1
4	Mineral storage	2.805	1.561	1.561	3.9
5	Infrastructure (Workshop, Admn. Building etc)	0.198	0	0	0.3
6	Roads	1.538	0.304	0.304	2.1
7	Railways	0	0	0	0.0
8	Green Belt (Safety Zone)	4.070	4.070	4.070	5.6
9	Tailing Pond	1.502	0	0	2.1
10	ETP with Settling Pit	0.437	0.360		0.6
11	Mineral Separation Plant (COB)	1.421	0.410	0	2.0
12	Township area	0	0	0	0.0
13	Others				0.0
i	Drain	1.028	1.290	0.790	1.4
ii	Barrier / Retaining wall	0.946	0.907	0.407	1.3
iii	Peripheral area	1.671	0.817	0.261	2.3
	Total	72.843	72.843	72.843	100

Table 7 Existing Land use pattern

2.3.2 Zone of Impact (Buffer Zone):

The Land use pattern of area coming within Zone of Impact has been analyzed through Satellite imagery study. The land use pattern as observed is as follows.



*Site Specific wildlife Conservation Plan for Ostapal
Chromite Mine of M/s Ferro Alloys Corporation Ltd*

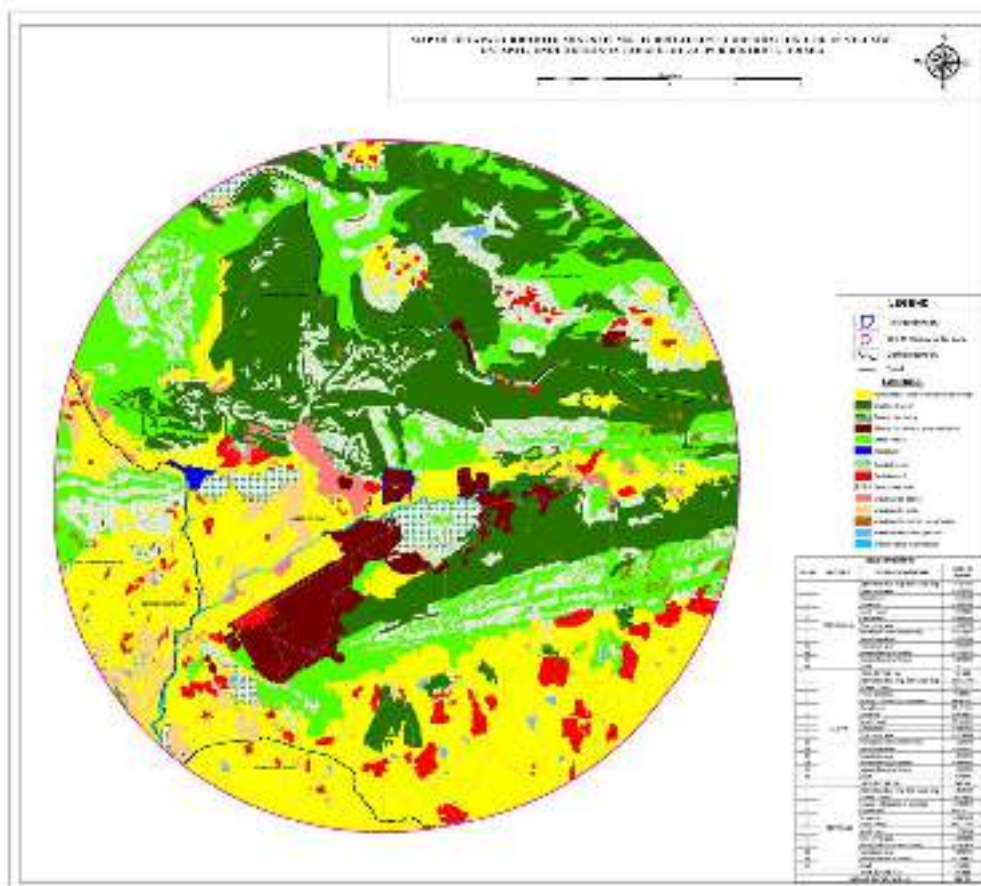


Land use pattern Zone of Impact (Buffer Zone)					
Land Use	District (Area in Sq.Km)			Total	Percentage
	Dhenkanal	Jajpur	Keonjhar		
Agricultural land	24.892	70.682	3.607	99.181	28.44
Dense Forest	0.000	62.025	30.075	92.1	26.41
Open Forest	3.524	39.187	15.925	58.636	16.82
Forest Plant.	0.151	0.144	0.000	0.295	0.08
Mining / industry	0.000	14.663	0.482	15.145	4.34
Reservoir	0.016	0.475	0.011	0.502	0.14
Road	0.213	0.413	0.278	0.904	0.26
Scrub Forest	4.737	27.603	13.221	45.561	13.07
Settlement	0.936	9.389	1.209	11.534	3.31
Tree cover	0.588	6.264	1.055	7.907	2.27
Scrub dense	0.173	4.897	0.000	5.07	1.45
Scrub open	3.349	4.248	0.256	7.853	2.25
Barren / rocky / stony	0.105	1.225	0.246	1.576	0.45
Lake / ponds	0.279	0.688	0.235	1.202	0.34
River / stream	0.037	1.197	0.000	1.234	0.35
Total	39.000	243.100	66.600	348.7	100.00

Table 8 Land use pattern ZOI(Buffer zone)



Site Specific wildlife Conservation Plan for Ostapal Chromite Mine of M/s Ferro Alloys Corporation Ltd

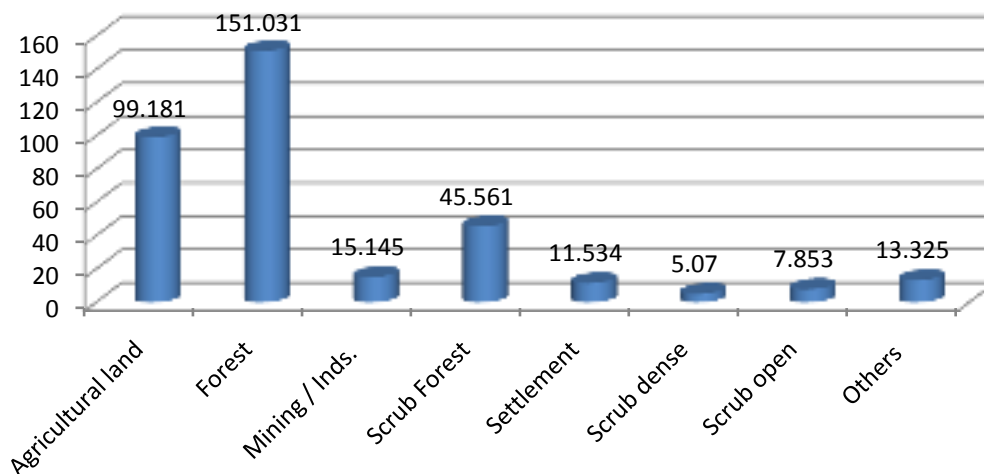


Broad land use (ZOI of Ostapal Mines)		
Land Use	Area in Sq.Km	Percentage
Agricultural land	99.181	28.44
Forest	151.031	43.31
Mining / Inds.	15.145	4.34
Scrub Forest	45.561	13.07
Settlement	11.534	3.31
Scrub dense	5.07	1.45
Scrub open	7.853	2.25
Others	13.325	3.82
Total	348.70	100

Table 9 Broad land use (ZOI of Ostapal mines)



Broad Land Utilization Pattern in Sq.Km



From the above it is observed that the main land use pattern is Forest (43.31%) followed by Agriculture (28.11%). Mining is also an important land use pattern which constitutes about 15.145 Sq.Km (4.34%).

Land Use pattern – Additional Zone of Impact:

As suggested during Presentation before the PCCF (WL) & Chief Wildlife Warden, Odisha Bhubaneswar on 28.09.2022, the land use pattern of additional Zone of Impact (area 162.20 Sq.km) has been analysed from Satellite imagery. The details of Land use pattern (Add. ZOI) is furnished at **Annexure-VI**.

2.4 Habitation:

2.4.1 Core Zone:

The Project is in Gurjang village. There is no habitation within the core area / within the project.

2.4.2 Zone of Impact (Buffer Zone):

In the Zone of Impact there are 44 villages (Jajpur District-31, Dhenkanal District- 9 and in Keonjhar District-4 villages). As per 2011 census, the total population is 52779 in 11046 house Hold. The male Female ration is 974 per 1000 male. The SC population is 4498 (8.52%) and ST Population is 26642 (50.48%). The area is mostly a tribal belt. The literacy percentage is 54.68%. The abstract of demographic profile is furnished below.

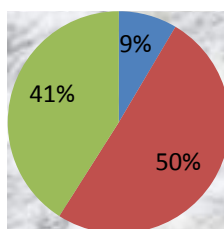


Abstract of Demographic Profile

District	No of Village	No_HH	TOT_P	TOT_M	TOT_F	P_SC	P_ST	P_LIT
Keonjhar	4	1506	6042	3130	2912	704	2951	3955
Jajpur	31	8124	39780	20189	19591	2560	20564	20951
Dhenkanal	9	1416	6957	3418	3539	1234	3127	3956
Total	44	11046	52779	26737	26042	4498	26642	28862
	Percentage			50.66	49.34	8.52	50.48	54.68

Table 10 Abstract of Demographic profile

Demographic Profile (ZOI)



■ SC
■ ST
■ Others

Demographic Profile Additional Zone of Impact:

There are 16 villages (Jajpur District: 01, Dhenkanal District 7 and Keonjhar District: 8 villages. The demographic profile (Abstract) for Additional Zone of impact is furnished below. (Area 162.20 Sq. Km)

District	No of Village	No_HH	TOT_P	TOT_M	TOT_F	P_SC	P_ST	P_LIT
Dhenkanal	7	984	4433	2301	2132	562	2016	2541
Jajpur	1	55	307	149	158	0	307	1
Keonjhar	8	796	3619	1778	1841	206	2543	1713
Total	16	1835	8359	4228	4131	768	4866	4255
%				50.58	49.42	9.19	58.21	50.90

The village wise Demographic profile of Zone of Impact & additional Zone of Impact is at **Annexure VII**

2.4.3 Occupational Profile:

The occupational profile has been analyzed basing on 2011 Census data. The occupational profile is as follows.



Site Specific wildlife Conservation Plan for Ostapal Chromite Mine of M/s Ferro Alloys Corporation Ltd



Abstract of Occupational Profile Zone of Impact.

District	No of Village	TOT_ WORK_P	MAIN_ WORK_P	MAIN_ CL_P	MAIN_ AL_P	MAIN_ HH_P	MAIN_ OT_P	MARG_ WORK_P	NON_ WORK_P
Keonjhar	4	2366	1744	238	394	42	1070	622	3676
Jajpur	31	14586	9067	1898	1422	268	5479	5519	25194
Dhenkanal	9	3175	1797	623	713	51	410	1378	3782
Total	44	20127	12608	2759	2529	361	6959	7519	32652
Percentage		38.13	62.64	13.71	12.57	1.79	34.58	37.36	61.87

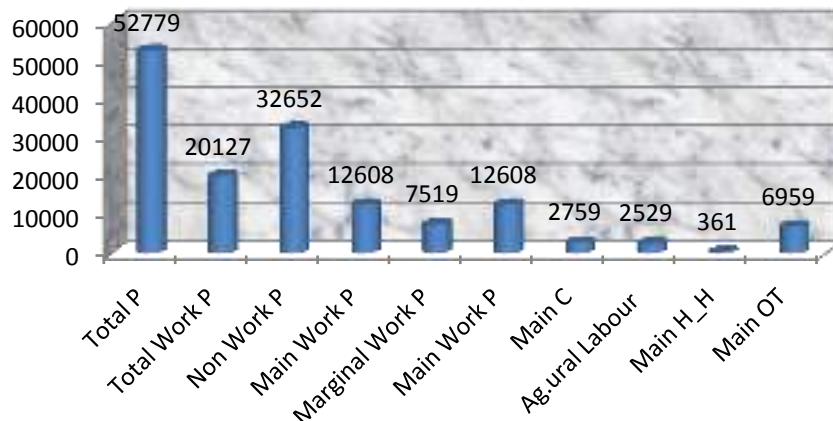
Table 11 Abstract of Occupation Profile ZOI

On analysis it is observed as follows:

Description	Population	Percentage
Total Population	52779	
Total Work Population	20127	38.13
Non Work Population	32652	61.87
Main Work Population	12608	62.64
Marginal Work Population	7519	37.36
Main Work Population	12608	21.88
Main Cultivators	2759	20.06
Agricultural Labour	2529	2.86
Main House Hold Trade	361	55.20
Main Other Trade	6959	21.88

Table 12 Occupation profile

Occupational Profile





**Site Specific wildlife Conservation Plan for Ostapal
Chromite Mine of M/s Ferro Alloys Corporation Ltd**



2.5 Flora & Fauna:

The forests of the Zone of impact is mostly moist Deciduous sal forests,. The flora and fauna has been studied in details and species observed are as follows. The DFO, Cuttack has also provided the list of Flora & fauna observed in Sukinda valley vide his letter No 6740/5F (Forest diversion) 235/2021 dated 23.09.2021 (copy at **Annexure- VIII**)

2.5.1 (Flora) Core Zone:

Sl. No	Name of the Plant	Family	Local Name
Trees			
1	<i>Acacia auriculiformis</i>	<i>Mimosaceae</i>	Acacia / Sunajhari
2	<i>Adina cordifolia</i>	<i>Rubiaceae</i>	Haldu
3	<i>Aegle marmelos (L.) Correa</i>	<i>Rutaceae</i>	Bela
4	<i>Albizia procera (Roxb.) Benth.</i>	<i>Mimosaceae</i>	Sirisa
5	<i>Alstonia scholaris (L.) R.Br.</i>	<i>Apocynaceae</i>	Chatiana
6	<i>Anthocephalus kadamba</i>	<i>Rubiaceae</i>	Kadamba
7	<i>Artocarpus heterophylla Lam.</i>	<i>Moraceae</i>	Panas
8	<i>Azadirachta indica A. Juss.</i>	<i>Meliaceae</i>	Nima
9	<i>Bauhinia racemosa Lam.</i>	<i>Caesalpiniaceae</i>	Kanchana
10	<i>Dalbergia sissoo L.f.</i>	<i>Fabaceae</i>	Sisoo
11	<i>Delonix regia</i>	<i>Caesalpiniaceae</i>	Krushna chuda
12	<i>Holarrhena antidysentrika (Buch.-Ham.) Wall. Ex G. Don</i>	<i>Apocynaceae</i>	Kurei
13	<i>Lagerstroemia parviflora Roxb.</i>	<i>Lythraceae</i>	Sidha
14	<i>Mangifera indica L.</i>	<i>Anacardiaceae</i>	Amba
16	<i>Melia azedarach L.</i>	<i>Meliaceae</i>	Mahanimba
17	<i>Mimusops elengii L.</i>	<i>Sapotaceae</i>	Baula
18	<i>Mitragyna parviflora</i>	<i>Rubiaceae</i>	Mundi
19	<i>Nyctanthes arbor-tristis L.</i>	<i>Nyctanthaceae</i>	Gangasiuli
20	<i>Phyllanthus emblica L.</i>	<i>Euphorbiaceae</i>	Amla
21	<i>Polyalthia longifolia</i>	<i>Annonaceae</i>	Debadaru
22	<i>Pongamia pinnata (L.) Pierre</i>	<i>Fabaceae</i>	Karanja
23	<i>Shorea robusta</i>	<i>Dipterocarpaceae</i>	Sal
24	<i>Syzygium cumini (L.) Skeels</i>	<i>Myrtaceae</i>	Jamun
25	<i>Terminalia arjuna</i>	<i>Combretaceae</i>	Arjun
26	<i>Terminalia bellirica (Gaertn.) Roxb.</i>	<i>Combretaceae</i>	Bahada
27	<i>Terminalia bellirica (Gaertn.) Roxb.</i>	<i>Combretaceae</i>	Bahada
28	<i>Terminalia tomentosa</i>	<i>Combretaceae</i>	Asan
29	<i>Trema orientalis</i>	<i>Cannabaceae</i>	Kharkas
30	<i>Ziziphus mauritiana (Retz.) Wild.</i>	<i>Rhamnaceae</i>	Kanteikoli



**Site Specific wildlife Conservation Plan for Ostapal
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Herbs			
1.	<i>Achyranthes aspera</i> L.	<i>Amaranthaceae</i>	Apamaranga
2.	<i>Ageratum conyzoides</i> L.	<i>Asteraceae</i>	Pokasungha
3.	<i>Cassia tora</i>	<i>Caesalpinaceae</i>	Bana chakunda
4.	<i>Cleome viscosa</i> L.	<i>Capparaceae</i>	Bana sorish
5.	<i>Eusteralis stellata</i> (Lour.) Panig. Var. <i>roxburghiana</i> (Kemg) Bennet & Raizada	<i>Lamiaceae</i>	Iswarajata
6.	<i>Ocimum canum</i> Sims	<i>Lamiaceae</i>	Sree tulasi
7.	<i>Oldenlandia corymbosa</i> L.	<i>Rubiaceae</i>	Gharapudia
Shurbs			
1	<i>Clerodendrum viscosum</i> Vent	<i>Verbenaceae</i>	Nagari
2	<i>Datura metel</i> L.	<i>Solanaceae</i>	Dudura
3	<i>Helicteres isora</i> L.	<i>Sterculiaceae</i>	Modimodica
4	<i>Hibiscus rosa-sinensis</i>	<i>Malvaceae</i>	Mandara
5	<i>Lantana camara</i> L.	<i>Verbenaceae</i>	Nagairi
6	<i>Vitex negundo</i>	<i>Verbenaceae</i>	Begunia
7	<i>Woodfordia fruticosa</i> (L.) Kurz	<i>Lythraceae</i>	Dhataki
	<i>Calotropis gigantea</i>	<i>Asclepiaceae</i>	Arakh
Climbers			
1	<i>Atylosia scrabaeoides</i> (L.) Benth.	<i>Fabaceae</i>	Banakolatha
2	<i>Butea parviflora</i> Roxb.	<i>Fabaceae</i>	Lata palas
3	<i>Dioscorea wallichii</i> Hook.f.	<i>Dioscoreaceae</i>	Pita alu
4	<i>Smilax zeylanica</i> L.	<i>Smilacaceae</i>	Muturi
5	<i>Tinospora cordifolia</i> (Willd.) Miers ex Hook.f. & Thoms.	<i>Menispermaceae</i>	Guluchi
6	<i>Combretum decandrum</i>	<i>Combretaceae</i>	Atundi
Grasses			
1	<i>Chrysopogon aciculatus</i> (Retz.) Trin.	<i>Poaceae</i>	Guguchia
2	<i>Eleusine indica</i> (L.) Gaertn.	<i>Poaceae</i>	Ghasa
3	<i>Eragrostis ciliaris</i> (L.) R.Br.	<i>Poaceae</i>	Ghasa
4	<i>Pennisetum pedicellatum</i>	<i>poaceae</i>	Dinanath grass
5	<i>Saccharum spontaneum</i>	<i>poaceae</i>	Kasatandi
6	<i>Cynodom dactylon</i>	<i>poaceae</i>	Duba Grass

Table 13 Flora (Core zone)



2.5.2 (Flora) Zone of Impact (Buffer Zone):

Sl. No	Name of the Plant	Family	Local Name
Trees			
1	<i>Acacia leucophala</i> (Roxb.) Willd.	<i>Mimosaceae</i>	Gahira
2	<i>Acacia nilotica</i> (L.) Delile	<i>Mimosaceae</i>	Babool
3	<i>Acacia auriculiformis</i>	<i>Mimosaceae</i>	Acacia / Sunajhari
4	<i>Aegle marmelos</i> (L.) Correa	<i>Rutaceae</i>	Bela
5	<i>Ailanthus varieg</i> Roxb.	<i>Simaroubaceae</i>	Mahala
6	<i>Alangium salvifolium</i> (L.f.) Wang	<i>Alangiaceae</i>	Ankula
7	<i>Albizia procera</i> (Roxb.) Benth.	<i>Mimosaceae</i>	Sirisa
8	<i>Alstonia scholaris</i> (L.) R.Br.	<i>Apocynaceae</i>	Chatiana
9	<i>Anacardium occidentale</i>	<i>Anacardiaceae</i>	Kaju
10	<i>Annona squamosa</i> L.	<i>Annonaceae</i>	Ata
11	<i>Anthocephalus kadamba</i>	<i>Rubiaceae</i>	Kadamba
12	<i>Artocarpus heterophylla</i> Lam.	<i>Moraceae</i>	Panas
13	<i>Azadirachta indica</i> A. Juss.	<i>Meliaceae</i>	Nima
14	<i>Bauhinia racemosa</i> Lam.	<i>Caesalpiniaceae</i>	Kanchana
15	<i>Bombax ceiba</i> L.	<i>Bombacaceae</i>	Simili
16	<i>Borassus flabellifer</i> L.	<i>Arecaceae</i>	Tala
17	<i>Bridelia retusa</i> (L.) Spreng.	<i>Euphorbiaceae</i>	Kasi
18	<i>Buchanania lanzan</i> Spreng.	<i>Anacardiaceae</i>	Chara
19	<i>Butea monosperma</i> (Lam.) Taub.	<i>Fabaceae</i>	Palasa
20	<i>Careya arborea</i> Roxb.	<i>Lecythidaceae</i>	Kumbhi
21	<i>Cassia siamia</i>	<i>Caesalpiniaceae</i>	Sana chakunda
22	<i>Cassia fistula</i> L.	<i>Caesalpiniaceae</i>	Sunari
23	<i>Ceiba pentadra</i>	<i>Malvaceae</i>	American Simili
24	<i>Chloroxylon swietenia</i> DC.	<i>Flindersiaceae</i>	Bheru
25	<i>Cleistanthus collinus</i> (Roxb.) Benth. Ex Hook.	<i>Euphorbiaceae</i>	Karada
26	<i>Cocos nocifera</i>	<i>Arecaceae</i>	Nadia
27	<i>Dalbergia latifolia</i> Roxb.	<i>Fabaceae</i>	Sisoo
28	<i>Dillenia pentagyna</i> Roxb.	<i>Dilleniaceae</i>	Ou
29	<i>Diospyros malabarica</i> (Desr.) Kostel.	<i>Ebenaceae</i>	Kendu
30	<i>Diospyros melanoxylon</i> Roxb.	<i>Ebenaceae</i>	Mankada kendu
31	<i>Erythrina variegata</i>	<i>Fabaceae</i>	Paladhua
32	<i>Eucalyptus citridora</i>	<i>Myrtaceae</i>	Eucalyptus



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33	<i>Ficus benghalensis</i> L.	Moraceae	Bara
34	<i>Ficus hispida</i> L.f.	Moraceae	Dimiri
35	<i>Ficus religiosa</i> L.	Moraceae	Osta
36	<i>Flacourtia indica</i> (Burm.f.) Merr.	Flacourtiaceae	
37	<i>Gardenia gummifera</i> L.f.	Rubiaceae	Ghurudu
38	<i>Gmelina arborea</i> Roxb.	Verbenaceae	Gambhari
39	<i>Haldina cordifolia</i> (Roxb.) Ridsdale	Rubiaceae	Kuruma
40	<i>Lagerstroemia parviflora</i> Roxb.	Lythraceae	Sidha
41	<i>Limonia acidissima</i> L.	Rutaceae	Kaitha
42	<i>Madhuca longifolia</i> (Koen.) Macbr. var. <i>latifolia</i> (Roxb.) A.Cheval	Sapotaceae	Mahua
43	<i>Mallotus philippensis</i> (L.) Muell.-Arg.	Euphorbiaceae	Kukuma
44	<i>Mangifera indica</i> L.	Anacardiaceae	Amba
45	<i>Melia azedarach</i> L.	Meliaceae	Mahanimba
46	<i>Michelia champaca</i> L.	Magnoliaceae	Champa
47	<i>Mimusops elengii</i> L.	Sapotaceae	Baula
48	<i>Nyctanthes arbor-tristis</i> L.	Nyctanthaceae	Gangasiuli
49	<i>Oroxylum indicum</i> (L.) Vent.	Bignoniaceae	Phanaphana
50	<i>Phyllanthus emblica</i> L.	Euphorbiaceae	Amla
51	<i>Pongamia pinnata</i> (L.) Pierre	Fabaceae	Karanja
52	<i>Polyalthia longifolia</i>	Annonaceae	Debadaru
53	<i>Pterospermum acerifolium</i>	Malvaceae	Muchukunda
54	<i>Schleichera oleosa</i> (Lour.) Oken	Sapindaceae	Kusuma
55	<i>Semecarpus anacardium</i> L.f.	Anacardiaceae	Bhalia
56	<i>Shorea robusta</i> Gaertn.f.	Dipterocarpaceae	Sal
57	<i>Sterculia urens</i> Roxb.	Sterculiaceae	Genduli
58	<i>Syzygium cumini</i> (L.) Skeels	Myrtaceae	Jamun
59	<i>Tamarindus indica</i>	Fabaceae	Tentuli
60	<i>Tectona grandis</i>	Verbenaceae	Saguan
61	<i>Terminalia alata</i> Heyne ex Roth	Combretaceae	Asana
62	<i>Terminalia arjuna</i> (Roxb. ex DC.) Wight & Arn.	Combretaceae	Arjuna
63	<i>Terminalia bellirica</i> (Gaertn.) Roxb.	Combretaceae	Bahada
64	<i>Terminalia catappa</i> L.	Combretaceae	Desi badam
65	<i>Terminalia chebula</i> Retz.	Combretaceae	Harida
66	<i>Trema orientalis</i>	Cannabaceae	Kharkas



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67	<i>Ziziphus jujuba (Retz.) Willd.</i>	<i>Rhamnaceae</i>	Barakoli
Herbs			
1	<i>Abelmoschus manihot (L.) Medic.</i>	<i>Malvaceae</i>	Banabhendi
2	<i>Acalypha indica L.</i>	<i>Euphorbiaceae</i>	Indramaris
3	<i>Alternanthera sessilis (L.) R.Br.</i>	<i>Amaranthaceae</i>	Madarnga saga
4	<i>Achyranthes aspera L.</i>	<i>Amaranthaceae</i>	Apamaranga
5	<i>Aerva lanata (L.) Juss. Ex Schultes</i>	<i>Amaranthaceae</i>	Torania
6	<i>Ageratum conyzoides L.</i>	<i>Asteraceae</i>	Pokasungha
7	<i>Amaranthus viridis L.</i>	<i>Amaranthaceae</i>	
8	<i>Amaratnus spinosus</i>	<i>Amaranthaceae</i>	Kanta leutia
9	<i>Andrographis paniculata (Burm.f.) Wall.</i>	<i>Acanthaceae</i>	Bhuin neem
10	<i>Argemone mexicana L.</i>	<i>Papavaraceae</i>	Agara
11	<i>Barleria cristata L.</i>	<i>Acanthaceae</i>	Daskerenda
12	<i>Boerhavia diffusa L.</i>	<i>Nyctaginaceae</i>	Puruni
13	<i>Centella asiatica (L.) Urban</i>	<i>Apiaceae</i>	Thalakudi
14	<i>Chrysopogon aciculatus (Retz.) Trin.</i>	<i>Poaceae</i>	Guguchia
15	<i>Cleome viscosa L.</i>	<i>Capparaceae</i>	Bana sorish
16	<i>Colocasia esculenta (L.) Schott</i>	<i>Araceae</i>	Banasaru
17	<i>Commelina benghalensis L.</i>	<i>Commelinaceae</i>	Kanasiri
18	<i>Costus speciosus (Koenig) Sm.</i>	<i>Costaceae</i>	Keu
19	<i>Crotalaria pallida Heyne ex Roth</i>	<i>Fabaceae</i>	
20	<i>Curcuma pseudomontana Graham</i>	<i>Zingiberaceae</i>	Banahaladi
21	<i>Cyperus rotundus L.</i>	<i>Cyperaceae</i>	Mutha
22	<i>Eclipta prostrate (L.) L.</i>	<i>Asteraceae</i>	Bhrungaraja
23	<i>Elephantopus scaber L.</i>	<i>Asteraceae</i>	Mayurchulia
24	<i>Eleusine indica (L.) Gaertn.</i>	<i>Poaceae</i>	Ghasa
25	<i>Eragrostis ciliaris (L.) R.Br.</i>	<i>Poaceae</i>	Ghasa
26	<i>Eusteralis stellata (Lour.) Panig. Var. roxburghiana (Kemg) Bennet & Raizada</i>	<i>Lamiaceae</i>	Iswarajata
27	<i>Evolvulus alsinoides (L.) L.</i>	<i>Convolvulaceae</i>	Jyotismati
28	<i>Evolvulus nummularius (L.) L.</i>	<i>Convolvulaceae</i>	Bichamalia
29	<i>Glinus oppositifolius (L.) A. DC.</i>	<i>Molluginaceae</i>	Pitasaga
30	<i>Hygrophilla auriculate</i>	<i>Acanthaceae</i>	Koilekha
31	<i>Justicia glauca Rottl.</i>	<i>Acanthaceae</i>	
32	<i>Leucas aspera (Willd.) Link</i>	<i>Lamiaceae</i>	Gayasa



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33	<i>Mimosa pudica</i>	<i>Mimaceae</i>	Lajakuli
34	<i>Ocimum americanum L.</i>	<i>Lamiaceae</i>	Banatulasi
35	<i>Ocimum canum Sims</i>	<i>Lamiaceae</i>	Sree tulasi
36	<i>Oldenlandia corymbosa L.</i>	<i>Rubiaceae</i>	Gharapudia
37	<i>Orthosiphon rubicundus (D.Don) Benth.</i>	<i>Lamiaceae</i>	
38	<i>Oxalis corniculata L.</i>	<i>Oxalidaceae</i>	Ambiliti
39	<i>Phyllanthus amarus Schum. & Thonn.</i>	<i>Euphorbiaceae</i>	Badi anala
40	<i>Phyllanthus urinaria L.</i>	<i>Euphorbiaceae</i>	Badi anala
41	<i>Phyllanthus virgatus Forst. F.</i>	<i>Euphorbiaceae</i>	Badi anala
42	<i>Rauvolfia tetraphylla</i>	<i>Apocyanaceae</i>	Patalagaruda
43	<i>Rungia pectinata (L.) Nees</i>	<i>Acanthaceae</i>	Sankhasaga
44	<i>Scoparia dulcis L.</i>	<i>Scrophulariaceae</i>	Badijustimadhu
45	<i>Sida acuta Burm.f.</i>	<i>Malvaceae</i>	Bajramuli
46	<i>Sida cordata (Burm.f.) Borssum</i>	<i>Malvaceae</i>	Brhmanajhatia
47	<i>Solanum virginianum L</i>	<i>Solanaceae</i>	Ankaranti
48	<i>Sphaeranthus indicus</i>	<i>Rubiaceae</i>	Bhuin Kadamba
49	<i>Tridax procumbens L.</i>	<i>Asteraceae</i>	Bisayakarani
50	<i>Uraria lagopodioides (L.) Desv. ex. DC.</i>	<i>Fabaceae</i>	Krushanaprani
51	<i>Vanda tessellata (Roxb.) Hook.</i>	<i>Orchidaceae</i>	Rasna
52	<i>Vetiveria zizanioides (L.) Nash.</i>	<i>Poaceae</i>	Bena
53	<i>Zingiber sp.</i>	<i>Zingiberaceae</i>	Banaada
Shurbs			
1	<i>Agave Americana</i>	<i>Agavaceae</i>	Murga
2	<i>Calotropis gigantea (L.) R.Br.</i>	<i>Asclepiadaceae</i>	Arakha
3	<i>Clerodendrum viscosum Vent</i>	<i>Verbenaceae</i>	Nagari
4	<i>Clerodendrum serratum (L.) Moon</i>	<i>Verbenaceae</i>	Samarkana
5	<i>Datura metel L.</i>	<i>Solanaceae</i>	Dudura
6	<i>Desmodium gangeticum (L.) DC.</i>	<i>Fabaceae</i>	Salapni
7	<i>Desmodium pulchellum (L.) Benth.</i>	<i>Fabaceae</i>	Masaparni
8	<i>Euphorbia neriifolia auct. non L.</i>	<i>Euphorbiaceae</i>	Trikon siju
9	<i>Flemingia chappar Buch.-Ham.</i>	<i>Fabaceae</i>	Ranikathi
10	<i>Helicteres isora L.</i>	<i>Sterculiaceae</i>	Modimodica
11	<i>Hibiscus rosa-sinensis</i>	<i>Malvaceae</i>	Mandara
12	<i>Ipomoea carnea Jacq.</i>	<i>Convolvulaceae</i>	Ammari
13	<i>Jatropha gossypifolia L.</i>	<i>Euphorbiaceae</i>	Nalibaigaba



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14	<i>Justicia adhatoda</i>	<i>Acanthaceae</i>	Basanga
15	<i>Lantana camara</i> L.	<i>Verbenaceae</i>	Nagairi
16	<i>Lawsonia inermis</i> L.	<i>Lythraceae</i>	Manjuati
17	<i>Nerium oleander</i>	<i>Apocyanaceae</i>	Kaniar
18	<i>Opuntia stricta</i> (Haw.)	<i>Cactaceae</i>	Nagaphani
19	<i>Pavetta tomentosa</i> Roxb. Ex. Sm.	<i>Rubiaceae</i>	Kukurdanti
20	<i>Phoenix acaulis</i> Roxb. Ex Buch.-Ham.	<i>Arecaceae</i>	Khajuri
21	<i>Phyllanthus reticulatus</i> Poir	<i>Euphorbiaceae</i>	Jajanga
22	<i>Ricinus communis</i>	<i>Euphorbiaceae</i>	Gaba
23	<i>Vitex negundo</i>	<i>Verbenaceae</i>	Begunia
24	<i>Woodfordia fruticosa</i> (L.) Kurz	<i>Lythraceae</i>	Dhataki
25	<i>Ziziphus zuzuba</i> (L.) Mill.	<i>Rhamnaceae</i>	Barkoli
Climber			
1	<i>Abrus precatorius</i>	<i>Faceae</i>	Kaincha
2	<i>Aristolochia indica</i>	<i>Aristolochiaceae</i>	Panairi
3	<i>Asparagus racemosus</i> Willd.	<i>Liliaceae</i>	Satabari
4	<i>Atylosia scrabaeoides</i> (L.) Benth.	<i>Fabaceae</i>	Banakolatha
5	<i>Bauhinia vahlii</i> Wight & Arn.	<i>Caesalpiniaceae</i>	Siali
6	<i>Butea parviflora</i> Roxb.	<i>Fabaceae</i>	Lata palas
7	<i>Clitoria ternatea</i> L.	<i>Fabaceae</i>	Aparajita
8	<i>Caesalpinia bonduc</i> (L.) Roxb.	<i>Caesalpiniaceae</i>	Gila
9	<i>Celastrus paniculata</i> Willd.	<i>Celastraceae</i>	Pingu
10	<i>Cissampelos pareira</i> L.	<i>Menispermaceae</i>	Akanabindhi
11	<i>Cissus quadrangularis</i> L.	<i>Vitiaceae</i>	Hadajoda
12	<i>Clerodendrum phlomidis</i>	<i>Verbanaceae</i>	Donkari
13	<i>Cuscuta reflexa</i> Roxb.	<i>Convolvulaceae</i>	Nirmuli
14	<i>Cryptolepis buchananii</i> Roem. & Schultes	<i>Periplocaceae</i>	Gopakanhu
15	<i>Dioscorea bulbifera</i> L.	<i>Dioscoreaceae</i>	Pita alu
16	<i>Dioscorea pentaphylla</i> L.	<i>Dioscoreaceae</i>	Air alu
17	<i>Dioscorea wallichii</i> Hook.f.	<i>Dioscoreaceae</i>	Pita alu
18	<i>Hemidesmus indicus</i> (L.) R.Br.	<i>Periplocaceae</i>	Anantamool
19	<i>Ipomoea herderifolia</i> L.	<i>Convolvulaceae</i>	Scarlet morning glory
20	<i>Jasminum arborescens</i> Roxb.	<i>Oleaceae</i>	Banamalli
21	<i>Luffa acutangula</i> (L.) Roxb var. <i>amara</i>	<i>Cucurbitaceae</i>	Pitatarada
22	<i>Mucuna puriens</i>	<i>Fabaceae</i>	Baidonka



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23	<i>Pergularia daemia</i> (Forssk.) Chiov.	<i>Asclepiadaceae</i>	Uturuli
24	<i>Scindapsus officinalis</i> (Roxb.) Schott	<i>Araceae</i>	Gajapippali
25	<i>Smilax zeylanica</i> L.	<i>Smilacaceae</i>	Muturi
26	<i>Tinospora cordifolia</i> (Willd.) Miers ex Hook.f. & Thoms.	<i>Menispermaceae</i>	Guluchi
27	<i>Tragia involucrate</i> L.	<i>Euphorbiaceae</i>	Bichhuati
28	<i>Tylophora indica</i> (Burm.f.) Merr.	<i>Asclepiadaceae</i>	Anantamool
Grass			
1	<i>Bambusa nutans</i>	<i>Poaceae</i>	Baunsa
2	<i>Cynodon dactylon</i> (L.) Pers.	<i>Poaceae</i>	Duba
3	<i>Chrysopogon aciculatus</i> (Retz.) Trin.	<i>Poaceae</i>	Guguchia
4	<i>Cyperus rotundus</i>	<i>Poaceae</i>	Mutha
5	<i>Dendrocalamus strictus</i>	<i>Poaceae</i>	Salia Baunsa
6	<i>Eleusine indica</i> (L.) Gaertn.	<i>Poaceae</i>	Ghasa(Kodua)
7	<i>Eragrostis ciliaris</i> (L.) R.Br.	<i>Poaceae</i>	Ghasa
8	<i>Pennisetum pedicellatum</i>	<i>Poaceae</i>	Dinanath grass
9	<i>Saccharum munja</i>	<i>Poaceae</i>	Khari
10	<i>Saccharum spontaneum</i>	<i>Poaceae</i>	Kasatandi
11	<i>Vetiveria zizanioides</i> (L.) Nash.	<i>Poaceae</i>	Bena
Ferns			
1.	<i>Athyrium filix femina</i>	<i>Polypodiaceae</i>	Fern common
2.	<i>Adiantum incisum</i> Forssk.	<i>Adiantaceae</i>	--
3.	<i>Adiantum philippense</i> L.	<i>Adiantaceae</i>	--
4.	<i>Dryopteris</i> sp.	<i>Dryopteridaceae</i>	--
5.	<i>Lygodium flexuosum</i> (L.) Sw.	<i>Lygodiaceae</i>	Indrajai
6.	<i>Marsilea minuta</i> L.	<i>Marsileaceae</i>	Sunsunia
7.	<i>Sellaginella</i> sps	<i>Sellaginellaceae</i>	Sanjibani

Table 14 Flora (Buffer zone)



2.5.3 Fauna (Core zone)

Sl. No	Common Name	Scientific Name	Conservation status
Mammal			
1.	Common house rat	<i>Rattus rattus</i>	Sch. V
2.	Common Mongoose	<i>Herpestes edwardsi</i>	Sch. II
3.	Five-striped Palm Squirrel	<i>Funambulus pennantl</i>	Sch. IV
4.	Jackal	<i>Canis aureus</i>	Sch. II
5.	Little Indian Field Mice	<i>Mus musculus</i>	Sch. V
Birds			
1.	Cattle Egret	<i>Bubulcus ibis</i>	Sch. IV
2.	Common Crow	<i>Corvus brachyrhynihos</i>	Sch. V
3.	Common Periah kite	<i>Milvasmigrans</i>	-----
4.	Drongo	<i>Dicrurus adsimilis</i>	Sch. IV
5.	Grey Partridge	<i>Francolinus pondicerianus</i>	Sch. IV
6.	Owl	<i>Strix Species</i>	Sch IV.
Reptiles			
1.	Bronze-back Tree snake	<i>Dendrelaphis tristis</i>	Sch. IV
2.	Buff-striped Keel back	<i>Amphiesma stolatum</i>	Sch. IV
3.	Chiti	<i>Bungarus caeruleus,</i>	
4.	Common Indian Rat Snake	<i>Ptyas mucosus</i>	Sch. II (Part-2)
5.	Eastern Bronze Skink	<i>Eutropis macularis</i>	----
6.	Naga	<i>Naja naja</i>	----
Amphibians			
7.	Common Indian Toad	<i>Duttaphrynus melanostictus</i>	-----
8.	Common Indian Tree Frog	<i>Polypedates maculatus</i>	----
9.	Narrow-mouthed Frog	<i>Microhyla ornate</i>	---

Table 15 Fauna (Core zone)



2.5.4 Fauna (Buffer zone)

SI No	Common Name	Scientific Name	Conservation Status
Mammal			
1	Common house rat	<i>Rattus rattus</i>	Sch. V
2	Common Langur	<i>Presbytis entellus</i>	Sch. II
3	Common Mongoose	<i>Herpestres edwardsii</i>	Sch. II
4	Common Palm Civet	<i>Paradoxurus hermaphroditus</i>	Sch. II
5	Five-striped Palm Squirrel	<i>Funambulus pennantii</i>	Sch. IV
6	Hyena	<i>Hyaena hyaena</i>	Sch. III
7	Indian Elephant	<i>Elephas maximus</i>	Sch. I
8	Indian Field Mouse	<i>Mus booduga</i>	Sch. V
9	Indian Fox	<i>Vulpes bengalensis</i>	Sch. II
10	Indian hare	<i>Lepus nigricollis</i>	Sch. IV
11	Indian Pangolin	<i>Manis crassicaudata</i>),	Sch-I
12	Indian Porcupine	<i>Hystrix indica</i>	Sch. IV
13	Jackal	<i>Canis aureus</i>	Sch. II
14	Jungle Cat	<i>Felis chaus</i>	Sch. II
15	Leopard	<i>Panthera pardus</i>	Sch.I
16	Little Indian Field Mice	<i>Mus booduga</i>	Sch. V
17	Mouse deer	<i>Moschiola indica</i>	Sch.I
18	Ratel or Honey Badger	<i>Mellivora capensis</i>	Sch. I
19	Rhesus Monkey	<i>Macaca mulata</i>	Sch. II
20	Sloth Bear	<i>Melursus ursinus</i>	Sch. I
21	Wild Boar	<i>Sus scrofa</i>	Sch. III
Birds			
1	Alexandrine Parakeet	<i>Psittacula eupatria</i>	Sch. IV
2	Ashy-crowned Sparrow-lark	<i>Eremopterix grisea</i>	Sch. IV
3	Asian Koel	<i>Eudynamys scolopacea</i>	Sch. IV
4	Asian Open bill	<i>Anastomus oscitans</i>	Sch. IV
5	Asian Palm Swift	<i>Cypsiurus balasiensis</i>	Sch. IV
6	Black Drongo	<i>Dicrurus macrocercus</i>	Sch. IV
7	Black Kite	<i>Milvus migrans</i>	Sch. IV
8	Black-crowned Night-Heron	<i>Nycticorax nycticorax</i>	Sch. IV
9	Black-headed Oriole	<i>Oriolus xanthornus</i>	Sch. IV
10	Black-shouldered Kite	<i>Elanus caeruleus</i>	Sch. IV



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11	Blue Rock Pigeon	<i>Columba livia</i>	Sch. IV
12	Blue-tailed Bee-eater	<i>Merops philippinus</i>	Sch. IV
13	Brahminy Myna	<i>Sturnus pagodarum</i>	Sch. IV
14	Bronze-winged Jacana	<i>Metopidius indicus</i>	Sch. IV
15	Brown Shrike	<i>Lanius cristatus</i>	Sch. IV
16	Brown-headed Barbet	<i>Megalaima zeylanica</i>	Sch. IV
17	Cattle Egret	<i>Bubulcus ibis</i>	Sch. IV
18	Common Crow	<i>Corvus splendens</i>	Sch. V
19	Common Hoopoe	<i>Upupa epops</i>	Sch. IV
20	Common Indian Nightjar	<i>Caprimulgus asiaticus</i>	Sch. IV
21	Common Kingfisher	<i>Alcedo atthis</i>	Sch. IV
22	Common Mynah	<i>Acridotheres tristis</i>	Sch. IV
23	Coppersmith Barbet	<i>Megalaima haemacephala</i>	Sch. IV
24	Crested Serpent Eagle	<i>Spilornis cheela</i>	Sch. IV
25	Eurasian Collared Dove	<i>Streptopelia decaocto</i>	Sch. IV
26	Eurasian Golden Oriole	<i>Oriolus oriolus</i>	Sch. IV
27	Grey Partridge	<i>Francolinus pondicerianus</i>	Sch. IV
28	House Sparrow	<i>Passer domesticus</i>	Sch. IV
29	House Swift	<i>Apus affinis</i>	Sch. IV
30	Indian Cuckoo / Brainfever Bird	<i>Hierococcyx varius</i>	Sch. IV
31	Indian Jungle Nightjar	<i>Caprimulgus indicus</i>	Sch. IV
32	Indian Roller	<i>Coracias benghalensis</i>	Sch. IV
33	Jungle Babbler		Sch. IV
34	Jungle Bush Quail		Sch. IV
35	Jungle Crow	<i>C. marorhynchos</i>	Sch. IV
36	Jungle Myna	<i>Acridotheres fuscus</i>	Sch. IV
37	Large Cuckoo Shrike	<i>Coracina macei</i>	Sch. IV
38	Laughing Dove	<i>Streptopelia senegalensis</i>	Sch. IV
39	Lesser Golden-backed Woodpecker	<i>Dinopium benghalense</i>	Sch. IV
40	Lesser Pied Kingfisher	<i>Ceryle rudis</i>	Sch. IV
41	Lesser Whistling-Duck	<i>Dendrocygna javanica</i>	Sch. IV
42	Little Cormorant	<i>Phalacrocorax niger</i>	Sch. IV
43	Little Egret	<i>Egretta garzetta</i>	Sch. IV
44	Oriental Honey-Buzzard	<i>Pernis ptilorhynchus</i>	Sch. IV
45	Oriental Turtle Dove	<i>Streptopelia orientalis</i>	Sch. IV



*Site Specific wildlife Conservation Plan for Ostapal
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46	Paddy field Pipit	<i>Anthus rufulus</i>	Sch. IV
47	Pea fowl	<i>Pavo cristatus</i>	Sch. I
48	Pied Crested Cuckoo	<i>Clamator jacobinus</i>	Sch. IV
49	Pied Starling	<i>Sturnus contra</i>	Sch. IV
50	Plum-headed Parakeet	<i>Psittacula cyanocephala</i>	Sch. IV
51	Pond Heron	<i>Ardeola grayii</i>	Sch. IV
52	Red Jungle Fowl	<i>Gallus gallus</i>	Sch. IV
53	Red-vent Bulbul	<i>Pycnonotus cafer</i>	Sch. IV
54	Red-wattled Lapwing	<i>Vanellus indicus</i>	Sch. IV
55	Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>	Sch. IV
56	Rose-ringed Parakeet	<i>Psittacula kramera</i>	Sch. IV
57	Rufous Tree pie	<i>Dendrocitta vagabunda</i>	Sch. IV
58	Scarlet Minivet	<i>Pericrocotus flammeus</i>	Sch. IV
59	Shikra	<i>Accipiter badius</i>	Sch. IV
60	Small Bee-eater	<i>Merops orientalis</i>	Sch. IV
61	Spotted Dove	<i>Streptopelia chinensis</i>	Sch. IV
62	Spotted Owlet	<i>Athene blewitti</i>	Sch. I
63	Tailor Bird	<i>Orthotomus sutorius</i>	Sch. IV
64	White Breasted Kingfisher	<i>Halcyon smyrnensis</i>	Sch. IV
65	White-bellied Drongo	<i>Dicrurus caerulescens</i>	Sch. IV
66	White-breasted Waterhen	<i>Amaurornis phoenicurus</i>	Sch. IV
67	White-eyed Buzzard	<i>Butastur teesa</i>	Sch. IV
68	Yellow-legged Button Quail	<i>Turnix tanki</i>	Sch. IV
69	Yellow-legged Green Pigeon	<i>Treron phoenicoptera</i>	Sch. IV
Reptiles			
1	Asian House Gecko	<i>Hemidactylus frenatus</i>	----
2	Bark Gecko	<i>Hemidactylus leschenaultia</i>	----
3	Bengal Monitor Lizard	<i>Varanus benghalensis</i>	Sch. I
4	Binocellate Cobra	<i>Naja naja</i>	Sch. II (Part-2)
5	Brahminy Snake	<i>Ramphotyphlops braminus</i>	Sch. IV
6	Bronze back Tree snake	<i>Dendrelaphis tristis</i>	Sch. IV
7	Buff-striped Keel back	<i>Amphiesma stolatum</i>	Sch. IV
8	Checkered Keel back	<i>Xenochrophis piscator</i>	Sch. II (Part-2)
9	Common Brahminy SKink	<i>Eutropis carinata</i>	----
10	Common Garden Lizard	<i>Calotes versicolor</i>	----



**Site Specific wildlife Conservation Plan for Ostapal
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11	Common Indian Rat Snake	<i>Ptyas mucosus</i>	Sch. II (Part-2)
12	Common Wolf Snake	<i>Lycodon aulicus</i>	Sch. IV
13	Eastern Bronze Skink	<i>Eutropis macularia</i>	----
14	Fan-throated Lizard	<i>Sitana ponticeriana</i>	----
15	Indian Gamma/ Common Cat Snake	<i>Boiga trigonata</i>	Sch. IV
16	Indian Rock Agama	<i>Psammophilus blanfordianus</i>	-----
17	Python	<i>Python molurus</i>	Sch. I
18	Russel's Viper	<i>Daboia russelii</i>	Sch. II (Part-2)
19	Spotted House Gecko	<i>Hemidactylus brookii</i>	Not Listed
20	Yellow Monitor Lizard	<i>Varanus flavescens</i>	Sch. I
Amphibians			
1	Common Indian Toad	<i>Bufo melanostictus</i>	---
2	Common Indian Tree frog	<i>Polypedates maculatus</i>	----
3	Indian Bull Frog	<i>Hoplobatrachus tigerinus</i>	Sch. IV
4	Indian Skittering Frog	<i>Euphlyctis cyanophlyctis</i>	-----
5	Jerdon's Bull Frog	<i>Hoplobatrachus crassus</i>	Sch. IV
6	Narrow-mouthed Frog	<i>Microhyla ornate</i>	----
7	Paddy-field Frog	<i>Rana limnocharis</i>	Sch. IV
8	Painted Ballon Frog	<i>Kaloula taprobanica</i>	-----
Fishes			
1	American rui	<i>Cyprinus carpio (Linnaeus)</i>	<i>Cyprinidae</i>
2	Balia	<i>Wallago attu</i>	<i>Siluridae</i>
3	Bata	<i>Osteobrama cotio cotio (Hamilton)</i>	<i>Cyprinidae</i>
4	Bhakur	<i>Catla catla</i>	<i>Cyprinidae</i>
5	Chanda	<i>Clarius batracus (Linnaeus)</i>	<i>Cyprinidae</i>
6	Chang	<i>Anabas testudineus (Bloch)</i>	<i>Channidae</i>
7	Kalbans	<i>Puntius saphori (Hamilton)</i>	<i>Cyprinidae</i>
8	Koi	<i>Anabas testudineus (Bloch)</i>	<i>Anabantidae</i>
9	Lata	<i>Channa punctatus (Bloch)</i>	<i>Channidae</i>
10	Magur	<i>Channa striatus (Bloch)</i>	<i>Clariidae</i>
11	Mrigal	<i>Cirrhinus mrigala (Hamilton)</i>	<i>Cyprinidae</i>
12	Punthi	<i>Heteropneustes fossilis (Bloch)</i>	<i>Cyprinidae</i>
13	Rohu	<i>Labeo rohita (Hamilton)</i>	<i>Cyprinidae</i>
14	Shol	<i>Channa punctatus (Bloch)</i>	<i>Channidae</i>
15	Singi	<i>Channa orientalis (Schneider)</i>	<i>Heteropneusidae</i>

Table 16 Fauna (Buffer zone)



2.5.5 Status of Rare, Endangered & Threatened Species:

There is no Rare, Endangered & Threatened (RET) species (both Flora & fauna) in the zone of impact. The Schedule-I animals as per Wildlife Protection Act, 1972 has been indicated under Para 2.5.3 & 2.5.4 above. These species are considered to be threatened under the Wildlife (Protection) Act, 1972.

2.6 Forests within Zone of Impact:

The forests of the study area as per Champion & Seth Classification belong to 3B Northern Tropical moist mixed deciduous forests and 5B Northern Tropical dry mixed deciduous Forests. The common associates are Sal with *Terminalia tomentosa*, *Lagerstomia parviflora*, *Gmelina arboria*, *Anogeisus latifolia*, *Bridelia retusa* and *Pterocarpus marsupium*. The middle story contains *Careya arborea*, *Oogenia oojensis*, *Syzygium cumini*, *Dyospyros melanoxylon*, *Helecteris ixora*, *Indigofera pulchra* and *Woodfordia fruticosa*, *Clerodendron* are commonly found as under growth. Common climbers seen are bauhinia, Smilax, Butea and Combretum decandrum. Presence of *Cleistanthus collinus*, *Chloroxylon swietenia*, and *Phyllanthus emblica* indicates forest marching to words a drier tract. The forest floor which is quite open (density less than 30%) is now invaded by Eupatorium & Dinanath grass.

The Forests within Zone of Impact is as follows.

Sl No	Name of Forest Block	Total area of the Forest Block in Ha.	Area coming within the buffer zone (ZOI).	Forest Division it belongs.
1	Daitary DPF	10386.36	4438.0	Cuttack
2	Mahagiri DPF	12040.55	6879.0	Cuttack
3	Ranjagarh RF	13822.10	351.0	Dhenkanal
4	Birasal RF	1362.90	65.0	Dhenkanal
8	Daitary DPF	10386.36	4514.0	Keonjhar
Total Area		47998.27	15247	

Table 17 Forests within the ZOI



Total Forest area within ZOI		
Name of Division	Area in ha as per Records	Area as per Satellite study (in ha)
Cuttack Div	11317	10121.2
Dhenkanal Div	416.0	352.40
Keonjhar Div	4514	4592.5
Total	15247	15066.1

Table 18 Total forest area within ZOI

No additional forest block is coming within Additional Zone of Impact except covering more area than in ZOI in same blocks.

2.6.1 Forest Crop Composition:

The forest in Zone of Impact comes under the major group Tropical Forest on the basis of “**Champion and Seth revised classification**”. Three Varieties of sub-type 3C/C_{2e} (Moist peninsular Sal) occur in different blocks and compartments.

3C/C_{2e(ii)} – Moist Peninsular Low level Sal:

In these forests the Characteristic of associates of Sal in over wood are *Pterocarpus marsupium* and *Terminalia tomentosa* with *Emblica officinalis* in middle story. Natural regeneration is satisfactory. Quality Class I/II.

5B/C_{1c} – Dry Peninsular Sal Forest:

Dry peninsular Sal forests cover the largest area of this zone and it is found extensively in all most all blocks. The entire block comes under this Sub-type except its steep slopes and ridges, where miscellaneous crop exists. The low moisture retaining capacity of the soil and drier condition prevailed by repeated annual ground fire stabilizes the forest of this Sub-type. Sal is the principal species, which often constituting about 65 % and the quality varies from Q-III to Q-IV. Regeneration of Sal is inadequate and high percentage of unsoundness of trees of all girth classes is the peculiar feature in this area. This is due to poor soil, continuous annual ground fire. The associates of Sal are *Terminalia tomentosa*, *Terminalia arjuna*, *Pterocarpus marsupium*, *Terminalia belerica*, *Lagerstromia sp*, *Terminalia chebula*, *Adina cardifolia*, *Bridelia retisa*, etc. In the middle story *Emblica*, *Dyospyrus melanoxylon*, *Beutea mosperma*, *Madhuca indica* are noticed.

5B/C₂ –Northern Dry Mixed Deciduous Forest:

Northern Dry Mixed Deciduous Forest is scattered throughout the hill tracts having poor humus contain soil. This Type of forest occurs in all most all blocks exist towards the



southern part of the Division. The culmination stage of plant succession is noticed in this locality, where the existing Sal crop has been replaced by miscellaneous species owing to excess illicit felling, fire and over grazing. The crop is less open and trees are stunted. The trees remain leafless for a longer period and the forests give a desolate look in summer season. *Dendrocalamus strictus* is seen in these forests.

Sal with *Sterculia urence*, *Linea coromondelica*, *Dalbergia latifolia*, *Acacia chatechu*, *Acacia nilotica* *Buetea monosperma*, *Buchnanian lanzena* are seen in the forest. The ground flora is damaged due to repeated fires and gives a ugly look during summer.

2.6.2 Present Management System:

The Working Plan of Cuttack Division/ Keonjhar WL Division is under process of revision. The Forests & Working Circle assigned is as follows.

SI No	Name of Forest Block	Total area of the Forest Block in Ha.	Area coming within the buffer zone (ZOI).	WC assigned	Forest Division it belongs.
1	Daitary DPF	10386.36	4438.0	Imp. WC	Cuttack
2	Mahagiri DPF	12040.55	6879.0	RWC and PI WC	Cuttack
3	Ranjagarh RF	13822.10	351.0	Eco. RS WC	Dhenkanal
4	Birasal RF	1362.90	65.0	Eco. RS WC	Dhenkanal
6	Daitary DPF	10386.36	4514.0	Imp. WC	Keonjhar
Total Area		47998.27	16247		

Table 19 Forest and Working circle assigned

2.7 Wildlife Habitat & Movement Pattern of Mega fauna:

Elephant movement is observed in Daitari DPF. Elephant moves towards Ranjagarh Reserved Forest and sometimes towards Maulabhanja- Jiridamali Elephant Corridor. Due to Rengali Right canal they face difficulties in movement and results in dispersion causing Man- Animal conflict. In other way they move towards Talpada- Daitari- Tikarpara- Kendupura- Kansa- Mahagiri DPF. Due to stiff ridges of Mahagiri the elephants return back to Daitari / Rabana RF

2.7.1 Wildlife Scenario:

The project does not form a part of any Wildlife Sanctuary, National Park nor any protected area. Daitary DPF is one of the good animal habitats due to its moist nature of vegetation. The nearest Sanctuary is Kapilas sanctuary which is about 31.20 km from the



project. The nearest elephant corridor is Maulabhanja Jiridimal Anantapur Elephant Corridor which is about 19.4 km from the project. The distance of Wildlife Sanctuary, National Park, Elephant corridor, Ramsar Site, Bio sphere reserve is at **Plate no -II**

2.7.2 Census data on wild life:

The Elephant census has been conducted in the state during 2012, 2015 and 2017. The elephant population during these three censuses in Cuttack, Dhenkanal and Keonjhar WL Division, Anandapur is as follows.

Name of Division	Male	Female	Unknown	Young	Total	Male : Female
Cuttack						
2012	3	9	4	6	22	1:03
2015	12	13	1	9	35	01:01.1
2017	7	17	0	13	37	01:02.4
Dhenkanal						
2012	31	93	3	35	162	1:03
2015	35	90	5	34	164	01:02.6
2017	30	94	15	30	169	01:03.1
Keonjhar WL						
2012	8	21	0	11	40	1: 2.6
2015	11	26	0	12	49	1:2.4
2017	13	27	1	10	51	1: 2.1
Total						
2012	34	102	7	41	184	1:03
2015	47	103	6	43	199	01:02.2
2017	37	111	15	43	206	1:03

Table 20 Wildlife census data

Tiger Census has also been conducted during 2016. The Division wise result as available is as follows.

Sl.No	Name of Division	Tiger				Leopard			
		M	F	C	Total	M	F	C	Total
1	Cuttack	0	0	0	0	0	0	0	0
2	Dhenkanal	0	0	0	0	0	1	0	1
3	Keonjhar WL	1	2	0	3	2	3	0	5

Table 21 Tiger Census data

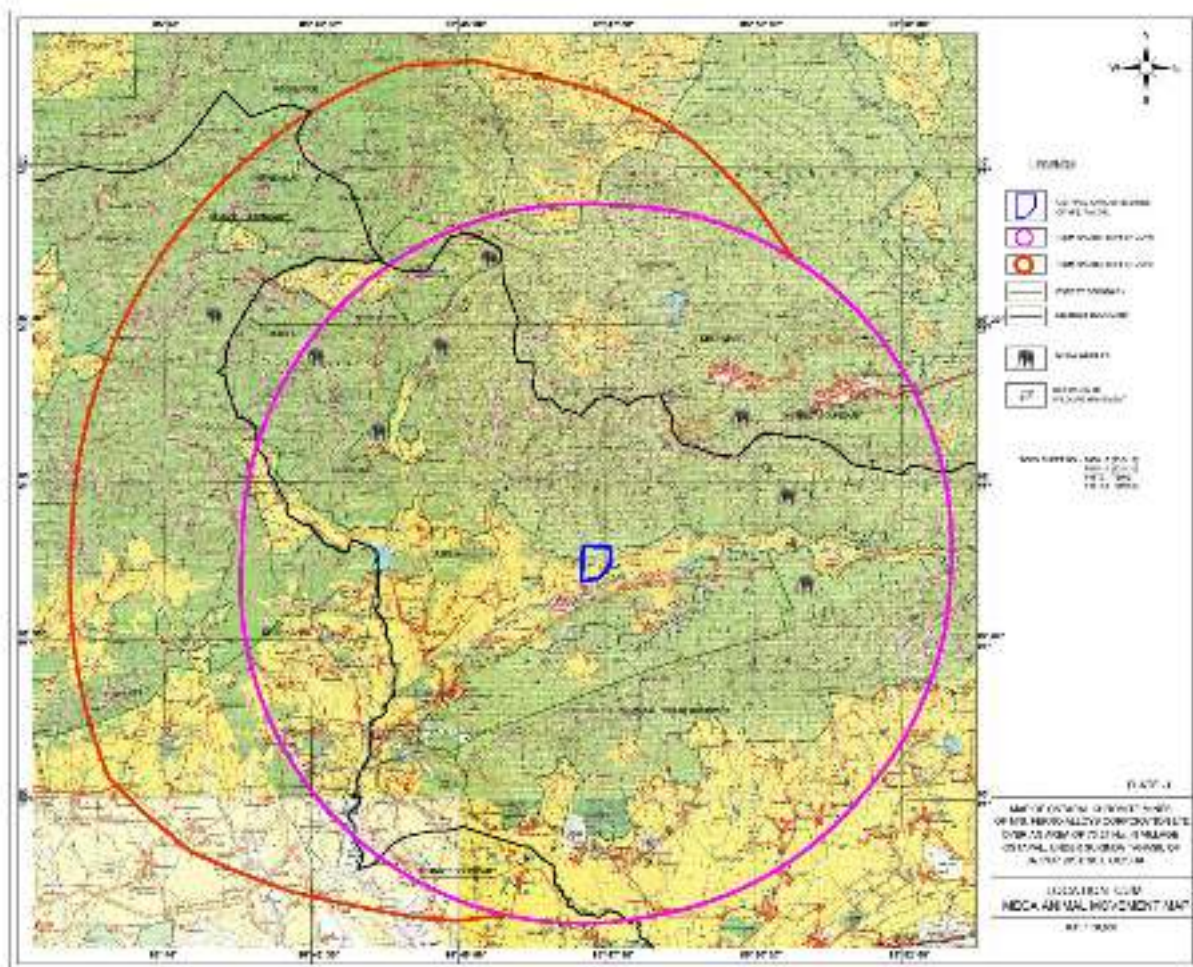


2.7.3 Wildlife Corridors:

There are no elephant corridors within the Project impact area.

2.7.4 Movement Pattern of Mega fauna:

Elephant movement in Daitari DPF is frequently noticed. They take a route to Kansa area and crossed the Mangalpur- Tamka Road near Kansa. Due to stiff ridge there after the elephant returns back to Daitary DPF. Mega animal movement is depicted at **Plate no- I**





2.7.5 HWC Details (Human- Wildlife Conflict):

Human- Animal Conflict in Sukinda Range of Cuttack Division is moderate but due to Maulabhanja- Jiridamal- Anantapur Corridor being disturbed, the elephant movement is very erratic in Kamakhyanagar East range of Dhenkanal Division. The information on Human- Animal Conflict is as furnished below.

a) Crop damage:

Crop damage data of Sunkinda Range			
Year	No of cases	Area affected in Acre	Amount paid
2015-16	11	3.30	35000/-
2016-17	0		
2017-18	0		

Table 22 Crop damage data of Sukinda Range

b) House Damage (Sukinda Range): Nil

c) Human Kill & Injury: Nil

d) Animal Death

Sl.No	Name of the Range	Year	No. of Wild Animal Dead
01.	Sukinda	2018-2019	1 no Spotted Deer
02.	Sukinda	2019-2020	1 no Sloth Bear
03.	Sukinda	2020-2021	1 no Female Spotted deer rescued in Serious injury condition
04.	Sukinda	2020-2021	1 no Dead male Sloth Bear

Table 23 Animal death data of Sukinda Range

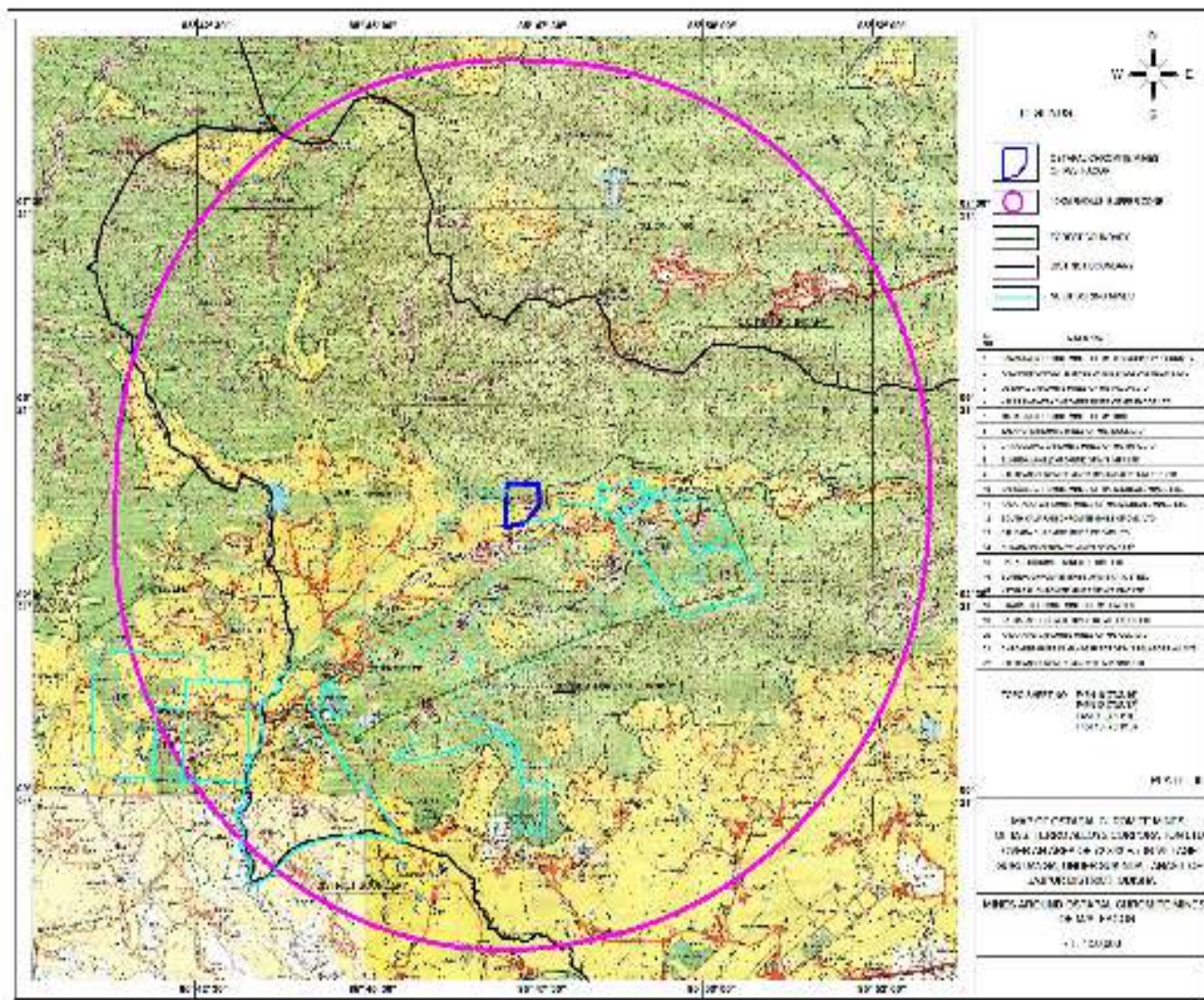
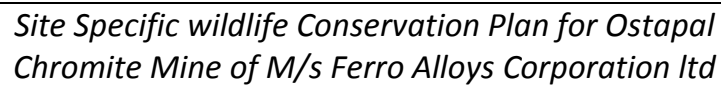
2.7.6 Public View on Man Animal Conflict:

Public view is very against occurrence of Human- animal conflict. Dhenkanal division is always in limelight for Human- Animal conflict. It is very urgently required to reduce Human- Wildlife Conflict in this area.

2.8 Other Projects within ZOI & and their Impact Zone:

2.8.1 Mining Project:

There are 21 Chromite mines in this locality. The list has been provided under Para 2.2.1 above. The location map is at Plate-III



2.8.2 Wildlife Conservation Plan approved & in Implementation Stage:

The Wildlife Conservation Plan for following mining plans are in operative stage. These are as follows.



Site Specific wildlife Conservation Plan for Ostapal Chromite Mine of M/s Ferro Alloys Corporation Ltd



Sl No	Name of Mine	Name of Lessee	Ore	Remark
1	Kamarda Chromite Block	M/s Tata Steel Mining Ltd.	Chromite	Operative
2	Kaliapani Chromite Mine	Balasore Alloys Ltd.	Chromite	Operative
3	Ostapal Chromite Mine	Ferro Alloys Corporation Ltd.	Chromite	Operative
4	Kalarangiatta Chromite Mine	Ferro Alloys Corporation Ltd.	Chromite	Operative
5	Mahagiri mines Chromite	M/s IMFA Ltd.	Chromite	Operative
6	Tailangi Chromite Mine	IDC of Odisha Ltd	Chromite	Operative
7	Sukinda Mines (Chromite)	IMFA Ltd	Chromite	Operative
8	Jindal Chromite Mine	Jindal Stainless Ltd.	Chromite	Non-Operative
9	South Kaliapani Chromite Mine	OMC Ltd.	Chromite	Operative
10	Kaliapani Chromite Mine	OMC Ltd	Chromite	Operative
11	Sukrangi Chromite Mine	OMC Ltd	Chromite	Operative
12	Daitari Chromite Mine	OMC Ltd	Iron	Operative
13	Sukinda Chromite Mine	M/s Tata Steel Mining Ltd.	Chromite	Operative

Table 24 Willife plans approved

2.9 Interventions implemented by Forest department

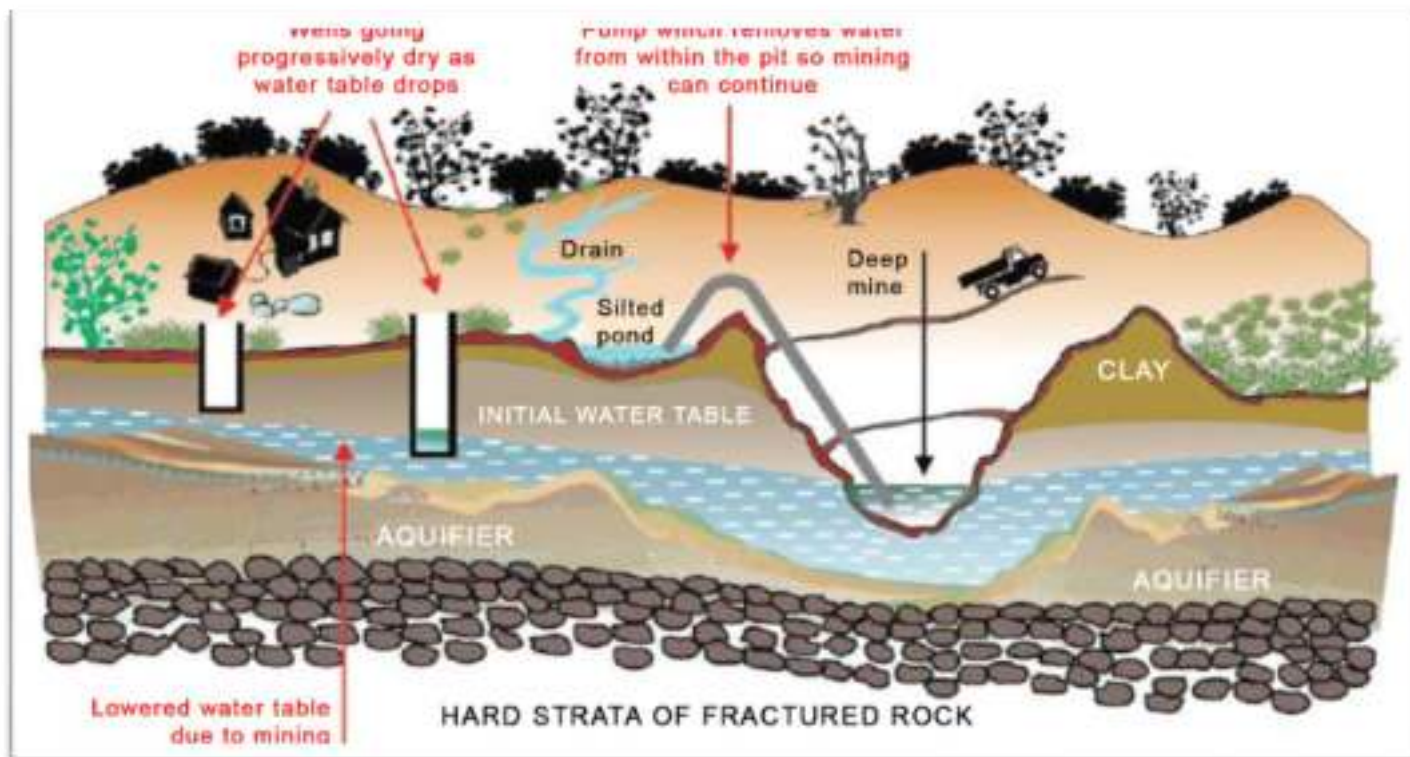
The forest department is taking adequate steps for

- I. Improving Habitat,
- II. Extensive Soil & Moisture Conservation measures
- III. Fire Protection measures,
- IV. Steps to reduce Man- animal conflict.
- V. Compassionate grant for life & property losses / damaged due to man- animal conflict.
- VI. Extensive awareness program on Forest Fire, Tree planting, Wildlife Conservation and related matters.





CHAPTER-III PROJECT & ITS PROBABLE IMPACT





CHAPTER-III

Project & Its Probable Impact

3.0 Project description:

The mining Lease is over 72.843 ha. The mine is categorized as “A” FM (Opencast). This is a captive mine and its product is being utilized at Ferro Alloys Plant Randia, Bhadrak. The Ore Production is projected at 0.240MTPA from the present level of 0.20 MTPA. During this enhancement of production, the total ROM 0.579MCum/ Annum from the present level 0.546MCum/ Annum is proposed to be excavated.

3A Period of lease and date of expiry of lease:

The mining lease is initially executed on 13.08.1985 and after supplementary lease deed executed on 22.08.2016, the life of the lease is extended up to 12.08.2035.

3B Reserve / Resource:

The Reserve Resource has been updated and estimated as per UNFC Guidelines. Considering present 28⁰ overall slope of Quarry wall, the bottom of the quarry around 30mRL the reserve of (111) category has been estimated around **15.3 Lakh Tonnes**. The production level projected in this plan is 12 Lakh Tonnes

3C Present Mining Methods:

The opencast mining of chromite ore is being carried out by removing the overburden, side burden/ intermediate burden by making suitable benches in all direction of the quarry. Waste materials removed from the quarry directly by Shovel / Dumper /Dozer combination to the dump yard. Similarly ores are removed from quarry to the ore plot but the hard portion of the quarry which cannot directly excavated by machines being required drilling and blasting with large diameter holes.

The benches are kept at 7-8 m height, 10-12m width and overall slope 26⁰ to 30⁰. Drains and barriers are constructed all along the longitudinal direction of one side of the bench edge for smooth flow of water to next lower bench and safe running of vehicles on the quarry benches. Benches are connected with each other with short ramps of 1:10 gradients. The main ramp on benches is kept at 1:14 gradient.



3D: Designed Parameters:

(i) Quarry Pit:

There is only one pit. The dimensions / parameters of the pit are as given below.

Sl No	Description	Area in ha
1	Quarry area	30.179
2	Quarry Length	640m
3	Quarry Width	470m
4	Top RL	143mRL (Avg)
5	Bottom RL	30m (Avg)
6	Dump Area	26.956
7	Ore Plot (Mineral Stock Yard)	2.54
8	Processing Ore (Concentrate)	0.285
9	Top Soil	0

Table 25 Dimensions/Parameters of the pit

Quarry dimensions

Name of Pit	Location	Length in m	Breadth in m	Depth in m	Bottom RL	Number of benches Ore / OB	Pit slope	Area back filled / reclaimed
Only One Pit	Central Part	640	470	113	30	E-4/9, W-9/4, N-18 OB S-1/14	E-25, W-30, N-23, S27.	Nil

Table 26 Quarry Dimensions

(ii) Grade Control:

At Present irrespective of grade ore is being sent to Charge Chrome Plant of FACOR at Randia, Bhadrak. Materials above 40% Cr_2O_3 are directly dispatched to CCP and below 40% grade are primarily being sent to Chrome Beneficiation Plant for up-gradation of concentrate production.

(iii) Provision of Sump:

A small portion has been developed at the quarry bottom and the said depression has been used as sump to accommodate rain precipitation and seepage water from the strata. The dimension of depression is 40mx25mx6m (appx.). During rainy season the entire quarry bottom is used as water storage.



(iv) Deployment of Mining Machineries:

The following machineries are being used in the mining operation and likely to be continued with additional machineries where required.

Sl No	Type	Existing	Proposed	Size	Air Pressure / HP
1	Long hole Drill Rig	2	2	110mm	6Cum/450Cft
2	Compressore	2	2	450Cft	220HP
3	Excavators (Back Hoe)	3	4	1.5 to 2.5 Cum	220 HP
		1	1	0.9Cum	175 HP
4	Front hoe Loader	2	2	1.7 Cum	170 HP
5	Rock Breaker	0	1		175HP
6	Dozer	2	2		
7	Ripper Dozer	0	1		405HP
8	Dumpers	20	36	10-12Cum/6VW-31T	
9	Road Grader	1	1		175 HP
10	Water Tanker	2	3		

Table 27 Deployment of mining Machinaries





(v) Drilling & Blasting:

The mine is being worked by mechanical drilling & blasting method. About 40% of hard surface has already been exposed and hence it is required long hole drilling & Blasting. The Indian School of Mines, Dhanbad has designed the blasting parameters. In order to



maintain a balance between the safety and production a blast design, and all undesirable side effects are to be kept at minimum.

Drilling: Tyre mounted DTH drill machine having 110mm dia are being used to drill blast holes. The hole are made 15° to 20° inclined from vertical for maintaining uniform burden all along the hole apart from reducing fly rocks and toe formation due to effective utilization of free face. As all the rocks are not very hard, only 30-40% of the in situ requires drilling & blasting.

Drilling parameters are as follows.

Sl No	Particulars	Quantity
1	Depth of Hole	8.5m to 9.5m
2	Burden from free face	2.5m to 3.0m
3	Spacing from hole to hole	2.5m to 3.0m
4	Toe Drilling	0.3 to 0.5m
5	Distance between two rows	2.5m to 3.0m

Table 28 Drilling parameters

Depending upon the nature of the rock, holes are being drilled in staggered manner in multi row pattern.

Blasting:

Explosive charge length is limited to $2/3$ rd depth of hole and quantity of explosive is around 13-16.70kg per delay depending upon the nature of the rock formation. Power Gel-C explosive is used for blasting purpose. Cordex, Nonel are used for initiating the charges. Delay detonators are used for different row of blasting. Powder factor varies from 2.5 - 4.5cum / kg.

Controlled Blasting Techniques to reduce ground vibration and noise:

The following blasting techniques are to be followed to reduce ground vibration & noise.

- NONEL System of Blasting,
- Distribution ratio of boosters to column charge 1:5 ratio
- Maximum charge / delay is calculated considering the distance of permanent structure from the blasting side.
- Delay detonators are used,



- Delay timing 25ms to 50ms within row
- Delay timing 15ms to 25ms between holes
- Number of Rows restricted to less than three,
- Proper burden & spacing,
- Inclined holes
- Proposer design of holes with respect to burden, spacing, inclination and stemming.

(vi) Noise & Vibration:

In Ostapal Chromite Mines, the present level of vibration, noise and fly rock generation due to blasting is low. Level of Vibration and noise due to blasting is within the limits prescribed by various national and international agencies. Indian School of Mines, Dhanbad has conducted various trial blasting and the resulting vibration equation has been established. The equation of vibration generated is as follows.

For 110 mm diameter holes

$$V = K \{R/(W)^{1/2}\}^{-\beta}$$

Where V is the Peak Particle velocity, and K=110

R is the distance from blasting site and W is maximum charge / delay.

Storage of Explosives:

Explosives are not stored in the mining lease area. It is brought from approved Explosive Van from Kathapal Chromite Mines, where a Licensed Explosive Magazine with 10T capacity is being maintained. However a reserve station is maintained in Ostapal Mines for temporary storage and preparation of explosive charges before charge in to the drill holes.

The annual requirement of explosives has been estimated to be 64344 Kg.

(vii) Excavation Schedule:

The excavation schedule (Annual) is projected as follows (in Lakh Cum).



Site Specific wildlife Conservation Plan for Ostapal Chromite Mine of M/s Ferro Alloys Corporation Ltd



Year	Pit no	Tentative excavation	Top soil	OB/ SB/IB	ROM			ROM / Waste Ratio
					Ore	Mineral Reject	Total	
2021-22	Single Pit	4.77	0	4.13	0.27	0.37	0.64	1:6.5
2022-23		5.74	0	4.95	0.29	0.50	0.79	1:6.3
2023-24		5.79	0	5.0	0.29	0.50	0.79	1:6.4
2024-25		5.79	0	5.0	0.28	0.51	0.79	1:6.4
2025-26		5.69	0	4.90	0.25	0.54	0.79	1:6.2
Total		27.78	0	23.98	1.38	2.41	3.79	1:6.3

Table 29 Excavation schedule projected

Average grade of Ore & mineral reject is about 44.40% and 26.9% respectively.

(viii) Waste Generation & Disposal:

The overburden quantity estimated to be excavated / generated during this Mining Plan Period is about 24 Lakh M³. This waste will be accommodated at the North Eastern, North Western and North dump by maintaining total height of the dump up to 90m during the plan period i.e. 2021-22 to 2025-26.

(ix) Conceptual Mine Planning

During conceptual Mining stage mining will be done by open cast method as the pit bottom limit is fixed up to +5mRL at central / western part of Pit and +69mRL at eastern part of the pit. Based on present data there is no plan to go further towards eastern part of the Pit. Reaching the ultimate pit limit is in 4th year. The bench height and width will be at 7-8m and 8-10 m respectively. The Ore body of Ostapal Mine is striking in east- west direction. Accordingly the benches will be parallel to ore strike direction & dipping towards south. The Dip of Ore Body is about 52° to the horizontal.

(x) Life of the Mine (as per Resource)

The update reserve estimation up to the conceptual period is about 15.3 Lac Ton. Considering 2.40 Lakh Ton annual ore production as per EC application, the life of Opencast Mine in Ostapal Chromite Mine will be more than current plan period i.e. more than 5 years. The final depth of opencast mine pit working will be +5mRL. At present the total life of mine is expected to be around 10 years i.e. from 2021-22 to 2030-31. However the life of mine may increase further based on future exploration & feasibility study.



(xi) Depth of Water Table:

The depth of Water table based on observations from nearby wells and water bodies are as follows. The water table is at a depth of 5.40m to 8.52m BGL during monsoon. It goes down to a depth of 9.2m to 16.4m BGL in dry season. The current extraction level of mining pit is 30m RL and likely to go upto 13mRL during current plan period. As the Water table is about 12 to 15m BGL, there is no possibility of functure of water table during mining.

(xii) Waste Management & Reclamation Plan:

During quarry development the overburden and Ore estimated to be excavated from opencast quarry is 11.783 L Cum and 3.5 L Ton respectively. During conceptual plan period about 4.045L Cum of overburden will be accommodated over south dump and North Dump.

To handle the remaining waste (11.783 L Cum-4.045 L Cum) i.e. 7.738 L cum will be handled in the following manners.

- Waste Rocks to be sent& use outside the lease area as per requirement of any community work or manufacturing or any other industrial construction purpose with due permission from competent authority.
- Management is planning to acquire additional land for dumping waste in conceptual period.
- There is no reclamation of excavated area within the conceptual period mining.
- The mined out area of the quarry during the conceptual period will be 34.53 ha and the average depth of the quarry will be 130m. Top two to three benches of the quarry will be reclaimed by afforestation.

(xiii) Quantum of water to be encountered during mining:

Sl No	Source	Quantity / Annum (M ³)	
1	Pumped out from Mining Pit	471600	314400
2	Pumped out from bore well	15000 M ³	

Table 30 Quantum of water to be encountered during mining

(xiv) Proposed Protective Measures (As per Mining Plan)

To protect the dump from erosion following measures will be adopted



- i. Dump will be properly terraced and each terrace height will be within 15m
- ii. Peripheral dumping process will be followed so that dead faces will be available for plantation and quick Stabilization.
- iii. The overall slope of the dump will be 28° and individual bench slope of 37.5°
- iv. Dump bench slope will be vegetated properly so that no erosion will take place.
- v. Construction of garland drains all around the periphery of the dump yard.
- vi. Plantation of grass and bushes over the dump area / slope area to stabilize the dead face of the dump from erosion.
- vii. Stone barriers across the drains at regular interval to check the water current and to arrest the solid particles washed out from dump yard.
- viii. Stone pitching will be done on the drains to restrict collapse of drain walls during flow of water.

(xv) Beneficiation Process:

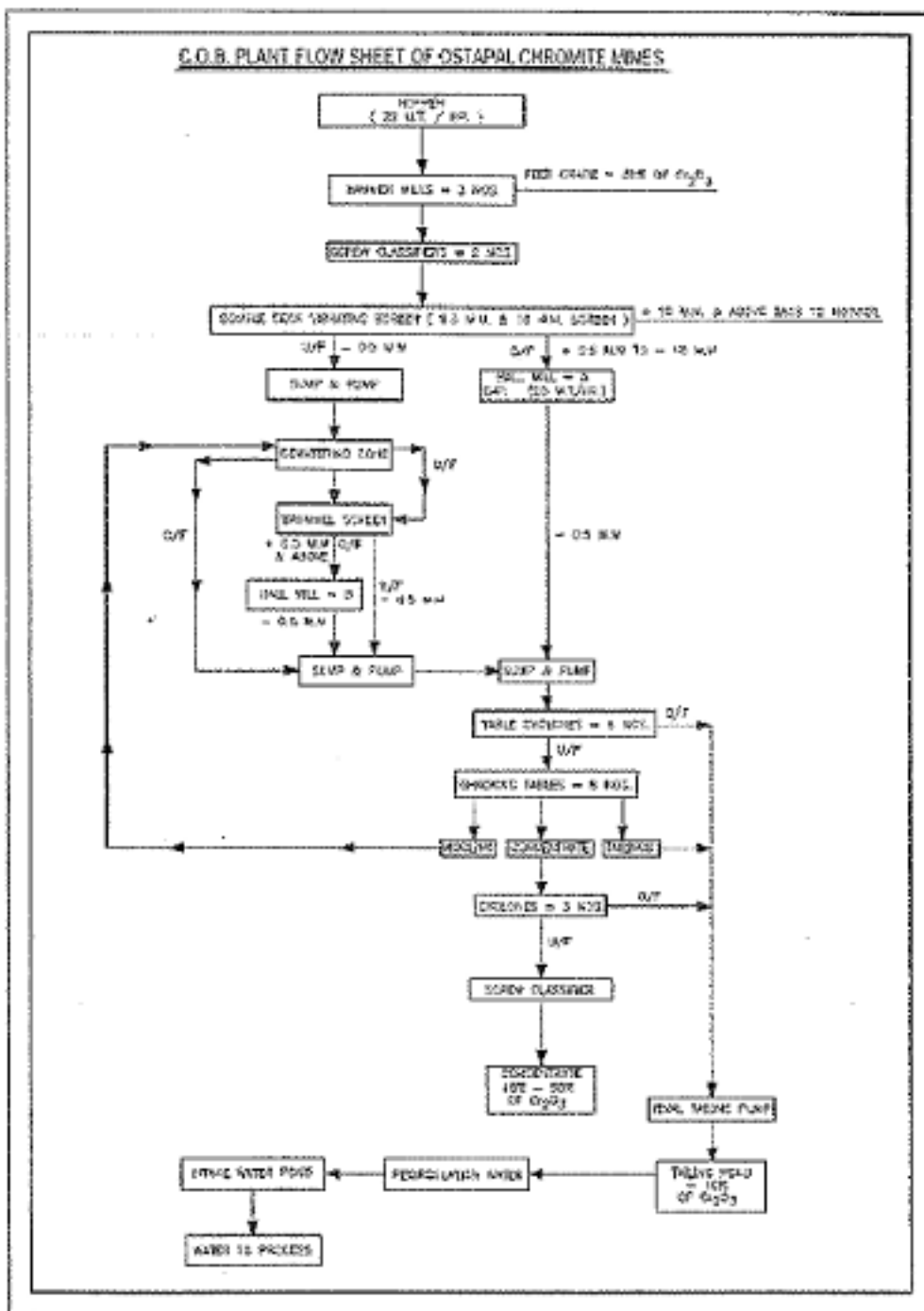
Chromite is one of the important Chrome Ore. It is an oxide of Iron & Chromium. The chemical formula is $(\text{Mg Fe}^{+2}) (\text{Cr, Al, Fe}^{+3})_2 \text{O}_4$. The Ferrous Oxide (Fe^{+2}) is often replaced by Mg and Cr_2O_3 and Alumina. Therefore variation in Cr / Fe ratio in chromite is observed.

The ROM is upgraded through manual shorting & picking to remove the waste rock pieces from the ore stack yard to suit the requirement of the captive industry. The average grade of Ore dispatch to captive plant is +44% to -40% Cr_2O_3 is primarily send for beneficiation and the concentrate generated are send to the Captive Plant at Bhadrak.

a) Nature of Processing:

The beneficiation process is a wet process. In the process of beneficiation the mineral reject (20-30% of Cr_2O_3) is being concentrated to 45-50% of Cr_2O_3 . Primarily 10-40% of chrome ore is sent for beneficiation. The beneficiation plant is mainly operated by gravity separation process. Major equipments are Hopper, Hammer Mill, Screw Classifier, vibrating Screen, Shaking table, slurry pump, belt conveyer and tailing ponds etc. The final concentrate is about 45-50% of Cr_2O_3 .

The Weight to Weight recovery percentage is about 45%. The flow diagram of Beneficiation process is furnished below.





The beneficiation plant capacity is 20 TPH. The average hours per month for working are 600 hrs. Monthly feeding / processing of ore is 12000 Tons per Month. The beneficiated ore i.e. concentrate is 5400 Tons per month. The capacity of concentrate Ore production per annum is 64800 TPA.

The rejects from the table, cyclones etc are pumped out to tailing pond. Out of the 120 M³ per hour send to Tailing pond 100 M³ per hour is recycled. The balance makeup water is 20 M³ per hour

b) Tailing Disposal:

The tailings generated in the beneficiation process are discharged through pipelines in to the tailing pond through gravity and after settling down the solids in the telling pond, the clean water is pumped back to the intake pond. The tailings are allowed to dry for 3-4 months and then the semi dried tailings are removed to dump yard. Steps are being taken to install press filter in order to generate dry tailings directly having minimum moisture. The tailings generation is about 65000 MT per annum and properly mixed with overburden at the dump yard. The tailings may be provided to Brick manufacturers, if so requested by any entrepreneurs after due permission of authority.

c) Physical & Chemical Characteristics of Tailings:

(i) Physical Characteristics of tailing:

The tailings produced from COB plant contain very fine particles and its grade is below threshold limit so it is not required for further processing or any other purpose. Finally it is discharged to the tailing pond. The characteristics (Physical) are furnished below.

S I No	Description	Unit	Tailing Details
1	Bulk Density	MT/ M ³	1.95
2	Texture	-	Fine / Medium
3	Colour		Grey
4	Specific Gravity	-	2.5
5	Hardness	Moh scale	4.0 to 4.5
6	Magnet / Non magnet		Feeble magnetic

Table 31 Physical characteristics of tailing

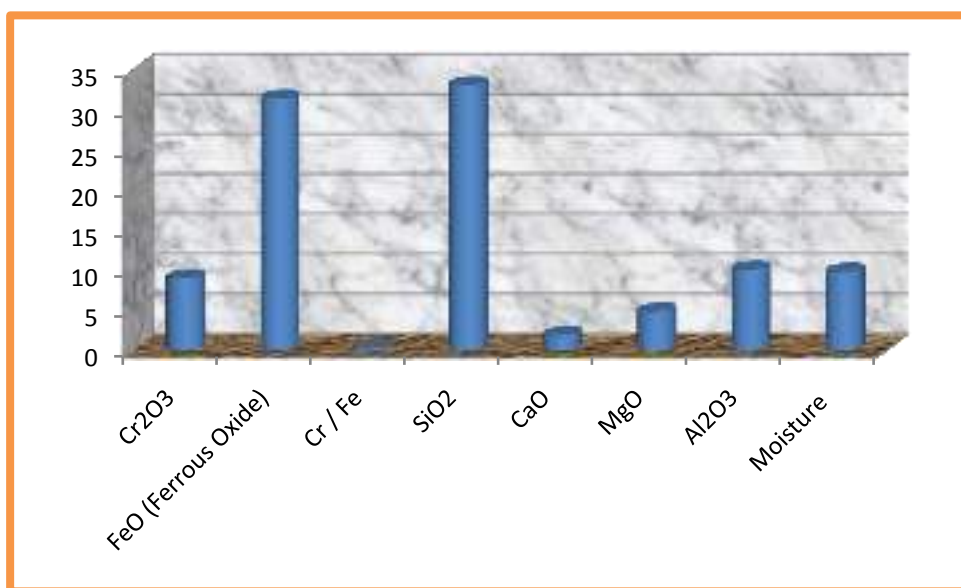


(ii) Chemical Properties:

Chemical analysis of tailing has been done. The chemical characteristics of tailing are furnished below.

Sl No	Component	Sample 1	Sample 2	Sample 3	Average
1	Cr ₂ O ₃	9.76	8.87	8.49	9.04
2	FeO (Ferrous Oxide)	29.46	36.21	28.76	31.48
3	Cr / Fe	0.29	0.21	0.26	0.25
4	SiO ₂	30.06	29.88	39.44	33.13
5	CaO	2.10	2.10	1.54	1.91
6	MgO	7.15	3.02	4.43	4.87
7	Al ₂ O ₃	11.35	9.82	9.18	10.12
8	Moisture	9.83	9.89	7.9	9.83
	Total	100	100	100	100

Table 32 Chemical properties of tailing



None of the tailing component is found to be toxic in nature.



d) Size & Capacity of tailing Pond:

Pond No	Dimensions in m Average			Pond Capacity (M ³)
	Length	Width	Depth	
1	45	35	11	17325
2	35	25	12	10500
3	110	15	8	13200

Table 33 Size and capacity of tailing ponds

Tailing Pond Design:

The tailings will be discharged one by One into three ponds in a cascading manner. Clear supernatant water will pass to the 3rd pond from where it will be pumped back to intake pond. The thickness of the earthen dam is 15m at bottom, 5m at top and height from 5m to 8m with side slope from 45⁰ to 60⁰. Any seepage water from tailing pond will be collected in a sump and pumped back to intake point. No seepage water is allowed to flow down to the natural drainage system.



e) Water Requirement & Source:

The quantity of water required in the COB plant is 120 M³ / hour. Out of 120 M³ of water 100 M³ is recycled back to the beneficiation system. Hence the makeup water is only 20 M³ per hour. The plant will function for 20 hours per day. Hence the water requirement is 400M³ per day after initial charging the plant. The water requirement of mine for dust suppression, afforestation, Wheel washing etc is estimated to be 150M³, 50M³, 50M³ per



day and for domestic use around 100m³ per day. So the total water requirement per day is 750M³(750 KLD)

This water will be available from Mine discharge water (Seepage water)

Sl No	Source	Quantity of Water Pumped Out (M ³ / Annum)		
		Rainy Season (June – Oct.)	Non Rainy Season (Nov- May)	Total
1	From Mining Pit	660000	425000	1085000/annum
2	Water consumption (COB) Plant			400KL/Day
3	Dust suppression			150
4	Afforestation			50KL/Day
5	Wheel washing			50KL/Day

Table 34 Quantity of water pumped out

3.1 Project Impact:

3.1.1 On Flora & Fauna:

The project is partly within Daitari DPF under Cuttack Division. The project is already in operation since 1985. During the present expansion i.e. from 0.20 MTPA to 0.240 MTPA with maximum excavation of total ROM 0.579MCum/ Annum from the present level 0.546MCum / Annum. During the process no lateral expansion has been envisaged. No further damage to flora & fauna is feared. Due to the mining activities the following effect on Flora & Fauna is feared in passage of time.

a) Adverse impact on Flora:

There are number of Chromite mines in this Sukinda valley. The effect of individual mines may not be on a perceptible danger level but the synergy effect of all mines is laudable. Due to planting activities on Dumps, haul roads and vacant lands lot of greenery has been created and the ugly face of excavation is covered up. Though there is effect on Water table of the region the combined effect of water harvesting measures have reduced the effect. The local flora is not affected by lowering of water table due to constant watering, sprinkling of water in the immediate vicinity. The nature of forests (Moist / Dry deciduous mixed forest) is found unchanged. The biodiversity of native flora has been partly changed due to planting species though mostly non brows able and hardy species. Though floral



density remains unchanged the composition has been changed which affects the bio diversity of the area.

b) Impact on Fauna:

Due to noise generated from mining activities and traffic throughout day and night, mine lighting, blasting and presence of heavy population in the locality has affected the tranquility of animals and they are keeping away from the locality. Animal concentration is becoming thinner in comparison to 30-35 years back.

3.1.2 Impact on Soil:

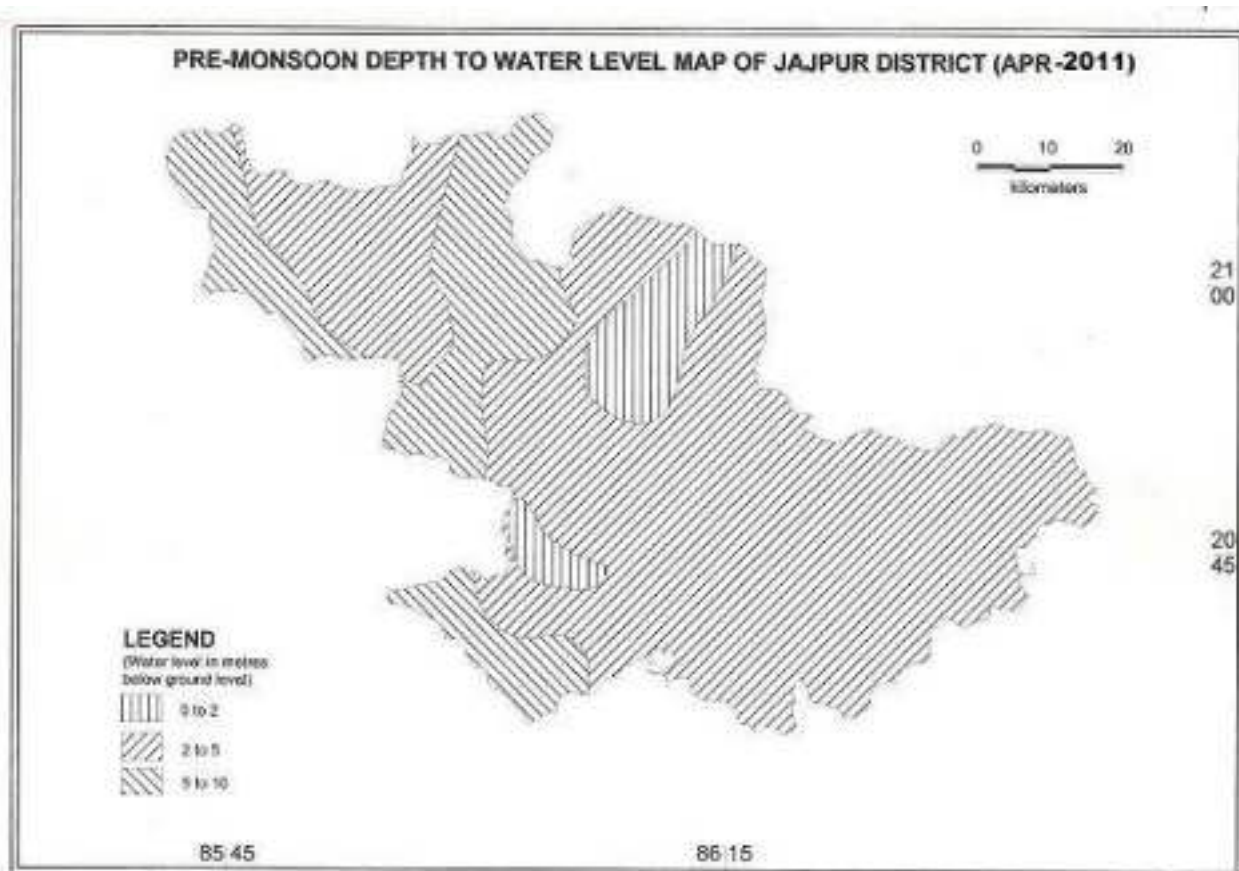
The land surface will be disturbed due to mining. On conceptual stage only two- three benches will be planted up with native species. Rest of the area will be maintained as water body. Due to flying dusts from road transportation, the soil characters will be changed. Deposit of heavy metals like Nickel, Cobalt on surface of will cause soil texture course.

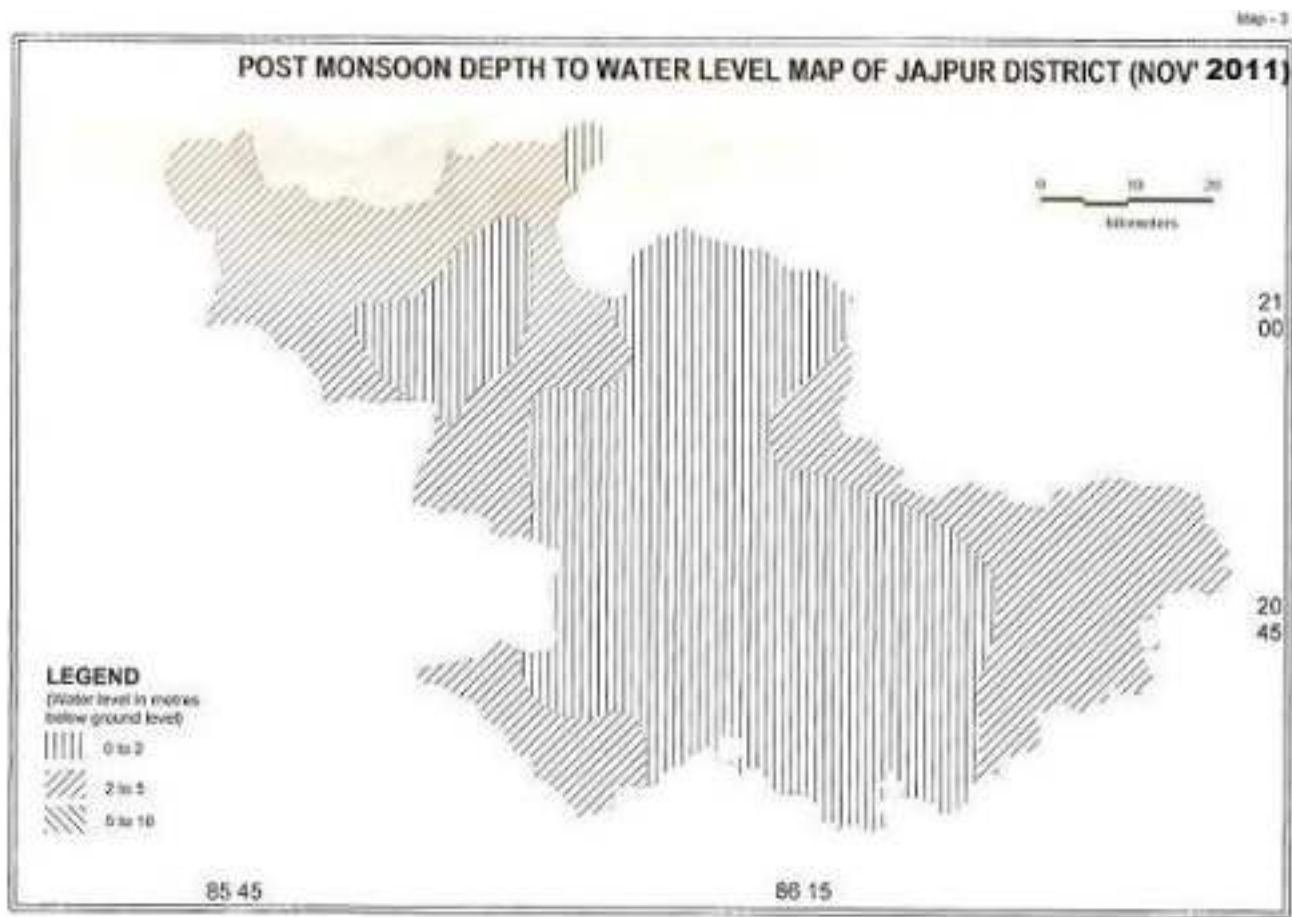
3.1.3 Impact on Water & Water Regime:

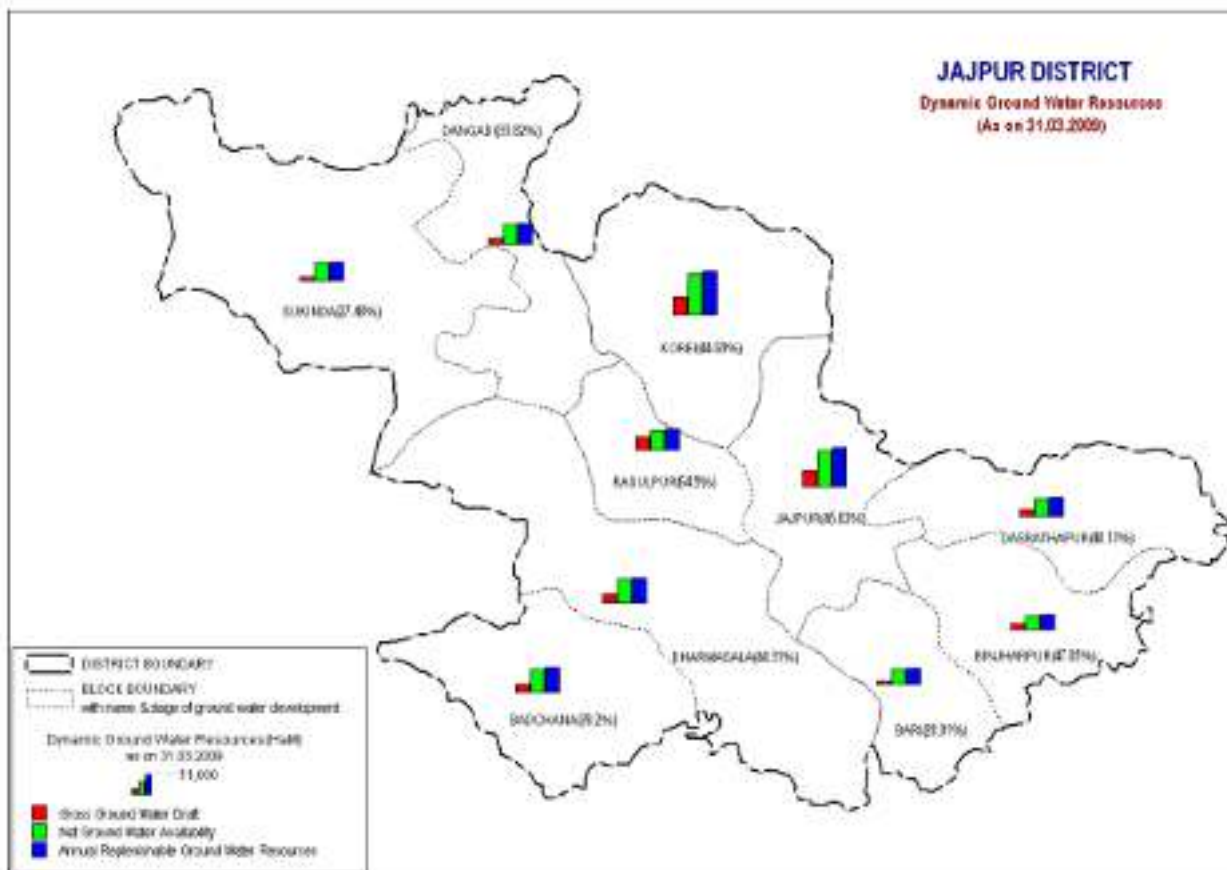
Mine discharge water about 1085000 M³ i.e. more than 3000 KLD will definitely exert pressure on recharging of Water table. The mining excavation is already puncturing the water table which is about 12-15 m BGL. The present working level is 30mRL.

The mine discharge water contains Cr⁺⁶ ions which is carcinogenic in nature. It is much relief that the ETP discharge water contains about 0.02mg/L which is much below the CPCB norm. Excess water is being discharged to Damsala nalla after treatment through ETP which is the main drainage of this area and joins with Brahmani River.

The ground Water table position of Sukinda valley / Jajpur District is given below.







3.1.4 Impact on Air (including Noise)

Excavation, unloading, loading of Ore, transportation within the Mining Lease area and outside the ML area are adding fugitive dust to the atmosphere. The level of RSPM (PM_{10} and $PM_{2.5}$) is comparatively high than the normal level but within the prescribed Limit of CPCB. The last quarter AAQ Report for September 2021 quarters is attached as Annexure-IX. The AAQ report for stations within the ML area and outside indicates the various parameters are below the norm for RSPM level prescribed by CPCB. (Analysis Report for September Quarters is at annexure-IX).

3.1.5 Ambient Noise Level:

There is provision for drilling and blasting in this mine. The noise level is due to drilling & blasting, use of HEMM, and transport trucks. The noise level for quarter ending September, 2021 is at **Annexure-X**. The noise level within Mining area is 71 dBL. The location wise noise level as recorded on 14.09.2021 is furnished below.



Location	Noise level as recorded in dB(A)	
	Day Time (6.00 Am to 10.00 PM)	Night Time (10PM to 6.00 AM)
Opencast Quarry	71	62
COB Plant	64	58
Mines Loading / Unloading	69.6	63.8

Table 35 Noise level recorded

The standard noise Level is as follows (As stipulated by CPCB)

Category of Area	Limit in dB(A)	
	Day Time (6.00 Am to 10.00 PM)	Night Time (10PM to 6.00 AM)
Industrial Area	75	70
Residential area	55	45
Commercial area	65	55
Silent Zone	50	40

Table 36 Standard Noise level by CPCB

It is observed that the noise level within Mining area / other area is within the prescribed limit.

3.1.6 Fugitive emission:

Dust emission from mining activity: Dust emission sources were identified based on mining activities of the project. Following mining and material handling operations were considered

- Loading of materials (Ore, OB, Mineral rejects)
- for dust emission sources & Truck dumping of materials (Ore, OB, Mineral rejects)
- Movement of dumper (wheel) generated dust
- Unloading of materials (Ore, OB, Mineral rejects)
- Wind erosion from waste dump
- Trucks Activity wise dust emissions during excavation of ore have been estimated.

The expected emissions from various mining activities like mining, drilling & blasting, waste dumping and transport of ore and overburden through haul roads wherever applicable have been estimated. It is found to be below prescribed norm.



3.1.7 Impact on Biological Environment:

During mining process, there will be mostly vertical development and no trees are proposed to be felled.

Due to Mining light arrangement, discharge of water to Damsala Nalla may affect the biological environment. Hence the biological environment is not going to be disturbed during plan period and beyond rather the condition will improve due to planting on dump surface, Haul Road side. Tree species along with climbers, herbs / shrubs are to be planted in mixture to maintain a natural look to the manmade tree cover.

3.1.8 Solid Waste & Acid Mine Drainage:

a) Solid waste:

During excavation Overburden and mineral reject (below 10% Cr₂ O₃) will be produced. During plan period 26.39 Lakh Cum OB and Mineral reject will be generated. The stripping ratio is 1: 6.3 i.e. for production of 1 Ton of Ore about 6.3 cum of waste. The waste materials will be dumped in the earmarked space. Though stabilization of dump is being taken up and appropriate slope is maintained, still there is possibility of soil erosion from the dump surface. Adequate measures will be taken for stabilization of dump.

b) Acid Mine Drain:

Overburden and side burden consists of serpentine materials along with clay etc. **Serpentine** is not the name of a single mineral. Instead it is a name used for a large group of minerals that fit this generalized formula: (X)₂₋₃(Y)₂O₅(OH)₄. In this formula, X will be one of the following metals: magnesium, iron, nickel, aluminum, zinc, or manganese; and, Y will be silicon, aluminum, or iron. The appropriate generalized formula is therefore as follows:

(Mg,Fe,Ni, Mn,Zn)₂₋₃(Si,Al,Fe)₂O₅(OH)₄. Chrysotile, antigorite, and lizardite are three of the primary serpentine minerals. There are many other serpentine minerals, most of which are rare. Serpentine group minerals have similar physical properties and form by similar processes. They often occur as fine-grained admixtures and can be difficult to distinguish within a rock. Geologists usually call these materials "serpentine" rather than more specific names to simplify communication.



During rains there is no possibility of any leaching elements to be characterized as acid. Due to transport related problems there may be acid rain due to exhaust burnt gases.

c) Exhaust gas or flue gas

Exhaust gas or flue gas is emitted as a result of the combustion of fuels such as natural gas, gasoline (petrol), diesel fuel, fuel oil, biodiesel blends. According to the type of engine, it is discharged into the atmosphere through an exhaust pipe, flue gas stack, or propelling nozzle. It often disperses downwind in a pattern called an *exhaust plume*.

It is a major component of motor vehicle emissions (and from stationary internal combustion engines), which can also include:

- Crankcase blow-by
- Evaporation of unused gasoline

Motor vehicle emissions contribute to air pollution and are a major ingredient in the creation of smog in some large cities.

The largest part of most combustion gas is nitrogen (N_2), water vapor (H_2O) (except with pure-carbon fuels), and carbon dioxide (CO_2) (except for fuels without carbon); these are not toxic or noxious (although water vapor and carbon dioxide are greenhouse gases that contribute to global warming). A relatively small part of combustion gas is undesirable, noxious, or toxic substances, such as carbon monoxide (CO) from incomplete combustion, hydrocarbons (properly indicated as C_xH_y , but typically shown simply as "HC" on emissions-test slips) from unburnt fuel, nitrogen oxides (NO_x) from excessive combustion temperatures, and particulate matter (mostly soot).

Exhaust gas temperature (EGT) is important to the functioning of the catalytic converter of an internal combustion engine. It may be measured by an exhaust gas temperature gauge. EGT is also a measure of engine health in gas-turbine engines.



Cold engines:

Steam from tailpipe of cold vehicles:

During the first two minutes after starting the engine of a car that has not been operated for several hours, the amount of emissions can be very high. This occurs for two main reasons:



- **Rich air-fuel ratio requirement in cold engines:**

When a cold engine is started, the fuel does not vaporize completely, creating higher emissions of hydrocarbons and carbon monoxide, which diminishes only as the engine reaches operating temperature. The duration of this start-up phase has been reduced by advances in materials and technology, including computer-controlled fuel injection, shorter intake lengths, and pre-heating of fuel and/or inducted air.

- **Inefficient catalytic converter under cold conditions:** Catalytic converters are very inefficient until warmed up to their operating temperature. This time has been much reduced by moving the converter closer to the exhaust manifold and even more so placing a small yet quick-to-heat-up converter directly at the exhaust manifold. The small converter handles the start-up emissions, which allows enough time for the larger main converter to heat up. Further improvements can be realized in many ways, including electric heating, thermal battery, chemical reaction preheating, flame heating and super insulation.

Component	Emission Rate	Annual pollution emitted
Hydrocarbons	2.80 grams/mile (1.75 g/km)	77.1 pounds (35.0 kg)
Carbon monoxide	20.9 grams/mile (13.06 g/km)	575 pounds (261 kg)
NO _x	1.39 grams/mile (0.87 g/km)	38.2 pounds (17.3 kg)
Carbon dioxide - greenhouse gas	415 grams/mile (258 g/km)	11,450 pounds (5,190 kg)

Main Motor Vehicle emission:

NO_x

Mono-nitrogen oxides NO and NO₂ (NO_x)(whether produced this way or naturally by lightning) react with ammonia, moisture, and other compounds to form nitric acid vapor and related particles. Small particles can penetrate deeply into sensitive lung



tissue and damage it, causing premature death in extreme cases. Inhalation of NO species increases the risk of lung cancer and colorectal cancer and inhalation of such particles may cause or worsen respiratory diseases such as emphysema and bronchitis and heart disease.

The largest emissions of NO_x came from on road motor vehicles, with the second largest contributor being non-road equipment which is mostly gasoline and diesel stations.

The resulting nitric acid may be washed into soil, where it becomes nitrate, which is useful to growing plants.

Volatile organic compounds

In atmosphere the volatile organic compounds presence is due to vehicles and others as furnished below.

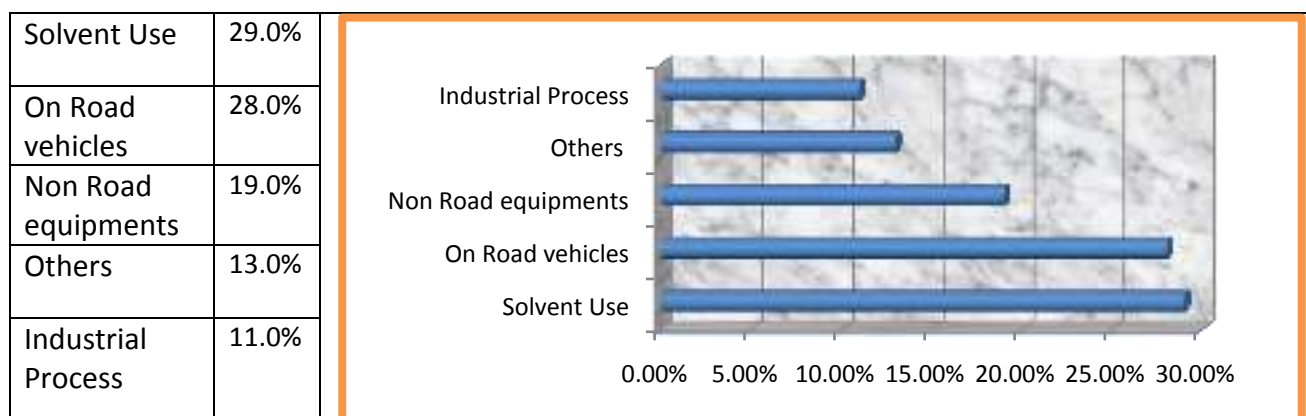


Table 37 Volatile organic compounds

Non-road equipment is mostly gasoline and diesel stations.

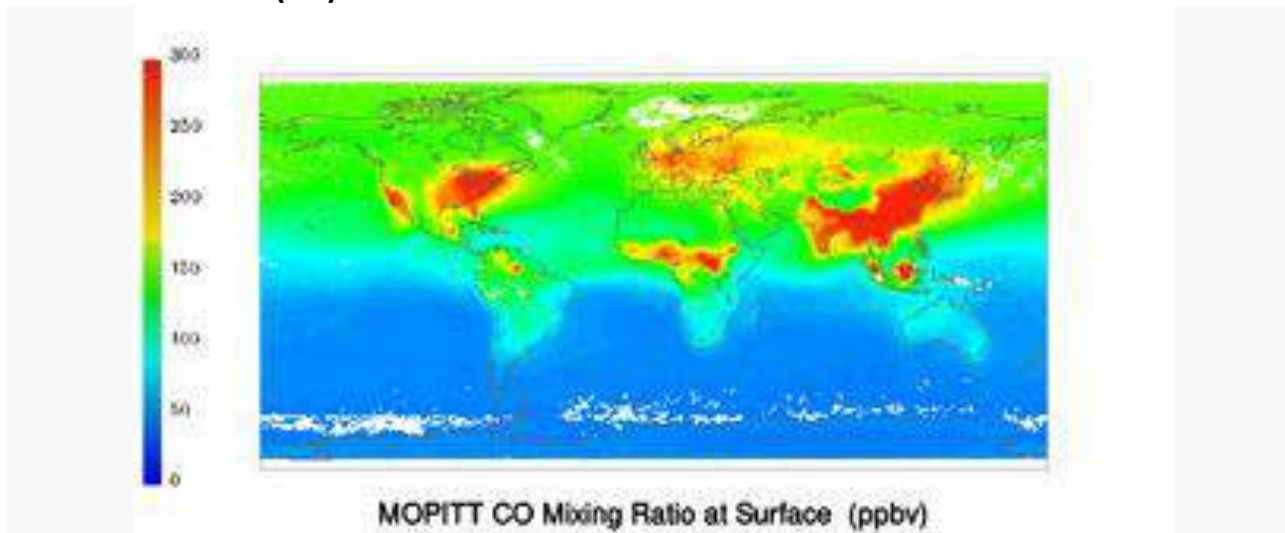
When oxides of nitrogen (NO_x) and volatile organic compounds (VOCs) react in the presence of sunlight, ground level ozone is formed, a primary ingredient in smog. A 2005 U.S. EPA report gives road vehicles as the second largest source of VOCs in the U.S. at 26% and 19% are from non road equipment which is mostly gasoline and diesel stations. 27% of VOC emissions are from solvents which are used in the manufacturer of paints and paint thinners and other uses.

Ozone

Ozone is beneficial in the upper atmosphere, but at ground level ozone irritates the respiratory system, causing coughing, choking, and reduced lung capacity. It also has many negative effects throughout the ecosystem.



Carbon monoxide (CO)



MOPITT satellite computer image of carbon monoxide March 2010

Carbon monoxide poisoning is the most common type of fatal air poisoning in many countries. Carbon monoxide is colorless, odorless and tasteless, but highly toxic. It combines with hemoglobin to produce carboxyhemoglobin, which blocks the transport of oxygen. At concentrations above 1000ppm it is considered immediately dangerous and is the most immediate health hazard from running engines in a poorly ventilated space.

Hazardous air pollutants (toxics)

Chronic (long-term) exposure to benzene (C₆H₆) damages bone marrow. It can also cause excessive bleeding and depress the immune system, increasing the chance of infection. Benzene causes leukemia and is associated with other blood cancers and pre-cancers of the blood.

Particulate matter (PM₁₀ and PM_{2.5})

The health effects of inhaling airborne particulate matter have been widely studied in humans and animals and include asthma, lung cancer, cardiovascular issues, premature death. Because of the size of the particles, they can penetrate the deepest part of the lungs. U.S. Federal Highway Administration (FHWA) state that in 2002 about 1 per-cent of all PM₁₀ and 2 per-cent of all PM_{2.5} emissions came from the exhaust of on-road motor vehicles (mostly from diesel engines).



Carbon dioxide (CO₂)

Carbon dioxide is a greenhouse gas. Motor vehicle CO₂ emissions are part of the anthropogenic contribution to the growth of CO₂ concentrations in the atmosphere which according to the vast majority of the scientific community is causing climate change. Motor vehicles are calculated to generate about 20% of the European Union's man-made CO₂ emissions, with passenger cars contributing about 12%. European emission standards limit the CO₂ emissions of new passenger cars and light vehicles.

3.1.9 Vibration (due to blasting):

There are provisions for drilling & blasting as the rock is comparatively hard (about 30-40%). The vibration monitoring report indicates a safe vibration status during blasting and use of other machineries.

3.1.10 Synergic Impact on Flora & Fauna:

At the present system of mining i.e. opencast mining and treatment of effluent, the following threats to flora and fauna is feared.

Threat to Flora:

- i. Lower recharging of ground water table may lower moisture availability and result in stunted growth, reduced site quality, disappearing colony of moisture loving vegetation, replacement of moisture loving species by thorny, hardy & low quality species.
- ii. Excess biotic pressure over a long period may result in visit of unpalatable, dwarf vegetation.
- iii. More and more open forest will be covered by Eupatorium, Lantana, Combretum (Atandi).
- iv. Bahunia (Siali) may be completely vanished from the region.
- v. Disappearance of many species may lead to loss of Biodiversity of the locality.
- vi. Plants may be affected by heart rot (especially Sal), Canker and top dying phenomena.
- vii. Accumulation of dust on leaf surface for a long period may reduce photosynthesis hence reduced oxygen generation. It may also affect growth rate of plants, especially planted on road sides.



Threat to Fauna:

- i. Movement of available species may be gradually restricted and finally seized from this tract.
- ii. Scarcity of food stock and water in forest may force them to come to habitations, agricultural field.
- iii. More and more human- animal conflict resulting repelling attitude of locals' towards wildlife.
- iv. More respiratory, digestive disease may affect animals.
- v. Presence of Cr^{+6} (Chromium hexavalent) a carcinogenic substance in water & dust particle may induce health hazard.
- vi. Presence of iron, Nickel and other heavy metals on grass fodder foliage surface may adversely affect herbivorous & health.
- vii. Animal behavior may change due to constant effect of noise & light of traffic.
- viii. Reptiles may be affected seriously due to light and ground vibration.

On habitat.

- i. Food and Water may become a limiting factor and seriously affecting the carrying capacity of the area.
- ii. Compact soil without good vegetation will accelerate soil erosion.
- iii. Nocturnal animals may have extremely a hard time.
- iv. Rising temperature in summer may induce sun stroke.

3.2. Ancillary Impact of the Project on Flora & Fauna:

Side effect of mining on flora and fauna is being gradually felt in this region. Loss of bio diversity, pollution of water body i.e. Damsala nalla and evading nature of fauna from this locality is felt by a common man.

3.3 Socio Economic Impact of the Project:

Besides direct and indirect employment being provided by mining company, the occupational profile indicates more and more people are being diverted from agriculture to other trade i.e. mostly mine related occupation. The socio economic condition of the locality has improved. Under CSR program of mines owner, peripheral development is quite perceptible.



Employment likely to be generated:

At present 96 regular employee and 441 contractual workers are working at the mine. On enhancement of production, it may be required to enhance engagement of Contractual labour. It may be enhanced by 10-20% and additional employment will be provided to the local people.

3.3.1 Impact on Traffic:

The Traffic study was conducted by NHAI for their project “Up gradation of NH-200”. After detail traffic study at five important places in homogeneous section i.e. at Saranga, Pitiri, Mangalpur, Duburi and Chandikhol the traffic increase in the road up to 2027 and after has been projected. As per most probable increase the growth rate at different years is furnished below.

Traffic Projections.

General

Mode	Base value as obtained (2006)	Year								
		2007-2011	Projected (2012)	2012-2016	Projected (2016)	2017 - 2021	Projected (2021)	2022 - 2026	Projected (2026)	2027 onwards
Scenario-1: Projected Most Probable Traffic Growth Rate										
Two Wheelers	3490	8.32	3780	9.1	4124	8.44	4472	7.5	4808	6.75
Three Wheelers	386	10.79	428	11.38	476	10.31	525	8.63	571	7.5
Cars	733	8.91	798	9.8	877	9.38	959	8.44	1040	7.5
Jeeps	318	6.78	340	7.35	365	7.13	391	6.38	415	5.63
Buses	81	3.7	84	4.03	87	3.94	91	3.75	94	3.56
Trucks	3112	7.34	3340	7.8	3601	7.2	3860	6.6	4115	6.3
Tractor and Tractor with trailer	449	7.99	485	8.25	525	7.5	564	6.5	601	5.85

Table 38 Traffic Projection Report

Production Related Traffic Pressure:

The production level for which EC is in process by which production level will enhance from 0.200MTPA to 0.240 MTPA i.e. 20% increases in production. The ore produced is being transported by Road to Randia, Bhadrak. The truck capacity is mostly 16 ton. Hence for 200000 TPA, about 12500 trip truck load is required at present. Taking 300 working



days about 42 trucks is engaged per day. In enhance production condition, about 50-52 trucks will be engaged per day. This traffic load has been taken in to account while making traffic study by NHAI at Mangalpur crossing. Now up gradation of Tamka- Mangalpur Road is being taken up by district administration.

a) Haulage & Transport within M.L Area Transportation between M.L Area & Dispatch Point:

For handling the ore stacks at mine-site, 2nos. of Front loader (0.9cum) is provided to keep in tune with quantum of handling.

For handling the generated waste rock to the decentralized portion/waste dump of the pit, excavators and dumpers will be engaged.

b) Transportation to Outside:

All the ore will be transported by Road to Randia, Bhadrak i.e. Ferro chrome / charge chrome plant of FACOR.

3.4 Impact /Effect on Movement of Mega Fauna:

There is no movement of mega animals neither within the ML area nor at immediate road alignment up to Magalpur – Chandikhol – Bhadrak. The Tamka- Mangalpur road experiences elephant movement from Daitari DPF to Mahagiri DPF via Kansa. The ores from the Mine will be transported via Mangalpur hence it is not affecting the movement of animals.





CHAPTER-IV

IMPACT MITIGATION MEASURES





CHAPTER-IV

Impact Mitigation Measures & Financial Projection

4.0 Adverse Impacts of the Project & Mitigation Measures suggested:

Ostapal Chromite mine is over 72.843ha and out of the lease area 68.424 ha is of forest land (Daitari DPF and Rev. Forest). The rest 4.419 ha is non forest land. The production of the mine as per present Environment Clearance is 0.20 MTPA and proposed to be enhanced to 0.240 MTPA. The mine working is opencast mining categorized as **“Category-“A” Fully Mechanized” (O/C)**. Transportation of Ore within ML area and outside is by Road.

In accordance with the stipulated condition no (xvi) of Terms of reference (ToR), the project proponent engaged Chandanam – A registered Society and previously an empanelled consultant on wildlife to study the impacts of Mining on wildlife and environment. The study report is at **Annexure- XI**. In light of study report / EIA report prepared with reference to ToR the probable impacts and mitigative measures suggested are as follows.

In the prescribed ToR by SEIAA indicates remedial measures as follows.

Specific ToR:

v) *The project proponent shall undertake the periferial plantation and closed areas as well as gap plantation within 6 months with seedling of 4-6ft height having atleast 90% survival rate.*

4.1 Adverse Impact on Air & Mitigation Measures:

In mining activities fugitive dust generation is expected at ore excavation, drilling & blasting, loading within the mining pit, transportation within ML area, dumping at Stock yard and subsequently beneficiation and transportation to outside the ML area to destination for end use.

The excavation is being carried out at 30mRL and Ore is at wet condition. Drilling & Blasting is required hence fugitive dust generation at pit level, transportation up to pit head. Transportation from Pit head to Stock yard and un-loading is associated with dust generation. From stock yard to outside the ML area is also associated with transport related dust pollution.

Mitigation measures:

The mitigation measures adopted by User Agency are



Site Specific wildlife Conservation Plan for Ostapal Chromite Mine of M/s Ferro Alloys Corporation Ltd



- Trees planted along the Haul Road within the ML area, as well as dump slope and green belt zone. Survival rate is varies from 85 to 100% Plantation details for last five years have been furnished as follows.

Year	Area (In Ha.)		No. of Plant (In Nos.)		Survival Rate
	Proposed	Actual	Proposed	Actual	
2017-18	2.043	2.58	5110	6465	100%
2018-19	2.385	3.07	5960	7673	85%
2019-20	2.37	2.42	5920	6050	85%
2020-21	2.09	2.1	5230	5250	85%
2021-22	0.795	1.15	1990	2897	95%

Table 39 Plantation details

- Sprinkling of water on haul road frequently (thrice in December to March and four times in summer. The frequency of water sprinkling depends upon weather condition and moisture on the road surface.
- Ore containing moisture <10% will be avoided for transporting outside to prevent any fall out.
- The truck will be fully covered with tarpaulin to avoid air pollution during transportation and ore fallout from trucks.





4.2 Adverse impact on Water body & Mitigation Measures:

The nearest water body is Damsala nalla flowing in Sukinda Valley and joins with Brahmani River. Any contamination of Damsala nalla water will affect aquatic fauna of River Brahmani. The other nalla flowing within zone of impact are as follows.

Sl No	Name	Distance from the Project in km	Flow Direction	Nature
1	Damsala Nala	0.27	S	Perennial
2	Sasubhuashuni Nala	5.8	NW	Seasonal
3	Karchamula Nala	6.4	W	Seasonal
4	Nadibarana Nala	7.6	SW	Seasonal

Table 40 Nallas/River

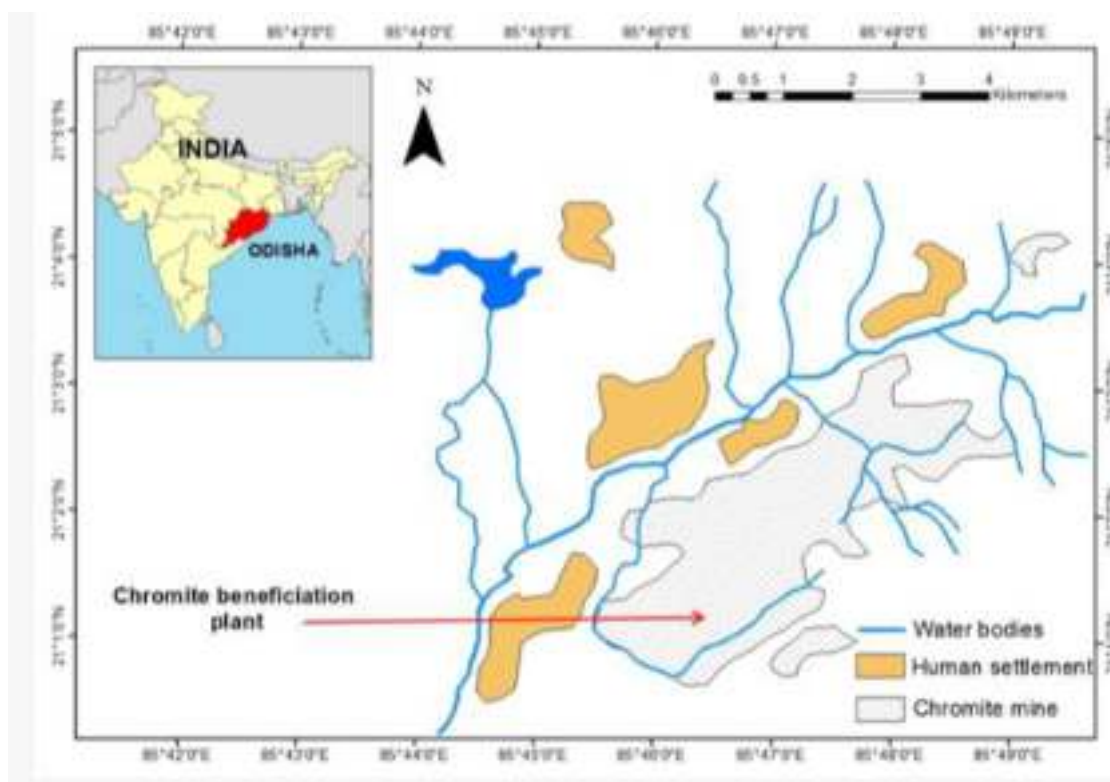
Besides dust settling on water body, the major problem is hexavalent Chromite (Cr^{+6}) in mine discharge water. It is carcinogenic in nature.

Mitigative measures:

The project proponent has installed Effluent Treatment Plant of 600KLD per hour capacity to treat the mine discharge water. The ETP reduce all Hexavalent Chromium to Trivalent Chromium, pH within 7 to 8.5 range, and turbidity at a low range. The ETP Analysis Report (inlet & outlet) is at **annexure-XII**. The result indicates pH: 7.81, Total suspended solid: 18, Cyanide: <0.05, Lead: <0.01 and other parameters below the standard norm prescribed by CPCB.



*Site Specific wildlife Conservation Plan for Ostapal
Chromite Mine of M/s Ferro Alloys Corporation Ltd*





Principle of ETP Functioning:

Chromium is found in two forms in waste streams i.e. hexavalent (Cr^{6+}) & trivalent (Cr^{3+}). Treatment of chromium is usually consists of two stage process; first the reduction of hexavalent chromium to trivalent form and second precipitation of the trivalent chromium.

1. Hexavalent chromium is a strong oxidizing agent and can readily be reduced to trivalent chromium by means of adding reducing agent i.e. Ferrous Sulphate (FeSO_4). After proper mixing with ferrous sulphate in flash mixer thus the hexavalent chromium is reduced to trivalent chromium while ferrous ion will be oxidized to ferric ion Fe^{3+} .
2. In the next stage by adding alkaline reagent that is NaOH / lime $\text{Ca}(\text{OH})_2$ the ferric ion and chromium ion will be precipitated jointly at pH 8.0 – 8.5 as Ferric Hydroxide $[\text{Fe}(\text{OH})_3]$ & Chromium Hydroxide $[\text{Cr}(\text{OH})_3]$.
3. The supernatant from settling tank is further filtered for removal of Fe^{3+} in form of suspended solids.

Reaction

Stage-I

- A. If Water contains chromates $[\text{CrO}_4]^{2-}$
$$[\text{CrO}_4]^{2-} + 3\text{Fe}^{2+} + 8\text{H}^+ \longrightarrow \text{Cr}^{3+} + 3\text{Fe}^{3+} + 4\text{H}_2\text{O}$$
- B. If Water contains dichromate $[\text{Cr}_2\text{O}_7]^{2-}$
$$[\text{Cr}_2\text{O}_7]^{2-} + 6\text{Fe}^{2+} + 14(\text{H}^+) \longrightarrow 2\text{Cr}^{3+} + 6\text{Fe}^{3+} + 7\text{H}_2\text{O}$$

Stage - II

- A. $\text{Cr}^{3+} + 3\text{NaOH} \longrightarrow \text{Cr}(\text{OH})_3 \downarrow + 3\text{Na}^+$
- B. $\text{Fe}^{3+} + 3\text{NaOH} \longrightarrow \text{Fe}(\text{OH})_3 \downarrow + 3\text{Na}^+$



Site Specific wildlife Conservation Plan for Ostapal Chromite Mine of M/s Ferro Alloys Corporation Ltd



The input / output of Mines discharge through ETP test result is furnished below.

Online Pollution Monitoring Portal					
Site Name: Ostapal Chromite Mines Of M/s. FACOR LTD					
From Date: 2021/11/01 To Date: 2021/11/30					
Report Name: Custom Report					
Report Created by FerroAlloys on 2021-12-02 11:28:29					
Sl No.	Time	EQMS_2_INLET-Flow_U	EQMS_2_INLET-TSS_U	EQMS_2_INLET-pH_U	EQMS_2_INLET-Chromium_U
1	2021-11-01	145.89	28.79	10.08	0.71
2	2021-11-02	203.83	24.84	10.03	0.72
3	2021-11-03	15.41	18.66	10	0.72
4	2021-11-04	318.4	25.58	10.1	0.74
5	2021-11-05	172.7	21.88	10.11	0.76
6	2021-11-06	185.64	17.33	10.02	0.76
7	2021-11-07	45.48	13.69	10.11	0.76
8	2021-11-08	247.4	10.88	10.17	0.76
9	2021-11-09	117.35	15	9.95	0.75
10	2021-11-10	102.46	16.35	9.93	0.76
11	2021-11-11	148.98	57.54	9.97	0.78
12	2021-11-12	49.94	82	10.09	0.81
13	2021-11-13	265.66	94.26	10.05	0.84
14	2021-11-14	259.22	48.81	10.12	0.82
15	2021-11-15	250.24	28.05	10	0.85



Site Specific wildlife Conservation Plan for Ostapal Chromite Mine of M/s Ferro Alloys Corporation Ltd



16	2021-11-16	162.37	19.76	9.89	0.84
17	2021-11-17	112.31	14.54	10.03	0.83
18	2021-11-18	125.7	11.49	10.11	0.83
19	2021-11-19	70.77	10.66	10.2	0.82
20	2021-11-20	162.65	16.66	10.28	0.81
21	2021-11-21	94.42	15.72	10.3	0.81
22	2021-11-22	163.68	12.73	10.29	0.8
23	2021-11-23	101.27	9.93	10.31	0.8
24	2021-11-24	106.35	7.65	10.31	0.79
25	2021-11-25	56.4	5.04	10.33	0.78
26	2021-11-26	48.73	38.46	10.13	0.74
27	2021-11-27	213.55	33.48	10.11	0.7
28	2021-11-28	65.21	20.55	10.14	0.7
29	2021-11-29	75.61	14.72	10.16	0.7
30	2021-11-30	146.59	11.48	10.23	0.69
31	Prescribed Standards	0 -	0 - 200	5.5 - 9	0 -
32	Maximum Value	318.4	94.26	10.33	0.85
33	Maximum Value At Time	2021-11-04	2021-11-13	2021-11-25	2021-11-15
34	Minimum Value	15.41	5.04	9.89	0.69
35	Minimum Value At Time	2021-11-03	2021-11-25	2021-11-16	2021-11-30
36	Geometric Mean	141.14	24.88	10.12	0.77
37	Median	135.79	16.99	10.11	0.77
38	Standard Deviation	76.53	20.87	0.12	0.05
39	Valid Data Points	30	30	30	30
40	Total Data Points	30	30	30	30
41	Data Availability %	100	100	100	100

Table 41 Online Pollution monitoring Portal of Ostapal Chromite Mines(1/11/21 to 30/11/21)



Site Specific wildlife Conservation Plan for Ostapal Chromite Mine of M/s Ferro Alloys Corporation Ltd



Online Pollution Monitoring Portal

Site Name: Ostapal Chromite Mines Of M/s. FACOR LTD

From Date: 2021/11/01 To Date: 2021/11/30

Report Name: Custom Report

Report Created by FerroAlloys on 2021-12-02 11:26:58

Sl No.	Time	EQMS_1_OUTLET-Chromium_U	EQMS_1_OUTLET-pH_U	EQMS_1_OUTLET-TSS_U	EQMS_1_OUTLET-Flow_U
1	2021-11-01	0.01	7.56	3.6	129.38
2	2021-11-02	0.01	7.53	3.61	191.46
3	2021-11-03	0.01	7.56	3.33	6.09
4	2021-11-04	0.01	7.59	3.38	202.96
5	2021-11-05	0.01	7.55	3.33	108.47
6	2021-11-06	0.01	7.52	3.31	190.02
7	2021-11-07	0.01	7.53	3.19	32.98
8	2021-11-08	0.01	7.55	3.2	214.05
9	2021-11-09	0.01	7.5	3.27	122.64
10	2021-11-10	0.01	7.51	4.16	103.89
11	2021-11-11	0.01	7.53	5.74	147.78
12	2021-11-12	0.01	7.57	6.35	48.02
13	2021-11-13	0	7.54	6.27	213.66
14	2021-11-14	0.01	7.57	5.63	195.29
15	2021-11-15	0.01	7.53	5.23	189.37
16	2021-11-16	0	7.53	5	124.08
17	2021-11-17	0.01	7.53	4.65	86.68
18	2021-11-18	0.01	7.5	4.39	107.2
19	2021-11-19	0.01	7.5	4.14	44.24
20	2021-11-20	0.01	7.51	3.96	157.17
21	2021-11-21	0.01	7.54	3.94	75.56
22	2021-11-22	0.01	7.48	3.86	166.97
23	2021-11-23	0.01	7.47	3.9	81.64
24	2021-11-24	0.01	7.48	3.23	86.49
25	2021-11-25	0.01	7.55	2.9	62.47
26	2021-11-26	0.01	7.55	3.92	45.91
27	2021-11-27	0.01	7.59	3.44	245.95
28	2021-11-28	0.01	7.63	3.17	72.51



Site Specific wildlife Conservation Plan for Ostapal Chromite Mine of M/s Ferro Alloys Corporation Ltd



29	2021-11-29	0.01	7.67	3.11	83.45
30	2021-11-30	0.01	7.71	3	166.63
31	Prescribed Standards	0 - 2	5.5 - 9	0 - 100	0 - 217
32	Maximum Value	0.01	7.71	6.35	245.95
33	Maximum Value At Time	2021-11-01	2021-11-30	2021-11-12	2021-11-27
34	Minimum Value	0	7.47	2.9	6.09
35	Minimum Value At Time	2021-11-13	2021-11-23	2021-11-25	2021-11-03
36	Geometric Mean	0.01	7.55	4.01	123.43
37	Median	0.01	7.54	3.74	115.56
38	Standard Deviation	0	0.05	0.98	63.58
39	Valid Data Points	30	30	30	30
40	Total Data Points	30	30	30	30
41	Data Availability %	100	100	100	100

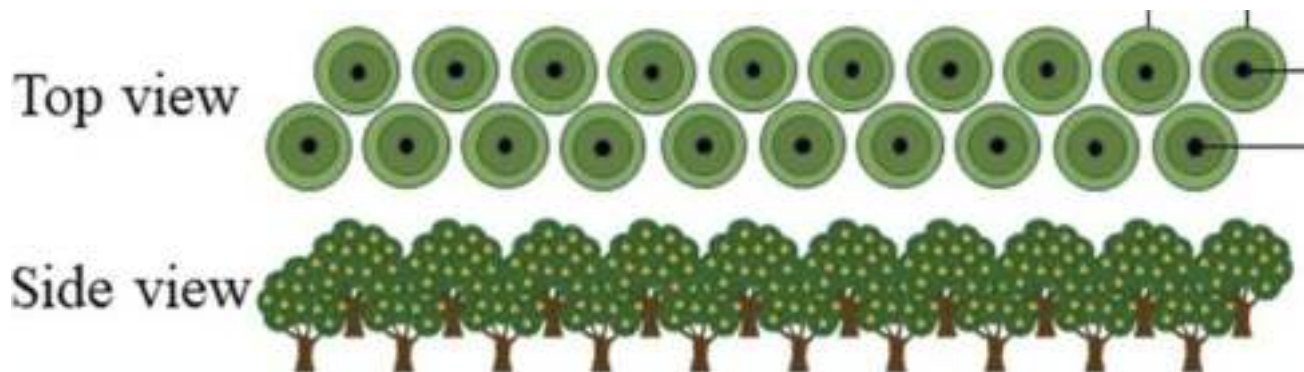
The ETP established within the ML area takes care of hexavalent Chromium and reduce it to trivalent chromium. The treated water is used for mining dust suppression and irrigation purpose. The residual treated water is being discharged to outside water bodies to Damsala Nala. As the water is treated and found pollutants within the prescribed Range, water contamination from this mine is negligible.

4.3 Adverse Impacts on Soil & Mitigation Measures:

The mining activities will disturb the land surface. After mining the area will be reclaimed. To check the soil erosion from dumps, planting of local tree species is being carried out. There is gap in between Row to Row and line to line (about 2m spacing). It is suggested to take up plantation on a staggered spacing as indicated below.



Site Specific wildlife Conservation Plan for Ostapal Chromite Mine of M/s Ferro Alloys Corporation Ltd



Besides staggered planting, rows of *Chrysopogon zizanioides* (bena) along the contour to be planted in double row (1/2m apart to filter the runoff and check soil erosion. It may be planted at a vertical interval of 5meter on dump surface.



PLANTATION ON DUMP



PLANTATION ON DUMP SLOPE





Due to accumulation of dusts containing heavy metals particles changes the behavior of soil. This can only be arrested / checked by more and more leaf litters decompose to humus. It is suggested to increase multitier tree planting along with fire control measures in nearby forests. Surplus water is being discharge to the Damala Nalla after proper treatment in ETP.

Adequate provisions will be made by the user agency to assist Forest staff in fire control measures. Mock drill on forest fire control, fire fighting and corresponding training will be organized by the User agency through subject experts every year in consultation with Forest staffs.

4.4 Adverse Impact on Flora & Suggestive Damage Control Measures:

Due to lot of mines in the area and planting activities by them, the tree covers though improved on Safety zone and other vacant land the mining excavation area has lost its green cover. Bio diversity of the area is at a degradation path.





Daitari DPF is one of the vital forest blocks coming within Cuttack Division and Keonjhar WL Division. The forest is being infested with “Alien Invasive Species (IAS)” and hindering with Natural Regeneration in the area. It is proposed to eradicate these “Alien Invasive Species (IAS)” like Eupatorium, Latena, Dinanath Grass etc by mechanical method. 50ha in Keonjhar WL Division and 50ha in Cuttack division are proposed in Daitari DPF.

4.5 Impact on Fauna & Impact Ameliorating Measures:

The fauna concentration is thin due to integral effect of all mining activities including transportation. The animal concentration is comparatively good towards north, North western side of Zone of Impact. It is proposed to improve habitat by extensive Soil & Moisture Conservation measures like Graded Contour Bond, sub soil dykes in nallas and renovating water body coming within Sukinda Range, Brahmanipal Range. For saving the ground flora, the fire protection measures like control burning of dry leaf litters, Fire line maintenance and provision for modern firefighting equipments will be provided at project cost.

4.6 Impact on Habitation & Human- Wildlife Conflict Damage Caused:

Man- animal conflict is experienced in Kamakshyanagar East Range and Sukinda Range to a greater extent. In order to reduce the conflict, it is proposed to provide additional man power (Squad Members) in Sukinda Range and in Kamashyanager East range in each Range. Elephant driving equipments are also to be provided to strengthen the damage control measures.

4.7 Identified Problems on Wildlife Management & Ameliorating Measures.

The forest functionaries are mainly facing problems due to erratic elephant movement in both Sukinda and Kamakshyanagar range. The Elephant corridors i.e. Maulabhanja- Jirdamali- Ananatpur is mostly disturbed due to fragmentation of habitat by National Highway 200 and Angul- Sukinda- Duburi Rail line under construction. Considering all aspects the following measures are suggested for implementation. In Keonjhar WL Division, the part of Daitari DPF / Rabana RF is disturbed due to Mining activities in Daitari Iron Ore Mines of OMC Ltd. Invasion by Alien species has hindered the natural regeneration in Daitari DPF. Fire is also a major concern. There is movement of elephant from Daitari DPF to Mahagiri DPF through Kansa across Tamka- Mangalpur MDR. All such important aspects need to be addressed in this plan to some extent.



4.7.1 Activities within Lease area:

a) The activities being implemented by user agency are

- I. Tree planting on Dump surface and both sides of haul Road,
- II. Retention walls along the dump outer line to check sliding of dump,
- III. Loose boulder check dams on garland drain to check silt from runoff water,
- IV. Channeling of water from Dump (Top bench / terrace) to ground level.
- V. Sprinkling of water on haul road and on vacant areas to suppress dusts.
- VI. Treating the Mine discharge through ETP and utilizing the treated water for dust suppression and other industrial purposes for protection of environment.

4.7.2 Interventions to be implemented within Lease area / by Lessee:

The following activities will be implemented by the Lessee during the Plan Period.

- I. Planting of trees on Dump surface on staggered manner.
- II. Planting of rows of *Vetiveria zizanioides* (bena) along the contour and to be planted in double row (1/2m apart to filter the runoff and check soil erosion. It is to be planted at a vertical interval of 5 meter on dump surface.
- III. User agency to assist Forest staff in fire control measures like Providing extra manpower at the time of fire extinguishing in near by locality, Providing mobility to Forest staff during fire season as and when required by Range Officer, Sukinda; Intimating forest staff about breakout of Fire if any within the area.
- IV. Mock drill on forest fire control, fire fighting and corresponding training will be organized by the User agency through subject experts every year in consultation with Forest staffs.
- V. Where ever plantations will be taken up not only tree species will be planted, other varieties i.e grasses, herbs, shrubs, climbers etc are also to be planted to maintain bio diversity of the area and maintain a ground flora.
- VI. As indicated in ToR, plantation in periphery and Gap (outside the Lease area as well as within Lease area will be planted with 4-6ft height seedlings with 90% survival ensured.
- VII. Project Proponent shall develop a good nursery in nearby village for production of saplings of 4-6ft height for planting in safety zone, side of external haulage roads and distribution among villagers for planting in their private land / community land.
- VIII. The proponent shall ensure to use organic fertilizer in the nursery.

Division wise interventions suggested are as follows.



Interventions to be implemented by Cuttack Division

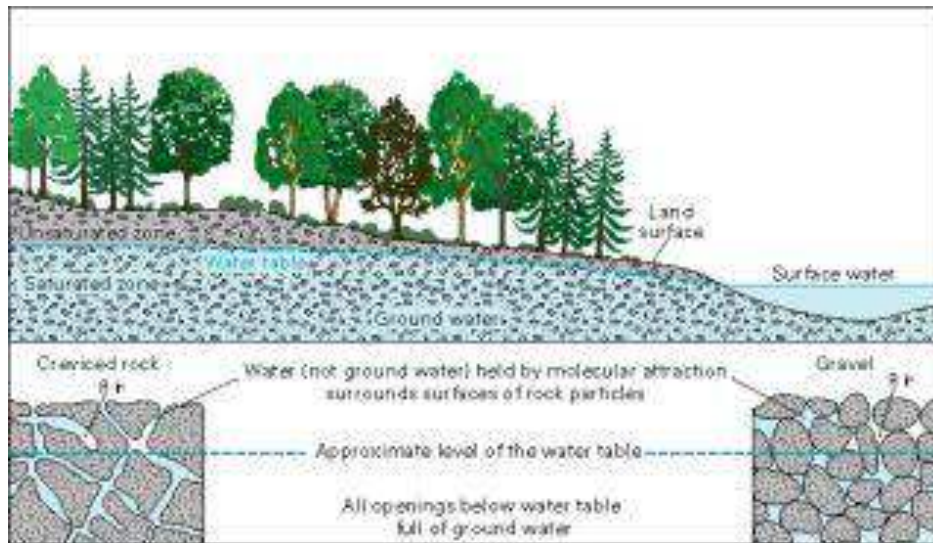
4.8 Improvement of Habitat:

(i) Eradication of Invasive Alien Species

Daitari DPF is one of the major forest blocks of Cuttack Division and having dense forest. Various wildlife are observed in the forests frequently. Due to invasion of weeds, unpalatable grasses and Eupatorium in open spaces all along the periphery of the forest block, establishment of natural regeneration and planted seedlings become difficult. In fire season, these weeds enhance the fire intensity. To keep the forest in a good status it is proposed to take up eradication of Invasive Alien Species over 20 ha. Each year uprooting of such weeds will be taken up thrice i.e. during monsoon, Post monsoon and pre monsoon in a year. This operation is required to be repeated for three years to make the area free from the weeds. All total $3 \times 3 = 9$ times uprooting will be taken up. For a cycle per ha 60 Man days will be required. Hence a sum of Rs 35.964 Lakh ($9 \times 20 \times 60 \times 333/-$) is proposed in this plan. During weed eradication process, the natural seedlings if encountered are to be taken care up for its establishment and subsequently it will suppress the weeds. Hence a sum of **Rs 35.964 Lakh** is provided in this plan.

(ii) Soil & Moisture Conservation:

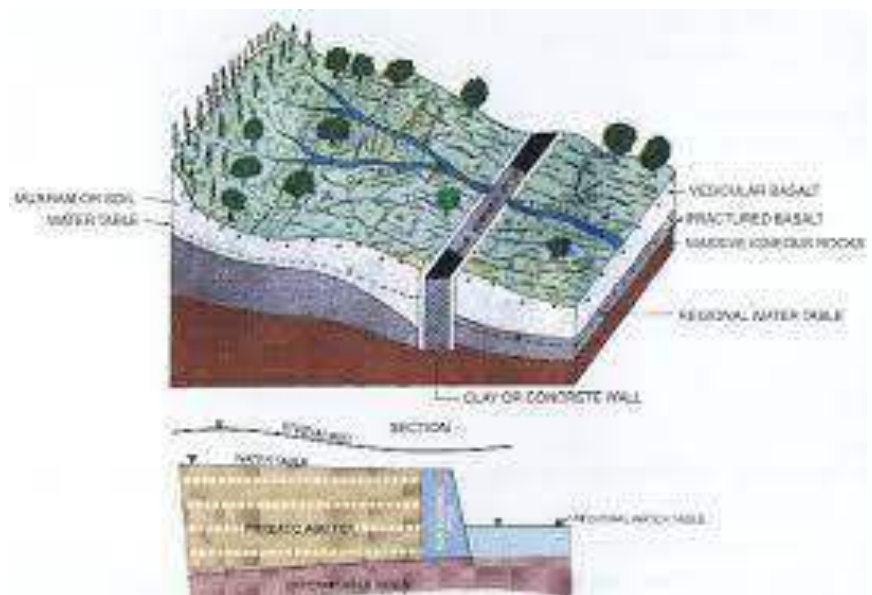
Due to water extraction in different mines of the locality (Sukinda Valley) the recharging of water table is hampered. In some mines water table has been punctured and water is being extracted. This has an effect on surrounding vegetation and luxuriance of vegetation is gradually reducing. Lower the ground water table, drier is the vegetation.



Considering the heavy dewatering in the locality as a whole (Integral Effect) it is proposed to take Moisture Conservation measures in the Zone of Impact specially the Daitari DPF.

(a) Construction of Subsurface Dyke:

A **subsurface dyke** is a structure that is built in an aquifer with the intention of obstructing the natural flow of ground water, thereby raising the ground water level and increasing the amount of water stored in the aquifer. Acting as an underground barrier impermeable to water, it controls the ground water flow in an aquifer and raises the water table.



Although the total amount of water on Earth is generally assumed to have remained virtually constant, the rapid growth in population, together with the extension of irrigated agriculture and industrial development, are putting stress on the quality and quantity aspects of natural system. Several institutions have experimented with the use of



subsurface dykes to conserve water in water-scarce areas. The ideal location for a dyke is a well defined, wide, greatly sloping valley with a narrow outlet having limited thickness of loose soil or porous rock on the top with massive or impervious rock below. A subsurface dyke has many advantages. It does not require additional surface reservoir, there is no loss of agricultural land, there is minimum evaporation loss since the storage is subsurface, there is no siltation and loss of reservoir capacity, the cost of maintenance is negligible, and it is relatively environment-friendly.

It is proposed to construct such subsurface dykes in rivulets / small seasonal nall. This dyke will be of 30cm width along the water course. The depth will be maintained at 3m. The length may vary depending upon width of the water course. For a normal nalla it may be taken as 10m. The total cubic content will be $10\text{m} \times 3\text{m} \times 0.25\text{m} = 7.5\text{cum}$. Considering difficult terrain and distributed work, a sum of Rs1.50 lakh per subsurface dyke is proposed. 10 such dyke will be constructed. Hence a sum of **Rs 15.00 lakh** is proposed in this plan.

(b) Graded bond (Contour bonding)

Contour bonding or called graded bond is defined as “Graded bunds or graded terraces or channel terraces are **the bunds or terraces laid along a pre-determined longitudinal grade very near the contour but not exactly along contour**”. Suitability: The graded bunds, commonly used in India are comparable to the narrow base terraces.





This type of bonding checks the flow of water across the contour and also retains water on shallow pits. It gives dual benefits to forest and ground water recharging. A sum of Rs 15.00 lakh per KM is proposed. During plan period 1.5km Graded bond will be taken up on available / degraded places. A sum of **Rs 22.50 lakh** is proposed.

(iii) Integrated Fire management:

a) Deployment of Fire Fighting Squad.

Under integrated fire management it is proposed to deploy one fire fighting squad having 5 persons and deployed for 5 months per year. For the plan period i.e. 5 years, a sum of **Rs 26.238 lakh** is provided as detailed below.

Sl no	Description	Rate	Amount	Total in Lakh Rs
1	Wages of Squad members	333/- per day	5x333x150x5	12.488
2	Hired Vehicle	30000/- per month for 5 month per year	30000x5x5	7.50
3	PoL cost	10000/- per month per 5 month per year	10000x5x5	2.50
4	Recharge of Mobile set	Rs 5000/- Per year	5000x5	0.25
5	Training of Squad members	Rs 15000/- per year	15000x5	0.75
6	Camp equipment Etc	Rs 75000/- per year	5 yr	3.75
		Total		27.238

Table 42 Fire fighting squad wage rate

b) Provisions for Control Burning:

Reduction of leaf litters on ground / forest floor is one of the most effective way of controlling forest fire. It is proposed to have control burning of leaf litters during early February which will reduce inflammable materials on forest floor and reduce fire hazard during April / may. It is proposed to provide Rs 1.00 lakh per year to take up control burning in Daitari DPF and Mahagiri DPF. For 5 years a sum of **Rs5.00 lakh** is provided in this plan.



(iv) Provisions for Anti depredation equipments / materials.

It is proposed to provide adequate anti depredation equipments to Sukinda and Dalijoda Range where elephant menace is noticed. A sum of Rs2.00 lakh per annum is provided. For five years **Rs10.00 lakh** is proposed in this plan. Equipments like search lights, mega phone arranging local driving manpower etc may be arranged from this head.

(v) Provisions for a Watch Tower:

It is proposed to construct a watch Tower in Daitari DPF at strategic location. A sum of **Rs 25.00 lakh** is provided in this Plan. It will enhance the process of Surveillance in the area.

(vi) Skill up gradation & Public awareness Camps:

Now a day VSS members are being associated in forest protection, wildlife driving operation, fire fighting in forests. For better result it is proposed to upgrade their skill on

- Understanding animal behavior and driving operation, Risk involved etc,
- Modern fire fighting techniques, Control burning and addressing emergency issues arising due to Forest fire.
- Silvicultural practices, Soil Moisture Conservations and need of Bio diversity conservation.

It is proposed to have skill up- gradation camp annually on different aspects. A sum of Rs 1.00 lakh is proposed for year. It will be conducted every year. For five camps a sum of **Rs 5.00 lakh** is provided in this plan.

4.8.1 Improvement of Avifauna habitat:

Due to various Mining activities lot of trees has been sacrificed in Sukinda valley. Due to loss of big old trees, the Avifauna has lost their natural host trees. It is proposed to improve avifauna habitat by fixing artificial nests in the habitations and sukinda valley.





(i) Fixing of Box nests:

It is proposed to fix Box nests of 20cmx25cmx 30cm with hipped roof in corridors of sukinda valley. It is proposed to fix 500 box nests @ Rs 2500/- per nest. Hence a provision of **Rs 12.50 lakh** is provided in this Plan.

(ii) Sparrows Conservation.

Due to rapid urbanization, the sparrows natural habitat i.e. thatched house has been replaced RCC Buildings. In order to conserve sparrows in Urban / Rural habitations, it is proposed to provide earthen nests for sparrows. A sum of **Rs 7.50 lakhs** is provided in this Plan for fixing 3000 sparrows' @Rs250/- per earthen nest in and around Mines area.



4.8.2 Providing alternate Livelihood support:

Due to mining activities many people have got Employment Avenue in the locality. Mining and transport sector are the main employment avenue directly and indirectly. The tribals depending upon forests have lost many NTFP on which they were depending upon. In order to provide alternate livelihood support, it is proposed to popularize the following trades.

- a) Bee keeping,
- b) Value addition to NTFP like Preparing "Triphala Churna", Leaf Plate / Paper plate making, Mush room cultivation,
- c) Prickle making from Forest based fruits / local fruits like Jack fruit, mango, Amla.



a) Bee Keeping:

It is proposed to fix 100 Bee Box in the periphery of the mines area. The modalities of bee keeping are as below.

Elephant menace is very acute in some villages. On interaction with the villagers / Bee Keepers it is observed that elephant kept away from villages after massive bee unit installed in the village. This was very effective. Due to lack in maintenance and supervision, bee units gradually became defunct.

It is proposed to provide 200 units in two villages @100 box unit per village).

A facilitator having good knowledge on bee keeping or a local youth after short training from “Krushi Vigyan Kendra (KVK)” will be engaged on part time basis for up keeping of bee units, extraction of honey till the villagers became accustomed with the process. This will be taken up on pilot project basis. On its success, bee fencing concept may be extended to other critically affected villages.

In this process, villagers will earn additional income and improve their economic condition.

The project cost is estimated for one village to be **Rs 7.00lakh** as detailed below.

Components of Bee Keeping & Cost projected						
Sl No	Description	Unit	Rate	Quantum	Amount in lakh Rs	Remark
1	Orientation meeting of villagers	No	15000/-	1	0.15	The KVK staffs / technicians will be consulted in implementing the project.
2	Honey Bee Boxes with Colonies (Apis Indica Cerena)	No	4500/-	100	4.50	
3	Honey Extractor Stainless Steel	No	5000/-	2	0.10	
4	Bee Veil, Smokers, Queen Excluder Sheets, Drone Traps, Swarm Nets and other accessories	IS		As required	0.50	
5	Providing management tips to beneficiary	No	15000/-	2	0.30	
6	Engaging Bee keeping Technician (Part time basis)	Month	2500/-	36	0.90	
7	Unforeseen				0.55	
	Total				7.00	

Table 43 Components of Bee keeping and Cost projected

For two villages a sum of **Rs 14.00 lakh** is proposed in this plan.



b) Value addition to NTFP:

NTFP collecting is gradually declining. Value addition to NTFP items will provide a good opportunity for alternate income. It is proposed to involve two SHG in the process. The trade will be decided on consultation with villagers / VSS. The trades preferred are Preparing “Triphala Churna”, Leaf Plate / Paper plate making, Mush room cultivation, Prickle making from Forest based fruits / local fruits like Jack fruit, mango, Amla etc. A sum of **Rs 10.00 lakh** is proposed in this Plan. All technical support including marketing will be assisted. If required one NGO / other organizations working in this field will be engaged to facilitate and implement this support.



**Site Specific wildlife Conservation Plan for Ostapal
Chromite Mine of M/s Ferro Alloys Corporation Ltd**



4A.1 Abstract of Interventions: (Cuttack Division)

Sl No	Description	Unit	Rate	Quantum	Amount in Lakh Rs	Remark
Improvement of Habitat:						
1	Eradication of Invasive Alien Species	ha	1.7982L	20	35.964	Daitari DPF
2	Construction of Subsurface Dyke	No	1.50	10	15.00	Daitari DPF
3	Graded bond (Contour bonding)	Km	15.00	1.50	22.50	
Integrated Fire management:						
4	Deployment of Fire Fighting Squad.	Unit	27.238	1	27.238	
5	Provisions for Control Burning:	Annual	1.00	5	5.00	
Improvement of Avifauna habitat:						
6	Fixing of wooden Box Nest	No	2500	500	12.50	Corridors of Sukinda valley
7	Sparrows Conservation Fixing of Earthen Nest	No	250/-	3000	7.50	In habitation.
Protection & Surveillance						
8	Provisions for Anti depredation equipments / materials.	Annual	2.00	5	10.00	
9	Providing a Watch Tower	No	25.00	1	25.00	Daitari DPF
10	Skill up gradation & Public awareness Camps	Annual	1.00	5	5.00	One camp every year
11	Providing alternate Livelihood support:					
a	Bee Keeping:	unit	7.00 L	2	14.00	1 unit= 100 bee box
b	Value addition to NTFP	SHG	5.00 L	2	10.00	Trade to be finalized on consultation
	S Total				189.702	
	Add 20% for cost escalation				37.940	
	Total				227.642	

Table 44 Abstract of Intervention of Cuttack Division

(Rupees Two Crores twenty Seven Lakh & Sixty Four Thousand & Two hundred only)



Interventions to be implemented by Dhenkanal Division

4B.1 Habitat Improvement:

(i) Provision for Water Harvesting Structure:

It is proposed to have a Water Harvesting Structure with Sub Soil Dyke near Baradakote to provide water to animals. A sum of **Rs 10.00 lakh** is proposed in this plan accordingly.

4B.2 Protection & Surveillance:

(i) Deployment of additional Man Power:

The Ranjagarh Reserved Forest Compartment No 23,24,25 and 26 are quite vulnerable to wildlife protection issues. Movement of elephant and other animals are quite prevalent. In order to provide a protection to wildlife in this area additional manpower (Protection Squad) is required to be deployed at Baradakot (Beat Head Quarters). They will be paid @ Rs13272/- PM. Hence a sum of **Rs 39.816 lakh** ($5 \times 0.13272 \times 60$) is provided in this plan.

(ii) Providing infrastructure facility:

There three beats i.e. Baradakot, Ekul and Kandha in Kamakshyanagar East Range which are very remote and have no minimum facilities to accommodate the manpower provided above. It is proposed to have water facilities, Solar light and other accessories to facilitate patrolling by the additional manpower.

a) Providing Fire watch Tower (Pre-Fabricated);

It is proposed to provide a Fire Watch Tower at Baradakote to keep a round clock watch over the fire menace. A sum of **Rs 20.00 lakh** is proposed in this Plan accordingly.

b) Improvement of communication:

Baradakote is a remote area and not assessable over mobile net work always. For a better communication it is proposed to have a VHF Tower (80') hight at Kamakdhyanagar East Range hqs. A sum of **Rs 3.50 lakh** is provided for the purpose in this Plan.

c) Sinking of tubewells with all fittings:

It is proposed to sink three tube wells with pumping system (on solar energy). A sum of **Rs 12.00 lakh** is provided @ Rs 4.00 lakhs per tube well. It will be at above three beats i.e. Baradakot, Ekul and Kandha.



d) Solar Lighting arrangements:

It is proposed to provide solar lighting system at three beat head quarters i.e. . Baradakot, Ekul and Kandha. A sum of **Rs 7.50 lakh** is proposed @ Rs2.50 lakh per site.

e) Other accessories:

It is proposed to provide minimum accessories to facilitate patrolling in the locality. A sum of **Rs1.00 lakh** is provided in this plan.

f) VHF Repeater Set:

It is proposed to provide one VHF repeater Set (Purchase of Repeater machine) to be provided at Birasal Section. A sum of **Rs 2.00 lakh** is provided in this Plan.

g) Maintenance of Inspection path:

The inspection path from Kandhar to Baradakote is required to be maintained every year. It is proposed to provide Rs 5.00 lakh for maintenance of inspection Path @Rs1.00 lakh per year. Hence a sum of **Rs 5.00 lakh** is provided in this Plan.

(iii) Providing Wild animal driving / Rescue accessories:

Elephant driving accessories like search light, net, Rope, ladders etc will be provided to facilitate at a cost of Rs 1.00 Lakh per year. Hence a sum of **Rs 5.00 Lakh** is provided in this plan.



4B.1 Abstract of interventions (Dhenkanal Division)

Sl No	Description	Unit	Rate	Quantum	Amount in Lakh Rs	Remark
A	Improvement of habitat					
1	Constriction of WHS (With Sub Soil Dyke)	No	10.00	1	10.00	At Baradakote
B	Protection & Surveillance:					
2	Deployment of additional Man Power	No	13556.43/- PM	5*60	40.669	To be stationed at Baradakot
C	Infrastructure facilities:					
a	Providing Fire watch Tower (Pre-Fabricated);	No	20.00L	1	20.00	Baradakote
b	Instalation of VHF Tower.	No	3.50 L	1	3.50	Kamakshyanagar East Range Hqs.
c	Sinking of tubewells with all fittings:	No	4.00	3	12.00	Baradakot, Ekul and Kandha
d	Solar Lighting arrangements	No	2.50L	3	7.50	
e	Other accessories	LS			1.00	
f	Providing VHF Repeater Set	No	2.00L	1	2.00	To be fixed at Birasal
g	Maintenance of Inspection path:	Annum	1.00L	5	5.00	from Kandhar to Baradakote(Apprx. 6km)
3	Providing Wild Animal driving / Rescue accessories	Annual	1.0L	5	5.00	
	S Total				106.669	
	Add 20% for cost escalation				21.334	
	Total				128.003	

Table 45 Abstract of Intervention (Dhenkanal Division)



(Rupees One Crore Twenty Eoght Lakh & Three Hundred Only)

Interventions to be implemented by Keonjhar Wildlife Division

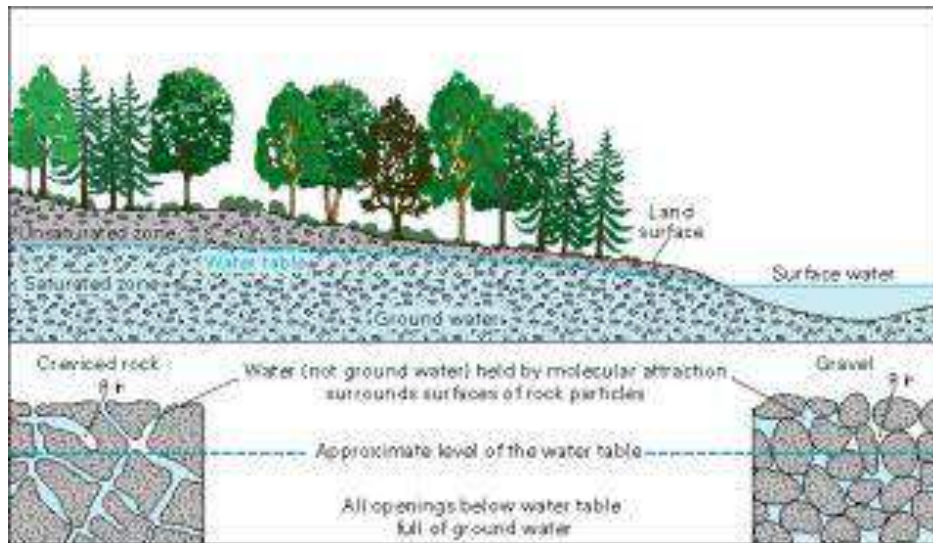
4C .1 Improvement of Habitat:

(i) Eradication of Invasive Alien Species

Rabana RF is one of the major forest blocks of Keonjhar Wildlife Division adjacent to Jajpur District and having dense forest. Various wildlifes are observed in the forests frequently. Due to invasion of weeds, un- palatable grasses and Eupatorium in open spaces all along the periphery of the forest block, establishment of natural regeneration and planted seedlings become difficult. In fire season, these weeds enhance the fire intensity. To keep the forest in a good status it is proposed to take up eradication of Invasive Alien Species over 20 ha. Each year uprooting of such weeds will be taken up thrice i.e. during monsoon, Post monsoon and pre monsoon in a year. This operation is required to be repeated for three years the make the area free from the weeds. All total $3 \times 3 = 9$ times uprooting will be taken up. For a cycle per ha 60 Man days will be required. Hence a sum of **Rs 35.208 Lakh** ($9 \times 20 \times 60 \times 333/-$) is proposed in this plan. During weed eradication process, the natural seedlings if encountered are to be taken care up for its establishment and subsequently it will suppress the weeds. Hence a sum of **Rs 35.964 Lakh** is provided in this plan.

(ii) Soil & Moisture Conservation:

Due to water extraction in different mines of the locality (Sukinda Valley and Daitari Iron Ore Mines of OMC Ltd) the recharging of water table is hampered. In some mines water table has been punctured and water is being extracted. This has an effect on surrounding vegetation and luxuriance of vegetation is gradually reducing. Lower the ground water table, drier is the vegetation.

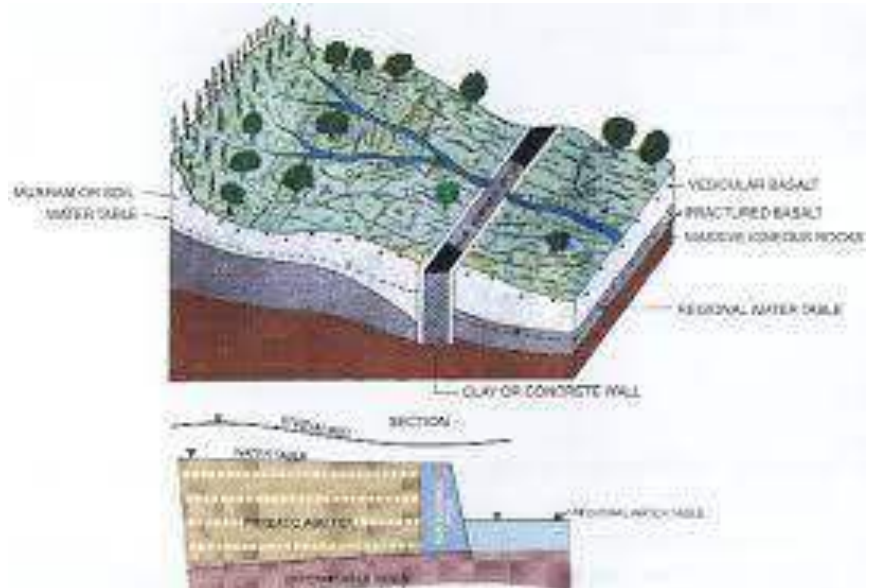


Considering the heavy dewatering in the locality as a whole (Integral Effect) it is proposed to take Moisture Conservation measures in the Zone of Impact specially the Rabana RF.

a) Construction of Subsurface Dyke:

A **subsurface dyke** is a structure that is built in an aquifer with the intention of obstructing the natural flow of ground water, thereby raising the ground water level and increasing the amount of water stored in the aquifer. Acting as an underground barrier impermeable to water, it controls the ground water flow in an aquifer and raises the water table.

Although the total amount of water on Earth is generally assumed to have remained virtually constant, the rapid growth in population, together with the extension of irrigated agriculture and industrial development, are putting stress on the quality and quantity aspects of natural system. Several institutions have experimented with the use of subsurface dykes to conserve water in water-scarce areas.





The ideal location for a dyke is a well defined, wide, greatly sloping valley with a narrow outlet having limited thickness of loose soil or porous rock on the top with massive or impervious rock below. A subsurface dyke has many advantages. It does not require additional surface reservoir, there is no loss of agricultural land, there is minimum evaporation loss since the storage is subsurface, there is no siltation and loss of reservoir capacity, the cost of maintenance is negligible, and it is relatively environment-friendly.

It is proposed to construct such subsurface dykes in rivulets / small seasonal nall. This dyke will be of 25cm width along the water course. The depth will be maintained at 3m. The length may vary depending upon width of the water course. For a normal nalla it may be taken as 10m. The total cubic content will be $10\text{m} \times 3\text{m} \times 0.25\text{m} = 7.50\text{cum}$. Considering difficult terrain and distributed work, a sum of Rs1.50 lakh per subsurface dyke is proposed. 15 such dyke will be constructed. Hence a sum of Rs 22.50 lakh is proposed in this plan.

(b) Graded bond (Contour bonding)

Contour bonding or called graded bond is defined as “Graded bunds or graded terraces or channel terraces are **the bunds or terraces laid along a pre-determined longitudinal grade very near the contour but not exactly along contour**”. Suitability: The graded bunds, commonly used in India are comparable to the narrow base terraces.



This type of bonding checks the flow of water across the contour and also retains water on shallow pits. It gives dual benefits to forest and ground water recharging. A sum of Rs15.00



lakh per KM is proposed. During plan period 1.50km Graded bond will be taken up on available / degraded places. A sum of **Rs 22.50 lakh** is proposed.

4C.2 Protection & Surveillance:

(i) Providing one Protection Camp:

It is proposed to provide one Staff barrack (Protection Shed) near to Dhenkanal Division / Keonjhar WL division interface to provide accommodation to Additional Man Power to be deployed for protection of Tiger in the locality. A sum of **Rs 25.00 lakh** is provided in this plan. The staff barrak with Solar lighting arrangements and minimum logistic support to accommodate additional manpower / staff/ officers on duty.

(ii) Additional manpower:

It is proposed to have a protection camp at the above site. Three Additional Man Powers is to be deployed at the site on daily wage basis @ Rs 13556.43/- Per Month. Hence for 3 persons for plan period i.e. 60 m the wage component comes to Rs 24.402 Lakh.

For other assesories a provision of **Rs 2.50 lakh** @ Rs0.50 lakh per year is provided.

4C.1 Public support:

In order to mobilize public support for cause of Wildlife, it is proposed to provide street light in five villages @ 4 lights in each village. A sum of Rs 6.00 lakh is provided @ Rs 0.30 lakh per light for 20 lights.



4C.2 Abstract of Interventions (Keonjhar Wildlife Division)

Sl No	Description	Unit	Rate in Lakh Rs	Quantum	Amount in Lakh Rs	Remark
Improvement of Habitat:						
1	Eradication of Invasive Alien Species	ha	1.7604 L	20	35.964	Rebana RF
2	Construction of Subsurface Dyke	No	1.50	15	22.50	
3	Graded bond (Contour bonding)	Km	15.00	1.50	22.50	
Protection & Surveillance						
4	Providing one Protection Camp (Staff Barrack) with solar light & logistic support	No	25.00	1	25.00	Dhenkanla / Keonjhar WL Divi. Interface Near Rabana RF
5 a	Deployment of additional man Power.	No	Rs13556 .43 PM	3*60 m	24.402	
5b	Providing other assesories	Annual	0.50L	5	2.50	
Mobilization of Public support						
4	Fixation of Street Solar light	No	0.30L	20	6.00	In five villages @4 lights per village
	S Total				138.866	
	Add 20% for cost escalation				27.773	
	Total				166.639	

Table 46 Abstract of Intervention (Keonjhar WL Division)

(Rupees One Crore Sixty Six Lakh Sixty Three Thousand & Nine Hundred Only)



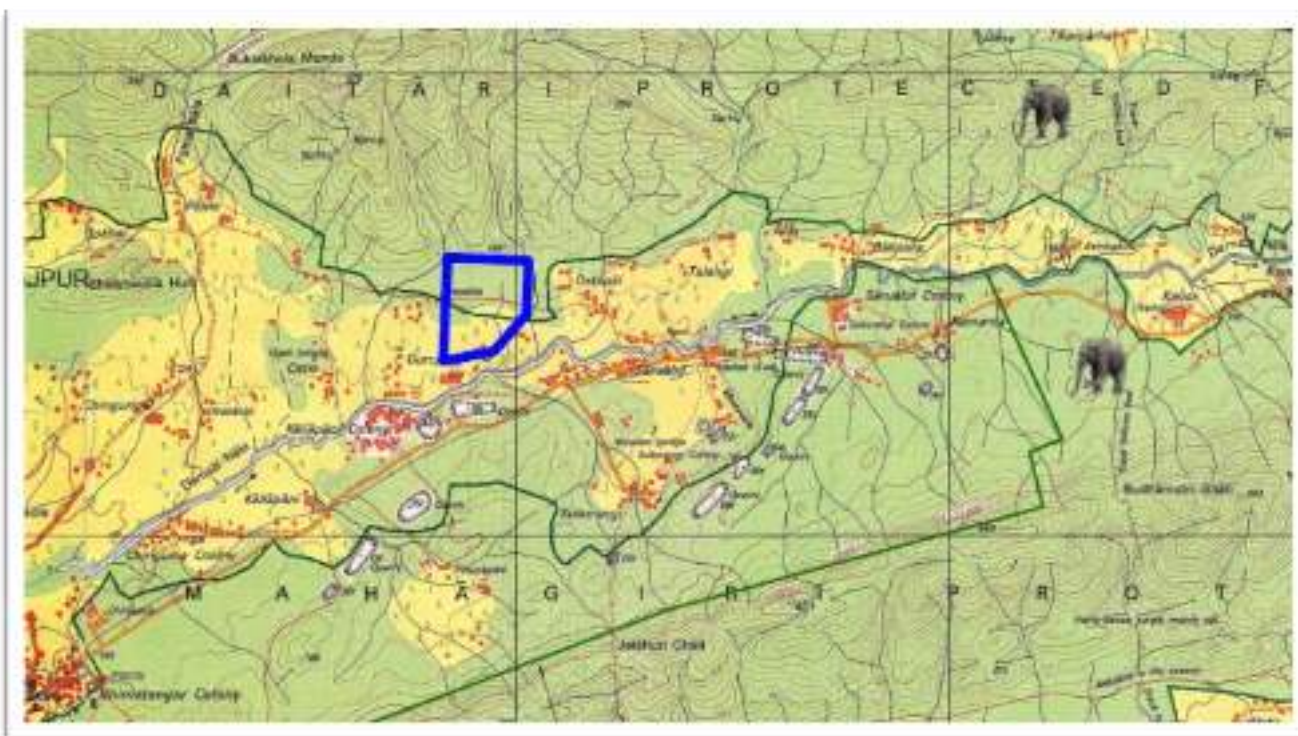


CHAPTER-V

ANIMAL PASSAGE PLAN

5.0 Animal Passage Plan:

The project is non linear in shape. The location of the Project is not coming within the Elephant movement path. No passage Plan is suggested.





CHAPTER-VI

FINANCIAL IMPLICATIONS & MONITORING





CHAPTER-VI

Financial Implications & Monitoring

6.0 Summary of Mitigation Measures:

A. Mitigative Measures By User Agency:

The following activities will be implemented by the Lessee during the Plan Period.

- I. Planting of trees on Dump surface on staggered manner.
- II. Planting of rows of *Vetiveria zizanioides* (bena) along the contour and to be planted in double row (1/2m apart to filter the runoff and check soil erosion. It is to be planted at a vertical interval of 5meter on dump surface.
- III. User agency to assist Forest staff in fire control measures like Providing extra manpower at the time of fire extinguishing in near by locality, Providing mobility to Forest staff during fire season as and when required by Range Officer, Sukinda; Intimating forest staff about breakout of Fire if any within the area.
- IV. Mock drill on forest fire control, fire fighting and corresponding training will be organized by the User agency through subject experts every year in consultation with Forest staffs.
- V. Where ever plantations will be taken up not only tree species will be planted, other varieties i.e grasses, herbs, shrubs, climbers etc are also to be planted to maintain bio diversity of the area and maintain a ground flora.
- VI. As indicated in ToR, plantation in periphery and Gap (outside the Lease area as well as within Lease area will be planted with 4-6ft height seedlings with 90% survival ensured.
- VII. Project Proponent shall develop a good nursery in nearby village for production of saplings of 4-6ft height for planting in safety zone, side of external haulage roads and distribution among villagers for planting in their private land / community land.
- VIII. The proponent shall ensure to use organic fertilizer in the nursery.

B. Mitigative Measures by Forest Department:

The forest department will take up following activities.



- i. Eradication of Invasive Alien Species from Daitari DPF, Rabana RF to secured natural regeneration and reduces fire hazards.
- ii. Intensive soil & Moisture Conservation measures like construction of Subsurface dyke on nalla, Graded bonds in order to improve ground water recharge and corresponding luxuriant vegetation.
- iii. Integrated Forest Fire Management by deployment of Fire fighting squad, reducing fire intensity by early control burning,.
- iv. Deployment of additional man power to assist the staffs in forest & Wildlife protection
- v. Infrastructure facility development to improve patrolling / protection.
- vi. Skill upgradation of VSS / Staff for better handling of Fire menace, Human-wildlife conflict.
- vii. Fixing street solar light as a good partnership attitude of department towards interior villages.



6.1 Abstract of Financial Implications (Cuttack Division)

The interventions those will be implemented by Cuttack division is furnished below.

Abstract of Interventions (Cuttack Division)					
Sl No	Description	Unit	Rate	Quantum	Amount in Lakh Rs
Improvement of Habitat:					
1	Eradication of Invasive Alien Species	ha	1.79821	20	35.964
2	Construction of Subsurface Dyke	No	1.7604	10	17.604
3	Graded bond (Contour bonding)	Km	15.00	1.50	22.50
Integrated Fire management:					
4	Deployment of Fire Fighting Squad	Unit	27.238	1	27.238
5	Provisions for Control Burning:	Annual	26.975	5	134.875
Improvement of Avifauna habitat:					
6	Fixing of wooden Box Nest	No	2500	500	12.50
7	Sparrows Conservation Earthen Nest	No	250/-	3000	7.50
Protection & Surveillance					
8	Provisions for Anti depredation equipments / materials.	Annual	2.00	5	10.00
9	Providing a Watch Tower	No	25.00	1	25.00
10	Skill up gradation & Public awareness Camps	Annual	1.00	5	5.00
11	Providing alternate Livelihood support:				
a	Bee Keeping:	unit	7.00 L	2	14.00
b	Value addition to NTFP	SHG	5.00 L	2	10.00
	S Total				188.683
	Add 20% for cost escalation				37.737
	Total				226.420

Table 4.7.7 Abstract of interventions of Cuttack Division

(Rupees Two Crores twenty Six Lakh Forty Two Thousand only)

(Rupees Two Crores twenty Seven Lakh + Sixty Four Thousand + Two Hundred only)

Head-Environment
Ostapal Chromite Mine
M/s FACOR Ltd

[Signature]

Divisional Forest Officer
Cuttack Forest Division

6.1.1 Physical & Financial Flow Chart: (Cuttack Division)

6.1.1A Physical Flow Chart:

Sl no	Interventions	Target	Year				
			1st	2 nd	3rd	4th	5th
1	Eradication of Invasive Alien Species	20ha	10	5	5		
2	Construction of Subsurface Dyke	10no	5	5			
3	Graded bond (Contour bonding)	1.50km	1.5				
4	Deployment of Fire Fighting Squad.	1unit	unit	unit	unit	unit	unit
5	Provisions for Control Burning:	5 yr	1	1	1	1	1
6	Fixing of wooden Box Nest	500	250	250			
7	Sparrows Conservation Fixing of Earthen Nest	3000	1000	1000	1000		
8	Provisions for Anti depredation equipments / materials..	5yr	1	1	1	1	1
9	Providing a Watch Tower	1	1				
10	Skill up gradation & Public awareness Camps	5 camps	1	1	1	1	1
11	Providing alternate Livelyhood support:						
a	Bee Keeping:	2 unit	1	1			
b	Value addition to NTFP	2 SHG	1	1			

Table 48 Physical flow chart (Cuttack Division)

6.1.1 B Financial Flow Chart:



Site Specific wildlife Conservation Plan for Ostapal Chromite Mine of M/s Ferro Alloys Corporation Ltd



Sl no	Interventions	Target	Year				
			1st	2 nd	3rd	4th	5th
1	Eradication of Invasive Alien Species	35.208	17.604	8.802	8.802		
2	Construction of Subsurface Dyke	15.00	7.5	7.5			
3	Graded bond (Contour bonding)	22.50	22.5				
4	Deployment of Fire Fighting Squad.	26.975	5.395	5.395	5.395	5.395	5.395
5	Provisions for Control Burning:	5.00	1.00	1.00	1.00	1.00	1.00
6	Fixing of wooden Box Nest	12.50	6.25	6.25			
7	Sparrows Conservation Fixing of Earthen Nest	7.50	2.50	2.50	2.50		
8	Provisions for Anti depredation equipments / materials.	10.00	2.00	2.00	2.00	2.00	2.00
9	Providing a Watch Tower	25.00	25.00				
10	Skill up gradation & Public awareness Camps	5.00	1.00	1.00	1.00	1.00	1.00
a	Bee Keeping:	14.00	7.00	7.00			
b	Value addition to NTFP	10.00	5.00	5.00			
	S.Total	188.683	102.749	46.447	20.697	9.395	9.395
	Add 20% Esc	37.737	20.550	9.289	4.139	1.879	1.879
	G.Total	226.420	123.299	55.736	24.836	11.274	11.274

Table 49 Financial flow chart (Cuttack Division)

6.2 Abstract of interventions (Dhenkanal Division.)

Sl No	Description	Unit	Rate	Quantum	Amount in Lakh Rs	Remark
A	Improvement of habitat					
1	Constriction of WHS (With Sub Soil Dyke)	No	10.00	1	10.00	At Baradakote
B	Protection & Surveillance:					
2	Deployment of additional Man Power	No	19556.431 (13272) PM	5*60	40.669 39.816	To be stationed at Baradakot
C	Infrastructure facilities:					
3a	Providing Fire watch Tower (Pre-Fabricated);	No	20.00L	1	20.00	Baradakote
3b	Instalation of VHF Tower.	No	3.50 L	1	3.50	Kamakshyanagar East Range Hqs.
3c	Sinking of tubewells with all fittings:	No	4.00	3	12.00	Baradakot, Ekul and Kandha
3d	Solar Lighting arrangements	No	2.50L	3	7.50	
3e	Other accessories	LS			1.00	
3f	Providing VHF Repeater Set	No	2.00L	1	2.00	To be fixed at Birasal
3g	Maintenance of Inspection path:	Annum	1.00L	5	5.00	from Kandhar to Baradakote(Apprx. 5km)
4	Providing Wild Animal driving / Rescue accessories	Annual	1.0L	5	5.00	
	S Total				405.816	106.669
	Add 20% for cost escalation				21.164	21.934
	Total				126.980	128.003

Table 48 Abstract of Intervention (Dhenkanal Division)

(Rupees One Crore Twenty Six Lakh & Ninety Eight Thousand Only)

(Rupees One Crore Twenty Eight Lakh 4 Three hundred only)

Head-Environment
Ostapal Chhramite Mine
M/s FACOR Ltd

Chief Forest Officer
Dhenkanal Division



6.2.1 Physical & Financial Flow Chart (Dhenkanal Division)

6.2.1A Physical Flow Chart:

SI No	Intervention	Target	Year				
			1st	2 nd	3rd	4th	5th
1	Constriction of WHS (With Sub Soil Dyke)	1	1				
2	Deployment of additional Man Power	5*60no	5*12	5*12	5*12	5*12	5*12
3	Infrastructure facilities:						
a	Providing Fire watch Tower (Pre-Fabricated);	1	1				
b	Instalation of VHF Tower.	1	1				
c	Sinking of Tube well With Solar pumping arrangements	3no	3				
d	Solar Lighting arrangements	3no	3				
e	Other accessories	LS	LS				
f	Providing VHF Repeater Set	1					
g	Maintenance of Inspection path:						
3	Anti depredation equipment	5yr	1	1	1	1	1

Table 50 Physical flow chart (Dhenkanal Division)

6.2.1B Financial Flow Chart:

SI No	Intervention	Target	Year				
			1st	2 nd	3rd	4th	5th
1	Constriction of WHS (With Sub Soil Dyke)	10.0	10.0				
2	Deployment of additional Man Power	39.816	7.9632	7.9632	7.9632	7.9632	7.9632
3	Infrastructure facilities:						
a	Providing Fire watch Tower (Pre-Fabricated);	20.0	20.0				
b	Instalation of VHF Tower.	3.50	3.50				
c	Sinking of Tube well With Solar pumping arrangements	12.00	12.00				
d	Solar Lighting arrangements	7.50	7.50				
e	Other accessories	1.00	1.00				
f	Providing VHF Repeater Set	2.00	2.00				
g	Maintenance of Inspection path:	5.00	1.00	1.00	1.00	1.00	1.00
3	Anti depredation equipment	5.00	1.0	1.0	1.0	1.0	1.0
	S.total	105.816	65.9632	9.9632	9.9632	9.9632	9.9632
	Add 20% Esc	21.164	13.194	1.993	1.993	1.993	1.993
	G.Total	126.980	79.157	11.956	11.956	11.956	11.956

Table 51 Financial Flow chart



6.3 Abstract of interventions (Keonjhar Wildlife Division)

Abstract of interventions (Keonjhar Wildlife Division)

Sl No	Description	Unit	Rate in Lakh Rs	Quantum	Amount in Lakh Rs	Remark
Improvement of Habitat:						
1	Eradication of Invasive Alien Species	ha	1.7982L (1.7604)	20	35.964 (35.208)	Rebana RF
2	Construction of Subsurface Dyke	No	1.50	15	22.50	
3	Graded bond (Contour bonding)	Km	15.00	1.50	22.50	
Protection & Surveillance						
4	Providing one Protection Camp (Staff Barrack)	No	25.00	1	25.00	Dhenkanla / Keonjhar WL Divi.
5 a	Deployment of additional man Power.	No	Rs. (327) /- PM	3*60 m	24.402 (23.890)	Interface Near Rabana RF
5b	Providing other assesories	Annual	0.50L	5	2.50	
Mobilization of Public support						
6	Fixation of Street Solar light	No	0.30L	20	6.00	In five villages
	S Total				(137.598)	138.866
	Add 20% for cost escalation				(27.520)	27.773
	Total				(165.118)	166.639

(Rupees One Crore Sixty Five Lakh Eleven Thousand and Eight Hundred Only)

(Rupees One Crore Sixty Six Lakh + Sixty Three Thousand Nine hundred only)

Head-Environment
Ostapal Chromite Mine
M/s FACOR Ltd

Divisional Forest Officer
Keonjhar (WL) Division
Anandapur



6.3.1 Physical & Financial Flow Chart: (Keonjhar WL Division)

6.3.1A Physical Flow Chart:

Sl No	Intervention	Target	Year				
			1st	2 nd	3rd	4th	5th
1	Eradication of Invasive Alien Species	20ha	10	5	5		
2	Construction of Subsurface Dyke	15no	10	5			
3	Graded bond (Contour bonding)	1.5km	1.5				
4	Providing one Protection Camp (Staff Barrack)	1 no	1				
5 a	Deployment of additional man Power.	3 *60m	3*12	3*12	3*12	3*12	3*12
5b	Providing other assesories	Annual					
6	Fixation of Street Solar light	20no	10	10			

Table 52 Physical flow chart

6.3.1B Financial Flow Chart:

Sl No	Intervention	Target	Year				
			1st	2 nd	3rd	4th	5th
1	Eradication of Invasive Alien Species	35.208	17.604	8.802	8.802		
2	Construction of Subsurface Dyke	22.50	15.00	7.50			
3	Graded bond (Contour bonding)	22.50	22.50				
4	Providing one Protection Camp (Staff Barrack)	25.00	25.00				
5 a	Deployment of additional man Power.	23.890	4.778	4.778	4.778	4.778	4.778
5b	Providing other assesories	2.50	0.50	0.50	0.50	0.50	0.50
6	Fixation of Street Solar light	6.00	3.00	3.00			
	S Total	137.598	88.382	24.58	14.08	5.278	5.278
	Add 20% for cost escalation	27.520	17.676	4.916	2.816	1.056	1.056
	Total	165.118	106.058	29.496	16.896	6.334	6.334

Table 53 Financial flow chart



6.4 Plan Period:

This plan is valid for 5 years i.e. from 2022-23 to 2026-27. Another plan will be prepared one year prior to expiry of this plan, if such necessity is felt by the Chief Wildlife Warden. An undertaking to this effect is at Annexure-XIII

6.5 Monitoring & Evaluation:

The project implementation will be monitored by a committee headed by Regional Chief Conservator of Forests, Angul Circle. The members of the Committee are the DFO, Cuttack Division, DFO, Dhenkanal Division and DFO, Keonjhar WL Division. The Asst. Conservator of Forests, Cuttack Division will act as member conveyor.

6.6 Interim Review & Revision of the Plan:

The Plan may be reviewed periodically and effectiveness of plan prescription may be evaluated. If required it may be modified after 3 year of implementation.

6.7 Projected Plan Cost:

The cumulative Plan Cost is projected at Rs 518.518 lakh as detailed below.

Sl No	Executive Agency	Amount in lakh Rs
1	Forest Department	
a	Cuttack Division	226.420 227.642
b	Dhenkanal Division	126.98 128.003
c	Keonjhar WL Division	165.118 166.639
	Total	518.518 522.284

Table 54 Project Plan Cost

Principal Chief Conservator of Forests (Wildlife) & Chief Wildlife Warden Odisha, Bhubaneswar

(Rupees Five Crore Eighteen Lakh Fifty One Thousand & Eight Hundred Only)

(Rupees Five Crore Twenty Two Lakh Twenty Eight Thousand & Four hundred only) *

6.8 Executing Agency:

Above interventions described will be implemented by Cuttack Division, Dhenkanal Division and Keonjhar WL Forest Division.

Approved

The Principal C.C.F. (Wildlife) & CWLY, Odisha, Bhubaneswar

Head-Environment
Ostapal Chromite Mine
M/s FACOR Ltd

* Revision done consequent to enhancement of minimum wages before of this approval of scheme

Principal Chief Conservator of Forests (Wildlife) & Chief Wildlife Warden Odisha, Bhubaneswar



CHAPTER-VII ANNEXURE





CHAPTER-VII

Annexure

In the text many documents has been referred to substantiate the data & figures. These are appended here for reference.

To pin point the location maps / plates have been prepared and given as plates. The lists of such plates are given here for reference.

A. Documents

Sl No	Details of annexure	Annexure No	No of Pages
1	ToR (Terms of Reference) for preparation of EIA/ EMP Report as per EIA Notification 2006 vide letter no 3883/SEIAA dated 28.01.2022.	I	12
2	The copy of the Report Part-I (Form B) i.e. Application online for Environment Clearance	II	11
3	The land Schedule attached to the Lease deed	III	3
4	Order no vide F.No-8-86/1996-FC (Vol-II) dated 07.02.2006	IV	2
5	EC Identification no EC228001OR120821 of MoEF&CC, dated 4 th April,2022	V	20
6	Details of Land use pattern (Add. ZOI)	VI	2
7	Demographic profile of Zone of Impact & additional Zone of Impact	VII	2
8	DFO, Cuttack has also provided the list of Flora & fauna observed in Sukinda valley vide his letter No 6740/5F (Forest diversion) 235/2021 dated 23.09.2021	VIII	11
9	Last quarter AAQ Report for September 2021 quarters	IX	3
10	The noise level for quarter ending September,2021	X	1
11	Study Report on impacts of Mining on Wildlife & Environment.	XI	15
12	The ETP Analysis Report (inlet & outlet)	XII	4
13	Undertaking	XIII	1

B. Maps / Plates.

Sl. No.	Maps	Plate no.
1	Location Map, Zone of Impact, Additional Zone of Impact and wildlife movement path (1:50000 Scale)	Plate-I
2	Map showing the distance of NP/ WLS/ PA from the Project	Plate-II



*Site Specific wildlife Conservation Plan for Ostapal
Chromite Mine of M/s Ferro Alloys Corporation Ltd*



3

Map showing the Other Mines within the Zone of Impact

Plate-III



**State Environment Impact Assessment Authority, (SEIAA),
Odisha**

Qr. No. 5RF-2/1, Unit – IX, Bhubaneswar – 751022, Tel: 0674-2540669

No. 3883/SEIAA

Dt. 28.04.2022

SEIAA File No. SIA/OR/MIN/66461/2021

To

Sri Biswanath Sahoo
(Authorized Signatory)
M/s Ferro Alloys Corporation Ltd
D.P. Nagar, Randia-756135
District-Bhadrak, Odisha

Sub: Proposal for Environmental Clearance (EC) of M/s Ferro Alloys Corporation Ltd. for expansion of existing Ostapal Chromite Mines for increase in production from 0.2 MTPA to 0.240 MTPA Chromite Ore (RoM) with maximum excavation of 0.579 million cum per annum and Beneficiated chrome ore of 0.1 MTPA through opencast mining method over an mining lease area: - 72.84ha., at village – Kalarangiatta, Tahasil – Sukinda, Dist – Jajpur, Odisha of Sri Biswanath Sahoo, (Authorized signatory) – ToR.

Ref: 1) Your online application dated 31.08.2021 for issue of ToR vide Proposal No: SIA/OR/MIN/66461/2021

2. SEIAA meeting held on 19.01.2022.

Sir,

This has reference to the online proposal submitted in the Ministry of Environment, Forest and Climate Change (SEIAA, Odisha) to prescribe 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. For this purpose, the proponent had submitted online information in the prescribed format. (Form-1) along with a Pre-feasibility Report, Mining Plan.

In this regard, under the provisions of the EIA Notification 2006 as amended, the Standard ToR (Annexure-I) is enclosed along with additional conditions as mentioned below for the purpose of preparing environment impact assessment report and environment management plan for environment clearance is prescribed. In this case the SEAC recommended the proposal for exemption of public hearing under clause 7(ii) of EIA Notification, 2006 and amendment thereafter as there will be no increase in pollution load due to mere 20% increase in production capacity and in similar situation

EAC of MoEF&CC, Govt. of India has exempted for conducting public hearing many such mines.

Specific ToR

- i) Submit correct google map distance from nearest Eco-sensitive Zone/Sanctuary. Submit 1:50,000 scale topomap with indication lease area, water body, nearest mines, village, village road, school, forest area, sanctuary, and area developed through plantation, etc.
- ii) EC conditions wise detailed compliance duly certified by MoEF&CC, Govt. of India, Regional office, Bhubaneswar be given in EIA/EMP along with Consent to Establish, Consent to Operate and Authorization under Hazardous Waste Rules conditions compliance report duly certified by the State Pollution Control Board.
- iii) The following information to be submitted in the compliance report:
 - a) Compliance of mining plan, including waste and OB dump management, mine closure plan etc.
 - b) Compliance to Common cause judgment
 - c) Status of R&R
 - d) Compliance of plantation
 - e) Compliance of public hearing issues
 - f) Compliance to CTO for the existing mines.
 - g) Status of complaints/ court cases/legal action.
 - h) Effluent, garland drain, soil quality including hexavalent chromium
 - i) Any other relevant environmental issue / parameter.
- iv) The following studies be undertaken by domain experts, viz:
 - a) Blast vibration study
 - b) Socio economic study of the neighbouring habitation
 - c) Biodiversity study with audit mechanism.
 - d) Slope stability study for both mines and OB /waste dumps.
 - e) Surface runoff management along with rainwater harvesting and ground water recharge including the design of drainage structures.
 - f) Traffic density study, both inside the mines and at haulage roads, intersecting points of haulage road with public road.
 - g) Hydrology study: The study findings and the mitigation measures thereof to be submitted
- v) The Project Proponent shall undertake the peripheral plantation and closed areas as well as gap plantation within 6 months with the seedling of 4-6 ft height having atleast 90% survival rate. An undertaking for the same also needs to be submitted by Project Proponent.

- vi) Cost of the CER calculated shall be utilized for the concerns of the people in terms of health, education, and infrastructure and environment protection. Project Proponent also shall include the budget for the betterment of schools nearby and to facilitate the online education system by providing Wi-Fi connectivity and desktops/tablets.
- vii) The project proponent should provide in the EIA report details of all the statutory clearances, permissions, no objection certificates, consents etc. required for this project under various Acts, Rules and regulations and their status or estimated timeline after grant of EC.
- viii) The project proponent should submit the revenue plan for mining lease, revenue plan should be imposed on the satellite imagery clearly demarcate the Govt. land, private land, agricultural land etc.
- ix) The project proponent should submit the real-time aerial footage & video of the mining lease area and of the transportation route. The project proponent should submit the detailed plan in tabular format (year-wise for life of mine) for afforestation and green belt development in and around the mining lease. The project proponent should submit the number of saplings to be planted, area to be covered under afforestation & green belt, location of plantation, target for survival rate and budget earmarked for the afforestation & green belt development. In addition to this the project proponent should show on a surface plan (5-year interval for life of mine) of suitable scale the area to be covered under afforestation & green belt clearly mentioning the latitude and longitude of the area to be covered during each 5 years. The capital and recurring expenditure to be incurred needs to be submitted. Presently in India there are many agencies which are developing forest in short interval of time. Thus, for the plantation activities details of the experts/agencies to be engaged needs to be provided with budgetary provisions.
- x) The project proponent should submit the quantity of surface or ground water to be used for this project. The complete water balance cycle needs to be submitted. In addition to this PP should submit a detailed plan for rain water harvesting measures to be taken. PP should submit the year wise target for reduction in consumption of the ground/surface water by developing alternative source of water through rain water harvesting measures. The capital and recurring expenditure to be incurred needs to be submitted.
- xi) The project proponent should clearly bring out the details of the manpower to be engaged for this project with their roles /responsibilities/designations. In addition to this the project proponent should mention the number and designation of person to be engaged for implementation of environmental management plan (EMP). The capital and recurring expenditure to be incurred needs to be submitted.
- xii) The project proponent should submit the year-wise, activity wise and time bound budget earmarked for EMP, occupational health surveillance & Corporate Environmental Responsibility. The capital and recurring expenditure to be incurred needs to be submitted.
- xiii) The project proponent should submit the measures/technology to be adopted for prevention of illegal mining and pilferage of mineral. The project proponent should submit the detailed mineralogical and chemical composition of the

mineral from a NABL/MoEF&CC accredited laboratory.

- xiv) The project proponent should submit the detailed mineralogical and chemical composition of the different grades of mineral and percentage of elements from a NABL/MoEF&CC accredited laboratory. Also, management of different grades need to be explained with mass balance. Also the analysis of wastes including presence of chromium, finally to be discarded and dumped with dumping plan.
- xv) The project proponent should clearly show the transport route of the mineral and protection and mitigative measure to be adopted while transportation of the mineral. The impact from the center line of the road on either side should be clearly brought out supported with the line source modelling and isopleth. Based on the above study the compensation to be paid in the event of damage to the crop and land on the either side of the road needs to be mentioned. The project proponent should provide the source of equations used and complete calculations for computing the emission rate from the various sources.
- xvi) The project proponent should clearly bring out that what is the specific diesel consumption and steps to be taken for reduction of the same. Year-wise target for reduction in the specific diesel consumption needs to be submitted, if such objective is planned.
- xvii) The project proponent should bring out the awareness campaign to be carried out on various environmental issues, practical training facility to be provided to the environmental engineer/diploma holders, mining engineer/diploma holders, geologists, and other trades related to mining operations. Target for the same needs to be submitted.
- xviii) The budget to be earmarked for the various activities shall be decided after perusal of the Standard EC conditions. After perusal of Standard EC conditions if agreed the project proponent should also submit an undertaking by the way of affidavit for Compliance of Standard EC conditions already prescribed by the Ministry vide O.M. No and Specific condition if prescribed by the SEAC/SEIAA, Odisha.
- xix) The project proponent should ensure that only NABET accredited consultant shall be engaged for the preparation of EIA/EMP Reports. The project proponent shall ensure that accreditation of consultant shall be valid during the collection of baseline data, preparation of EIA/EMP report and during the appraisal process. The project proponent and consultant should submit an undertaking the information and data provided in the EIA Report and submitted to the SEIAA, Odisha are factually correct and the project proponent and consultant are fully accountable for the same.
- xx) The project proponent should submit the photograph of monitoring stations & sampling locations. The photograph should bear the date, time, latitude & longitude of the monitoring station/sampling location. In addition to this the project proponent should submit the original test reports and certificates of the labs which will analyze the samples.
- xxi) Internal roads, drain management with network of the drain, retaining walls and settling tanks with ETPs be submitted.
- xxii) Details of air quality monitoring stations of the area and additional stations at entry and exit of mines and haulage roads, habitation to be considered.



- xxiii) Construction and perennial maintenance of haulage road with details of plantation and the species thereof to be submitted.
- xxiv) Parking plaza layout with maximum no. of vehicles and types of vehicles that can be parked with basic amenities and facilities.
- xxv) Forest Clearance details with copy of all Forest Clearance.
- xxvi) Status of complaints/ court cases/legal action regarding to lease along with a detailed write up indicating case no., purpose of the case etc.
- xxvii) Copy of lease document.
 - i) Details of waste management i.e. composition and nature of waste generated, tabulated form showing year wise waste generation, usage and storage and mitigation measures.
- xxviii) Comparative statement for increase in pollution load for existing production vis-à-vis proposed production (taking all parameters like water consumption, waste water generation, air pollutants, OB management, greenbelt, haulage roads, settling ponds, ETP etc.) in comparative form on environmental parameter including all forms of chromium and superimposing in layout on physical features.
- xxix) Project Proponent shall consider developing a good nursery in nearby village for production of saplings of 4-6 feet height for planting in safety zone, sides of external haulage roads and distribution among villagers for planting in their private land/ community land. The nursery may be developed by company on their own or in collaboration with forest department. A detailed proposal to this effect shall be submitted. The proponent shall ensure to use organic fertilizer in the nursery.
- xxx) Comprehensive water management, water balance with water harvesting and its reuse both monsoon and non-monsoon period. Detailed proposal for Zero Liquid Discharge.
- xxxi) STP plan with design with location in the layout map for domestic waste water treatment.
- xxxii) Provision of solar power (percentage wise) with detail plan.
- xxxiii) To submit the network with dimension of concrete cement roads inside the mining lease area and haulage road.
- xxxiv) Plan and SoP to be submitted for water sprinkling inside the mines and outside in haulage road including regular vacuum cleaning and Zero Dust Re-suspension system to completely mitigate and arrest fugitive dust emission.
- xxxv) Comparative data for previous and proposed production w.r.t overburden, green belt, water balance, haulage roads, settling ponds, ETP, runoff management etc. including chromium of different forms.
- xxxvi) Additional environmental measures taken for expansion of the project be submitted.
- xxxvii) Total water management including domestic use w.r.t sourcing from bore-well, rain water harvesting and recycling of waste water from ETP/STP, both for monsoon and non-monsoon be submitted of the existing mines and propose

expansion.

- xxxviii) Measures taken and proposed to be taken further for arresting and mitigation of occupational health hazard including identification of the same, both for employees and nearby/surrounding habitation.
- xxxix) Test report on Cr+6 content in surface water, ground water and underground soil within five (10) radius of core zone of the said mines. Technology used for removal of Cr+6 from surface run-off as well as mines drainage water. Proponent should explore using of latest membrane-based technology to mitigate hexavalent chromium.
- xl) Since the mine is located at Seismic Zone III (Moderate risk zone), slope stability study of mineral benches, OB dumps and mine sumps is envitable.
- xli) "No settling Pond" exists. A write up to be submitted why it is not required and how wash off / run off from OB / mineral waste / mineral are treated & disposed.
- xlii) Is the existing & proposed expansion is / will be "ZLD"? Whether any treated waste water is discharged to any outside water body including "Damsala Nala" located at 270 mtr from lease boundary? If so, the permission from the authority of Nala has been later including additional land due to proposed expansion? Existing and proposed measures to protect Damsala nala from getting contaminated due to mining due to mining activity.
- xliii) Treatment and disposal of mines seepage water of 3300 KLD with SOP be submitted.
- xliv) Permission for ground water drawal from WR Deptt, Govt of Odisha be submitted.
- xliv) Tomka – Mangalpur State highway is only 340 mtrs south of lease boundary and primary schools are located at 100 mtrs only from the lease boundry. So, safety precautions due to movement of vehicle and blasting be submitted.
- xlvi) About 0.105 Ha land is "Debasthali" Statue of it is to be submitted.



Yours faithfully,


Member Secretary

TERMS OF REFERENCE (ToR) FOR CONDUCTING ENVIRONMENT IMPACT ASSESSMENT STUDY AND INFORMATION TO BE INCLUDED IN EIA/EMP REPORT FOR M/S FERRO ALLOYS CORPORATION LTD. FOR EXPANSION OF EXISTING OSTAPAL CHROMITE MINES FOR INCREASE IN PRODUCTION FROM 0.2 MTPA TO 0.240 MTPA CHROMITE ORE (ROM) WITH MAXIMUM EXCAVATION OF 0.579 MILLION CUM PER ANNUM AND BENEFICIATED CHROME ORE OF 0.1 MTPA THROUGH OPENCAST MINING METHOD OVER AN MINING LEASE AREA: - 72.84HA., AT VILLAGE – KALARANGIATTA, TAHASIL – SUKINDA, DIST – JAJPUR, ODISHA OF SRI. BISWANATH SAHOO, (AUTHORIZED SIGNATORY) – TOR.

A. ADDITIONAL TOR's:

- i) Project proponent should provide in the EIA Report details of all the statutory clearances, permissions, no objection certificates, consents etc. required for this project under various Acts, Rules and regulations and their status or estimated timeline after grant of EC.
- ii) Project proponent should submit the revenue plan for mining lease, revenue plan should be superimposed on the satellite imaginary clearly demarcate the Govt. land, private land, agricultural land etc.
- iii) Project proponent should submit the real-time aerial footage & video of the mining lease area and of the transportation route. Project proponent should submit the detailed plan in tabular format (year-wise for life of mine) for afforestation and greenbelt development in and around the mining lease. The Project proponent should submit the number of saplings to be planted, area to be covered under afforestation & green belt, location of plantation, target for survival rate and budget earmarked for the afforestation & green belt development. In addition to this project proponent should show on a surface plan (5-year interval for life of mine) of suitable scale the area to be covered under afforestation & green belt clearly mentioning the latitude and longitude of the area to be covered during each 5 years. The capital and recurring expenditure to be incurred needs to be submitted. Presently in India there are many agencies which are developing forest in short interval of time. Thus, for the plantation activities details of the experts/agencies to be engaged needs to be provided with budgetary provisions.
- iv) Project proponent should submit the quantity of surface or ground water to be used for this project. The complete water balance cycle need to be submitted. In addition to this project proponent should submit a detailed plan for rain water harvesting measures to be taken. Project proponent should submit the year wise target for reduction in consumption of the ground/surface water by developing alternative source of water through rain water harvesting measures. The capital and recurring expenditure to be incurred needs to be submitted.
- v) Project proponent should clearly bring out the details of the manpower to be engaged for this project with their roles /responsibilities/designations. In addition to this Project proponent should mention the number and designation of person to be engaged for implementation of environmental management plan (EMP). The capital and recurring expenditure to be incurred needs to be submitted.
- vi) Project proponent Should submit the year- wise, activity wise and time bound budget earmarked for EMP, occupational health surveillance & corporate Environmental Responsibility. The capital and recurring expenditure to be incurred needs to be submitted.
- vii) Project proponent should submit the measures/technology to be adopted for prevention of illegal mining and pilferage of mineral. Project proponent should submit the detailed mineralogical and chemical composition of the mineral and percentage of free silica from a NABL/MoEF&CC accredited laboratory.
- viii) Project proponent should clearly show the transport route of the mineral and protection and mitigative measure to be adopted while transportation of the mineral. The impact

from the centre line of the road on either side should be clearly brought out supported with the line source modelling and isopleth. Further, frequency of testing of Poly Aromatic Hydrocarbon needs to be submitted along with budget. Based on the above study the compensation to be paid in the event of damage to the crop and land on the either side of the road needs to be mentioned. The Project proponent should provide the source of equations used and complete calculations for computing the emission rate from the various sources.

- ix) Project proponent should clearly bring out that what is the specific diesel consumption and steps to be taken for reduction of the same. Year-wise target for reduction in the specific diesel consumption needs to be submitted.
- x) Project proponent should bring out the awareness campaign to be carried out on various environmental issues, practical training facility to be provided to the environmental engineer/diploma holders, mining engineer/diploma holders, geologists, and other trades related to mining operations. Target for the same needs to be submitted.
- xi) The budget to be earmarked for the various activities shall be decided after perusal of the Standard EC Conditions published by the MoEF&CC, Govt. of India. After perusal of Standard EC conditions if agreed, project proponent should also submit an undertaking by the way of affidavit for Compliance of Standard EC conditions already prescribed by the Ministry vide O.M. No and Specific condition if prescribed by the SEAC / MoEF&CC.
- xii) The project proponent should ensure that only NABET accredited consultant shall be engaged for the preparation of EIA/EMP Reports. Project proponent shall ensure that accreditation of consultant shall be valid during the collection of baseline data, preparation of EIA/EMP report and during the appraisal process. The Project proponent and consultant should submit an undertaking the information and data provided in the EIA Report and submitted to the Ministry are factually correct and Project proponent and consultant are fully accountable for the same.
- xiii) The project proponent should submit the photograph of monitoring stations & sampling locations. The photograph should bear the date, time, latitude & longitude of the monitoring station/sampling location. In addition to this Project proponent should submit the original test reports and certificates of the labs which will analyse the samples.

B. STANDARD TOR FOR MINING PROJECT

- i) Year-wise production details since 1994 should be given; clearly stating the highest production achieved in anyone 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.
- ii) A copy of the document in support of the fact that the proponent is the rightful lessee of the mine should be given.
- iii) 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.
- iv) All corner coordinates of the mine lease area, superimposed on a High-Resolution Imagery / top sheet, 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).
- v) 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.
- vi) 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.
- vii) It should be clearly stated whether the proponent Company has a well laid down Environment Policy approved by its Board of Directors? If so, it may be spelt out in the

EIA Report with description of the prescribed operating process/procedures to bring into focus any infringement/deviation/violation of the environmental or forest norms/conditions? The hierarchical system or administrative order of the Company to deal with the environmental issues and for ensuring compliance with the EC conditions may also be given. The system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the Company and/or shareholders or stakeholders at large, may also be detailed in the proposed safeguard measures in each case should also be provided.

- viii) Issue 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.
- ix) 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.
- x) 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.
- xi) 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.
- xii) 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.
- xiii) 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.
- xiv) 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.
- xv) The vegetation in the RF / PF areas in the study area, with necessary details, should be given.
- xvi) 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.
- xvii) 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.
- xviii) 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 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.

- xix) 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.
- xx) 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).
- xxi) 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.
- xxii) 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.
- xxiii) 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.
- xxiv) 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.
- xxv) Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided.
- xxvi) 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.
- xxvii) 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.
- xxviii) 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.
- xxix) 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.

- xxx) 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.
 - xxxi) 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.
 - xxxii) 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.
 - xxxiii) Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report.
 - xxxiv) 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.
 - xxxv) 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.
 - xxxvi) 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.
 - xxxvii) 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.
 - xxxviii) 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.
 - xxxix) 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.
 - xl) Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.
 - xli) The cost of the project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.
 - xlii) A Disaster Management plan shall be prepared and included in the EIA/EMP report.
 - xliii) 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.
 - xliv) Activity-wise time-bound action plan on the issues raised and commitment made during public hearing to be submitted as part of the final EMP Report in compliance of the Ministry's OM F.No.22-65/2017- IA.III dated 30th September, 2020
- C. Besides the above, the below mentioned general points are also to be followed: -
- a) All documents to be properly referenced with index and continuous page numbering.
 - b) Where data are presented in the Report especially in Tables, the period in which the

- data were collected and the sources should be indicated.
- c) Project Proponent shall enclose all the analysis/testing reports of water, air, soil, noise etc. using the MoEF&CC/NABL accredited laboratories. All the original analysis/testing reports should be available during appraisal of the Project.
 - d) Where the documents provided are in a language other than English, an English translation should be provided.
 - e) The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted.
 - f) While preparing the EIA report, the instructions for the Proponents and instructions for the Consultants issued by MoEF vide O.M. No. J-11013/41/2006- IA.II (I) dated 4th August, 2009, which are available on the website of this Ministry, should be followed.
 - g) Changes, if any made in the basic scope and project parameters (as submitted in Form-I and the PFR for securing the TOR) should be brought to the attention of MoEF&CC with reasons for such changes and permission should be sought, as the TOR may also have to be altered. Post Public Hearing changes in structure and content of the draft EIA/EMP (other than modifications arising out of the P.H. process) will entail conducting the PH again with the revised documentation.
 - h) As per the circular no. J-11011/618/2010-IA.II (I) dated 30.5.2012, certified report of the status of compliance of the conditions stipulated in the environment clearance for the existing operations of the project, should be obtained from the Regional Office of Ministry of Environment, Forest and Climate Change, as may be applicable.
 - i) The EIA report should also include (i) surface plan of the area indicating contours of main topographic features, drainage and mining area, (ii) geological maps and sections and (iii) Sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area.
- D. The prescribed TOR would be valid for a period of four years for submission of the EIA/EMP report.**


APPENDIX I

(See Paragraph-6)

CATEGORY - B

Note : If space provided against any parameter is inadequate, Kindly upload supporting document under 'Additional Attachments if any' at the last part of the Form1. Please note that all such Annexures must be part of single pdf document.

(I) Basic Informations

S.No.	Item	Details
	Whether proposal involved violation of EIA notification	No
	Weather Consent to Establishment Obtained	NA
	Upload copy of CTE	NA
1.	Name of the Project	Expansion of existing Ostapal chromite Mine of M/s Ferro Alloys Corporation Limited from 0.2 MTPA to 0.240 MTPA Chromite Ore (ROM) with maximum excavation of 0.579 Million CUM per annum and beneficiated Chrome Ore of 0.1 MTPA through opencast mining method
2.	Project Sector	Non-Coal Mining
3.	Location of the project	Village Gurujanga, tehsil Sukinda, district Jajpur, State Odisha
4.	Shape of the project land Uploaded GPS file Uploaded copy of survey of India Toposheet	Block (Polygon) Annexure-GPS file  Annexure-Survey of india toposheet
5.	Brief summary of project	Annexure-Brief summary of project
6.	State of the project	Orissa

Details of State of the project

S.no	State Name	District Name	Tehsil Name
(1.)	Orissa	Jajpur	Sukinda
7.	Town / Village	Gurujanga	
8.	Plot/Survey/Khasra No.	Plots in Khata No. 1 - 9 Plots in Khata No. 2 - 1, 10, 11, 12 Plots in Khata No. 3 - 22, 23 Plots in Khata No. 4 - 26 Plots in Khata No. 5 - 35 Plots in Khata No. 6 - 16, 18 Plots in Khata No. 7 - 25, 31 Plots in Khata no. 8 - 15, 17 Plots in Khata No. 9 - 29, 30 Plots in Khata No. 10 - 19, 20, 21, 27 Plots in Khata No. 11 - 5, 13, 14 Plots in Khata No. 12 - 24 Plots in Khata No. 13 - 1/1	
9.	S. No. in the schedule	1(a) Mining of minerals 2(b) Mineral beneficiation	
10.	Proposed capacity/area/length/tonnage to be handled/command area/lease area/number or wells to be drilled	Chromite Ore Production -0.240 MTPA (ROM) OB/Waste handling 1.0 MTPA (Max) Total Excavation: 1.24 MTPA Mining Lease Area - 72.843 ha.	
11.	New/Expansion/Modernization MoEF file number(Previous EC)	Expansion SIA/OR/MIN/66460/2006	

	Existing capacity/area etc. Uploaded EC letter Uploaded Approval of mining Plan	72.843 ha. Annexure-Uploaded EC letter Annexure-Uploaded Approval of mining plan
12.	Category of project	B
13.	Does it attract the general condition? If yes, please specify	No
15.	Does it attract the specific condition?	No
16.	Is there any litigation pending against the project?	No
17.	Nearest railway station along with distance in kms.	Tomka Railway Station, E, 19.06 km
18.	Nearest airport along with distance in kms	Biju Patnaik International Airport, Bhubaneswar, S, 89.02 km
19.	Nearest Town/City/District Headquarters along with distance in kms	Sukinda, SE , 16.55 km
20.	Distance of the project from nearest Habitation	Gurujanga Village is next to Mine Lease towards South and Ostapal Village is next to Mine Lease towa , Gurujanga Village is next to Mine Lease towards South and Ostapal Village is next to Mine Lease towa km
21.	Details of alternative sites examined shown on a toposheet	No
22.	Whether part of interlinked projects?	No
23.	Whether the proposal involves approval/clearance under the Forest (Conservation)Act,1980? Status MoEF file number Date of In-Principle Date of final approval Area diverted Uploaded Clearance Letter	Yes Final(Stage-II) Approval Obtained 8-86/1996/F.C. (Vol-II) 17/02/2006 17/02/2006 64.354 ha. Annexure-Uploaded clearance letter
24.	Whether the proposal involves approval/clearance under the wildlife (Protection)Act,1972?	No
25.	Whether the proposal involves approval/clearance under the C.R.Z notification,2011?	No
26.	Whether there is any Government Order/Policy relevent/relating to the site?	No
27.	Whether there is any litigation pending against the project and/or land in which the project is proposed to be set up?	No
28.	Project Cost(in Lac.)	8885
29.	Mining lease area (in ha.)	72.843
30.	Whether the proposed project/activity located in notified Industrial area(Yes/No)	No

Activity

1 Construction, operation or decommissioning of the Project involving actions, which will cause physical changes in the locality (topography, land use, changes in water bodies, etc.)

S.No	Information/Checklist confirmation	Yes/No	Details there of (with approximate quantities/rates, wherever possible) with source of information data
1.1	Permanent or temporary change in land use, land cover or topography including increase in intensity of land use (with respect to local land use plan)	Yes	The existing topography will be altered due to mine development (as per approved Mining Plan). This is an existing mine, and the entire lease area of 72.843 Ha will be used for mining and allied activities. The original land use of the area has been altered to mining/industrial use.
1.2	Clearance of existing land, vegetation and buildings?	No	This is an operational mine having necessary clearances.
1.3	Creation of new land uses?	Yes	This is an existing mine. Entire lease area will be used for mining and allied activities.
1.4	Pre-construction investigations e.g. bore houses, soil testing?	Yes	The whole mine area has been explored. Total 235 no. of holes have been drilled within the leasehold area covering a length of 16338.30m as on dated 31.05.2021
1.5	Construction works?	Yes	Necessary infrastructure facilities are already constructed within the lease area. Some additional small-scale construction will be done as per requirement. The beneficiation plant will be shifted towards the south dump.
1.6	Demolition works?	Yes	The office building will be demolished, and waste generated will be handled as per C & D rules 2016.
1.7	Temporary sites used for construction works or housing of construction workers?	No	Existing residential facilities will be used. Most of the construction workers will come from nearby villages, so no major housing facilities will be required for these workers.
1.8	Above ground buildings, structures or earthworks including linear structures, cut and fill or excavations and fill or excavations	Yes	The mine already has existing structures such as offices, canteen etc. in the lease area. Opencast mining will be practiced which will involve excavations and dumping.
1.9	Underground works including mining or tunneling?	No	No underground mining is proposed at present.
1.10	Reclamation works?	No	There is no proposal for carrying out reclamation/restoration/rehabilitation program by backfilling of quarry in 5

			years plan period i.e., from 2021-22 to 2025-26. Plantation will be carried out along finalized dump & pit slopes during this period.
1.11	Dredging?	No	Not envisaged
1.12	Offshore structures?	No	Not applicable
1.13	Production and manufacturing processes?	Yes	The project involves opencast fully mechanized mining. The production of Chromite ore involves drilling, blasting, excavation, beneficiation, loading, unloading & transportation activities.
1.14	Facilities for storage of goods or materials?	Yes	Area for stacking of ROM ore has been earmarked within the mine lease area.
1.15	Facilities for treatment or disposal of solid waste or liquid effluents?	Yes	Overburden / waste generated will be stored in specified area in the mine lease area. Liquid wastes will be treated in the ETP.
1.16	Facilities for long term housing of operational workers?	No	There is no proposal for construction of any new colony.
1.17	New road, rail or sea traffic during construction or operation?	No	No construction of new roads, railway lines or sea traffic is proposed. Existing roads will be used.
1.18	New road, rail, air water borne or other transport infrastructure including new or altered routes and stations, ports, airports etc?	No	Not envisaged.
1.19	Closure or diversion of existing transport routes or infrastructure leading to changes in traffic movements?	No	Tomka-Mangalpur State Highway is located 0.35 km from mine lease boundary in the S-direction.
1.20	New or diverted transmission lines or pipelines?	No	Not proposed.
1.21	Impoundment, damming, culverting, realignment or other changes to the hydrology of watercourses or aquifers?	No	This is an existing mine. Diversion of stream is not proposed. And any kind of changes in regional hydrology is not envisaged.
1.22	Stream crossings?	No	No stream is flowing through the mine lease
1.23	Abstraction or transfers of water from ground or surface waters?	Yes	COB Plant requires 400 KLD water. For dust suppression, afforestation & wheel washing system around 250 KLD mine dewatering treated water required. Another 100 KLD is required from borewell for domestic use. A total of 750KLD required for consumption. CGWA NOC has been obtained vide letter no. CGWA/NOC/MIN/ORIG/2018/3957 dated 28 August 2018. for withdrawal of 100 KLD from borewell & avg 3300 KLD from mine seepage dewatering.
1.24	Changes in water bodies or the land surface affecting drainage or run-off?	No	There are no changes proposed in any surface water bodies. Topography of the mine lease area will be altered due to creation of mine pits and dumps. Ground water seepage from

			the active mine pits will have to be pumped out for enabling mine working.
1.25	Transport of personnel or materials for construction, operation or decommissioning?	Yes	All the transportation of construction material, ROM and personnel etc. will be carried out through existing road.
1.26	Long-term dismantling or decommissioning or restoration works?	No	Long-term dismantling or decommissioning or restoration works not envisaged.
1.27	Ongoing activity during decommissioning which could have an impact on the environment?	No	Not applicable.
1.28	Influx of people to an area in either temporarily or permanently?	Yes	A total of 595 personnel (direct & Contractual workers) are employed in the mine as on 01.07.2021 and 38 Technical Persons are engaged in the mine. A significant portion of which are locals, but some are from other areas. People may also migrate to this area in search of secondary employment opportunities.
1.29	Introduction of alien species?	No	Only native species of flora will be planted.
1.30	Loss of native species or genetic diversity?	No	Not envisaged.
1.31	Any other actions?	No	Not envisaged.

2 Use of Natural resources for construction or operation of the Project (such as land, water, materials or energy, especially any resources which are non-renewable or in short supply):

S.No	Information/Checklist confirmation	Yes/No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
2.1	Land especially undeveloped or agricultural land (ha)	Yes	The land is classified as Govt. land and Forest Land. Total area – 72.843 ha., out of which 68.424 ha. is forest land (64.354 Ha. diverted forest land for mining use) and 4.419 ha. land is non-forest land.
2.2	Water (expected source & competing users) unit: KLD	Yes	At present, main source of water is seepage water from quarry bottom. A total of 750 KLD water is required for carious purposes. Only 100 KLD water is required from Borewell, & rest of the water is required from mine seepage water. To withdraw the water, NOC from CGWA has been obtained for a total withdrawal of 3400 KLD. Renewal of NOC is under process.
2.3	Minerals (MT)	Yes	Chromite Ore – 0.240 MTPA (ROM)
2.4	Construction material – stone, aggregates, sand / soil (expected source – MT)	No	All site infrastructure is already available. Minor construction will be

			done when COB plant is shifted.
2.5	Forests and timber (source – MT)	No	No use envisaged.
2.6	Energy including electricity and fuels (source, competing users) Unit: fuel (MT),energy (MW)	Yes	Average diesel for mining machinery required will be 521KL/Annum. Average power requirement of ~ 25.30 Kwh/Annum will be required for electricity for mine office and mine illumination purpose. The present contract demand is 600 KVA would be met from local grid.
2.7	Any other natural resources (use appropriate standard units)	No	None

3 Use, storage, transport, handling or production of substances or materials, which could be harmful to human health or the environment or raise concerns about actual or perceived risks to human health

S.No	Information/Checklist confirmation	Yes/No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
3.1	Use of substances or materials, which are hazardous (as per MSIHC rules) to human health or the environment (flora, fauna, and water supplies)	Yes	There will be use of explosives for blasting. Power gel – C will be used for blasting. Cordex, Nonel system will be used for initiation and delay detonators will be used for different row of blasting. On requirement basis explosives are brought by approved Explosive Van from Kathpal Chromite Mines of M/s FACOR, where a licensed Explosive Magazine with 10 Ton of Explosives is maintained for use. No explosives will be stored in mine lease area.
3.2	Changes in occurrence of disease or affect disease vectors (e.g. insect or water borne diseases)	No	Project activities are not likely to cause changes in occurrence of disease or affect disease vector.
3.3	Affect the welfare of people e.g. by changing living conditions?	Yes	Locals will be benefited by direct & indirect employment leading to better lifestyle.
3.4	Vulnerable groups of people who could be affected by the project e.g. hospital patients, children, the elderly etc.	Yes	There is small village habitation in the vicinity of the mine lease area.
3.5	Any other causes	No	Not envisaged.

4 Production of solid wastes during construction or operation or decommissioning (MT/month)

S.No	Information/Checklist confirmation	Yes/No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
4.1	Spoil, overburden or mine wastes	Yes	A total of 4.795 MT of overburden will

			be generated from opencast mining during plan period.
4.2	Municipal waste (domestic and or commercial wastes)	Yes	Only the domestic waste from mine office, canteen and township.
4.3	Hazardous wastes (as per Hazardous Waste Management Rules)	Yes	Used Oil: 0.317TPA Waste containing oil: 0.02TPA Sludge from wastewater treatment: 21.26TPA Used Oil & Waste containing oil will be sold to genuine recycler having valid authorization from concerned SPCB. ETP Sludge will be stored off in an impervious pit adjacent to ETP & finally will be handed over to authorized recycle (CHWTSDf) vendor at Jajpur.
4.4	Other industrial process wastes	No	No other industrial waste will be generated in the mine lease.
4.5	Surplus product	No	No surplus product
4.6	Sewage sludge or other sludge from effluent treatment	Yes	ETP sludge will be disposed to authorised CHWTSDf Operator. ETP of capacity 400 KL/hour has been installed in the mine lease, whose capacity is proposed to be increased to 550 KL/hour.
4.7	Construction or demolition wastes	Yes	Construction will be done to increase the capacity of ETP and during relocation of COB plant. Also, the mine office will be demolished. All the waste generated shall be handled as per C & D rules 2016.
4.8	Redundant machinery or equipment	Yes	Redundant machinery, whenever available, will be shifted to other mines or will be sold to authorised dealers.
4.9	Contaminated soils or other materials	No	Not envisaged
4.10	Agricultural wastes	No	No agricultural waste generated.
4.11	Other solid wastes	No	No other solid waste generated.

5 Release of pollutants or any hazardous, toxic or noxious substances to air(Kg/hr)

S.No	Information/Checklist confirmation	Yes/No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
5.1	Emissions from combustion of fossil fuels from stationary or mobile sources	Yes	Diesel will be used for mining machinery and transport vehicles. Vehicular exhaust emissions like CO, SO ₂ & NO _x are envisaged.
5.2	Emissions from production processes	Yes	The project proposal is for mining of chromite ore, thus mainly particulate

			emission is envisaged due to drilling, blasting and material handling.
5.3	Emissions from materials handling including storage or transport	Yes	Mineral excavation, handling and Transportation activities will generate PM, CO, and NOX. They are likely to produce CO & NOx. @ 10.67 gm/Km & 18.97 gm/km respectively.
5.4	Emissions from construction activities including plant and equipment	No	No major construction activity proposed
5.5	Dust or odours from handling of materials including construction materials, sewage and waste	Yes	Dust will be generating from handling and loading of ore and overburden.
5.6	Emissions from incineration of waste	No	Incineration is not proposed.
5.7	Emissions from burning of waste in open air (e.g. slash materials, construction debris)	No	No such activity is proposed
5.8	Emissions from any other sources	No	Not envisaged

6 Generation of Noise and Vibration, and Emissions of Light and Heat:

S.No	Information/Checklist confirmation	Yes/No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
6.1	From operation of equipment e.g. engines, ventilation plant, crushers	No	No major noise and vibration source is envisaged.
6.2	From industrial or similar processes	No	Not envisaged
6.3	From construction or demolition	Yes	Relocation of beneficiation plant and demolition of office building will be done.
6.4	From blasting or piling	Yes	As drilling and blasting activities are proposed, there will be generation of noise to certain extent.
6.5	From construction or operational traffic	Yes	Mined out minerals will be transported to user industries by dumpers. This will generate noise.
6.6	From lighting or cooling systems	Yes	Emission of light during night from high mast lights provided for illumination in the mine lease area.
6.7	From any other sources	No	No other sources.

7 Risks of contamination of land or water from releases of pollutants into the ground or into sewers, surface waters, groundwater, coastal waters or the sea:

S.No	Information/Checklist confirmation	Yes/No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
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7.1	From handling, storage, use or spillage of hazardous materials	No	Not envisaged.
7.2	From discharge of sewage or other effluents to water or the land (expected mode and place of discharge)	No	Domestic effluent will be discharged in septic tank & soak pit system. Effluent and sump water will be treated in ETP.
7.3	By deposition of pollutants emitted to air into the land or into water	Yes	Deposition of dust on land due to mining, transportation will have minor negative effect on flora- fauna.
7.4	From any other sources	No	No other sources.
7.5	Is there a risk of long term build up of pollutants in the environment from these sources?	No	Not envisaged.

8 Risk of accidents during construction or operation of the Project, which could affect human health or the environment

S.No	Information/Checklist confirmation	Yes/No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
8.1	From explosions, spillages, fires etc from storage, handling, use or production of hazardous substances	Yes	There is the risk of injury during blasting in the mine lease but all precautionary measures have been taken to negate the chances of same. Also, there is no storage of explosives in the mine lease.
8.2	From any other causes	No	Not envisaged
8.3	Could the project be affected by natural disasters causing environmental damage (e.g. floods, earthquakes, landslides, cloudburst etc)?	Yes	The project may be affected by natural disasters: Jajpur District falls under Moderate Risk Zone (Seismic Zone-III). Dump height, Dump slope and Proper angle of repose will be maintained to guard against dump failures. Inactive dump slopes will be stabilised by plantation. Timely evacuation, relief and rehabilitation activities have been planned by the management using their own resources and from outside agencies.

9 Factors which should be considered (such as consequential development) which could lead to environmental effects or the potential for cumulative impacts with other existing or planned activities in the locality

S.No	Information/Checklist confirmation	Yes/No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
9.1	Lead to development of supporting utilities, ancillary development or development stimulated by the project which could have impact on the environment e.g.: <ul style="list-style-type: none"> Supporting infrastructure (roads, power supply, waste or waste water treatment, etc.) 	No	This is an existing mine and necessary infrastructure facilities are already available. This is a mining project. No raw material is required for this project. Small scale

	<ul style="list-style-type: none"> ◦ housing development ◦ extractive industries ◦ supply industries ◦ Other 		businesses like restaurants, garages, hotels, etc. may be developed in the nearby area.
9.2	Lead to after-use of the site, which could have an impact on the environment	Yes	After reaching the maximum depth the finally worked out voids shall be used as reservoir. Trees will be planted on the top benches of the mined-out pit.
9.3	Set a precedent for later developments	No	Not Applicable
9.4	Have cumulative effects due to proximity to other existing or planned projects with similar effects	Yes	The Sukinda area has several chromite ore mining projects.

(III) Environmental Sensitivity

S.No	Areas	Name/Identity	Aerial distance (within 15km.) Proposed project location boundary
1	Areas protected under international conventions, national or local legislation for their ecological, landscape, cultural or other related value	Yes	Mahagiri Protected Forest 2.17 km S Daitari Protected Forest - The Mine site partially covers Daitari PF
2	Areas which are important or sensitive for ecological reasons - Wetlands, watercourses or other water bodies, coastal zone, biospheres, mountains, forests	Yes	Mahagiri Protected Forest 2.17 km S Daitari Protected Forest - The Mine site partially covers Daitari PF Damsal Nala - 0.27 km S Nadiberena Nala - 6.84 SW Puagadhua Nala - 6.20 km W
3	Areas used by protected, important or sensitive species of flora or fauna for breeding, nesting, foraging, resting, over wintering, migration	Yes	Mahagiri Protected Forest - 2.17 km S Daitari Protected Forest - The mine site partially covers Daitari PF
4	Inland, coastal, marine or underground waters	Yes	Damsal Nala - 0.27 km S Nadiberena Nala - 6.84 km SW Puagadhua Nala - 6.20 km W
5	State, National boundaries	No	None
6	Routes or facilities used by the public for access to recreation or other tourist, pilgrim areas	Yes	Tomka Mangalpur State Highway passing 0.34 km S of ML
7	Defence installations	No	none
8	Densely populated or built-up area	Yes	Sukinda
9	Areas occupied by sensitive man-made land uses (hospitals, schools, places of worship, community facilities)	Yes	Schools • Sri Ram U.P School 0.10 km S • UP School, Ostapal 0.83 km E • Gurujangapal Primary School 0.42 km S • Kaliapani High School 4.23 km SW • Stewart School, SCM 4.89 SW • SSVM, SCM (TISCO) 5.23 km SW Places of Worship • Hanuman Temple, Kaliapani 1.27 km SW • Shiva Temple, Kaliapani 1.90 km SW • Jagannath Temple, Kaliapani 4.81 SW Community Facilities • Kaliapani Police Station

			3.31 km SW • OMC Bus Stand, Kaliapani 4.35 km SW
10	Areas containing important, high quality or scarce resources. (ground water resources,surface resources,forestry,agriculture,fisheries,tourism,minerals)	Yes	The area has major Chromite ore formations of the nation.
11	Areas already subjected to pollution or environmental damage. (those where existing legal environmental standards are exceeded)	No	None
12	Areas susceptible to natural hazard which could cause the project to present environmental problems (earthquakes, subsidence, landslides, erosion, flooding or extreme or adverse climatic conditions) similar effects	Yes	Jajpur District falls under Moderate Risk Zone (Seismic Zone-III).

(IV) PROPOSED TERMS OF REFERENCE FOR EIA STUDIES

1	Uploaded Proposed TOR File	Annexure-TOR file
2	Uploaded scanned copy of covering letter	Annexure-scanned copy of covering letter
3	Uploaded Pre-Feasibility report(PFR)	Annexure-PFR
4	Uploaded additional attachments(only single pdf file)	Annexure-Additional attachments

(V) Undertaking

The aforesaid application and documents furnished here with are true to my knowledge

V. (i)	Name	FERRO ALLOYS CORPORATION LTD		
	Designation	Chief HSE		
	Company	FERRO ALLOYS CORPORATION LTD		
	Address	At. D.P. Nagar, PO- Randia, Dist. - Bhadrak, Odisha		
Essential Details Sought				
S. No.	EDS Sought Date	EDS Sought	Letter	
NO Record				
Additional Details Sought				
S. No.	ADS Sought Date	ADS Sought	Letter	
NO Record				

LAND SCHEDULE OF OSTAPAL MINE



LAND SCHEDULE OVER AN AREA OF 72.843 HECTS. IN FAVOUR OF FERRO ALLOYS CORPORATION LIMITED FOR CHROMITE ORE IN OSTAPAL CHROMITE MINES IN JAJPUR DISTRICT

VILLAGE - GURUJANG NO.16.

Plot No.	Khata No.	Name of the tenant	Kusom	Area in Acre	Remarks
1	2	3	4	5	6
1/1	13	Anand Govt.	Anand Govt. Jungle	45.11	Part
5	11	Bhobitra Pradhan S/o Bhobu Pradhan	Passi-2/46	0.01	-do-
9	1	Shri Kandan Thakurani	Nutan pad-4 Passi-2	0.15	-do-
10	2	Kiran Dehury S/o Madhu Dehury	Passi-2/5	0.17	Full
11	2	-do-	Nutan pad-4 Passi-2	1.30	Part
12	2	-do-	Passi-2/3	0.20	Full
13	11	Bhobitra Pradhan S/o Bhobu Pradhan	Passi-2/8	0.40	Full
14	11	Bhobitra Pradhan S/o Bhobu Pradhan	Nutan Pad-4 Passi-2	0.05	-do-

For FERRO ALLOYS CORP. LTD.

M.V. RAO
Regional Manager &
Lessee

Regional Officer
Buxar

Collector, Jajpur



13	8	Nekula Debury S/o Madha Debury	Nutan Padia, Passi-2	0.25	Full
16	6	Narendra Debury S/o Guriya Debury	Nutan Padia, Passi-2/11	0.28	-do-
17	8	Nekula Debury S/o Madha Debury	Passi-2/4	0.19	-do-
18	6	Narendra Debury S/o Guriya Debury	Passi-2/6	0.20	-do-
19	10	Bhadrin Pradhan S/o Bhotu Pradhan	Passi-2/30	1.17	-do-
20	10	-do-	Nutan Padia, Passi-2/7	0.37	-do-
21	10	Bhadrin Pradhan S/o Bhotu Pradhan	Passi-2/26	0.28	-do-
22	3	Golapi Debury S/o Sagar Debury	Passi-2/23	0.84	-do-
23	3	-do-	Nutan Padia, Passi-2/11	0.33	-do-
24	12	Mangul Patra S/o Bhotu Patra	Nutan Padia, Passi-2/34	1.01	-do-

For PERRO ALLOYS CORP. LTD.

M.V. JAD
Resident Manager &
Power License Holder

Registering Officer
Sundar

COLLECTOR, JALPURA
COLLECTOR
JALPURA



25	7	Naga Dehury & Jaga Dehury S/o Dhanu Dehury	Nutan Pada, Passi-2/13	0.28	-do-
26	4	Goutam Dehury S/o Bhima Dehury	Passi-2/16	0.63	Part
27	10	Bhobitra Pradhan S/o Bhotu Pradhan	Passi-2/13	0.13	Part
29	9	Bancho Dehury S/o Abtar Dehury	Nutan Pada, Passi-2/41	0.05	-do-
30	9	-do-	Passi-2/19	0.13	Part
31	7	Naga Dehury & Jaga Dehury S/o Dhanu Dehury	Passi-2/48	1.50	-do-
35	5	Nanda Dehury S/o Dasa Dehury	Passi-2/125	0.39	-do-
			TOTAL	56.03	

FOREST BLOCK

Jungle Block No. 27/1 - 123.97 Acre (Part)

A.S.S.A.C.T

01. Village - Gurupang No. 16 56.03 Acres

02. Forest Block No. 27/1 123.97 Acres

Grand Total : 180.00 Acres / 72.843 Hectr.

Hereinafter referred to as said land.

For FERROALLOYS CORPN. LTD.

M.V. RAO
Resident Manager &
Lessee

Resident Officer
Jharkhand

COLLECTOR
JALPAIGURI

S. R. 1
F. No. 4-86/1496-FC (Vol. II)
Government of India
Ministry of Environment & Forests
(F.C. Division)

Parivartan Bhawan,
C.G.O. Complex, Lodhi Road,
New Delhi-110003

Dated: 24 February 2006

To
The Secretary (Forests),
Government of Orissa,
Bhubaneswar.

Sub: Diversion of 64.354 ha. of forest land for 1st renewal of mining lease for mining of Chromite Ore in Ostapal Chromite Mine in favour of M/s Ferro Alloys Corporation Limited (FACOR) in Jaipur District, Orissa.

Sir,

Kindly refer to your letter No. 10F(Cons)/67/2005/15539/F&E dated 02.09.2005 whereunder the above proposal was forwarded to this office seeking prior approval of the Central Government in accordance with the Section-2 of the Forest (Conservation) Act, 1980 and to say that the above proposal was examined by the Forest Advisory Committee (FAC) constituted under Section-3 of the Act.

2. After careful consideration of the proposal of the State Government and on the basis of the recommendation of the Forest Advisory Committee, the Central Government granted in-principle approval vide letter of even no. dated 03.10.2005 subject to certain conditions. The compliance of these conditions was submitted vide State Government's letter No. 10F(Cons)/67/2005/15539/F&E dated 19.01.2006. After consideration of the proposal and compliance of various conditions by the State Government, the Central Government hereby conveys its approval under Section-2 of the Forest (Conservation) Act, 1980 for diversion of 64.354 ha of forest land for 1st renewal of mining lease for mining of Chromite Ore in Ostapal Chromite Mine in favour of M/s Ferro Alloys Corporation Limited (FACOR) in Jaipur District, Orissa, subject to the fulfilment of following conditions :-

- (i) Legal status of the forest land shall remain unchanged.
- (ii) The non-forest land identified for Compensatory Afforestation shall be declared as Protected Forest under Indian Forest Act, 1927, as directed while granting approval on 04.05.1996. Compliance report in this regard may be sent to this office within 3 months.
- (iii) The mining lease period under the Forest (Conservation) Act, 1980 shall be co-terminus with the current lease granted under MMRD Act, 1957.
- (iv) The State Government shall transfer amount of NPV and other funds to Compensatory Afforestation Fund Management and Planning Authority (CAMPA), which has already been constituted and notified by the Central Government on 23.04.2004. Till such time, the CAMPA intimates the Head of Accounts for deposition of funds, the funds will be maintained in the form of fixed deposits in the name of Nodal Officer or concerned Divisional Forest Officer of the State Government. The funds realized towards the NPV shall not be utilized by the State Government.
- (v) RCC pillars of 4 feet height shall be erected to demarcate the area by the user agency at the project cost and will be marked with forward and back bearings.
- (vi) The user agency shall raise, fence and maintain a safety zone around the mining area and will also raise and maintain the plantation over an area one and half times in extent

P.T.O.

to that of the safety zone at the project cost. The condition of raising safety zone and raising plantation on forest land 1.5 times the area of safety zone as stipulated earlier should be complied with immediately and a compliance report should be sent to this office within 3 months.

- (vii) The concurrent reclamation plan shall be executed by the user agency from the very 1st year and an annual report shall be sent to the Nodal Officer and the RCCF, Bhubaneswar. If it is found from the annual report that the concurrent reclamation plan is not being adhered to by the user agency, the mining activities shall remain suspended till such time, the annual programme is completed for that year.
 - (viii) The top soil shall be protected at the project cost.
 - (ix) The comprehensive Wildlife Management Plan of conservation of wildlife and their habitat for Sukinda mining belt shall be implemented at the project cost.
 - (x) No labour camps shall be established on the forest land.
 - (xi) All necessary measures should be taken by the user agency to protect the environment.
 - (xii) Sufficient firewood shall be provided by the user agency to the labourers at the project cost after purchase from the State Forest Department/Forest Development Corporation.
 - (xiii) The user agency shall ensure that there should be no damage to the available wildlife.
 - (xiv) The forest land shall not be used for any purpose other than that specified in the proposal and the land use shall be as mentioned in the State Government's letter No. 10F(Cons)/67/2005/1037/F&E dated 19.01.2006.
 - (xv) The State Government shall ensure that Compensatory Afforestation as stipulated for the State should be taken up and the targets are achieved. The amount to be deposited by the different user agencies should be realised from them immediately. A compliance report may be sent to this office in this regard.
- The forest land thus diverted shall be non-transferable. Whenever and whatever extent of the forest land not required, shall be surrendered to the State Forest Department under intimation to this Ministry.

Yours faithfully,

(Pankaj Asthana)
Assistant Inspector General of Forests

Copy to :-

1. The Principal Chief Conservator of Forests, Government of Orissa, Bhubaneswar.
2. The Nodal Officer, Forest Department, Government of Orissa, Bhubaneswar.
3. The Chief Conservator of Forests (Central), Regional Office, Bhopal.
4. User Agency.
5. Guard File.
6. Monitoring Cell.
7. PS to IGF (FC)


(Pankaj Asthana)
Assistant Inspector General of Forests

ENVIRONMENTAL
CLEARANCE

Government of India
Ministry of Environment, Forest and Climate Change
(Issued by the State Environment Impact Assessment
Authority(SEIAA), Orissa)

To,

The Chief HSE
 FERRO ALLOYS CORPORATION LTD
 At. D.P. Nagar, PO - Randia, Dist - Bhadrak, Odisha -756135

Subject: Grant of Environmental Clearance (EC) to the proposed Project Activity under the provision of EIA Notification 2006-regarding

Sir/Madam,

This is in reference to your application for Environmental Clearance (EC) in respect of project submitted to the SEIAA vide proposal number SIA/OR/MIN/66461/2021 dated 03 Feb 2022. The particulars of the environmental clearance granted to the project are as below.

- | | |
|--|--|
| 1. EC Identification No. | EC22B001OR120821 |
| 2. File No. | 66461/75-MINB1/02-2022 |
| 3. Project Type | Expansion |
| 4. Category | B1 |
| 5. Project/Activity including Schedule No. | 1(a) Mining of minerals |
| 6. Name of Project | EXPANSION OF OSTAPAL CHROMITE MINE (ML AREA: 72.843 HA) FOR INCREASE IN PRODUCTION FROM 0.2 MTPA TO 0.240 MTPA CHROMITE ORE (ROM) WITH MAXIMUM EXCAVATION OF 0.579 MILLION CUM PER ANNUM AND BENEFICIATED CHROME ORE OF 0.1 MTPA THROUGH OPENCAST MINING METHOD AT VILLAGE: GURUJANGA, TEHSIL SUKINDA, DISTRICT JAJPUR, STATE ODISHA |
| 7. Name of Company/Organization | FERRO ALLOYS CORPORATION LTD |
| 8. Location of Project | Orissa |
| 9. TOR Date | 29 Sep 2021 |

The project details along with terms and conditions are appended herewith from page no 2 onwards.

Date: 04/04/2022

(e-signed)
 Dr. K Murugesan
 Member Secretary
 SEIAA - (Orissa)

Note: A valid environmental clearance shall be one that has EC identification number & E-Sign generated from PARIVESH. Please quote identification number in all future correspondence.

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STATE LEVEL ENVIRONMENT IMPACT ASSESSMENT AUTHORITY ODISHA, BHUBANESWAR

(Constituted under the EP Act, 1986 and EIA Notification, 2006 by the MoEF & CC, Govt. of India)
SRF-2/1, Unit-IX, Bhubaneswar-751022, Tel: 0674-2541029, E-mail-seiaaorissa@gmail.com

Letter No. _____

Di. _____

SEIAA File No. 66461/75-MINB1/02-2022

Project: Application of M/s Ferro Alloys Corporation Ltd. ("FACOR") for EC for Enhancement in Production from 0.2 MTPA to 0.240 MTPA of Chromite Ore(ROM) with Maximum Excavation of 0.579 Million Cum per annum and Beneficiated Chrome Ore of 0.1 MTPA from Ostapal Chromite Mines (MI Area: 72.843 Ha) at Village- Gurujanga, Tehsil- Sukinda, District- Jajpur -Environmental Clearance reg.

Ref: Your online application dated 03.02.2022 for issue of EC vide File No: SIA/OR/ MIN/ 66461/2021.

Sir,

This has reference to your online application seeking environmental clearance of the project proposal for Enhancement in Production from 0.2 MTPA to 0.240 MTPA of Chromite Ore(ROM) with Maximum Excavation of 0.579 Million Cum per annum and Beneficiated Chrome Ore of 0.1 MTPA from Ostapal Chromite Mines (MI Area: 72.843 Ha) at Village- Gurujanga, Tehsil- Sukinda, District- Jajpur. The mine area is a part of the Survey of India Toposheet No. F45N16 (73G/16) bounded by latitude:- Latitude 21° 03'26.60" N to 21° 04'00.98" N and Longitude 85° 47' 4.39" E to 85° 47' 34.29" E. The proposal falls in the category 1(a)- 'Mining of minerals' in the schedule of EIA Notification, 2006 as amended from time to time. The proposal has been appraised on the basis of the documents enclosed with the application, such as form-2, form-1, prefeasibility report, approved mining plan, final EIA /EMP, certified compliance report and clarifications furnished to SEAC in response to their observations.

The Project Proposal in a nutshell:

1. This is a proposal of Environmental Clearance for enhancement in production from 0.2 MTPA to 0.240 MTPA of Chromite Ore(ROM) with Maximum Excavation of 0.579 Million Cum per Annum and Beneficiated Chrome Ore of 0.1 MTPA from

Ostapal Chromite Mines (MI Area: 72.843 Ha) at Village- Gurujanga, Tehsil- Sukinda, District- Jajpur filed by M/s Ferro Alloys Corporation Ltd. ("FACOR").

2. The Terms of Reference (ToR) has been granted by SEIAA, Odisha vide dated 29.09.2021(Standard ToR) & vide letter no. 3883/SEIAA dated 28.01.2022(Specific ToR) for undertaking detailed EIA study for the project.
3. Baseline Data was collected from March 2021 to May 2021(Summer season).
4. The proposal was recommended for exemption in Public Consultation by SEAC in its meeting held on dated 05.01.2022 under Clause 7(ii) of EIA Notification, 2006 and amendments thereof as there will be no increase in pollution load due to mere 20% increase in production capacity and in similar situation EAC of MoEF & CC, Govt. of India has also exempted for conducting public hearing in many such mines.
5. The mining lease over 72.843 Ha, which comes under the part of Daitari Protected Forest and Village Gurujanga, was granted to M/s Ferro Alloys Corporation Limited ("FACOR") on 13.08.1985 for 20 years i.e., from 13.08.1985 to 12.08.2005. The lease was expired on 12.08.2005, but it has continued to conduct the mining operations in the said lease under the deemed extension provisions of section 8 of the MMDRA, 1957 with Rule-24-A(6) of the MCR, 1960 till 21.08.2016. As per the MMDR amendment Ordinance, 2015 under sec. 8A, the lease period has been deemed to be extended for a period of fifty years i.e., from 13.08.1985 to 12.08.2035. The supplementary Lease Deed has been executed on 22.08.2016. Thereafter, Hon'ble NCLT Cuttack Bench under the provisions of Insolvency and Bankruptcy Code (IBC)-2016 vide its order dt. 30.01.2020, has approved the resolution plan of M/s Sterlite Power Transmission Limited (Vedanta Ltd.). Pursuant to the said order with of NCLT Cuttack, the Board of Directors of M/s. Ferro Alloys Corporation Ltd. have been changed with effective from dt. 21.09.2020. Consequently, the Board of Directors have appointed the nominated owner of the company vide its resolution dt. 27.09.2020, in accordance with the statutory provisions.
6. The project proponent has submitted that the review of modified mining plan was submitted to IBM for approval which was approved vide letter no. MRMP/A/16-ORI/BHU/2020-21 dated 05.08.2021 for a period of 5 years (2021-22 to 2025-26).
7. The project proponent has submitted that the lease hold area of Ostapal Chromite Mine is 72.843 Ha. Out of the total area, 68.668 Ha of Surface right area has been granted by State Govt. of Odisha at different period as per the company's requirement vide Letter No. 2718, 7850, 2712 & 8272 dated. 02.12.1985, 19.12.1998, 29.04.2003 and 03.08.2011 respectively for mining purpose. Balance area has been left as safety zone (4.070 Ha) / Debastali (0.105 Ha) and it is marked by Forest Department. all around the periphery of the lease hold area for their forest growth.



8. The project proponent has submitted that forest clearance has been obtained from Govt. of India Ministry of Environment & Forest (F.C Division) New Delhi, in accordance with section-2 of the Forest Conservation Act, 1980 vide Letter No. F. No. 8-86/1996/F.C (Vol. II) Dated. 07.02.2006, Leasehold area of Ostapal Chromite Mines is 72.843 Ha. Out of total Forest Land of 68.424 Ha, only 64.354 Ha is diverted for mining purpose, rest 4.419 Ha has been left for safety zone and it is maintained at a distance of 7.5 m all along the periphery of the leasehold area.
9. The project proponent has submitted that Consent order of Ostapal Chromite Mines of M/s. FACOR LTD. for discharge of sewage & trade effluent under section 25/26 of water (PCP) Act, 1974 and operation of Plant under section 21 of Air (PCP) Act, 1981, was obtained vide Consent Order No. 5320/IND-I-CON-1163 Dated. 27/03/2021. The consent order is valid for the period up to 31/03/2022. The consent order is granted for 0.2 MTPA of Chrome Ore (ROM) and 0.1 MTPA (Chrome Ore concentrate) for operation of COB Plant.
10. The current project involves mining of Chrome Ore (Chromite) through a Fully Mechanized Opencast mining method using HEMM and Deep Hole Blasting. The proposal is for increasing the production from 0.20 MTPA to 0.240 MTPA of Chromite Ore (ROM) with maximum excavation of 0.579 Million Cubic Meters per Annum. Total area under mining lease is 72.843 Ha. There is an existing 0.1 MTPA Chrome Ore beneficiation plant within the mine lease area. The area consists of 68.424 Ha forest land as per Sabik settlement records. Estimated capital cost is 88.85 Crores.
11. Total Geological Reserves of Chromite Ore as on 01.10.2020 have been estimated to be 10.128 Million tonnes. Of these, Mineable reserves have been assessed to be 4.389 Million tonnes. Based on the present reserve estimates and proposed production program, the life of mine is estimated to be about 11 years.
12. Method of Mining: Fully mechanized Opencast mining is proposed to be carried out during the plan period. The operations like digging, excavation and removal of ore in conjunction with deep hole drilling and blasting will be done with the help of heavy earth moving machineries. Controlled blasting will be adopted for excavation of chromite ore. Mining has already intersected ground water table of the area.
13. Water Requirement: Water will be required in large amounts for the mining operation, dust suppression, plantation, workshop, wheel washing system, ore processing in COB plant, vehicle wash, domestic needs, environmental management etc. Total water withdrawal from the Ostapal Mine is estimated to be about avg. 3400 KLD. Permission from Central Ground Water Authority (CGWA) vide Letter No. CGWA/NOC/MIN/REN/1/2021/6481 for withdrawal of ground water of 100 KLD through two existing bore wells and 3300 KLD through dewatering mine seepage from mine pit.



14. Employment Potential: The estimated total manpower requirement for the mining project is about 536 persons.
15. Power Requirement: The use of electricity will be for lighting/ illumination/ pumping purposes in mining operations and will be obtained from GRIDCO. The electricity/DG power will be provided at the office, camp, and mines. The contract demand is 600 KVA and the total connected load is about 894 HP.
16. No R&R is proposed for the project.
17. The project proponent has estimated the EMP budget which includes the capital cost as 5.12 Crores and recurring cost as 0.89 Crores for implementation of Environment protection measures as well as the cost of CER. Further, as per MoEF&CC OM dated 1 May 2018 and its subsequent amendment on 30 September 2020, tentative CER budget of Rs. 0.88 Crores, therefore a budget of 0.90 Crore has been earmarked for CER activities.
18. The Environment consultant M/s Visiontek Consultancy Services Pvt Ltd, Bhubaneswar along with the proponent has made a presentation on the proposal before the Committee on 18.02.2022
19. The project proponent furnished additional information / documents on the project to SEAC on 05.03.2022.
20. The SEAC have appraised the proposal in its meeting dated 15.03.2022 and have recommended for grant of Environmental Clearance for the project, stipulating various conditions.

The State Environment Impact Assessment Authority (SEIAA) after considering the proposal and recommendations of SEAC, Odisha hereby accords Environmental Clearance in favour of the project under the provisions of EIA Notification 2006 and subsequent amendments thereto subject to strict compliance of all stipulated conditions, as follows. Detailed compliance report of these conditions is mandatorily to be submitted by the project proponent to SEIAA at half yearly intervals by 1st June and 1st December each year.

Stipulated Conditions:

A. Specific Conditions:

1. The mine shall explore implementation of membrane-based technology for removing hexavalent chromium from tailing pond, Surface run off & mine drainage water as proposed.
2. The mine shall submit copy of the letter to NIT, Rourkela and their response thereof engaging them for the purpose of reduction of hexavalent chromium from tailing pond, surface run off, and mine drainage to SEIAA within one month time



period.

3. The mine shall submit copy of study report conducted by NIT, Rourkela for the purpose of reduction of hexavalent chromium from tailing pond, Surface run off & mine drainage water once study is over and implement the recommendations of the study. The project proponent shall submit implementation & action plan report to SEIAA.
4. Since, mining has already intersected the ground water table; the steps proposed for augmentation of ground water resources are not adequate. The project proponent shall put adequate number of recharge pits beyond the zone of influence based on a detailed hydro-geological study. The project proponent shall submit the measures to be undertaken for augmentation of ground water resources along with action plan to SEIAA within one month time period.
5. The mine shall take adequate measures to minimize the discharge of waste water to Damsala nallah.
6. All the compliances submitted/ committed by PP (s) shall be strictly adhered to by them.
7. Waste should be dumped on the earmarked sites within the mining lease area and no waste should be dumped outside the lease area.
8. The Project Proponent shall start the plantation and cover at least 50% of the proposed area under plantation in the next 5 years. The density of the plantation should not be less than 2500 saplings/Ha. The species to be selected for the plantation should be in consultation with local forest department or any other expert agency engaged for the same. The Project Proponent shall keep the record of saplings planted, survival rate, area covered under plantation, location etc. In addition to this gap filling needs to be done to as and when require for maintaining the density of plantation. The PP shall submit the drone images of area before and after the plantation. PP shall carry out pilot study for phyto remediation of hexavalent chromium through IMMT, CSIR, Bhubaneswar. The budget earmarked for the plantation shall be kept in separate bank account and audited annually. PP shall submit the detail such as photographs (before & after with geo-location date & time), details of expert agency engaged, details of species planted, number of species planted, survival rate, density of plantation and outcome of the pilot study etc. to the Regional Office of MoEF&CC, Bhubaneswar and SEIAA, Odisha before 1st July & 1st December of every year for the activities carried out during previous year.
9. Approval/permission of CGWA/SGWA shall be obtained before drawing ground water for the project activities. State Pollution Control Board (SPCB) concerned shall not issue Consent to Operate (CTO) till the project proponent obtains such permission.



10. The amount proposed under Corporate Environment Responsibility (CER) head should be kept in a separate bank account and should be audited annually. The PP should annually submit the audited statement and details of implementation of CER activities along with proof of activities viz. photographs (before & after with geo-location date & time), purchase documents, photographs & Geo-location of the infrastructures/facilities developed, etc. to the Regional Office of MoEF&CC, Bhubaneswar and SEIAA, Odisha before 1st July & 1st December of every year for the activities carried out during previous year.
11. The amount (except occupational health) proposed under Environmental Management Plan (EMP) head should be kept in a separate bank account and should be audited annually. The PP should annually submit the audited statement and detailed environment monitoring report along with proof of activities viz. photographs (before & after with geo-location date & time), purchase documents, sampling reports, photographs & Geo-location of the infrastructures/facilities developed, details of persons engaged in Environment Management Cell etc. to the Regional Office of MoEF&CC, Bhubaneswar and SEIAA, Odisha before 1st July of every year for the activities carried out during previous year.
12. The amount proposed under Occupational Health plan head should be kept in a separate bank account and should be audited annually. The PP should annually submit the audited statement and detailed environment monitoring report along with proof of activities viz. photographs (before & after with geo-location date & time), purchase documents, sampling reports, photographs & Geo-location of the infrastructures/facilities developed, details of persons engaged in Environment Management Cell etc. to the Regional Office of MoEF&CC, Bhubaneswar and SEIAA, Odisha before 1st July of every year for the activities carried out during previous year.
13. The Project Proponent shall set up an Environmental Management Cell comprises of persons having qualification and experience in the field of environment along with supporting staff. The details of the same needs to be submitted to the SEIAA, Odisha within 3 months of the grant of EC.
14. The Sub-Committee of SEAC will visit the site within 6 months from the date of issue of Environmental Clearance to ensure implementation of agreed measures. However, either during the visit of the SEAC Sub-committee and/or at any time, if it is noticed that stipulated conditions on which EC is granted is not in place or found otherwise, steps will be taken for revocation of EC granted.
15. The Project Proponent shall implement the short term and long term measures proposed to be taken in order to get rid from the adversity of Cr (VI) contamination, needs to be implemented and status report of the same along with benefit occurred needs to be submitted to Regional Office of MoEF&CC, Bhubaneswar and SEIAA, Odisha annually.



16. The Project Proponent shall keep a record of each blasting viz. location, number of holes, delay assigned of each hole, explosive quantity of each hole, blasting pattern etc.
17. This Environmental Clearance (EC) is subject to orders/ judgment of Hon'ble Supreme Court of India, Hon'ble High Court, Hon'ble NGT and any other Court of Law, Common Cause Conditions as may be applicable.
18. The Project proponent complies with all the statutory requirements and judgment of Hon'ble Supreme Court dated 2nd August, 2017 in Writ Petition (Civil) No. 114 of 2014 in matter of Common Cause versus Union of India & Ors before commencing the mining operations, if applicable to the Project.
19. The State Government concerned shall ensure that mining operation shall not be commenced till the entire compensation levied, if any, for illegal mining paid by the Project Proponent through their respective Department of Mining & Geology in strict compliance of Judgment of Hon'ble Supreme Court dated 2nd August, 2017 in Writ Petition (Civil) No. 114 of 2014 in matter of Common Cause versus Union of India & Ors as may be applicable.
20. This Environmental Clearance shall become operational only after receiving formal NBWL Clearance from MoEF & CC subsequent to the recommendations of the Standing Committee of National Board for Wildlife, if applicable to the Project.
21. This Environmental Clearance shall become operational only after receiving formal Forest Clearance (FC) under the provision of Forest Conservation Act, 1980, if applicable to the project.
22. Project Proponent (PP) shall obtain Consent to Operate after grant of EC and effectively implement all the conditions stipulated therein. The mining activity shall not commence prior to obtaining Consent to Establish / Consent to Operate from the concerned State Pollution Control Board.
23. The PP shall adhere to the provision of the Mines Act, 1952, Mines and Mineral (Development & Regulation), Act, 2015 and rules & regulations made there under. PP shall adhere to various circulars issued by Directorate General Mines Safety (DGMS) and Indian Bureau of Mines from time to time.
24. The Project Proponent shall obtain consents from all the concerned land owners, before start of mining operations, as per the provisions of MMDR Act, 1957 and rules made there under in respect of lands which are not owned by it.
25. The Project Proponent shall follow the mitigation measures provided in MoEF & CC's Office Memorandum No. Z-11013/57/2014-IA.II (M), dated 29th October, 2014, titled "Impact of mining activities on Habitations-Issues related to the mining Projects wherein Habitations and villages are the part of mine lease areas or Habitations and villages are surrounded by the mine lease area".
26. The copies of the environmental clearance shall be submitted by the project proponents to the Heads of local bodies, Panchayats and Municipal Bodies in



addition to the relevant offices of the Government who in turn has to display the same for 30 days from the date of receipt.

27. State Pollution Control Board shall be responsible for display of this EC letter at its Regional office, District Industries Centre and Collector's office/ Tahasildar's Office for 30 days.
28. The Project Authorities should widely advertise about the grant of this EC letter by printing the same in at least two local newspapers, one of which shall be in vernacular language of the concerned area. The advertisement shall be done within 7 days of the issue of the clearance letter mentioning that the instant project has been accorded EC and copy of the EC letter is available with the State Pollution Control Board and web site of the Ministry of Environment, Forest and Climate Change (www.environmentclearance.nic.in). A copy of the advertisement may be forwarded to the concerned MoEF & CC Regional Office for compliance and record.
29. The Project Proponent shall inform the MoEF & CC/SEIAA, Odisha for any change in ownership of the mining lease. In case there is any change in ownership or mining lease is transferred than mining operation shall only be carried out after transfer of EC as per provisions of the para 11 of EIA Notification, 2006 as amended from time to time.

B. Statutory Conditions:

(I) Air Quality Monitoring and Preservation:

30. The Project Proponent shall install a minimum of 1 (one) online Ambient Air Quality Monitoring Stations to monitor critical parameters, relevant for mining operations, of air pollution viz. PM₁₀, PM_{2.5}, NO₂, CO and SO₂ etc. as per the methodology mentioned in NAAQS Notification No. B-29016/20/90/PCI/I, dated 18.11.2009 covering the aspects of transportation and use of heavy machinery in the impact zone. The ambient air quality shall also be monitored at prominent places like office building, canteen etc. as per the site condition to ascertain the exposure characteristics at specific places. The above data shall be digitally displayed within 03 months in front of the main Gate of the mine site.
31. Effective safeguard measures for prevention of dust generation and subsequent suppression (like regular water sprinkling, metalled road construction etc.) shall be carried out in areas prone to air pollution wherein high levels of PM₁₀ and PM_{2.5} are evident such as haul road, loading and unloading point and transfer points. The Fugitive dust emissions from all sources shall be regularly controlled by installation of required equipments/ machineries and preventive maintenance. Use of suitable water-soluble chemical dust suppressing agents may be explored for better effectiveness of dust control system. It shall be ensured that air pollution level conform to the standards prescribed by the MoEF&CC/ Central Pollution Control



Board.

(II) Water Quality Monitoring and Preservation:

32. In case, immediate mining scheme envisages intersection of ground water table, then Environmental Clearance shall become operational only after receiving formal clearance from CGWA. In case, mining operation involves intersection of ground water table at a later stage, then PP shall ensure that prior approval from CGWA and MoEF&CC is in place before such mining operations. The permission for intersection of ground water table shall essentially be based on detailed hydro-geological study of the area.
33. Regular monitoring of the flow rate of the springs and perennial nallahs flowing in and around the mine lease shall be carried out and records maintain. The natural water bodies and or streams which are flowing in an around the village, should not be disturbed. The Water Table should be nurtured so as not to go down below the pre-mining period. In case of any water scarcity in the area, the Project Proponent has to provide water to the villagers for their use. A provision for regular monitoring of water table in open dug wall located in village should be incorporated to ascertain the impact of mining over ground water table. The Report on changes in Ground water level and quality shall be submitted on six-monthly basis to the Regional Office of the Ministry, CGWA and State Groundwater Department / State Pollution Control Board.
34. Project Proponent shall regularly monitor and maintain records w.r.t. ground water level and quality in and around the mine lease by establishing a network of existing wells as well as new piezo-meter installations during the mining operation in consultation with Central Ground Water Authority/ State Ground Water Department. The Report on changes in Ground water level and quality shall be submitted on six-monthly basis to the Regional Office of the Ministry, CGWA and State Groundwater Department / State Pollution Control Board.
35. The Project Proponent shall undertake regular monitoring of natural water course/ water resources/ springs and perennial nallahs existing/ flowing in and around the mine lease and maintain its records. The project proponent shall undertake regular monitoring of water quality upstream and downstream of water bodies passing within and nearby/ adjacent to the mine lease and maintain its records. Sufficient number of gullies shall be provided at appropriate places within the lease for management of water. PP shall carryout regular monitoring w.r.t. pH and included the same in monitoring plan. The parameters to be monitored shall include their water quality vis-a-vis suitability for usage as per CPCB criteria and flow rate. It shall be ensured that no obstruction and/ or alteration be made to water bodies during mining operations without justification and prior approval of MoEF&CC / SEIAA, Odisha. The monitoring of water courses/ bodies existing in lease area



shall be carried out four times in a year viz. pre- monsoon (April-May), monsoon (August), post-monsoon (November) and winter (January) and the record of monitored data be sent regularly to Ministry of Environment, Forest and Climate Change and its Regional Office, SEIAA, Odisha, Central Ground Water Authority and Regional Director, Central Ground Water Board, State Pollution Control Board and Central Pollution Control Board. Clearly showing the trend analysis on six-monthly basis.

36. Quality of polluted water generated from mining operations which include Chemical Oxygen Demand (COD) in mines run-off, acid mine drainage and metal contamination in runoff shall be monitored along with Total Suspended Solids (TDS), Dissolved Oxygen (DO), pH and Total Suspended Solids (TSS). The monitored data shall be uploaded on the website of the company as well as displayed at the project site in public domain, on a display board, at a suitable location near the main gate of the Company. The circular No. J- 20012/1 /2006-IA.II (M) dated 27.05.2009 issued by Ministry of Environment, Forest and Climate Change may also be referred in this regard.
37. The project proponent shall construct retaining wall and settling pond within the lease area. Further, check dams shall be constructed at strategic locations in which rain water passes in rainy season. Quality of the mine drainage water shall be monitored on real-time basis & also monitored through NABL Lab. Mine drainage water shall be used only after treatment through ETP for various industrial uses.
38. Detail design of the existing retaining wall and the proposed for the expansion from a chartered Civil Engineer shall be submitted within 6 months from the date of issue of Environmental Clearance to ensure that no silt after wash up & treatment is escaped from the core / buffer zone of the mines.
39. Project Proponent shall plan, develop and implement rainwater harvesting measures on long term basis to augment ground water resources in the area in consultation with Central Ground Water Board/ State Groundwater Department. A report on amount of water recharged needs to be submitted to Regional Office, MoEF & CC annually.
40. Industrial waste water (workshop and waste water from the mine) should be properly collected and treated in an ETP as proposed so as to conform to the notified standards prescribed from time to time. The standards shall be prescribed through Consent to Operate (CTO) issued by concerned State Pollution Control Board (SPCB). The workshop effluent shall be treated after its initial passage through Oil and grease trap.
41. The water balance/water auditing shall be carried out and measure for reducing the consumption of water shall be taken up and reported to the Regional Office of the MoEF & CC and State Pollution Control Board.



(III) Noise and Vibration Monitoring and Prevention:

42. The peak particle velocity at 500m distance or within the nearest habitation, whichever is closer shall be monitored periodically as per applicable DGMS guidelines.
43. The illumination and sound at night at project sites disturb the villages in respect of both human and animal population. Consequent sleeping disorders and stress may affect the health in the villages located close to mining operations. Habitations have a right for darkness and minimal noise levels at night. PPs must ensure that the biological clock of the villages is not disturbed; by orienting the floodlights/ masks away from the villagers and keeping the noise levels well within the prescribed limits for day /night hours.
44. The Project Proponent shall take measures for control of noise levels below 85 dBA in the work environment. The worker engaged in operations of HEMM, etc. should be provided with ear plugs /muffs. All personnel including laborers working in dusty areas shall be provided with protective respiratory devices along with adequate training, awareness and information on safety and health aspects. The PP shall be held responsible in case it has been found that workers/ personals/ laborers are working without personal protective equipment.

(IV) Mining Plan:

45. The Project Proponent shall adhere to the working parameters of mining plan which was submitted at the time of EC appraisal wherein year-wise plan was mentioned for total excavation i.e. quantum of mineral, waste, over burden, inter burden and top soil etc.. No change in basic mining proposal like mining technology, total excavation, mineral & waste production, lease area and scope of working (viz. method of mining, overburden & dump management, O.B & dump mining, mineral transportation mode, ultimate depth of mining etc.) shall not be carried out without prior approval of the Ministry of Environment, Forest and Climate Change, which entail adverse environmental impacts, even if it is a part of approved mining plan modified after grant of EC or granted by State Govt. in the form to Short Term Permit (STP), Query license or any other name.
46. The Project Proponent shall get the Final Mine Closure Plan along with Financial Assurance approved from Indian Bureau of Mines/Department of Mining & Geology as required under the Provision of the MMDR Act, 1957 and Rules/ Guidelines made there under. A copy of approved final mine closure plan shall be submitted within 2 months of the approval of the same from the competent authority to the concerned Regional Office of the Ministry of Environment, Forest and Climate Change for record and verification.
47. The land-use of the mine lease area at various stages of mining scheme as well as at the end-of-life shall be governed as per the approved Mining Plan. The



excavation vis-a-vis backfilling in the mine lease area and corresponding afforestation to be raised in the reclaimed area shall be governed as per approved mining plan. PP shall ensure the monitoring and management of rehabilitated areas until the vegetation becomes self-sustaining. The compliance status shall be submitted half-yearly to the MoEF & CC and its concerned Regional Office / SEIAA, Odisha.

(V) Land Reclamation:

48. The Overburden (O.B.) generated during the mining operations shall be stacked at earmarked OB dump site(s) only and it should not be kept active for a long period of time. The physical parameters of the OB dumps like height, width and angle of slope shall be governed as per the approved Mining Plan as per the guidelines/circulars issued by D.G.M.S w.r.t. safety in mining operations shall be strictly adhered to maintain the stability of top soil/OB dumps. The topsoil shall be used for land reclamation and plantation.
49. The reject/waste generated during the mining operations shall be stacked at earmarked waste dump site(s) only. The physical parameters of the waste dumps like height, width and angle of slope shall be governed as per the approved Mining Plan as per the guidelines/circulars issued by DGMS w.r.t. safety in mining operations shall be strictly adhered to maintain the stability of waste dumps.
50. The reclamation of waste dump sites shall be done in scientific manner as per the Approved Mining Plan cum Progressive Mine Closure Plan.
51. The slope of dumps shall be vegetated in scientific manner with suitable native species to maintain the slope stability, prevent erosion and surface run off. The selection of local species regulates local climatic parameters and help in adaptation of plant species to the microclimate. The gullies formed on slopes should be adequately taken care of as it impacts the overall stability of dumps. The dump mass should be consolidated with the help of dozer/ compactors thereby ensuring proper filling/ leveling of dump mass. In critical areas, use of geo textiles/ geo-membranes / clay liners / Bentonite etc. shall be undertaken for stabilization of the dump.
52. The Project Proponent shall carry out slope stability study in case the dump height is more than 30 meters. The slope stability report shall be submitted to concerned regional office of MoEF & CC, Govt. of India, Bhubaneswar as well as SEIAA, Odisha.
53. Catch drains, settling tanks and siltation ponds of appropriate size shall be constructed around the mine working, mineral yards and topsoil / OB / waste dumps to prevent runoff of water and flow of sediments directly into the water bodies (Nallah/ River/ Pond etc.). The collected water should be utilized for watering the mine area, roads, green belt development, plantation etc. The drains/



sedimentation sumps etc. shall be de-silted regularly, particularly after monsoon season, and maintained properly.

54. Check dams of appropriate size, gradient and length shall be constructed around mine pit and OB dumps to prevent storm run-off and sediment flow into adjoining water bodies. A safety margin of 50% shall be kept for designing of sump structures over and above peak rainfall (based on 50 years data) and maximum discharge in the mine and its adjoining area which shall also help in providing adequate retention time period thereby allowing proper settling of sediments/ silt material. The sedimentation pits/ sumps shall be constructed at the corners of the garland drains.
55. Storm water and leached water for treatment shall be led in separate pipes and where required, retaining wall, settling pond and check dam shall be constructed within the lease hold area for conservation of rain water and prevention of soil loss.
56. The top soil, if any, shall temporarily be stored at earmarked site(s) within the mine lease only and should not be kept unutilized for long. The physical parameters of the top soil dumps like height, width and angle of slope shall be governed as per the approved Mining Plan and as per the guidelines framed by DGMS w.r.t. safety in mining operations shall be strictly adhered to maintain the stability of dumps. The topsoil shall be used for land reclamation and plantation purpose.
57. The mining lease holder shall, after ceasing mining operations, undertake re-grassing the mining area and any other area which may have been disturbed due to their mining activities and restore the land to a condition which is fit for growth of fodder, flora, fauna etc.
58. Slope study by an expert of repute of water dumps to be done and submitted within six months from the date of issue of EC to SEAC / SEIAA

(VI) Transportation:

59. No Transportation of the minerals shall be allowed in case of roads passing through transportation of the minerals leaving an adequate gap (say at least 200 meters) so that the adverse impact of sound and dust along with chances of accidents could be mitigated. All costs resulting from widening and strengthening of existing public road network shall be borne by the PP in consultation with nodal State Govt. Department. Transportation of minerals through road movement in case of existing village/ rural roads shall be allowed in consultation with nodal State Govt. Department only after required strengthening such that the carrying capacity of roads is increased to handle the traffic load. The pollution due to transportation load on the environment will be effectively controlled and water sprinkling will also be done regularly. Vehicular emissions shall be kept under control and regularly monitored. Project should obtain Pollution Under Control (PUC) certificate for all the vehicles from authorized pollution testing centers.
60. The Main haulage road within the mine lease should be provided with a permanent



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

61. The pollution due to transportation load on the environment will be effectively controlled and water sprinkling will also be done regularly. Vehicular emissions shall be kept under control and regularly monitored. Project should obtain Pollution under Control (PUC) certificate for all the vehicles from authorized pollution testing centers.
62. Haulage road shall be developed and maintained perennially and perpetually by the proponent in construction with the concerned authority of the Govt. and to this effect, the proponent shall submit an undertaking in form of a legal affidavit
63. Traffic density study if not done by domain expert, then the expert to be ratified / authenticated by domain expert and submitted within a month time

(VII) Green Belt:

64. The Project Proponent shall develop greenbelt in 7.5m wide safety zone all along the mine lease boundary as per the guidelines of CPCB in order to arrest pollution emanating from mining operations within the lease. The whole Green belt shall be developed within first 5 years starting from windward side of the active mining area. The development of greenbelt shall be governed as per the EC granted by the Ministry irrespective of the stipulation made in approved mine plan.
65. The Project Proponent shall carryout plantation/ afforestation in backfilled and reclaimed area of mining lease, around water body, along the roadsides, in community areas etc. by planting the native species in consultation with the State Forest Department/ Agriculture Department/ Rural development department/ Tribal Welfare Department/ Gram Panchayat such that only those species be selected which are of use to the local people. The CPCB guidelines in this respect shall also be adhered. The density of the trees should be around 2500 saplings per Hectare. Adequate budgetary provision shall be made for protection and care of trees.
66. The Project Proponent shall make necessary alternative arrangements for livestock feed by developing grazing land with a view to compensate those areas which are coming within the mine lease. The development of such grazing land shall be done in consultation with the State Government. In this regard, Project Proponent should essentially implement the directions of the Hon'ble Supreme



Court with regard to acquisition of grazing land. The sparse trees on such grazing ground, which provide mid-day shelter from the scorching sun, should be scrupulously guarded/ protected against felling and plantation of such trees should be promoted.

67. The Project Proponent shall undertake all precautionary measures for conservation and protection of endangered flora and fauna and Schedule-I species during mining operation. A Wildlife Conservation Plan shall be prepared for the same clearly delineating action to be taken for conservation of flora and fauna. The Plan shall be approved by Chief Wild Life Warden of the State Govt. and implemented in consultation with the State Forest and Wildlife Department. A copy of Wildlife Conservation Plan and its implementation status (annual) shall be submitted to the Regional Office of the Ministry.

(VIII) Public hearing and human health issues:

68. The Project Proponent shall appoint an Occupational Health Specialist for Regular as well as Periodical medical examination of the workers engaged in the mining activities, as per the DGMS guidelines. The records shall be maintained properly. PP shall also carryout Occupational health check-ups in respect of workers which are having ailments like BP, diabetes, habitual smoking, etc. The check-ups shall be undertaken once in six months and necessary remedial/ preventive measures be taken. A status report on the same may be sent to MoEF & CC Regional Office and DGMS on half-yearly basis.
69. A commitment in form of an undertaking for periodical occupational health check up of the employee and the local people shall be done through an occupational health expert.
70. The Project Proponent must demonstrate commitment to work towards 'Zero Harm' from their mining activities and carry out Health Risk Assessment (HRA) for identification workplace hazards and assess their potential risks to health and determine appropriate control measures to protect the health and wellbeing of workers and nearby community. The proponent shall maintain accurate and systematic records of the HRA. The HRA for neighborhood has to focus on Public Health Problems like Malaria, Tuberculosis, HIV, Anaemia, Diarrhoea in children under five, respiratory infections due to bio mass cooking. The proponent shall also create awareness and educate the nearby community and workers for Sanitation, Personal Hygiene, Hand washing, not to defecate in open, Women Health and Hygiene (Providing Sanitary Napkins), hazard of tobacco and alcohol use. The Proponent shall carryout base line HRA for all the category of workers and thereafter every five years.
71. The Proponent shall carry out Occupational health surveillance which be a part of HRA and include Biological Monitoring where practical and feasible, and the tests and investigations relevant to the exposure (e.g. for Dust a X-Ray chest; For Noise



Audiometric; for Lead Exposure Blood Lead, For Welders Full Ophthalmologic Assessment; for Manganese Miners a complete Neurological Assessment by a Certified Neurologist, and Manganese (Mn) estimation in Blood; For Inorganic Chromium- Fortnightly skin inspection of hands and forearms by a responsible person. Except routine tests all tests would be carried out in a Lab accredited by NABH. Records of Health Surveillance must be kept for 30 years, including the results of and the records of Physical examination and tests. The record of exposure due to materials like Asbestos, Hard Rock Mining, Silica, Gold, Kaolin, Aluminium, Iron, Manganese, Chromium, Lead, Uranium need to be handed over to the Mining Department of the State in case the life of the mine is less than 30 years. It would be obligatory for the State Mines Departments to make arrangements for the safe and secure storage of the records including X-Ray. Only conventional X-Ray will be accepted for record purposes and not the digital one). X-Ray must meet ILO criteria (17 x14 inches and of good quality).

72. The Proponent shall maintained a record of performance indicators for workers which includes (a) there should not be a significant decline in their Body Mass Index and it should stay between 18.5 -24.9, (b) the Final Chest X-Ray compared with the base line X-Ray should not show any capacities,(c) At the end of their leaving job there should be no Diminution in their Lung Functions Forced Expiratory Volume in one second (FEV1),Forced Vital Capacity (FVC), and the ratio) unless they are smokers which has to be adjusted, and the effect of age, (d) their hearing should not be affected. As a proof an Audiogram (first and last need to be presented), (e) they should not have developed any Persistent Back Pain, Neck Pain, and the movement of their Hip, Knee and other joints should have normal range of movement, (f) they should not have suffered loss of any body part. The record of the same should be submitted to the Regional Office, MoEF&CC annually along with details of the relief and compensation paid to workers having above indications.
73. The Project Proponent shall ensure that 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.
74. Project Proponent shall make provision for the housing for workers/labors or shall construct labor camps within/outside (company owned land) with necessary basic infrastructure/ facilities like fuel for cooking, mobile toilets, mobile STP, safe drinking water, medical health care, creche for kids etc. The housing may be provided in the form of temporary structures which can be removed after the completion of the project related infrastructure. The domestic waste water should be treated with STP in order to avoid contamination of underground water.
75. The proponent shall implement the mitigative measures as suggested in the Study Report on effect of chromite mines to nearest human habitation.



(IX) Corporate Environment Responsibility (CER):

76. As per the MoEF & CC, Govt. of India Office Memorandum dated 30.09.2020, the project proponent is required to prepare and implement Corporate Environment Responsibility (CER) Plan. The activities proposed under CER shall be restricted to the affected area around the project. The company shall undertake all relevant measures for improving the socio-economic conditions of the surrounding area. CSR activities shall be undertaken by involving local villages and administration. The activities proposed for CER shall be implemented and to be completed within three years and annual report of implementation of the same along with documentary proof viz. photographs, purchase documents, latitude & longitude of infrastructure developed & road constructed needs to be submitted to Regional Office MoEF & CC annually along with audited statement and to the District Collector. It should be posted on the website of the project proponent.
77. Action plan for implementing EMP and environmental conditions along with responsibility matrix of the company shall be prepared and shall be duly approved by competent authority. The year wise funds earmarked for environmental protection measures shall be kept in separate account and not to be diverted for any other purpose. Year wise progress of implementation of action plan shall be reported to the Regional Office of MoEF & CC, Bhubaneswar, SPCB, Odisha along with the Six Monthly Compliance Report.

(X) Miscellaneous:

78. The Project Proponent shall prepare digital map (land use & land cover) of the entire lease area once in five years purpose of monitoring land use pattern and submit a report to concerned Regional Office of the MoEF & CC.
79. The Project Authorities should inform to the Regional Office regarding date of financial closures and final approval of the project by the concerned authorities and the date of start of land development work.
80. The project proponent shall establish a solar power plant with 30KVA capacity within the lease area as proposed.
81. It shall be mandatory for the project management to submit six (06) monthly compliance reports on post environmental monitoring in respect of the stipulated terms and conditions in this Environmental Clearance to the State Environment Impact Assessment Authority (SEIAA), Odisha, SPCB & Regional Office of the Ministry of Environment & Forest, Odisha in hard and soft copies on 1st June and 1st December of each calendar year. The proponent shall also upload the compliance report including results of monitored data, as applicable in the website of the Ministry for monitoring of EC Conditions.



82. The environmental statement for each financial year ending 31st March in Form-V as is mandated to be submitted by the project proponent to the Odisha State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently, shall also be put on the website of the company along with the status of compliance of EC conditions and shall also be sent to the respective to the MoEF & CC & its concerned Regional Office, Central Pollution Control Board and State Pollution Control Board.
83. The proponent shall submit/upload six monthly reports on the status of compliance of the stipulated Environmental Clearance conditions, including results of monitored data on their website and shall update the same periodically. It shall simultaneously be sent to the Regional Office of MoEF & CC, Govt. of India, the respective Zonal Office of CPCB and the SPCB. The criteria pollutant levels namely: SPM, RSPM, SO₂, NO_x (ambient levels as well as stack emissions) or critical sectoral parameters, indicated for the project shall be monitored and displayed at a convenient location near the main gate of the company in the public domain.
84. The Project Proponent shall submit six monthly compliance reports on the status of the implementation of the stipulated environmental safeguards to the MoEF & CC & its concerned Regional Office, SEIAA, Odisha, Central Pollution Control Board and State Pollution Control Board.
85. The SEIAA, Odisha may revoke or suspend this EC, if implementation of any of the above conditions is not satisfactory. The SEIAA, Odisha reserves the right to alter /modify the above conditions or stipulate any further condition in the interest of environment protection.
86. The project proponent shall augment infrastructure on drinking water, health care and education in nearby villages as per time bound action plan submitted.
87. The project proponent shall obtain permission from DGMS under 106(2b) to carry out blasting operation within the lease area.
88. The site will be visited by the sub-Committee of SEAC after six months to review the progress of recommendations of SEAC on specific conditions.
89. The concerned Regional Office of the MoEF & CC shall randomly monitor compliance of the stipulated conditions. The project authorities should extend full cooperation to the MoEF & CC officer(s) by furnishing the requisite data / information / monitoring reports.
90. The above conditions will be enforced inter-alia, under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986 and the Public Liability Insurance Act, 1991 along with their amendments and rules made there under and also any other orders passed by the Hon'ble Supreme Court of India/ High Court and any other Court of Law relating to the subject matter.




91. This Environmental Clearance (EC) is subject to orders/judgment of Hon'ble Supreme Court of India, Hon'ble High Court, Hon'ble NGT and any other Court of Law, Common Cause Conditions as may be applicable.
92. Any appeal against this environmental clearance shall lie with the National Green Tribunal, if preferred, within a period of 30 days as prescribed under Section 16 of the National Green Tribunal Act, 2010.

Yours faithfully,


Member Secretary

Copy to :

1. **Joint Secretary (Environment)**, Ministry of Environment, Forests and Climate Change Govt. of India, Indira Paryavaran Bhavan, Jor Bagh Road, Aliganj, New Delhi-110003 for information.
2. **Additional Chief Secretary**, Forests & Environment Dept., Government of Odisha for information.
3. **Member Secretary**, State Pollution Control Board, Odisha, Paribesh Bhawan, A/118, Nilakantha Nagar, Unit-8, Bhubaneswar for information.
4. **Additional Principal Conservator** of Forests, Regional Office (EZ), Ministry of Environment & Forests, A-31, Chandrasekharapur, Bhubaneswar for information.
5. **Member Secretary**, CGWA, 18/11, Jamnagar House, ManSingh Road, New Delhi-110011 for information.
6. **Collector, District Magistrate**, Jaipur, for kind information and necessary action.
7. **Secretary**, SEAC, Paribesh Bhawan, A/118, Nilakantha Nagar, Unit-VIII, Bhubaneswar for kind information.
8. Guard file for record/Website/Parivesh Portal.


Member Secretary

Signature Not Verified

Digitally signed by D. K. Murugesan
Member Secretary

Date: 4/4/2022 4:38:25 PM

Annexure-VI

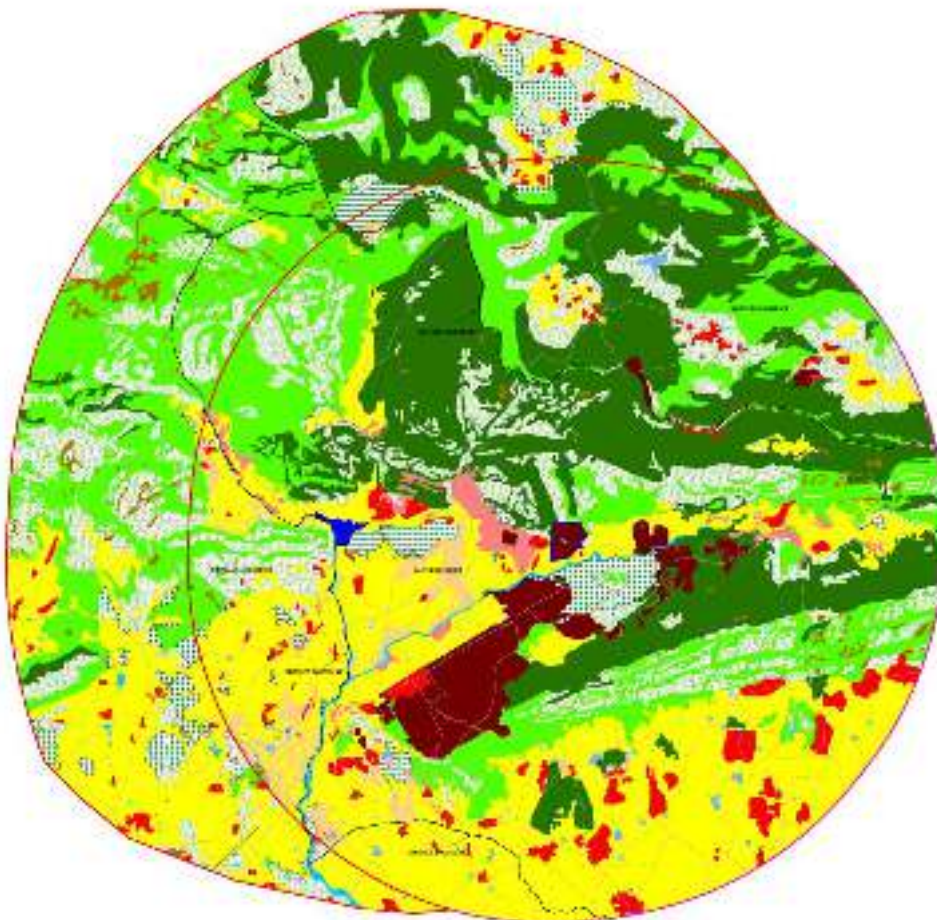
Study of Land Use Pattern of

Additional Zone of Impact, Ostapal Chromite Mine of M/s Ferro Alloys Corporation Ltd

The Additional Zone of Impact (area 162.20 Sq.km) has been analyzed from Satellite imagery. The details of Land use pattern (Add. ZOI) is furnished below.

Land use pattern of Additional Zone of Impact Ostapal				
Land Use	District (Area in Sq.Km)			Total
	Dhenkanal	Jajpur	Keonjhar	
Agricultural land	31.5616	0.2794	3.9063	35.7473
Dense Forest	5.4182	0.5801	19.9247	25.9230
Open Forest	37.288	6.6488	5.6975	49.6343
Forest Plant.	0.056	0	0	0.0560
Mining / industry	0	0	0	0.0000
Reservoir	0	0	0	0.0000
Road	0.0362	0.0011	0.0211	0.0584
Scrub Forest	22.2287	2.9852	11.9968	37.2107
Settlement	1.4413	0.022	0.7367	2.2000
Tree cover	4.0425	0.013	3.585	7.6405
Scrub dense	0	0	0	0.0000
Scrub open	0	0	0	0.0000
Barren / rocky / stony	2.717	0.1704	0.1289	3.0163
Lake / ponds	0.0212	0	0	0.0212
River / stream	0.6894	0	0.0031	0.6925
Total	105.50	10.70	46.00	162.20

MAP OF US LOCAL CEMENT PLANTS OF S.S. FERRO ALLOY CORPORATION, LTD. IN VILLAGE
 SOJALAI, UNDER DISTRICT JALPAIGURI OF JHARKHAND STATE, INDIA.



LEGEND

- High intensity
- Low intensity
- Very low intensity
- No intensity
- Road
- Water body
- Cement plants
- Other plants
- Water bodies
- Roads
- High intensity
- Low intensity
- Very low intensity
- No intensity
- Road
- Water body
- Cement plants
- Other plants
- Water bodies
- Roads

Sl. No.	Plant Name	Capacity (MT/Day)	Location
1	Plant 1	1000	Plant 1
2	Plant 2	1000	Plant 2
3	Plant 3	1000	Plant 3
4	Plant 4	1000	Plant 4
5	Plant 5	1000	Plant 5
6	Plant 6	1000	Plant 6
7	Plant 7	1000	Plant 7
8	Plant 8	1000	Plant 8
9	Plant 9	1000	Plant 9
10	Plant 10	1000	Plant 10
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94	Plant 94	1000	Plant 94
95	Plant 95	1000	Plant 95
96	Plant 96	1000	Plant 96
97	Plant 97	1000	Plant 97
98	Plant 98	1000	Plant 98
99	Plant 99	1000	Plant 99
100	Plant 100	1000	Plant 100

Annexure-VII

Demographic profile in the ZOI								
SI No	Village	No_HH	TOT_P	TOT_M	TOT_F	P_SC	P_ST	P_LIT
Keonjhar								
1	Talapada	98	413	194	219	2	391	282
2	Sonatangiri	302	1293	634	659	5	919	633
3	Revana(Ka)	63	271	140	131	4	205	130
4	Daitari (CT)	1043	4065	2162	1903	693	1436	2910
S. Total	4 Village	1506	6042	3130	2912	704	2951	3955
Jajpur								
5	Ambapal	167	820	404	416	31	563	422
6	Arjunjhar	81	429	209	220	131	277	125
7	Baghuapal	163	1000	429	571	57	941	436
8	Baragaji	121	598	307	291	0	596	167
9	Bhalukipatala	195	1173	619	554	102	424	715
10	Chingudipal	446	2402	1241	1161	212	1161	1381
11	Deogan	124	735	363	372	0	686	101
12	Dhabahali	67	315	163	152	0	278	142
13	Gantayatkateni	89	461	232	229	0	416	172
14	Garamian	333	1873	962	911	3	1817	708
15	Giringamala	440	2404	1199	1205	56	1222	1039
16	Guhiasal	32	155	80	75	0	134	2
17	Gurujanga	236	1115	576	539	42	615	516
18	Jemadeipur	82	509	249	260	0	493	84
19	Kakudia	135	643	323	320	5	508	365
20	Kalarangiata (CT)	1256	5505	2882	2623	153	2068	3610
21	Kaliapani (CT)	1142	5028	2666	2362	351	2005	3175
22	Kamardiha	180	705	357	348	186	0	582
23	Karadagadia	214	1167	580	587	29	1005	451
24	Kolha	112	539	277	262	0	480	134
25	Krushnapada	472	2114	1086	1028	667	77	1487
26	Kusumundia	130	653	327	326	52	555	344
27	Nuadihi	121	671	328	343	36	51	452
28	Ostapal	322	1283	643	640	141	1	810
29	Panasua	29	155	76	79	0	0	123
30	Patana	82	471	224	247	113	309	228
31	Ragada	335	1807	911	896	76	988	845
32	Rankia	371	1946	928	1018	0	1338	642
33	Ransol	199	926	461	465	69	97	637
34	Saruabil	317	1542	789	753	48	879	811

35	Talangi	131	636	298	338	0	580	245
S.total	31 Village	8124	39780	20189	19591	2560	20564	20951
Dhenkanal								
36	Chadeiragada(ka)	128	613	294	319	18	390	363
37	Denga Bahali	79	435	219	216	0	410	175
38	Kampulei	222	939	470	469	65	296	535
39	Kateni No-02	17	59	31	28	0	10	37
40	Kathapal	180	876	442	434	781	0	578
41	Kenduapada	135	650	309	341	3	565	207
42	Kharakhari	197	991	511	480	17	595	506
43	Maruabili	393	2119	1008	1111	315	698	1411
44	Sapuajhar	65	275	134	141	35	163	144
S.Total	9 Village	1416	6957	3418	3539	1234	3127	3956
G.Total	44 Village	11046	52779	26737	26042	4498	26642	28862

Demographic Profile of the Ostapal Mines (Additional ZOI)								
Sl No	Village	No_HH	TOT_P	TOT_M	TOT_F	P_SC	P_ST	P_LIT
	Keonjhar							
1	Junga	264	1103	558	545	56	886	600
2	Kalighai	48	235	112	123	0	235	159
3	Kanjiapal	65	268	126	142	0	245	128
4	Kusumajodi	108	579	285	294	9	524	183
5	Naradangipenth	112	509	244	265	0	336	140
6	Pathuripentha	20	109	51	58	0	94	34
7	Raghabpur	125	568	291	277	129	0	446
8	Turkipada	54	248	111	137	12	223	23
8Village	Total	796	3619	1778	1841	206	2543	1713
	Dhenkanal							
1	Bhalutangar	75	381	209	172	0	381	132
2	Ekuli	56	276	151	125	1	275	184
3	Korianpal	213	856	447	409	436	70	487
4	Patharakata	152	651	341	310	27	252	387
5	Salia	43	226	115	111	67	0	174
6	Sendhasar	337	1507	770	737	31	1034	773
7	Sitalabasa	108	536	268	268	0	4	404
7Village	Total	984	4433	2301	2132	562	2016	2541
	Jajpur							
1Village	Nagada	55	307	149	158	0	307	1
16Village	G.Total	1835	8359	4228	4131	768	4866	4255

District	No of Village	No_HH	TOT_P	TOT_M	TOT_F	P_SC	P_ST	P_LIT
Dhenkanal	7	984	4433	2301	2132	562	2016	2541
Jajpur	1	55	307	149	158	0	307	1
Keonjhar	8	796	3619	1778	1841	206	2543	1713
Total	16	1835	8359	4228	4131	768	4866	4255
Percentage				50.58	49.42	9.19	58.21	50.90



OFFICE OF THE DIVISIONAL FOREST OFFICER: CUTTACK FOREST DIVISION

AT:- GHATAKULA, NUAPADA, CUTTACK 753010

Tel:- 0671-2957611 FAX:- 0671-2347611 Email:- dfocuttack-od@gov.in

No. 6740 /SF(Forest Diversion) 235/2021

Dated, Cuttack the 23th September, 2021

To

The Authorized Signatory,
Ostapal Chromite Mines,
M/s FACOR Ltd.

Sub: - List of Flora and Fauna existing in Sukinda valley for the purpose of Environmental clearance in respect of Ostapal Chromite Mines of M/S FACOR Ltd.

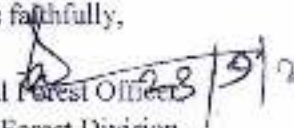
Ref: - Your Letter No.BHF/E-7/332/2021 dt.30.08.2021.

Sir,

As requested by you vide your letter under reference, the list of Flora and Fauna existing in Sukinda Valley as per prescribed working plan is re-sent herewith for the purpose of Environmental Clearance for expansion project from 0.200 MTPA to 0.240 MTPA chromite ore (ROM) & beneficiated chrome ore of 0.1 MTPA through opencast mining of Mining Lease of Ostapal Chromite Mines which may please be acknowledge.

Encl: As above.

Yours faithfully,


Divisional Forest Officer
Cuttack Forest Division.

LIST OF FLORA

Sl. No.	Local name	Botanical name	Family
Tree			
1	Acacia	<i>Acacia aciculiformis</i>	Mimosaceae
2	Akasmali / Akas mmi	<i>Meltingtonia hortensis</i>	Bigoniaceae
3	Amra / Am	<i>Mangifera indica</i>	Anacardiaceae
4	Amhada / Anda	<i>Spondias pinnata</i>	Anacardiaceae
5	Amsha	<i>Bauhinia racemosa</i>	Fabaceae
6	Amli	<i>Lasiohema retusum</i>	Caesalpiniaceae
7	Anelhu	<i>Morinda tinctoria</i>	Rubiaceae
8	Ankura	<i>Alangium lanarekii</i>	Alangiaceae
9	Anla / Amila	<i>Phyllanthus emblica</i>	Euphorbiaceae
10	Ajuna / Kaha / Kai	<i>Terminalia arjuna</i>	Combretaceae
11	Asan / Sahaja	<i>Terminalia tomentosa</i>	Combretaceae
12	Aslak	<i>Sarcosasis</i>	Fabaceae
13	Aswathi / Poopal / Osta	<i>Ficus religiosa</i>	Moraceae
14	Bahat	<i>Acacia nilotica</i>	Mimosaceae
15	Bahada	<i>Terminalia belerica</i>	Combretaceae
16	Dana kapusta	<i>Kydia cordata</i>	Malvaceae
17	Benadhan / Tinsa	<i>Ougeana insignis</i>	Fabaceae
18	Banala	<i>Artocarpus lacucha</i>	Myrsinaceae
19	Bara	<i>Ficus bengalensis</i>	Moraceae
20	Hambaluria / Diaben	<i>Dalbergia paniculata</i>	Fabaceae
21	Barada	<i>Bauhinia purpurea</i>	Caesalpiniaceae
22	Barkeli	<i>Zizyphus maurandia</i>	Rhamnaceae
23	Barua	<i>Croton retusus</i>	Capparidaceae
24	Bata	<i>Melia dubia</i>	Meliaceae
25	Bate	<i>Schinus molle</i>	Sapotaceae
26	Baneta	<i>Linaria acutobas</i>	Rutaceae
27	Bea	<i>Aegle marmelos</i>	Rutaceae
28	Bana	<i>Nuclea cordata</i>	Rutaceae
29	Bhalia	<i>Semecarpus anacardium</i>	Anacardiaceae
30	Bhera	<i>Chloroxylon swietenia</i>	Rutaceae
31	Cashew	<i>Anacardium occidentale</i>	Anacardiaceae
32	Chadholgudi	<i>Pteris longifolia</i>	Verbenaceae
33	Chalanda	<i>Cassia monna</i>	Caesalpiniaceae
34	Champa	<i>Michelia champaca</i>	Annonaceae
35	Chara	<i>Buchanania lanzan</i>	Anacardiaceae
36	Chaul (Makha)	<i>Cassia glabra</i>	Caesalpiniaceae
37	Chhagan	<i>Alstonia scholaris</i>	Apocynaceae
38	Chhagatuli	<i>Stemmadia indica</i>	Bignoniaceae
39	Chikhi / Kaichua	<i>Glochidion malabaricum</i>	Euphorbiaceae

Sl. No.	Local name	Botanical name	Family
40	Damgurudu	<i>Gardenia latifolia</i>	Rubiaceae
41	Debadaru	<i>Polyalthia longifolia</i>	Annonaceae
42	Dhalasiris	<i>Albizia procera</i>	Mimosaceae
43	Dhaman	<i>Grewia tilifolia</i>	Tiliaceae
44	Dhaura	<i>Anogeissus latifolia</i>	Combretaceae
45	Dhauranza	<i>Holoptelia integrifolia</i>	Ulmaceae
46	Dimiri	<i>Ficus glomerata</i>	Moraceae
47	Eucalyptus / Nilagiri	<i>Eucalyptus spp</i>	Myrtaceae
48	Gambhari	<i>Cassia arborea</i>	Verbenaceae
49	Gandha palas	<i>Millettia velutina</i>	Annonaceae
50	Ganga siuli	<i>Nectanthus arborescens</i>	Oleaceae
51	Genduli (Girdhini)	<i>Sterculia urens</i>	Sterculiaceae
52	Ghontol (Gotha)	<i>Ziziphus xylocarpus</i>	Rhamnaceae
53	Ghodalanjia	<i>Albizia chinensis</i>	Mimosaceae
54	Ghurudu	<i>Gardenia grandiflora</i>	Rubiaceae
55	Giringa	<i>Pterospermum canescens</i>	Sterculiaceae
56	Gohira	<i>Acacia leucophloea</i>	Mimosaceae
57	Halda	<i>Diospyros montana</i>	Ebenaceae
58	Harida	<i>Terminalia chebula</i>	Combretaceae
59	Hijal	<i>Barringtonia acutangula</i>	Myrtaceae
60	Jaisanda	<i>Litsea glutinosa</i>	Lauraceae
61	Jamu/Jambu	<i>Syzygium cumini</i>	Myrtaceae
62	Jari	<i>Ficus virens</i>	Moraceae
63	Jethi	<i>Artocarpus lacucha</i>	Moraceae
64	Kadani/Kadamba	<i>Anthocephalus cadamba</i>	Rubiaceae
65	Katha	<i>Limonia acidissima</i>	Rutaceae
66	Kalichia	<i>Diospyros sylvatica</i>	Ebenaceae
67	Kamlagundi	<i>Mallotus philippinensis</i>	Euphorbiaceae
68	Kangada	<i>Xylocarpus xylocarpus</i>	Mimosaceae
69	Kansa	<i>Hymenodictyon excelsum</i>	Rubiaceae
70	Kapasia	<i>Kydia calycina</i>	Malvaceae
71	Karada / Karla	<i>Cleistanthus collinus</i>	Euphorbiaceae
72	Karanja	<i>Pongamia pinnata</i>	Fabaceae
73	Kasi / Khais	<i>Bridelia retusa</i>	Euphorbiaceae
74	Katikala	<i>Strychnos potatorum</i>	Loganiaceae
75	Katha badam	<i>Terminalia catappa</i>	Combretaceae
76	Katha jamu	<i>Eugenia hirsuta</i>	Myrtaceae
77	Katranga / Domkurudu	<i>Gardenia latifolia</i>	Rubiaceae
78	Kendu / Tendu	<i>Diospyros melanoxylon</i>	Ebenaceae
79	Khair	<i>Acacia catechu</i>	Mimosaceae
80	Khakada	<i>Casuarina elliptica</i>	Samiaceae
81	Kochila	<i>Stychnos nuxvomica</i>	Loganiaceae

Sl. No.	Local name	Botanical name	Family
82	Krushnachuda	<i>Detonia regia</i>	Caesalpiniaceae
83	Kumbli	<i>Careya arborea</i>	Leechthidaceae
84	Kuruma / Haldu	<i>Adina cordifolia</i>	Rubiaceae
85	Kusum	<i>Schleichera oleosa</i>	Sapindaceae
86	Lanka badhial	<i>Annona reticulata</i>	Annonaceae
87	Lambu (Kagan)	<i>Citrus aurantifolia</i>	Rutaceae
88	Leimur Mai	<i>Bursera serrata</i>	Burseraceae
89	Lodha	<i>Symplocos racemosa</i>	Symplocaceae
90	Mahda	<i>Ailanthus excelsa</i>	Simarubaceae
91	Mehi	<i>Lannea coromandelica</i>	Anacardiaceae
92	Manda / Gandhaguria	<i>Macaranga peltata</i>	Euphorbiaceae
93	Mankara kenda	<i>Diospyros embryopteris</i>	Ebenaceae
94	Mohul	<i>Madhuca indica</i>	Sapotaceae
95	Mokha / Mukha	<i>Scheuchera swietenioides</i>	Oleaceae
96	Morda	<i>Milletia oriculata</i>	Fabaceae
97	Muchkanda	<i>Pterospermum acerifolium</i>	Sterculiaceae
98	Mundi / Mitkania	<i>Astragyna parviflora</i>	Rubiaceae
99	Neem Limbo	<i>Azadirachta indica</i>	Meliaceae
100	Nimbunimoi	<i>Bursera serrata</i>	Burseraceae
101	Onu	<i>Dillenia indica</i>	Dilleniaceae
102	Paladhua	<i>Erythrina indica</i>	Fabaceae
103	Palas / Phalas	<i>Butea monosperma</i>	Fabaceae
104	Panas	<i>Artocarpus integrifolia</i>	Moraceae
105	Panigumbhari / Tabhar	<i>Trewia nudiflora</i>	Euphorbiaceae
106	Panikadala	<i>Fernandea colmata</i>	Sterculiaceae
107	Panikeseru / Pitakeseru	<i>Aphanamixis polystachya</i>	Meliaceae
108	Panipatali	<i>Lagerstrœmia speciosa</i>	Lythraceae
109	Patamasu / Gandhapalas	<i>Polyalthia cerasoides</i>	Annonaceae
110	Phanphana / Phantuni	<i>Oroxylon indicum</i>	Bignoniaceae
111	Phasi	<i>Anogeissus acuminata</i>	Correaeaceae
112	Pisak Bija	<i>Pterocarpus marsipian</i>	Fabaceae
113	Pochandia	<i>Putranjiva roxburghii</i>	Euphorbiaceae
114	Peijamu / Bhatjenu	<i>Syzygium caryophyllifolium</i>	Myrtaceae
115	Radnachuda	<i>Peltaphornofruginatum</i>	Caesalpiniaceae
116	Rai / Kerengha / Michunachu	<i>Dillenia pentagyna</i>	Dilleniaceae
117	Rithe / Muktamaja	<i>Sapindus emarginatus</i>	Sapindaceae
118	Rohini	<i>Soymila febrifuga</i>	Meliaceae
119	Sahada	<i>Streblus asper</i>	Moraceae
120	Sal / Sargi / Rengai	<i>Shorea robusta</i>	Dipterocarpaceae
121	Salai	<i>Baccharia serrata</i>	Burseraceae
122	Salap	<i>Coryata swens</i>	Palmaceae / Arecaceae

Sl. No.	Local name	Botanical name	Family
123	Sidha / Senha	<i>Lagerstroemia parviflora</i>	Lythraceae
124	Sija	<i>Euphorbia nervifolia</i>	Euphorbiaceae
125	Sinai / Simili	<i>Bombax catha</i>	Boraginaceae
126	Siris	<i>Albizia lebbek</i>	Mimosaceae
127	Sissoo	<i>Albizia odoratissima</i>	Fabaceae
128	Sissoo / Pahadi	<i>Dalbergia latifolia</i>	Fabaceae
129	Sunari	<i>Cassia fistula</i>	Caesalpinaceae
130	Tala	<i>Borassia flabelliformis</i>	Arecaceae
131	Tark / Sagan	<i>Tectona grandis</i>	Vettonaceae
132	Tenna	<i>Albizia procera</i>	Mimosaceae
133	Tentul / Kania	<i>Famarindia indica</i>	Caesalpinaceae
134	Urgina	<i>Cycas circinalis</i>	Cycadaceae
Shrubs/ Herbs			
1	Aat	<i>Annona squamosa</i>	Annonaceae
2	Agabathu	<i>Prunna obtusifolia</i>	Verbenaceae
3	Agnijal / Bana Jalangi	<i>Vernonia cinerea</i>	Asteraceae
4	Agnijhal	<i>Clausena excavata</i>	Rutaceae
5	Agniskha	<i>Gloriosa superba</i>	Liliaceae
6	Amarpo / Kalonchoe	<i>Bryophytum pinnata</i>	Crassulaceae
7	Amiril / Raipani	<i>Ipomoea carnea</i>	Convolvulaceae
8	Anantanula	<i>Tylophora indica</i>	Asclepiadaceae
9	Ankanti	<i>Solanum xanthocarpum</i>	Solanaceae
10	Arakula	<i>Alangium salicifolium</i>	Alangiaceae
11	Arakha	<i>Calotropis gigantea</i>	Asclepiaceae
12	Arkala	<i>Milletia racemosa</i>	Fabaceae
13	Radiala	<i>Phyllanthus fraternus</i>	Euphorbiaceae
14	Raigana	<i>Jatropha gossypifolia</i>	Euphorbiaceae
15	Baiacha kahi	<i>Placouria indica</i>	Flacourtiaceae
16	Bajamuli	<i>Sida acuta</i>	Malvaceae
17	Bana chakunda	<i>Cassia tora</i>	Fabaceae
18	Bana Olua	<i>Anorphopobis fulifera</i>	Arecaceae
19	Banachireita	<i>Leea asiatica</i>	Ampellidaceae
20	Banachudi	<i>Cuscuta groenlandica</i>	Zingiberaceae
21	Barakadali	<i>Musa arata</i>	Musaceae
22	Barakapasi	<i>Thespesia laevis</i>	Malvaceae
23	Barakelhi	<i>Atrophia scarabaeoides</i>	Fabaceae
24	Baranulli	<i>Jasminum arbuscula</i>	Oleaceae
25	Banasara	<i>Colocasia esculenta</i>	Arecaceae
26	Baratulasi	<i>Orthosiphon pallidus</i>	Lamiaceae/abiatae
27	Barpija	<i>Urginea indica</i>	Liliaceae
28	Banrasan	<i>Scilla indica</i>	Liliaceae
29	Bansoris	<i>Clome viscosa</i>	Capparidaceae
30	Bantalasi	<i>Ocimum gratissimum</i>	Lamiaceae

Sl. No.	Local name	Botanical name	Family
31	Barkoli	<i>Zizyphus Mauritiana</i>	Rhamnaceae
32	Basanga	<i>Adhatoda vasica</i>	Acanthaceae
33	Begunia	<i>Vitex negundo</i>	Verbenaceae
34	Beta	<i>Colorus latifolius</i>	Arecaceae
35	Bhabhadalia	<i>Olex scandens</i>	Oleaceae
36	Bhersunga / Bhugsang	<i>Murraya koenigii</i>	Rutaceae
37	Bhuin Anla	<i>Phyllanthus fraternus</i>	Euphorbiaceae
38	Bauinkurwan / Telkurwan	<i>Isora arborea / Isora unchdota</i>	Rubiaceae
39	Bhuin-neem	<i>Andrographis paniculata</i>	Acanthaceae
40	Biehhuati	<i>Tragia involucrata</i>	Euphorbiaceae
41	Bisalyakarani	<i>Tridax procumbens</i>	Asteraceae
42	Dalsanga	<i>Canthium dicoccum</i>	Rubiaceae
43	Dhatiki	<i>Woodfordia fruticosa</i>	Lythraceae
44	Dhatum	<i>Datura fastuosa</i>	Solanaceae
45	Gayas	<i>Leucas aspera</i>	Lamiaceae/Labiatae
46	Giliri/gilira	<i>Indigofera cassioides</i>	Fabaceae
47	Gotha	<i>Croton oblongifolius</i>	Euphorbiaceae
48	Guskoli	<i>Diospyros ferrea</i>	Ebenaceae
49	Hajuri Bhuipal	<i>Phoenix acutis</i>	Arecaceae
50	Haldigundi	<i>Spilanthes calva</i>	Rubiaceae
51	Jajangi	<i>Phyllanthus reticulatus</i>	Euphorbiaceae
52	Jatijatia saru	<i>Urena lobata</i>	Malvaceae
53	Jhumpuri	<i>Streblus taxoides</i>	Moraceae
54	Kamini	<i>Murraya exotica</i>	Rutaceae
55	Kanta beta	<i>Calamus guruba</i>	Arecaceae
56	Kantasiju	<i>Euphorbia nivula</i>	Euphorbiaceae
57	Kanteikoli	<i>Zizyphus oenoplia</i>	Rhamnaceae
58	Khajuri	<i>Phoenix sylvestris</i>	Arecaceae
59	Khajuri	<i>Phoenix dactylifera</i>	Arecaceae
60	Khirkit / Khirkichi	<i>Mimosa himalayana</i>	Mimosaceae
61	Khirkoli	<i>Moulikura hexandra</i>	Sapotaceae
62	Korei / kher	<i>Holarrhena pubescens</i>	Apocynaceae
63	Krushnaparni	<i>Desmodium polycarpum</i>	Fabaceae
64	Kukurchhalia	<i>Pavetta crassicaulis</i>	Rubiaceae
65	Kumbhar chikni	<i>Canthium dicoccum</i>	Rubiaceae
66	Kuruda/Ghurudu	<i>Gardenia gumosifera</i>	Rubiaceae
67	Lajakulilata / Laiwaati	<i>Idinasa pudica</i>	Mimosaceae
68	Lantana/ Bho lupadi/ Nagairi	<i>Lantana camara</i>	Verbenaceae
69	Lunikia	<i>Pandanus foetidus</i>	Pandanaceae
70	Madanga	<i>Loranthus longiflorus</i>	Loranthaceae
71	Mamuri	<i>Antidesma diandrum</i>	Euphorbiaceae

Sl. No.	Local name	Botanical name	Family
72	Mayurachalia	<i>Elephantopus scaber</i>	Amaranthaceae
73	Mirgichara/Barenga	<i>Grewia elastica</i>	Tiliaceae
74	Mmanjuati/Mehendi	<i>Lawsonia inermis</i>	Lithraceae
75	Murashal/ muri muri	<i>Helicteres isora</i>	Sterculiaceae
76	Nahalbeli	<i>Cipadessa baccifera</i>	Melaceae
77	Narguni	<i>Atalantia monophylla</i>	Rutaceae
78	Pajikenduli	<i>Croton deflexus</i>	Amaryllidaceae
79	Patalgaruda	<i>Rauwolfia serpentina</i>	Apocynaceae
80	Poksunga	<i>Pogostemon benghalensis</i>	Lamiaceae
81	Salparni	<i>Desmodium gangeticum</i>	Fabaceae
82	Salra	<i>Cannaregam nutans</i>	Rubiaceae
83	Singhapurna / Ranidantakathi	<i>Flemingia chappar</i>	Fabaceae
84	Siamloi	<i>Leuocarpus frutescens</i>	Apocynaceae
85	Sinaragada	<i>Grewia helicterifolia</i>	Tiliaceae
86	Talmuli	<i>Cuscuta orchades</i>	Amaryllidaceae
87	Tinakoli	<i>Ziziphus rugosa</i>	Rhamnaceae
88	Tulsi	<i>Ocimum sanctum</i>	Lamiaceae

Climbers

1	Akanbindhi	<i>Cissampelos pareira</i>	Menispermaceae
2	Asadhua	<i>Capparis zeylanica</i>	Capparidaceae
3	Atundi	<i>Combretum decandrum / Combretum roxburghii</i>	Combretaceae
4	Baidanka	<i>Mucuna pruriens</i>	Fabaceae
5	Bana alu	<i>Dioscorea hispida</i>	Dioscoraceae
6	Bana kolthi	<i>Alysicarabaeoides</i>	Fabaceae
7	Bana kunduri/ Mataka	<i>Solenia amplexicaulis</i>	Cucurbitaceae
8	Bana kunduru	<i>Trichosanthes cucumerina</i>	Cucurbitaceae
9	Bana simba	<i>Lob lob purpurens</i>	Fabaceae
10	Bhadabhadalia	<i>Oxalis scandens</i>	Oxalaceae
11	Bichhuati	<i>Tragia involucrate/ Tragia phuketii</i>	Euphorbiaceae
12	Dantari	<i>Acacia pennata</i>	Mimosaceae
13	Dodhuilo	<i>Leuocarpus frutescens</i>	Apocynaceae
14	Gila	<i>Entada scandens</i>	Mimosaceae
15	Gopakanihu/ Dhudhiani	<i>Cryptolepis buchanani</i>	Periplocaceae
16	Gudmari	<i>Gymnema sylvestre</i>	Asclepidaceae
17	Handiphuta/Kataka	<i>Pueraria tuberosa</i>	Fabaceae
18	Kaincha	<i>Abrus precatorius</i>	Fabaceae
19	Kakada	<i>Momordica dioica</i>	Cucurbitaceae
20	Kanta Alu	<i>Dioscorea glabra</i>	Dioscoraceae
21	Kanteikoli	<i>Ziziphus oenoplia</i>	Rhamnaceae
22	Khamba Alu	<i>Dioscorea alata cultivated</i>	Dioscoraceae

Sl. No.	Local name	Botanical name	Family
23	Khsilata	<i>Finlaysonia obovata</i>	Asclepiadaceae
24	Korondi alu	<i>Dioscorea helophylla</i>	Dioscoreaceae
25	Kosa Alu	<i>Dioscorea puber</i>	Dioscoreaceae
26	Kunjilata	<i>Ipomoea quamoclit</i>	Convolvulaceae
27	Latapalas / Dhude	<i>Butea superba</i>	Fabaceae
28	Madhabilata	<i>Hiptage madabata</i>	Malpighiaceae
29	Mfalanga	<i>Dendroplabos falcata</i>	Lauranthaceae
30	Malati	<i>Agavea diochaoma</i>	Apocynaceae
31	Manda	<i>Milletia racemosa</i>	Fabaceae
32	Mutari lala/ Muter	<i>Smilax macrophylla</i>	Liliaceae
33	Nagairi	<i>Lantana camara</i>	Verbenaceae
34	Nimuli	<i>Cuscuta reflexa</i>	Convolvulaceae
35	Noipulsa/Latapalas	<i>Butea parviflora</i>	Fabaceae
36	Penayiri	<i>Aristolochia indica</i>	Aristolochiaceae
37	Pani Alu	<i>Dioscorea oppositifolia</i>	Dioscoreaceae
38	Pani bet	<i>Calamus viminalis</i>	Arecaceae
39	Pasanmi	<i>Pandero foetida</i>	Rubiaceae
40	Pichhuli	<i>Gouania leptostachya</i>	Rhamnaceae
41	Pinga	<i>Celastrus paniculata</i>	Celastraceae
42	Pita Alu	<i>Dioscorea foetida</i>	Dioscoreaceae
43	Rakta pichhuli	<i>Gouania leptostachya</i>	Rhamnaceae
44	Satabari	<i>Asparagus racemosus</i>	Liliaceae
45	Siali, Santoi	<i>Bizantia voluta</i>	Fabaceae
46	Scandoi	<i>Lehmannia frutescens</i>	Apocynaceae
47	Tankua lai	<i>Schefflera variegata</i>	Araliaceae
48	Tunga Alu	<i>Dioscorea vullchii</i>	Dioscoreaceae
Bamboo			
1	Balang bans	<i>Oryzenanthera nigrociliata</i>	Poaceae
2	Daha bans/ kanta bans	<i>Bambusa prandinacea</i>	Poaceae
3	Dungi bans	<i>Cephaetostachys pargocile</i>	Poaceae
4	Salia / Hill bambo	<i>Dendrocalamus strictus</i>	Poaceae
Ferns			
1		<i>Actinopteris radiata</i>	Actinopteridaceae
2		<i>Adiantum condatum</i>	Adiantaceae
3		<i>Adiantum philippense</i>	Adiantaceae
4		<i>Asplenium perakense</i>	Aspleniaceae
5		<i>Azolla pinnata</i>	Azollaceae
6		<i>Blechnum orientale</i>	Blechnaceae
7		<i>Ceratopteris thalictroides</i>	Ceratophyllaceae
8		<i>Cheilanthes tenuifolia</i>	Cheilantheaceae
9		<i>Chromola parviflora</i>	Chenopodiaceae
10		<i>Diplazium esculentum</i>	Dioscoreaceae

Sl. No.	Local name	Botanical name	Family
11		<i>Drynaria aureifolia</i>	Droseraceae
12		<i>Lygodium flexuosum</i>	Lygodiaceae
13		<i>Marsilea quadrifolia</i>	Marsiliaceae
14		<i>Pteridium aquilinum</i>	Dennstaedtiaceae
15		<i>Pteris bicaurita</i>	Pteridaceae
16		<i>Pyrosia mollis</i>	Polypodiaceae
17		<i>Selaginella indica</i>	Selaginellaceae
18		<i>Sphenomertis chinensis</i>	Lindsacaceae
Grasses			
1	Bounsuni	<i>Saccharum naja</i>	Poaceae
2	Bena	<i>Vetiveria zizanioides</i>	Poaceae
3	Chepri	<i>Evolvulus albidoides</i>	Convolvulaceae
4	Chhara	<i>Imperata cylindrica</i>	Poaceae
5	Dhanwantary / Khara	<i>Cymbopogon martinii</i>	Poaceae
6	Daba	<i>Cynodon dactylon</i>	Poaceae
7	Kodua	<i>Paspalum scrobicidatum</i>	Poaceae
8	Mutha	<i>Arundo donax</i>	Poaceae
9	Phulchanchani/ phuljhadu	<i>Thysanolaena maxima</i>	Poaceae
10	Panighasha	<i>Eragrostis japonica</i>	Poaceae
11	Sabai/Panasi/ Bazuli	<i>Echinochloa polystachya</i>	Poaceae
12	Sinkhola	<i>Heteropogon contortus</i>	Poaceae
13	Tenda/ Kastandi	<i>Saccharum spontaneum</i>	Poaceae
Orchids			
1		<i>Acompe carinata</i>	Orchidaceae
2		<i>Aerides maculatum</i>	Orchidaceae
3		<i>Bulbophyllum ceriniflorum</i>	Orchidaceae
4		<i>Cymbidium aloifolium</i>	Orchidaceae
5		<i>Dendrobium bicaucratum</i>	Orchidaceae
6		<i>Dendrobium hercynicum</i>	Orchidaceae
7		<i>Dendrobium macrostachyum</i>	Orchidaceae
8		<i>Dendrobium regium</i>	Orchidaceae
9		<i>Eulophia nuda</i>	Orchidaceae
10		<i>Rhynchostylis retusa</i>	Orchidaceae
11		<i>Vanda testaceae</i>	Orchidaceae
11	Rasna	<i>Vanda tessellata</i>	Orchidaceae

LIST OF FAUNA

Sl. No.	Type of Wild Animals	Local Name	English Name	Scientific Name	Family
1	Lizard	Endua	Rock gecko	<i>Hemidactylus maculatus</i>	Gekkonidae
2	Lizard	Godhi	Land monitor	<i>Varanus flavescens</i>	Varanidae
3	Lizard	Godhi, Grisap	Land monitor	<i>Varanus bengalensis</i>	Varanidae
4	Lizard	Kandi endua	Banded gecko	<i>Cyrtodactylus jeyapurensis</i>	Gekkonidae
5	Lizard	Satubarni endua/ Bahurupi endua	Chameleon	<i>Chameleon calcaratus</i>	Chamaeleonidae
1	Snake	Ahrajapa	King cobra	<i>Naja naja</i>	Elapidae
2	Snake	Ajagar Sapa	Indian Python	<i>Python molurus molurus</i>	Boidae
3	Snake	Boda sapa	Russel's earthboa	<i>Eryx conicus</i>	Boidae
4	Snake	Chittisapa	Common Indian krait	<i>Dendrelaphis abietula</i>	Colubridae
5	Snake	Dhamana sapa	Rat snake	<i>Elaphe radiata</i>	Colubridae
6	Snake	Dhanda sapa, Punidhanda		<i>Enhyalis enhybris</i>	Colubridae
7	Snake	Naga sapa	Indian cobra	<i>Naja naja khottia</i>	Elapidae
8	Snake	Rana sapa	Banded krait	<i>Bungarus caeruleus</i>	Elapidae
9	Snake	Tampa naga	Copper head	<i>Elaphe Helena</i>	Colubridae
1	Bird	Mayura	Pheasant	<i>Pavo cristatus</i>	Phasianidae
2	Bird	Balishua	Indian small green bee-eater	<i>Merops orientalis orientalis</i>	Meropidae
3	Bird	Baramashi	Indian spotted munia	<i>Lonchura punctulata punctulata</i>	Plucidae
4	Bird	Baza	Indian shikra	<i>Accipiter badius dussumieri</i>	Accipitridae
5	Bird	Bulbul	Bengal red whiskered bulbul	<i>Pycnonotus jocosus emerica</i>	Pycnonotidae
6	Bird	Gharacharia	Indian house sparrow	<i>Passer domesticus indicus</i>	Plucidae
7	Bird	Gakkai maina	Indian pied myna	<i>Sturnus contra contra</i>	Sturnidae
8	Bird	Haladibasanta	Indian Golden oriole	<i>Oriolus oriolus kundoo</i>	Orididae
9	Bird	Kajalepati	South Indian black drongo or King crow	<i>Dicrurus adsimilis macrocaros</i>	Dicruridae
10	Bird	Kapota	Indian ring dove	<i>Streptopelia decaocto decaocto</i>	Columbidae
11	Bird	Kochilakhai	Indian pied hornbill	<i>Antheroceros malabaricus malabaricus</i>	Bucerotidae
12	Bird	Keih	Cuckoo	<i>Cuculus canorus canorus</i>	Cuculidae
13	Bird	Kuwa	Indian house crow	<i>Corvus splendens splendens</i>	Corvidae

Sl. No.	Type of Wild Animals	Local Name	English Name	Scientific Name	Family
14	Bird	Pecha	Southern spotted owl	<i>Athene bramabrama</i>	Strigidae
15	Bird	Raja bani	Indian myna	<i>Acridotheres tristis tristis</i>	Sturnidae
16	Bird	Raja pecha	Northern spotted owl	<i>Athene brama indica</i>	Strigidae
17	Bird	Shari	Northern hill myna	<i>Gracula religiosa intermedia</i>	Sturnidae
18	Bird	Tentei	Redwattled lapwing	<i>Vanellus indicus indicus</i>	Charadriidae
19	Bird	Tentei	Indian little ringed plover	<i>Charadrius dubius jerdoni</i>	Charadriidae
1	Mammal	Bajrakapta	Indian pangolin	<i>Manis crassicaudata</i>	Manidae
2	Mammal	Barha	Wild boar	<i>Sus scrofa cristatus</i>	Suidae
3	Mammal	Bhalu	Sloth bear	<i>Melursus ursinus ursinus</i>	Ursidae
4	Mammal	Chital, Singala	Spotted deer	<i>Axis axis</i>	Suidae
5	Mammal	Guranti/ Gurandi, Khuranti	Mouse deer	<i>Tragulus meminna</i>	Tragulidae
6	Mammal	Gadhia, Hetabagha	Stripethyaena	<i>Hyaena hyaena hyaena</i>	Hyacnidae
7	Mammal	Hetabagha, Nekeda bagha	Indian wolf	<i>Canis lupus pallipes</i>	Canidae
8	Mammal	Katasha	Toddy cat	<i>Paradoxurus hermaphrodites</i>	Mustelidae
9	Mammal	Tendua	Leopard	<i>Panthera pardus fusca</i>	Felidae
10	Mammal	Kokiciali	Bengal fox	<i>Vulpes bengalensis</i>	Manidae
11	Mammal	Kutura	Barking deer	<i>Muntiacus muntjak malabaricus</i>	Cervidae
12	Mammal	Odha	Smooth coated Indian otter	<i>Lutra perspicillata perspicillata</i>	Mustelidae
13	Mammal	Pati mankada	Rhesus Macaque	<i>Macaca mulatta mulatta</i>	Cercopithecidae
14	Mammal	Sasa, Thekua	Indian hare	<i>Lepus nigricollis ruficaudatus</i>	Leporidae
15	Mammal	Siala	Asiatic Jackal	<i>Canis aureus</i>	Canidae
16	Mammal	Jhinka	Indian crested porcupine	<i>Hystrix indica indica</i>	Hystriidae
17	Mammal	Neula (kuji)	Small Indian Mongoose	<i>Herpestes javanicus</i>	Muridae
18	Mammal	Baghata	Leopard Cat	<i>Felis bengalensis</i>	Felidae


 Divisional Forest Officer
 Cuttack Forest Division

UNDERTAKING.

This is to undertake that after expire of this present Wildlife Conservation Plan, another Wildlife Conservation Plan will be Prepared & get it approved by the competent authority one year prior to expiry of this plan, if so desired by the Chief Wildlife Warden, Odisha.

Project Proponent.


Head-Environment

Study Report

Impacts of Mining on Wildlife & Environment for Ostapal Chromite Mine of M/s Ferro Alloys Corporation Ltd.

1. Introduction:

The mining Lease is over 72.843 ha. The mine is categorized as “A” FM (Opencast). This is a captive mine and its product is being utilized at Ferro Alloys Plant Randia, Bhadrak. The Ore Production is projected at 0.240MTPA from the present level of 0.20 MTPA. During this enhancement of production, the total ROM 0.579MCum/ Annum from the present level 0.546MCum/ Annum is proposed to be excavated.

2. Period of lease and date of expiry of lease:

The mining lease is initially executed on 13.08.1985 and after supplementary lease deed executed on 22.08.2016, the life of the lease is extended up to 12.08.2035.

3. Reserve / Resource:

The Reserve Resource has been updated and estimated as per UNFC Guidelines. Considering present 28⁰ overall slope of Quarry wall, the bottom of the quarry around 30mRL the reserve of (111) category has been estimated around **15.3 Lakh Tonnes**. The production level projected in current Mining Scheme is 12 Lakh Tonnes

4. Present Mining Methods:

The opencast mining of chromite ore is being carried out by removing the overburden, side burden/ intermediate burden by making suitable benches in all direction of the quarry. Waste materials removed from the quarry directly by Shovel / Dumper /Dozer combination to the dump yard. Similarly ores are removed from quarry to the ore plot but the hard portion of the quarry which cannot directly excavated by machines being required drilling and blasting with large diameter holes.

The benches are kept at 7-8 m height, 10-12m width and overall slope 26⁰ to 30⁰. Drains and barriers are constructed all along the longitudinal direction of one side of the bench edge for smooth flow of water to next lower bench and safe running of vehicles on the quarry

benches. Benches are connected with each other with short ramps of 1:10 gradients. The main ramp on benches is kept at 1:14 gradient.

4.1 Quarry dimensions

Name of Pit	Location	Length in m	Breadth in m	Depth in m	Bottom RL	Number of benches Ore / OB	Pit slope	Area back filled / reclaimed
Only One Pit	Central Part	640	470	113	30	E-4/9, W-9/4, N-18 OB S-1/14	E-25, W-30, N-23, S27.	Nil

Table 1 Quarry Dimensions

4.2 Provision of Sump:

A small portion has been developed at the quarry bottom and the said depression has been used as sump to accommodate rain precipitation and seepage water from the strata. The dimension of depression is 40mx25mx6m (appx.). During rainy season the entire quarry bottom is used as water storage.

4.3 Deployment of Mining Machineries:

The following machineries are being used in the mining operation and likely to be continued with additional machineries where required.

Sl No	Type	Existing	Proposed	Size	Air Pressure / HP
1	Long hole Drill Rig	2	2	110mm	6Cum/450Cft
2	Compressore	2	2	450Cft	220HP
3	Excavators (Back Hoe)	3	4	1.5 to 2.5 Cum	220 HP
		1	1	0.9Cum	175 HP
4	Front hoe Loader	2	2	1.7 Cum	170 HP
5	Rock Breaker	0	1		175HP
6	Dozer	2	2		
7	Ripper Dozer	0	1		405HP
8	Dumpers	20	36	10-12Cum/6VW-31T	
9	Road Grader	1	1		175 HP
10	Water Tanker	2	3		

4.4 Drilling & Blasting:

The mine is being worked by mechanical drilling & blasting method. About 40% of hard surface has already been exposed and hence it is required long hole drilling & Blasting. The Indian School of Mines, Dhanbad has designed the blasting parameters. In order to maintain a balance between the safety and production a blast design, and all undesirable side effects are to be kept at minimum.

Drilling: Tyre mounted DTH drill machine having 110mm dia are being used to drill blast holes. The hole are made 15° to 20° inclined from vertical for maintaining uniform burden all along the hole apart from reducing fly rocks and toe formation due to effective utilization of free face. As all the rocks are not very hard, only 30-40% of the in situ requires drilling & blasting.

Depending upon the nature of the rock, holes are being drilled in staggered manner in multi row pattern.

Blasting:

Explosive charge length is limited to 2/3 rd depth of hole and quantity of explosive is around 13-16.70kg per delay depending upon the nature of the rock formation. Power Gel-C explosive is used for blasting purpose. Cordex, Nonel are used for initiating the charges. Delay detonators are used for different row of blasting. Powder factor varies from 2.5 - 4.5cum / kg.

Controlled Blasting Techniques to reduce ground vibration and noise:

The following blasting techniques are to be followed to reduce ground vibration & noise.

- NONEL System of Blasting,
- Distribution ratio of boosters to column charge 1:5 ratio
- Maximum charge / delay is calculated considering the distance of permanent structure from the blasting side.
- Delay detonators are used,
- Delay timing 25ms to 50ms within row
- Delay timing 15ms to 25ms between holes
- Number of Rows restricted to less than three,
- Proper burden & spacing,
- Inclined holes

- Proposer design of holes with respect to burden, spacing, inclination and stemming.

4.5 Noise & Vibration:

In Ostapal Chromite Mines, the present level of vibration, noise and fly rock generation due to blasting is low. Level of Vibration and noise due to blasting is within the limits prescribed by various national and international agencies. Indian School of Mines, Dhanbad has conducted various trial blasting and the resulting vibration equation has been established. The equation of vibration generated is as follows.

For 110 mm diameter holes

$$V = K \{R/(W)^{1/2}\} - \beta$$

Where V is the Peak Particle velocity, and K=110

R is the distance from blasting site and W is maximum charge / delay.

Storage of Explosives:

Explosives are not stored in the mining lease area. It is brought from approved Explosive Van from Kathapal Chromite Mines, where a Licensed Explosive Magazine with 10T capacity is being maintained. However a reserve station is maintained in Ostapal Mines for temporary storage and preparation of explosive charges before charge in to the drill holes.

The annual requirement of explosives has been estimated to be 64344 Kg.

4.6 Waste Generation & Disposal:

The overburden quantity estimated to be excavated / generated during this Mining Plan Period is about 24 Lakh M³. This waste will be accommodated at the North Eastern, North Western and North dump by maintaining total height of the dump up to 90m during the plan period i.e. 2021-22 to 2025-26.

4.7 Conceptual Mine Planning

During conceptual Mining stage mining will be done by open cast method as the pit bottom limit is fixed up to +5mRL at central / western part of Pit and +69mRL at eastern part of the pit. Based on present data there is no plan to go further towards eastern part of the Pit. Reaching the ultimate pit limit is in 4th year. The bench height and width will be at 7-8m and 8-10 m respectively. The Ore body of Ostapal Mine is striking in east- west direction.

Accordingly the benches will be parallel to ore strike direction & dipping towards south. The Dip of Ore Body is about 52° to the horizontal.

4.8 Depth of Water Table:

The depth of Water table based on observations from nearby wells and water bodies are as follows. The water table is at a depth of 5.40m to 8.52m BGL during monsoon. It goes down to a depth of 9.2m to 16.4m BGL in dry season. The current extraction level of mining pit is 30m RL and likely to go upto 13mRL during current plan period. As the Water table is about 12 to 15m BGL, there is no possibility of functure of water table during mining.

4.9 Waste Management & Reclamation Plan:

During quarry development the overburden and Ore estimated to be excavated from opencast quarry is 11.783 L Cum and 3.5 L Ton respectively. During conceptual plan period about 4.045L Cum of overburden will be accommodated over south dump and North Dump.

To handle the remaining waste (11.783 L Cum-4.045 L Cum) i.e. 7.738 L cum will be handled in the following manners.

- Waste Rocks to be sent& use outside the lease area as per requirement of any community work or manufacturing or any other industrial construction purpose with due permission from competent authority.
- Management is planning to acquire additional land for dumping waste in conceptual period.
- There is no reclamation of excavated area within the conceptual period mining.
- The mined out area of the quarry during the conceptual period will be 34.53 ha and the average depth of the quarry will be 130m. Top two to three benches of the quarry will be reclaimed by afforestation.

4.10 Beneficiation Process:

Chromite is one of the important Chrome Ore. It is an oxide of Iron & Chromium. The chemical formula is $(\text{Mg Fe}^{+2}) (\text{Cr, Al, Fe}^{+3})_2 \text{O}_4$. The Ferrous Oxide (Fe^{+2}) is often replaced by Mg and Cr_2O_3 and Alumina. Therefore variation in Cr / Fe ratio in chromite is observed.

The ROM is upgraded through manual shorting & picking to remove the waste rock pieces from the ore stack yard to suit the requirement of the captive industry. The average grade

of Ore dispatch to captive plant is +44% to -40% Cr_2O_3 is primarily send for beneficiation and the concentrate generated are send to the Captive Plant at Bhadrak.

a) Nature of Processing:

The beneficiation process is a wet process. In the process of beneficiation the mineral reject (20-30% of Cr_2O_3) is being concentrated to 45-50% of Cr_2O_3 . Primarily 10-40% of chrome ore is sent for beneficiation. The beneficiation plant is mainly operated by gravity separation process. Major equipments are Hopper, Hammer Mill, Screw Classifier, vibrating Screen, Shaking table, slurry pump, belt conveyer and tailing ponds etc. The final concentrate is about 45-50% of Cr_2O_3 .

The Weight to Weight recovery percentage is about 45%. The beneficiation plant capacity is 20 TPH. The average hours per month for working are 600 hrs. Monthly feeding / processing of ore is 12000 Tons per Month. The beneficiated ore i.e. concentrate is 5400 Tons per month. The capacity of concentrate Ore production per annum is 64800 TPA.

The rejects from the table, cyclones etc are pumped out to tailing pond. Out of the 120 M^3 per hour send to Tailing pond 100 M^3 per hour is recycled. The balance makeup water is 20 M^3 per hour

b) Tailing Disposal:

The tailings generated in the beneficiation process are discharged through pipelines in to the tailing pond through gravity and after settling down the solids in the telling pond, the clean water is pumped back to the intake pond. The tailings are allowed to dry for 3-4 months and then the semi dried tailings are removed to dump yard. Steps are being taken to install press filter in order to generate dry tailings directly having minimum moisture. The tailings generation is about 65000 MT per annum and properly mixed with overburden at the dump yard. The tailings may be provided to Brick manufacturers, if so requested by any entrepreneurs after due permission of authority.

c) Tailing Pond Design:

The tailings will be discharged one by One into three ponds in a cascading manner. Clear supernatant water will pass to the 3rd pond from where it will be pumped back to intake pond. The thickness of the earthen dam is 15m at bottom, 5m at top and height from 5m to 8m with side slope from 45⁰ to 60⁰. Any seepage water from tailing pond will be collected in

a sump and pumped back to intake point. No seepage water is allowed to flow down to the natural drainage system.

c) Water Requirement & Source:

The quantity of water required in the COB plant is 120 M^3 / hour. Out of 120 M^3 of water 100 M^3 is recycled back to the beneficiation system. Hence the makeup water is only 20 M^3 per hour. The plant will function for 20 hours per day. Hence the water requirement is 400 M^3 per day after initial charging the plant. The water requirement of mine for dust suppression, afforestation, Wheel washing etc is estimated to be 150 M^3 , 50 M^3 , 50 M^3 per day and for domestic use around 100 m^3 per day. So the total water requirement per day is 750 M^3 (750 KLD). This water will be available from Mine discharge water (Seepage water)

7. Solid Waste & Acid Mine Drainage:

a) Solid waste:

During excavation Overburden and mineral reject (below 10% Cr_2O_3) will be produced. During plan period 26.39 Lakh Cum OB and Mineral reject will be generated. The stripping ratio is 1: 6.3 i.e. for production of 1 Ton of Ore about 6.3 cum of waste. The waste materials will be dumped in the earmarked space. Though stabilization of dump is being taken up and appropriate slope is maintained, still there is possibility of soil erosion from the dump surface. Adequate measures will be taken for stabilization of dump.

b) Acid Mine Drain:

Overburden and side burden consists of serpentine materials along with clay etc. **Serpentine** is not the name of a single mineral. Instead it is a name used for a large group of minerals that fit this generalized formula: $(\text{X})_{2-3}(\text{Y})_2\text{O}_5(\text{OH})_4$. In this formula, X will be one of the following metals: magnesium, iron, nickel, aluminum, zinc, or manganese; and, Y will be silicon, aluminum, or iron. The appropriate generalized formula is therefore as follows: $(\text{Mg,Fe,Ni, Mn,Zn})_{2-3}(\text{Si,Al,Fe})_2\text{O}_5(\text{OH})_4$. Chrysotile, antigorite, and lizardite are three of the primary serpentine minerals. There are many other serpentine minerals, most of which are rare. Serpentine group minerals have similar physical properties and form by similar processes. They often occur as fine-grained admixtures and can be difficult to distinguish within a rock. Geologists usually call these materials "serpentine" rather than more specific names to simplify communication.

During rains there is no possibility of any leaching elements to be characterized as acid. Due to transport related problems there may be acid rain due to exhaust burnt gases. During rains there is no possibility of any leaching elements to be characterized as acid. Due to transport related problems there may be acid rain due to exhaust burnt gases.

Exhaust gas or flue gas is emitted as a result of the combustion of fuels such as natural gas, gasoline (petrol), diesel fuel, fuel oil, biodiesel blends. According to the type of engine, it is discharged into the atmosphere through an exhaust pipe, flue gas stack, or propelling nozzle. It often disperses downwind in a pattern called an *exhaust plume*.

It is a major component of motor vehicle emissions (and from stationary internal combustion engines), which can also include:

- Crankcase blow-by
- Evaporation of unused gasoline

Motor vehicle emissions contribute to air pollution and are a major ingredient in the creation of smog in some large cities.

The largest part of most combustion gas is nitrogen (N_2), water vapor (H_2O) (except with pure-carbon fuels), and carbon dioxide (CO_2) (except for fuels without carbon); these are not toxic or noxious (although water vapor and carbon dioxide are green house gases that contribute to global warming). A relatively small part of combustion gas is undesirable, noxious, or toxic substances, such as carbon monoxide (CO) from incomplete combustion, hydrocarbons (properly indicated as C_xH_y , but typically shown simply as "HC" on emissions-test slips) from unburnt fuel, nitrogen oxides (NO_x) from excessive combustion temperatures, and particulate matter (mostly soot).

Exhaust gas temperature (EGT) is important to the functioning of the catalytic converter of an internal combustion engine. It may be measured by an exhaust gas temperature gauge. EGT is also a measure of engine health in gas-turbine engines.



Cold engines:

Steam from tailpipe of cold vehicles:

During the first two minutes after starting the engine of a car that has not been operated for several hours, the amount of emissions can be very high. This occurs for two main reasons:

- **Rich air-fuel ratio requirement in cold engines:** When a cold engine is started, the fuel does not vaporize completely, creating higher emissions of hydrocarbons and carbon monoxide, which diminishes only as the engine reaches operating temperature. The duration of this start-up phase has been reduced by advances in materials and technology, including computer-controlled fuel injection, shorter intake lengths, and pre-heating of fuel and/or inducted air.
- **Inefficient catalytic converter under cold conditions:** Catalytic converters are very inefficient until warmed up to their operating temperature. This time has been much reduced by moving the converter closer to the exhaust manifold and even more so placing a small yet quick-to-heat-up converter directly at the exhaust manifold. The small converter handles the start-up emissions, which allows enough time for the larger main converter to heat up. Further improvements can be realized in many ways, including electric heating, thermal battery, chemical reaction preheating, flame heating and super insulation.

Component	Emission Rate	Annual pollution emitted
Hydrocarbons	2.80 grams/mile (1.75 g/km)	77.1 pounds (35.0 kg)
Carbon monoxide	20.9 grams/mile (13.06 g/km)	575 pounds (261 kg)
NO _x	1.39 grams/mile (0.87 g/km)	38.2 pounds (17.3 kg)
Carbon dioxide - greenhouse gas	415 grams/mile (258 g/km)	11,450 pounds (5,190 kg)

Main Motor Vehicle emission:

NO_x

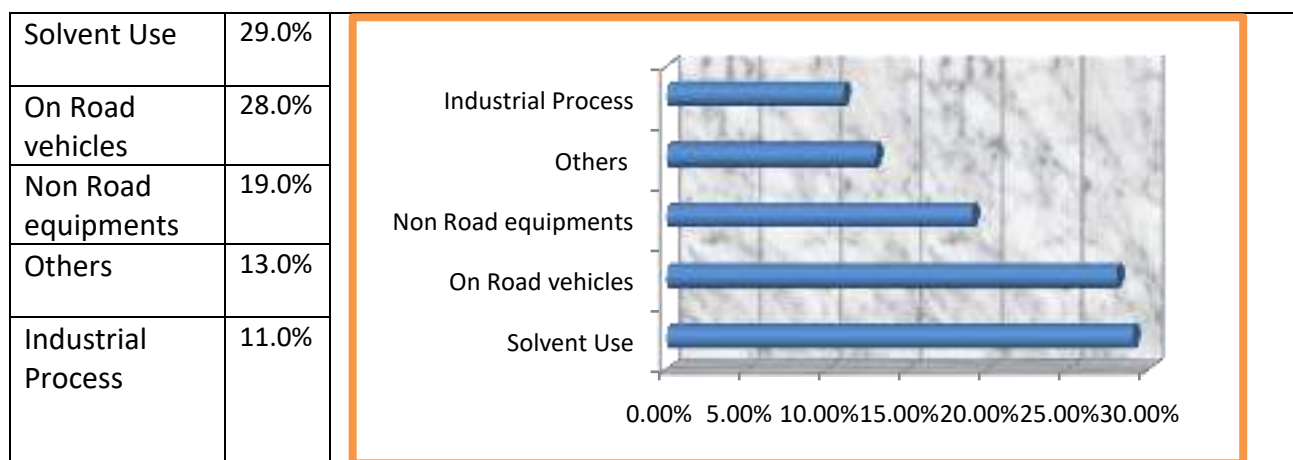
Mono-nitrogen oxides NO and NO₂ (NO_x)(whether produced this way or naturally by lightning) react with ammonia, moisture, and other compounds to form nitric acid vapor and related particles. Small particles can penetrate deeply into sensitive lung tissue and damage it, causing premature death in extreme cases. Inhalation of NO species increases the risk of lung cancer and colorectal cancer and inhalation of such particles may cause or worsen respiratory diseases such as emphysema and bronchitis and heart disease.

The largest emissions of NO_x came from on road motor vehicles, with the second largest contributor being non-road equipment which is mostly gasoline and diesel stations.

The resulting nitric acid may be washed into soil, where it becomes nitrate, which is useful to growing plants.

Volatile organic compounds

In atmosphere the volatile organic compounds presence is due to vehicles and others as furnished below.



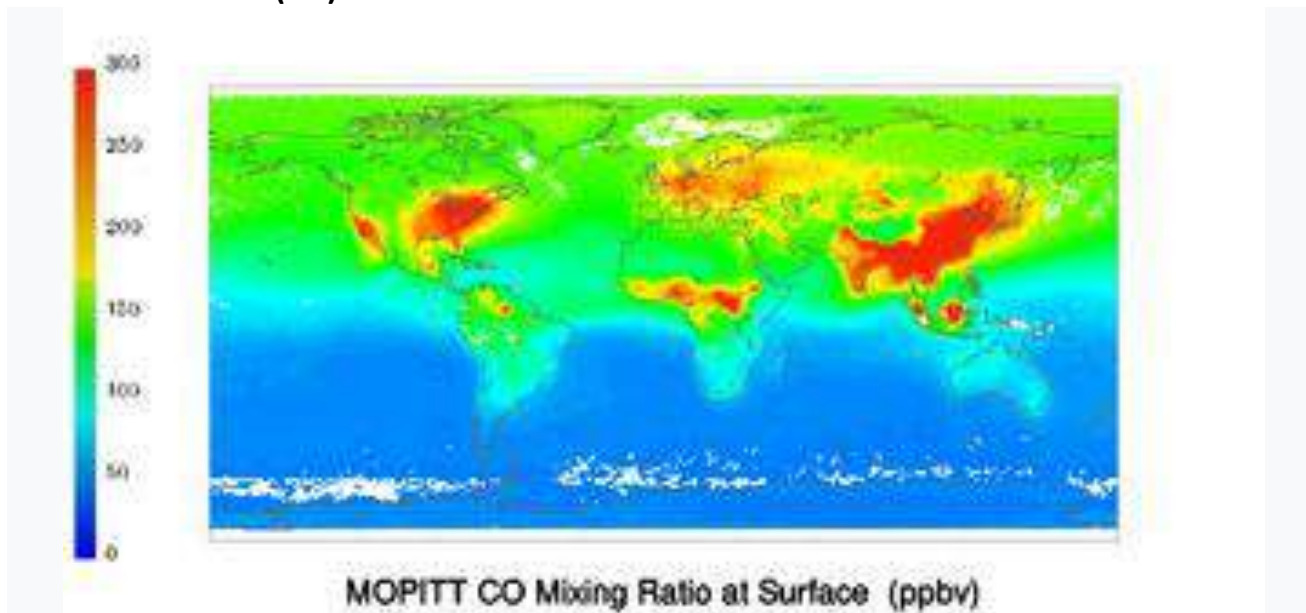
Non-road equipment is mostly gasoline and diesel stations.

When oxides of nitrogen (NO_x) and volatile organic compounds (VOCs) react in the presence of sunlight, ground level ozone is formed, a primary ingredient in smog. A 2005 U.S. EPA report gives road vehicles as the second largest source of VOCs in the U.S. at 26% and 19% are from non road equipment which is mostly gasoline and diesel stations. 27% of VOC emissions are from solvents which are used in the manufacturer of paints and paint thinners and other uses.

Ozone

Ozone is beneficial in the upper atmosphere, but at ground level ozone irritates the respiratory system, causing coughing, choking, and reduced lung capacity. It also has many negative effects throughout the ecosystem.

Carbon monoxide (CO)



MOPITT satellite computer image of carbon monoxide March 2010

Carbon monoxide poisoning is the most common type of fatal air poisoning in many countries. Carbon monoxide is colorless, odorless and tasteless, but highly toxic. It combines with hemoglobin to produce carboxyhemoglobin, which blocks the transport of oxygen. At concentrations above 1000ppm it is considered immediately dangerous and is the most immediate health hazard from running engines in a poorly ventilated space.

Hazardous air pollutants (toxics)

Chronic (long-term) exposure to benzene (C_6H_6) damages bone marrow. It can also cause excessive bleeding and depress the immune system, increasing the chance of infection. Benzene causes leukemia and is associated with other blood cancers and pre-cancers of the blood.

Particulate matter (PM_{10} and $PM_{2.5}$)

The health effects of inhaling airborne particulate matter have been widely studied in humans and animals and include asthma, lung cancer, cardiovascular issues, premature death. Because of the size of the particles, they can penetrate the deepest part of the lungs. U.S. Federal Highway Administration (FHWA) state that in 2002 about 1 per-cent of all PM_{10} and 2 per-cent of all $PM_{2.5}$ emissions came from the exhaust of on-road motor vehicles (mostly from diesel engines).

Carbon dioxide (CO₂)

Carbon dioxide is a greenhouse gas. Motor vehicle CO₂ emissions are part of the anthropogenic contribution to the growth of CO₂ concentrations in the atmosphere which according to the vast majority of the scientific community is causing climate change. Motor vehicles are calculated to generate about 20% of the European Union's man-made CO₂ emissions, with passenger cars contributing about 12%. European emission standards limit the CO₂ emissions of new passenger cars and light vehicles.

8. Vibration (due to blasting):

There are provisions for drilling & blasting as the rock is comparatively hard (about 30-40%). The vibration monitoring report indicates a safe vibration status during blasting and use of other machineries.

9. Synergic Impact on Flora & Fauna:

At the present system of mining i.e. opencast mining and treatment of effluent, the following threats to flora and fauna is feared.

Threat to Flora:

- i. Lower recharging of ground water table may lower moisture availability and result in stunted growth, reduced site quality, disappearing colony of moisture loving vegetation, replacement of moisture loving species by thorny, hardy & low quality species.
- ii. Excess biotic pressure over a long period may result visit of unpalatable, dwarf vegetation.
- iii. More and more open forest will be covered by Eupatorium, Lantena, Combretum (Atandi).
- iv. Bahunia (Siali) may be completely vanished from the region.
- v. Disappearance of many species may lead to loss of Biodiversity of the locality.
- vi. Plants may be affected by heart rot (especially Sal), Canker and top dying phenomena.
- vii. Accumulation of dust on leaf surface for a long period may reduce photosynthesis hence reduced oxygen generation. It may also affect growth rate of plants, especially planted on road sides.

Threat to Fauna:

- i. Movement of available species may be gradually restricted and finally seized from this tract.
- ii. Scarcity of food stock and water in forest may force them to come to habitations, agricultural field.
- iii. More and more human- animal conflict resulting repelling attitude of locals' towards wildlife.
- iv. More respiratory, digestive disease may affect animals.
- v. Presence of Cr^{+6} (Chromium hexavalent) a carcinogenic substance in water & dust particle may induce health hazard.
- vi. Presence of iron, Nickel and other heavy metals on grass fodder foliage surface may adversely affect herbivorous & health.
- vii. Animal behavior may change due to constant effect of noise & light of traffic.
- viii. Reptiles may be affected seriously due to light and ground vibration.

On habitat.

- i. Food and Water may become a limiting factor and seriously affecting the carrying capacity of the area.
- ii. Compact soil without good vegetation will accelerate soil erosion.
- iii. Nocturnal animals may have extremely a hard time.
- iv. Rising temperature in summer may induce sun stroke.

10. Ancillary Impact of the Project on Flora & Fauna:

Side effect of mining on flora and fauna is being gradually felt in this region. Loss of bio diversity, pollution of water body i.e. Damsala nalla and evading nature of fauna from this locality is felt by a common man.

11. Socio Economic Impact of the Project:

Besides direct and indirect employment being provided by mining company, the occupational profile indicates more and more people are being diverted from agriculture to other trade i.e. mostly mine related occupation. The socio economic condition of the locality has improved. Under CSR program of mines owner, peripheral development is quite perceptible.

Employment likely to be generated:

At present 96 regular employee and 441 contractual workers are working at the mine. On enhancement of production, it may be required to enhance engagement of Contractual

labour. It may be enhanced by 10-20% and additional employment will be provided to the local people.

12. Impact on Traffic:

The Traffic study was conducted by NHAI for their project “Up gradation of NH-200”. After detail traffic study at five important places in homogeneous section i.e. at Saranga, Pitiri, Mangalpur, Duburi and Chandikhol the traffic increase in the road up to 2027 and after has been projected. As per most probable increase the growth rate at different years is furnished below.

Traffic Projections.

General

Mode	Base value as obtained (2006)	Year								
		2007-2011	Projecte d (2012)	2012-2016	Projecte d (2016)	2017-2021	Projecte d (2021)	2022 - 2026	Projecte d (2026)	2027 onwa rds
Scenario-1: Projected Most Probable Traffic Growth Rate										
Two Wheelers	3490	8.32	3780	9.1	4124	8.44	4472	7.5	4808	6.75
Three Wheelers	386	10.79	428	11.38	476	10.31	525	8.63	571	7.5
Cars	733	8.91	798	9.8	877	9.38	959	8.44	1040	7.5
Jeeps	318	6.78	340	7.35	365	7.13	391	6.38	415	5.63
Buses	81	3.7	84	4.03	87	3.94	91	3.75	94	3.56
Trucks	3112	7.34	3340	7.8	3601	7.2	3860	6.6	4115	6.3
Tractor and Tractor with trailer	449	7.99	485	8.25	525	7.5	564	6.5	601	5.85

Table 2 Traffic Projection Report

Production Related Traffic Pressure:

The production level for which EC is in process by which production level will enhance from 0.200MTPA to 0.240 MTPA i.e. 20% increases in production. The ore produced is being transported by Road to Randia, Bhadrak. The truck capacity is mostly 16 ton. Hence for 200000 TPA, about 12500 trip truck load is required at present. Taking 300 working days about 42trucks is engaged per day. In enhance production condition, about 50-52 trucks will be engaged per day. This traffic load has been taken in to account while making traffic study by NHAI at Mangalpur crossing. Now up gradation of Tamka- Mangalpur Road is being taken up by district administration.

a) Haulage & Transport within M.L Area Transportation between M.L Area & Dispatch Point:

For handling the ore stacks at mine-site, 2nos. of Front loader (0.9cum) is provided to keep in tune with quantum of handling.

For handling the generated waste rock to the decentralized portion/waste dump of the pit, excavators and dumpers will be engaged.

b) Transportation to Outside:

All the ore will be transported by Road to Randia, Bhadrak i.e. Ferro chrome / charge chrome plant of FACOR.

13. Impact /Effect on Movement of Mega Fauna:

There is no movement of mega animals neither within the ML area nor at immediate road alignment up to Magalpur – Chandikhol – Bhadrak. The Tamka- Mangalpur road experiences elephant movement from Daitari DPF to Mahagiri DPF via Kansa. The ores from the Mine will be transported via Mangalpur hence it is not affecting the movement of animals.



THE MAP OF ODISHA SHOWING DISTANCE OF OSTAPAL CHROMITE MINES OF M/s. FACOR IN DISTRICT JAJPUR, ODISHA FROM NATIONAL PARKS/SANCTUARIES/ ELEPHANT /TIGER RESERVE/ BIOSPHERE RESERVE /ELEPHANT CORRIDORS AND RAMSAR SITES.

SL. NO.	ELEPHANT CORRIDOR	DISTANCE (IN KM)
1	Badampahar - Dhoba Dhobin	104.3
2	Badampahar - Karida	118.7
3	West Bengal - Deuli - Sulapada	155.8
4a	Similipal - Hadhgah	70.2
4b	Similipal - Kuldha	70.8
5	Telikoi - Palahara	52.4
6	Karo - Karampada	114.5
7	Maulabhanja - Jiridimai - Anantpur	19.40
8	Kahnetjena - Anantpur	61.6
9	Buguda - Central RF	139.3
10	Nuagaon - Baruni	142.7
11	Tal - Kholgah	154.2
12	Barpahad-Tarava- Kantamal	209.5
13	Kotagah - Chandrapur	250.2
14	Karlapat - Urisdani	250.9

SL. NO.	SANCTUARY	DISTANCE (IN KM)
1	Bhitarkanika	101.4
2	Balukhand - Konark	125.6
3	Baisipalli	106.2
4	Badrama	141.5
5	Chilika (Nalaban)	157.5
6	Chandaka - Damapara	70.8
7	Debrigarh	213.6
8	Gahirmatha (Marine)	112.3
9	Hadhgah	48.5
10	Khhalasuni	131.3
11	Kuldha	76.9
12	Nandankhan	86.4
13	Similipal	54.8
14	Satkosia Gorge	88.2
15	Sunabeda	337.1
16	Karlapat	298.4
17	Lakheri - Valley	227.3
18	Kotagah	221.7
19	Kapilash	31.2

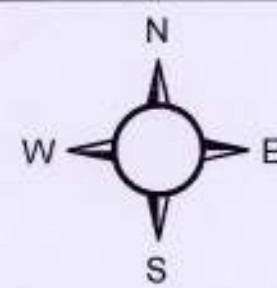
SL. NO.	NATIONAL PARK	DISTANCE (IN KM)
1	Bhitarkanika National Park	108.4
2	Similipal National Park (Proposed)	76.4

SL. NO.	TIGER RESERVE	DISTANCE (IN KM)
1	Similipal Tiger Reserve	47.9
2	Satkosia Tiger Reserve	89.1

SL. NO.	ELEPHANT RESERVE	DISTANCE (IN KM)
1	Mayurbhanj Elephant Reserve	39.7
2	Mahanadi Elephant Reserve Existing	88.2
3	Mahanadi Elephant Reserve Proposed	71.4
4	Sambalpur Elephant Reserve Existing	130.9
5	Sambalpur Elephant Reserve Proposed	101.4

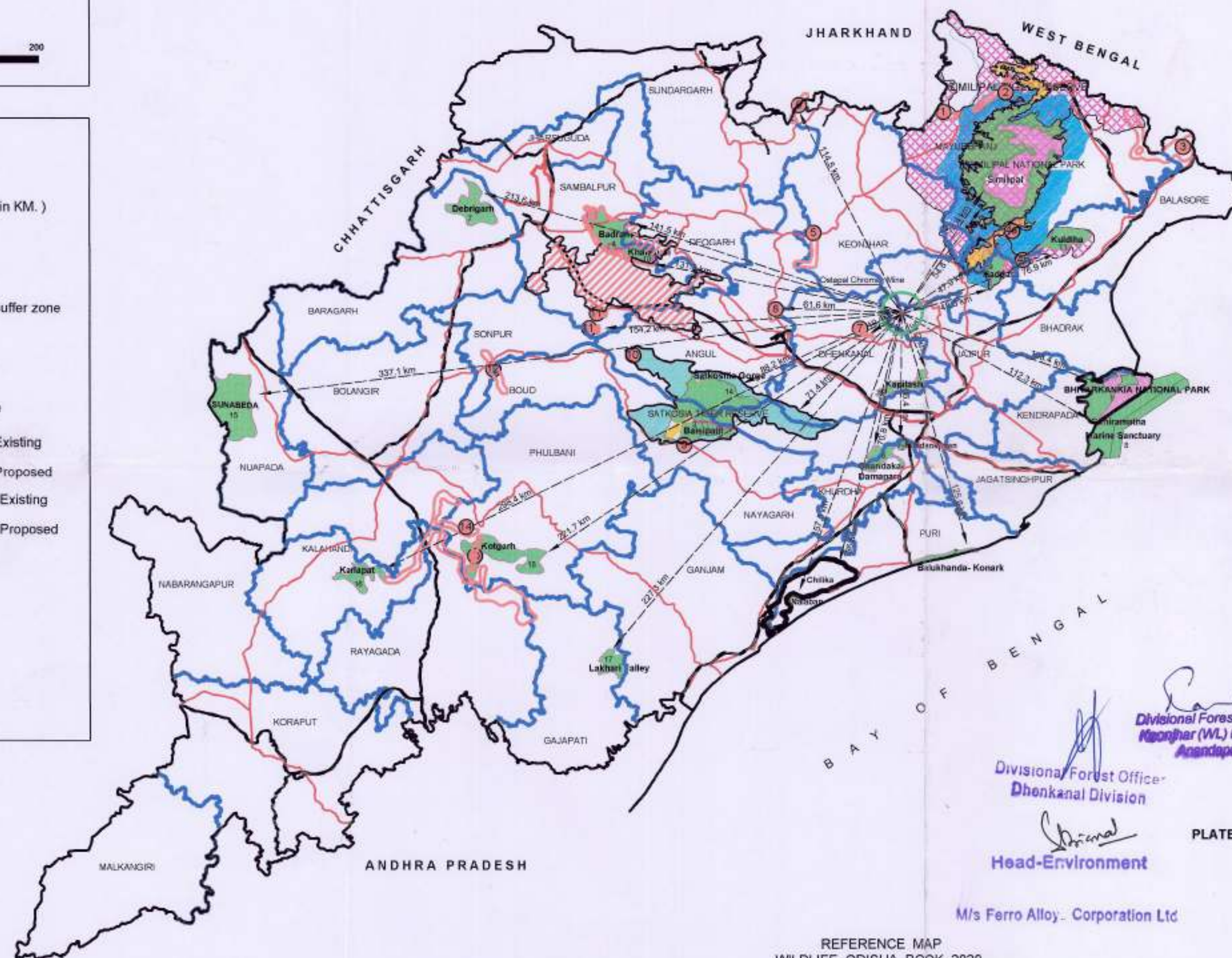
SL. NO.	BIOSPHERE RESERVE	DISTANCE (IN KM)
1	Similipal Biosphere Reserve	47.3

SL. NO.	RAMSAR SITES	DISTANCE (IN KM)
1	Chilika Lake	136.8
2	Bhitarkanika	101.4



LEGEND

- Tiger Reserve
- Distance to Sanctuaries etc. (in KM.)
- National Highways
- Railway Line
- Project Location With 10 km Buffer zone
- Elephant Corridor
- Wildlife Sanctuaries
- Mayurbhanj Elephant Reserve
- Mahanadi Elephant Reserve Existing
- Mahanadi Elephant Reserve Proposed
- Sambalpur Elephant Reserve Existing
- Sambalpur Elephant Reserve Proposed
- Similipal Biosphere Reserve
- National Park
- Ramsar Site
- District Boundary



Divisional Forest Officer
Koraput (WL) Division
Anandpur

Divisional Forest Officer
Dhenkanal Division

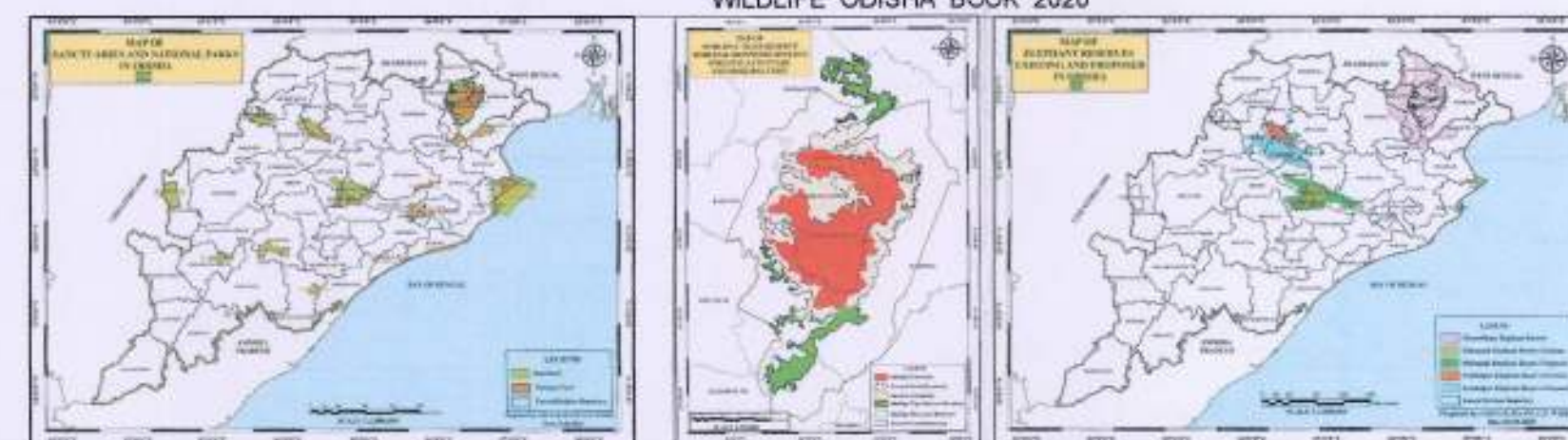
Head-Environment

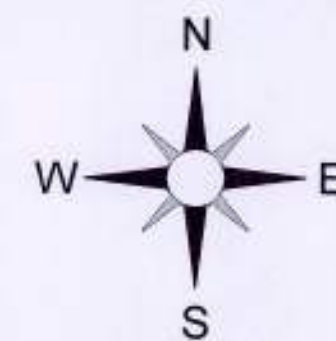
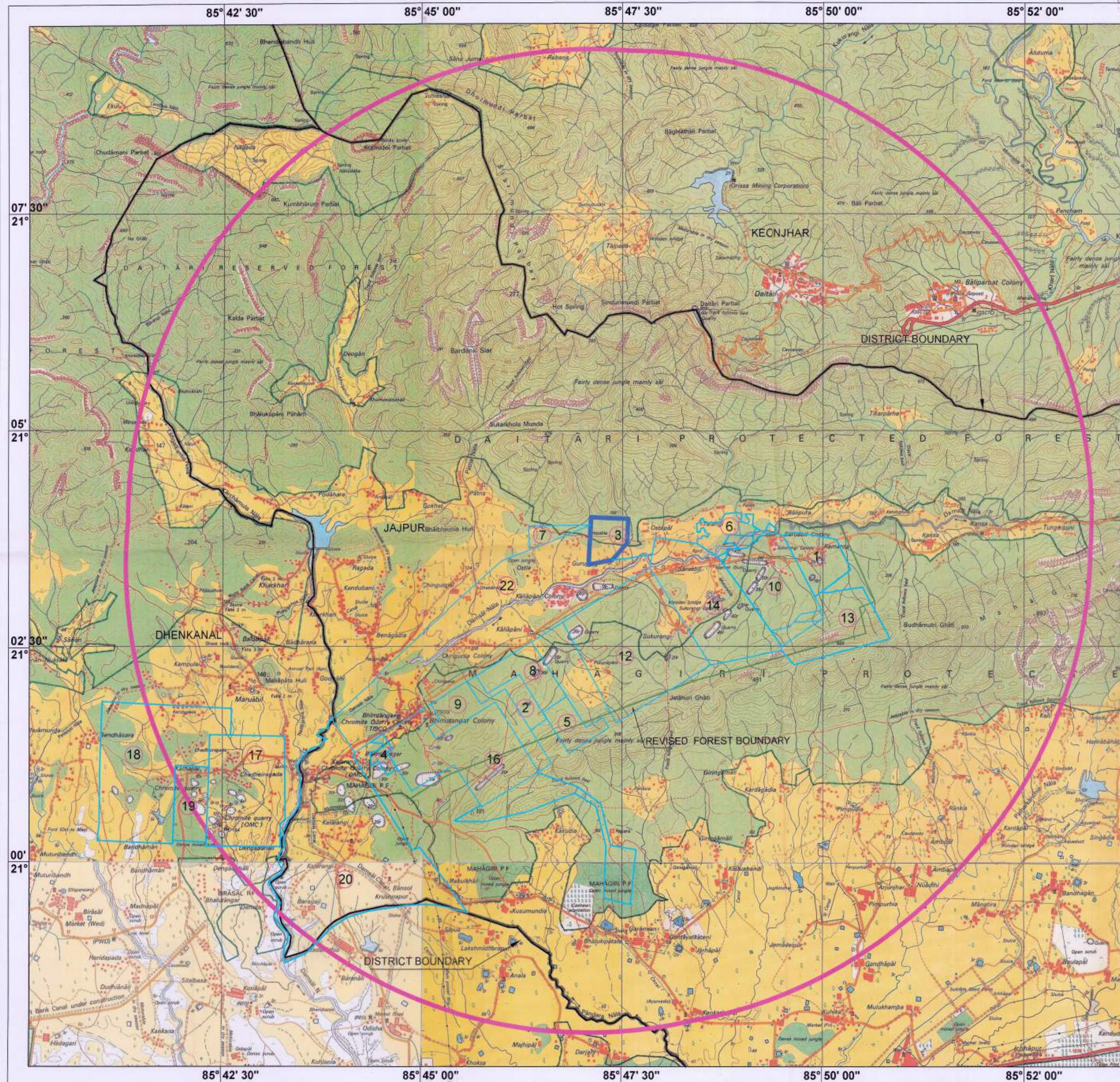
M/s Ferro Alloy Corporation Ltd

PLATE - II

Divisional Forest Officer
Cuttack Forest Division

REFERENCE MAP
WILDLIFE ODISHA BOOK 2020





LEGENDS

- OSTAPAL CHROMITE MINES OF M/S. FACOR
- 10KM RADIUS BUFFER ZONE
- FOREST BOUNDARY
- DISTRICT BOUNDARY
- NEIGHBORING MINES

SL NO	MINES NAME
1	KAMARDA CHROMITE MINES OF M/S B C MOHANTY & SONS PVT LTD
2	KALIAPANI CHROMITE MINES OF M/S BALASORE ALLOYS LTD
3	OSTAPAL CHROMITE MINES OF M/S FACOR LTD
4	KALARANGIATTA CHROMITE MINES OF M/S FACOR LTD
5	MAHAGIRI CHROMITE MINES OF M/S ICCL
6	TALANGI CHROMITE MINES OF M/S IDCOL LTD
7	CHINGUDIPAL CHROMITE MINES OF M/S IMFA LTD
8	SUKINDA MINE (CHROMITE) OF M/S IMFA LTD
9	KALIAPANI CHROMITE MINES M/S JINDAL STAINLESS LTD
10	SARUABIL CHROMITE MINES OF M/S MISIRALL MINES LTD.
11	KALARANGI CHROMITE MINES OF M/S MISIRALL MINES LTD.
12	SOUTH KALIAPANI CHROMITE MINES OF OMC LTD
13	BALIPADA CHROMITE MINES OF OMC LTD
14	SUKARANGI CHROMITE MINES OF OMC LTD
15	DAITARI CHROMITE MINES OF OMC LTD
16	SUKINDA CHROMITE MINES OF M/S TATA STEEL
17	KATHAPAL CHROMITE MINES OF M/S OMC LTD
18	BIRASAL CHROMITE MINES OF M/S OMC LTD
19	KATHAPAL CHROMITE MINES OF M/S FACOR LTD
20	KALARANGI CHROMITE MINES OF M/S OMC LTD.
21	CHROMITE MINES IN MAHAGIRI PDF OF M/S BALASORE ALLOYS
22	KALIAPANI CHROMITE MINES OF M/S OMC LTD

TOPO SHEET NO :- F45N16 (73G/16)
F45N12 (73G/12)
F45T9 (73H/9)
F45T13 (73H/13)

*Divisional Forest Officer
Keonjhar (WL) Division
Amardapur*

Head-Environment

*Divisional Forest Officer
Dhenkanal Division*

PLATE - III

M's Ferro Alloy Corporation Ltd

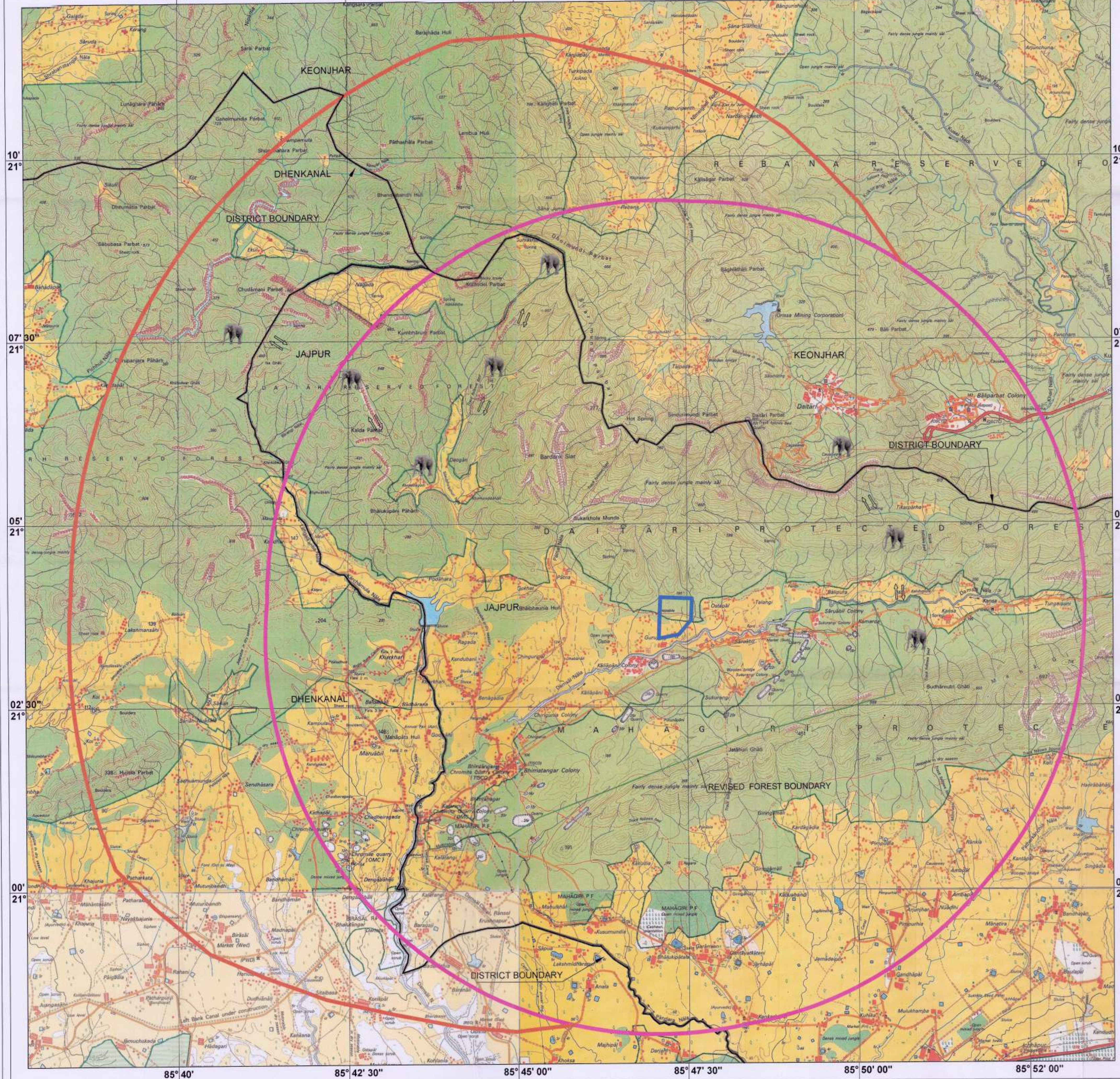
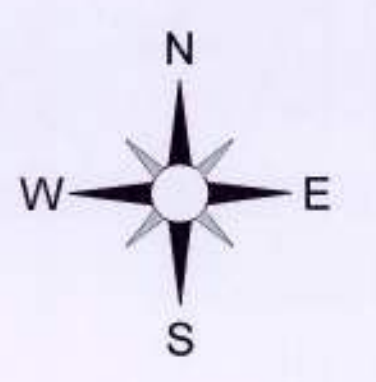
MAP OF OSTAPAL CHROMITE MINES
OF M/S. FERRO ALLOYS CORPORATION LTD.
OVER AN AREA OF 72.843 Ha. IN VILLAGE
GURUJANGA, UNDER SUKINDA TAHASIL OF
JAJPUR DISTRICT, ODISHA

MINES AROUND OSTAPAL CHROMITE MINES
OF M/S. FACOR

R.F. 1:50,000

*Divisional Forest Officer
Cuttack Forest Division*

85° 40' 85° 42' 30" 85° 45' 00" 85° 47' 30" 85° 50' 00" 85° 52' 00"



LEGENDS

- OSTAPAL CHROMITE MINES OF M/S. FACOR
- 10KM RADIUS BUFFER ZONE
- 15KM RADIUS BUFFER ZONE
- FOREST BOUNDARY
- DISTRICT BOUNDARY
- MEGA WILDLIFE
- DIRECTION OF WILDLIFE MOVEMENT

TOPO SHEET NO :- F45N16 (73G/16)
F45N12 (73G/12)
F45T9 (73H/9)
F45T13 (73H/13)

Divisional Forest Officer
Dhenkanal Division

Head-Environment

M/s Ferro Alloy Corporation Ltd

Divisional Forest Officer
Keonjhar (WL) Division
Amudapur

Divisional Forest Officer
Cuttack Forest Division

PLATE - I

MAP OF OSTAPAL CHROMITE MINES
OF M/S. FERRO ALLOYS CORPORATION LTD.
OVER AN AREA OF 73.21 Ha. IN VILLAGE
OSTAPAL, UNDER SUKINDA TAHASIL OF
JAJPUR DISTRICT, ODISHA

LOCATION CUM
MEGA ANIMAL MOVEMENT MAP

R.F. 1:50,000

85° 40' 85° 42' 30" 85° 45' 00" 85° 47' 30" 85° 50' 00" 85° 52' 00"

OCM/ENV/920/2024

Date-19.11.2024

To
The Director Mines Safety,
Directorate General Mine Safety,
Bhubaneswar Region,
Bhubaneswar, ODISHA

Sub: Status Report on Occupational Health Check-up in respect of Ostapal Chromite Mine of M/s Ferro Alloys Corporation Limited.

Ref: Environment Clearance (Identification no EC22B0010R12081) Condition no. - 68

Respected Sir,

Referring to the above cited subject, we would like to submit the occupational Health Status Report of Workmen of Ostapal Chromite Mine of M/s Ferro Alloys Corporation Limited.

This is for your kind perusal.

Thanking You

Yours Faithfully
For M/s Ferro Alloys Corporation Limited



MINER MANAGER
OSTAPAL CHROMITE MINE

Enclosure: As above

CC: The Joint Director, MOEF&CC, Eastern Region, Bhubaneswar

M/s. Ferro Alloys Corporation Ltd. (A subsidiary of Vedanta Ltd.)

Registered Office:

D.P.Nagar, PO : Randia, Dist.: Bhadrak, Odisha, India - 756 135

T +91-6784 240320/240347, Email: facor_mines@vedanta.co.in / facor_cco@vedanta.co.in

Website: www.facorgroup.in, CIN: U45201OR1955PLC008400.

[illegible]


UNDERTAKING FOR PERIODICAL HEALTH CHECKUP OF EMPLOYEES AND LOCAL PEOPLE

We, at Ostapal Chromite Mine M/s FACOR Ltd, are committed to ensuring the health and wellbeing of our employees and the local community. To that end, we hereby undertake to conduct periodic health and wellbeing check-up through the expertise of our own occupational health expert.

The health check-up shall include basic medical examination, vision and hearing tests, lung function tests, blood tests, and vaccination and immunization, if necessary. The check-up shall be conducted on a regular basis, as per the schedule recommended by our occupational health expert.

We appoint Dr. Anil Mahato as our occupational health expert to conduct the check-up and to recommend any further tests or treatment, if required.

For Ferro Alloys Corporation Ltd.


Mine Manager
Ostapal Chromite Mine

M/s. Ferro Alloys Corporation Ltd. (A subsidiary of Vedanta Ltd.)

Registered Office:

D.P.Nagar, PO : Randia, Dist.: Bhadrak, Odisha, India - 756 135

T : +91-6784 240320/240347, Email: facor.mine@vedanta.co.in / facor.ccp@vedanta.co.in

Website: www.facorgroup.in, CIN: U45201OR1955PLC008400

FERRO ALLOYS CORPORATION LIMITED																Issue Date : 01.10.2022			
OSTAPAL CHROMITE MINE																Revision Date : Nil			
																Department : Medical			
																Document No.			
Integrated Management System																Revision No.: 01			
IDENTIFICATION OF HAZARDS & EVALUATION OF ASSOCIATED RISK																			
OSTAPAL CHROMITE MINES, M/s FACOR LTD																			
Issue Date 01.10.2022																			
S.No.	Area	Activity/ Process	Hazard	Condition			Consequence/Risk	Occupational Safety (OS)/Occupational Health (OH)	Existing Control	Evaluation				Significant (Yes/ No)	Additional Control	Evaluation			
				Routine (R)/Non-Routine (NR)	Direct (D)/Indirect (I)	Normal (N)/Abnormal (AN)/Emergency (E)				Consequence(A)	Probability(B)	Exposure(C)	Risk Rating = AxBxC			Consequence (0.0001 to 5) (D)	(1 to 5) €	Exposure(0.0 2to 10)(F)	Residual Risk Rating = DxExF
1	Dressing room	Dressing of infected wound	Contact with infectious person & infectious body fluids (Biological hazards- Bacterial/Viral infection like COVID-19)	R	D	N	Infectious diseases	OH	Elimination- NA Substitution- NA Engineering Control- NA Admin Control- 1. General hygienic practices 2. Safe working practices as per SOP for dressing of infected wound & scheduled training PPE- Hand gloves, mouth mask, aprons, goggles	1	3	3	9	No	Elimination- NA Substitution- NA Engineering Control- NA Admin Control- NA PPE- NA	1	3	3	9
2			Exposure to chemical	R	D	N	Allergies & dermatitis	OH	Elimination- NA Substitution- NA Engineering Control- NA Admin Control- 1. General hygienic practices 2. Safe working practices as per SOP for dressing of infected wound & scheduled training PPE- Hand gloves, aprons	0.0001	1	0.5	0.00005	No	Elimination- NA Substitution- NA Engineering Control- NA Admin Control- NA PPE- NA	0.0001	1	0.5	0.00005
3			Exposure to sharp edge of medical instruments	R	D	N	Minor finger cut injury	OS	Elimination- NA Substitution- NA Engineering Control- NA Admin Control- 1. Use of standard medical instruments 2. Safe handling of medical instruments 3. Safe working practices as per SOP for dressing of infected wound & scheduled training PPE- Hand gloves	0.0001	3	3	0.0009	No	Elimination- NA Substitution- NA Engineering Control- NA Admin Control- NA PPE- NA	0.0001	3	2	0.0006
4			Contact with contaminated medical instruments (Biological hazards- Bacterial/Viral infection like COVID-19)	R	D	N	Infectious diseases	OH	Elimination- NA Substitution- NA Engineering Control- NA Admin Control- 1. Sterilization 2. Safe handling of medical instruments 3. Safe working practices as per SOP for dressing of infected wound & scheduled training PPE- Hand gloves	1	3	3	9	No	Elimination- NA Substitution- NA Engineering Control- NA Admin Control- NA PPE- NA	1	3	3	9
5	Sterilization room	Sterilization of medical instruments	Electrocution from sterilization machine	R	D	AN	Fatality, Permanent disability	OS	Elimination- NA Substitution- NA Engineering Control- NA Admin Control- 1. Scheduled checking of poor/loose wiring, faulty plug & sockets and correction 2. Safe working practices as per SOP of general electrical safety and scheduled training PPE- Rubber shoes, hand gloves	1	10	3	30	Yes	Elimination- NA Substitution- NA Engineering Control- ELCB, RCCB, Relays Admin Control- Site GESM SSP, fitness checks of electrical appliances & certification of portable tools. PPE- NA	1	3	3	9
6			Exposure to sharp edge of medical instruments	R	D	N	Minor finger cut injury	OS	Elimination- NA Substitution- NA Engineering Control- NA Admin Control- 1. Safe handling of medical instruments 2. Safe working practices as per SOP for sterilization of medical instruments & scheduled training PPE- Hand gloves	0.0001	3	3	0.0009	No	Elimination- NA Substitution- NA Engineering Control- NA Admin Control- NA PPE- NA	0.0001	3	3	0.0009
7			Contact with contaminated medical instruments (Biological hazards- Bacterial/Viral infection like COVID-19)	R	D	N	Infectious diseases	OH	Elimination- NA Substitution- NA Engineering Control- NA Admin Control- 1. Safe handling of medical instruments 2. Safe working practices as per SOP for sterilization of medical instruments & scheduled training PPE- Hand gloves	1	3	3	9	No	Elimination- NA Substitution- NA Engineering Control- NA Admin Control- NA PPE- NA	1	3	3	9

IDENTIFICATION OF HAZARDS & EVALUATION OF ASSOCIATED RISK OSTAPAL CHROMITE MINES, M/s FACOR LTD Issue Date 01.10.2022
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S.No.	Area	Activity/ Process	Hazard	Condition			Consequence/Risk	Occupational Safety (OS)/Occupational Health (OH)	Existing Control	Evaluation				Significant (Yes/ No)	Additional Control	Evaluation			
				Routine (R)/Non-Routine (NR)	Direct (D)/Indirect (I)	Normal (N)/Abnormal (AN)/Emergency (E)				Consequence (A)	Probability (B)	Exposure (C)	Risk Rating = AxBxC			Consequence (0.0001 to 5) (D)	(1 to 5) (E)	Exposure (0.0 to 10) (F)	Residual Risk Rating = DxExF
8	OHC	Disposal of bio medical waste	Biological Hazard	R	D	N	Spread of infection	OH	Elimination- NA Substitution- NA Engineering Control- NA Admin Control- 1. Proper collection (segregated), safe storage at designated place 2. Disposal by authorized waste handler 3. Safe working practices as per SOP for disposal of bio medical waste & scheduled training PPE- Hand gloves, mouth mask, aprons, goggles	0.3	3	10	9	No	Elimination- NA Substitution- NA Engineering Control- NA Admin Control- NA PPE- NA	0.3	3	10	9
9		OHC Activity (Examination/Treatment of Patient)	Cross infection- contact with infectious person (Biological hazards- Bacterial/Viral infection like COVID-19)	R	D	N	Infectious diseases	OH	Elimination- NA Substitution- NA Engineering Control- NA Admin Control- 1. Awareness to people 2. General hygienic practices 3. Proper disinfection of used medical instrument, Sanitizer & PPEs PPE- Hand gloves, mouth mask, aprons, goggles	1	7	10	70	yes	Elimination- NA Substitution- NA Engineering Control- NA Admin Control- NA PPE- NA	1	7	10	70
10	Ambulance	Parking of ambulance	Sudden movement of parked ambulance	R	D	AN	Fatality, major physical injury	OS	Elimination- NA Substitution- NA Engineering Control- Standard wheel choke (stopper) Admin Control- 1. Proper parking provision (even floor) 2. Use of hand brake 3. Remove of ignition key 4. Display for not to sit or rest near vehicle PPE- NA	1	10	10	100	Yes	Elimination- NA Substitution- NA Engineering Control- To blow the horn before starting the vehicle Admin Control- NA PPE- NA	0.3	2	10	6
11		Transporting patients in ambulance	Accident due to driver's health or behavioural issue and ambulance failure	R	D	AN	Fatality, major physical injury	OS	Elimination- NA Substitution- NA Engineering Control- NA Admin Control- 1. Inspection of surrounding area of vehicle before start 2. Use of back horn/siren when reversing 3. Display for not to sit or rest near vehicle 4. Restriction of unnecessary movement of persons 5. Use of ambulance siren 6. Regular inspection of vehicle for brake, front/rear light, horn, siren, wiper, tyre condition & pressure etc. PPE- Seat belt	5	7	3	105	No	Elimination- NA Substitution- NA Engineering Control- Reverse camera Admin Control- 1. Restriction of use of mobile by driver while driving 2. Random checking of driver for use of alcohol or drug 4. Training on VDSS & defensive driving 5. Driver's fatigue management 6. Driver's eye & health check up on regular basis 7. Use of seat belt PPE- NA	0.01	2	3	0.06
12			Contact with infectious person & infectious body fluids (Biological hazards- Bacterial/Viral infection like COVID-19)	R	D	N	Infectious diseases	OH	Elimination- NA Substitution- NA Engineering Control- NA Admin Control- 1. General hygienic practices 2. Safe working practices as per SOP for transporting the patients in ambulance & scheduled training PPE- Hand gloves, mouth mask, aprons, goggles	1	3	3	9	No	Elimination- NA Substitution- NA Engineering Control- NA Admin Control- NA PPE- NA	1	3	3	9

IDENTIFICATION OF HAZARDS & EVALUATION OF ASSOCIATED RISK OSTAPAL CHROMITE MINES, M/s FACOR LTD Issue Date 01.10.2022
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S.No.	Area	Activity/ Process	Hazard	Condition			Consequence/Risk	Occupational Safety (OS)/Occupational Health (OH)	Existing Control	Evaluation				Significant (Yes/ No)	Additional Control	Evaluation			
				Routine (R)/Non-Routine (NR)	Direct (D)/Indirect (I)	Normal (N)/Abnormal (AN)/Emergency (E)				Consequence (A)	Probability (B)	Exposure (C)	Risk Rating = AxBxC			Consequence (0.0001 to 5) (D)	(1 to 5) (E)	Exposure (0.0 to 10) (F)	Residual Risk Rating = DxE/F
13			Contact with contaminated medical instruments/ambulance (Biological hazards- Bacterial/Viral infection like COVID-19)	R	D	N	Infectious diseases	OH	Elimination- NA Substitution- NA Engineering Control- NA Admin Control- 1. Disinfection/fumigation 2. Safe handling of medical instruments 3. Safe working practices as per SOP for transporting the patients in ambulance & scheduled training PPE- Hand gloves	1	3	3	9	No	Elimination- NA Substitution- NA Engineering Control- NA Admin Control- NA PPE- NA	1	3	3	9
14			Explosion due to mishandling of oxygen gas cylinders	R	D	AN	Major physical injury	OS	Elimination- NA Substitution- NA Engineering Control- Fixed stand for cylinder Admin Control- 1. Safe handling of cylinder 2. Safe working practices as per SOP for transporting the patients in ambulance & scheduled training PPE- Hand gloves	5	3	3	45	Yes	Elimination- NA Substitution- NA Engineering Control- NA Admin Control- NA PPE- NA	5	3	3	45
15			Ergonomic hazard (1. Manual handling of patients and material from the vehicle. 2. Sustained posture and duration of journey.)	R	D	N	Back bone related problems, ligament injury, tendinitis and neurological impact	OH	Elimination- NA Substitution- NA Engineering Control- NA Admin Control- Safe working practices as per SOP for manual handling and scheduled training PPE- NA	0.3	4	2.5	3	No	Elimination- NA Substitution- NA Engineering Control- NA Admin Control- NA PPE- NA	0.3	4	2.5	3
16			Contact with fire flame during attending the patient from fire accident area	NR	D	AN	Burn injury	OS	Elimination- NA Substitution- NA Engineering Control- NA Admin Control- 1. Safe distance 2. Safe working practices as per SOP for transporting the patients in ambulance & scheduled training PPE- NA	0.3	3	2.5	2.25	No	Elimination- NA Substitution- NA Engineering Control- NA Admin Control- NA PPE- NA	0.3	3	2.5	2.25
17	Common	Manual Material handling	Ergonomics	R	D	N	Back bone related problems, ligament injury, tendinitis and neurological impact	OH	Elimination- NA Substitution- NA Engineering Control- Use of pallet trucks/stacker where as applicable Admin Control- Safe working practices as per SOP for manual handling and scheduled training PPE- NA	0.1	7	10	7	No	Elimination- NA Substitution- NA Engineering Control- NA Admin Control- NA PPE- NA	0.1	7	10	7
18		Housekeeping	Scrap material & spillage	R	D	N	Body injury due to slip & trip fall	OS	Elimination- NA Substitution- NA Engineering Control- NA Admin Control- Scheduled cleaning-no unwanted material & spillage, Proper supervision, SS Implementation, Regular Trainings PPE- Helmet, slip resistance safety shoes	0.1	10	5	5	No	Elimination- NA Substitution- NA Engineering Control- NA Admin Control- NA PPE- NA	0.1	10	5	5
19		Use of common electrical appliances	Electrocution due to poor/loose/sub standard wiring, damaged plug & socket, naked wire, joints, improper earthing	R	D	N	Fatality, Permanent disability	OS	Elimination- NA Substitution- NA Engineering Control- NA Admin Control- 1. Scheduled checking of poor/loose wiring, faulty plug & sockets and correction 2. Safe working practices as per SOP of general electrical safety and scheduled training PPE- Rubber shoes, hand gloves	5	7	5	35	Yes	Elimination- NA Substitution- NA Engineering Control- ELCB, RCCB, Relays, MCBs Admin Control- Site GESM SSP, fitness checks of electrical appliances & certification of portable tools. PPE- NA	0.3	1	10	3

IDENTIFICATION OF HAZARDS & EVALUATION OF ASSOCIATED RISK
OSTAPAL CHROMITE MINES, M/s FACOR LTD
Issue Date 01.10.2022

S.No.	Area	Activity/ Process	Hazard	Condition			Consequence/Risk	Occupational Safety (OS)/Occupational Health (OH)	Existing Control	Evaluation				Significant (Yes/ No)	Additional Control	Evaluation			
				Routine (R)/Non-Routine (NR)	Direct (D)/Indirect (I)	Normal (N)/Abnormal (AN)/Emergency (E)				Consequence (A)	Probability (B)	Exposure (C)	Risk Rating = AxBxC			Consequence (0.0001 to 5) (D)	(1 to 5) (E)	Exposure (0.0 to 10) (F)	Residual Risk Rating = DxExF
20			Fire due to short circuit	R	D	N	Burn injury, property damage	OS	Elimination- NA Substitution- NA Engineering Control- NA Admin Control- 1. Scheduled checking of poor/loose wiring, faulty plug & sockets and correction 2. Safe working practices as per SOP of general electrical safety and scheduled training PPE- NA	0.3	10	10	7	No	Elimination- NA Substitution- NA Engineering Control- ELCB, RCCB, Relays, MCBs, Fire detection system Admin Control- Site GESM SSP, fitness checks of electrical appliances & certification of portable tools. PPE- NA	0.3	1	10	3
21		Work Zone	Poor illumination	R	D	N	Body injury due to slip & trip fall, Poor eyesight & vision damage	OH	Elimination- NA Substitution- NA Engineering Control- NA Admin Control- 1. Scheduled illumination checking & correction 2. Guidelines for illumination (Lux level) PPE- NA	0.3	3	10	9	No	Elimination- NA Substitution- NA Engineering Control- NA Admin Control- NA PPE- NA	0.3	3	10	9
22			Uneven floor	R	D	N	Body injury due to slip & trip fall	OS	Elimination- NA Substitution- NA Engineering Control- NA Admin Control- Scheduled inspection & correction PPE- Helmet, slip resistance safety shoes	0.3	3	10	9	No	Elimination- NA Substitution- NA Engineering Control- NA Admin Control- NA PPE- NA	0.3	3	10	9
23			High ambient temperature	R	D	N	Heat exhaustion, heat stroke	OS	Elimination- NA Substitution- NA Engineering Control- Provision of cooling fans, shaded rest rooms Admin Control- 1. Plenty of water/fluid intake 2. General awareness on high ambient temperature risk & prevention PPE- NA	5	10	2.5	125	Yes	Elimination- NA Substitution- NA Engineering Control- NA Admin Control- No work in summer season 12pm-2 pm PPE- NA	0.3	7	2.5	5.25
24			Noise	R	D	N	Hearing loss	OH	Elimination- Eliminate noise sources Substitution- NA Engineering Control- Isolation of sources Admin Control- NA PPE- Ear Plugs	0.1	10	5	5	No	Elimination- NA Substitution- NA Engineering Control- NA Admin Control- NA PPE- NA	0.1	10	5	5
25			Dust	R	D	N	Upper Respiratory tract infection, Asbestosis and pneumoconiosis	OH	Elimination- NA Substitution- NA Engineering Control- Dust compressor while drilling. Admin Control- Water sprinkling in haul road. PPE- Dust Mask	0.1	10	5	5	No	Elimination- NA Substitution- NA Engineering Control- NA Admin Control- NA PPE- NA	0.1	10	5	5
26			VIBRATION	R	D	N	Lower back pain, MOTION SICKNESS, VARIATIONS IN BP												

AWARENESS PROGRAMME ON HEALTH WITH COMMUNIITY PEOPLE & WORKERS



Awareness on HIV AIDS at different locations at Ostapal Chromite Mine



Awareness on Dengue



Awareness on Malaria



Awareness on Tuberculosis



Awareness on dengue



Awareness on Malaria



Awareness on Tuberculosis



Awareness on Tuberculosis



Awareness on Malaria



Awareness on Tuberculosis



Awareness on Dengue



DATE : 04.12.2023



MONTHLY SAFETY TOWNHALL

SAFETY THEME: FALL FROM HEIGHT



SAFETY TOWNHALL : 03.10.2023



SAFETY TOWNHALL : 01.09.2023



SAFETY TOWNHALL : 01.08.2023



SAFETY TOWNHALL : 01.07.2023



SAFETY TOWNHALL : 01.06.2023



SAFETY TOWNHALL : 01.05.2023

OSTAPAL CHROMITE MINE & KALARANGITTA CHROMITE MINE
M/s FACOR

FORTNIGHTLY SKIN TEST REPORT																									
SL	SL NO	NAME OF THE SAMPLE	SLT-201	SLT-202	SLT-203	SLT-204	SLT-205	SLT-206	SLT-207	SLT-208	SLT-209	SLT-210	SLT-211	SLT-212	SLT-213	SLT-214	SLT-215	SLT-216	SLT-217	SLT-218	SLT-219	SLT-220	SLT-221	SLT-222	
1	1	100% Pure Cotton	1001	1002	1003	1004	1005	1006	1007	1008	1009	1010	1011	1012	1013	1014	1015	1016	1017	1018	1019	1020	1021	1022	
2	2	100% Pure Cotton	1001	1002	1003	1004	1005	1006	1007	1008	1009	1010	1011	1012	1013	1014	1015	1016	1017	1018	1019	1020	1021	1022	
3	3	100% Pure Cotton	1001	1002	1003	1004	1005	1006	1007	1008	1009	1010	1011	1012	1013	1014	1015	1016	1017	1018	1019	1020	1021	1022	
4	4	100% Pure Cotton	1001	1002	1003	1004	1005	1006	1007	1008	1009	1010	1011	1012	1013	1014	1015	1016	1017	1018	1019	1020	1021	1022	
5	5	100% Pure Cotton	1001	1002	1003	1004	1005	1006	1007	1008	1009	1010	1011	1012	1013	1014	1015	1016	1017	1018	1019	1020	1021	1022	
6	6	100% Pure Cotton	1001	1002	1003	1004	1005	1006	1007	1008	1009	1010	1011	1012	1013	1014	1015	1016	1017	1018	1019	1020	1021	1022	
7	7	100% Pure Cotton	1001	1002	1003	1004	1005	1006	1007	1008	1009	1010	1011	1012	1013	1014	1015	1016	1017	1018	1019	1020	1021	1022	
8	8	100% Pure Cotton	1001	1002	1003	1004	1005	1006	1007	1008	1009	1010	1011	1012	1013	1014	1015	1016	1017	1018	1019	1020	1021	1022	
9	9	100% Pure Cotton	1001	1002	1003	1004	1005	1006	1007	1008	1009	1010	1011	1012	1013	1014	1015	1016	1017	1018	1019	1020	1021	1022	
10	10	100% Pure Cotton	1001	1002	1003	1004	1005	1006	1007	1008	1009	1010	1011	1012	1013	1014	1015	1016	1017	1018	1019	1020	1021	1022	
11	11	100% Pure Cotton	1001	1002	1003	1004	1005	1006	1007	1008	1009	1010	1011	1012	1013	1014	1015	1016	1017	1018	1019	1020	1021	1022	
12	12	100% Pure Cotton	1001	1002	1003	1004	1005	1006	1007	1008	1009	1010	1011	1012	1013	1014	1015	1016	1017	1018	1019	1020	1021	1022	
13	13	100% Pure Cotton	1001	1002	1003	1004	1005	1006	1007	1008	1009	1010	1011	1012	1013	1014	1015	1016	1017	1018	1019	1020	1021	1022	
14	14	100% Pure Cotton	1001	1002	1003	1004	1005	1006	1007	1008	1009	1010	1011	1012	1013	1014	1015	1016	1017	1018	1019	1020	1021	1022	
15	15	100% Pure Cotton	1001	1002	1003	1004	1005	1006	1007	1008	1009	1010	1011	1012	1013	1014	1015	1016	1017	1018	1019	1020	1021	1022	
16	16	100% Pure Cotton	1001	1002	1003	1004	1005	1006	1007	1008	1009	1010	1011	1012	1013	1014	1015	1016	1017	1018	1019	1020	1021	1022	
17	17	100% Pure Cotton	1001	1002	1003	1004	1005	1006	1007	1008	1009	1010	1011	1012	1013	1014	1015	1016	1017	1018	1019	1020	1021	1022	

FORM - O

(See Rule 29 F (2) and 29 L)

REPORT OF MEDICAL EXAMINATION UNDER RULE 29 B

Certificate No.:

OF-123

Certified that, SHRI CHAMPYA GADASARA employed
in LOADING MACHINE/MPRI in ONTAPAL CHROMITE MINES of
M/s. FACEULTS Form 'B' No. 1818
has been examined for a periodical medical examination. He/she appears to be 29 years of age.
The findings of examining authority are given in the attached sheet. It is considered that,
SHRI CHAMPYA GADASARA

a) ☒ is fit for any employment in mines.

b) is suffering from _____ and is medically unfit for

- (i) any employment in mine, or
- (ii) any employment below ground or
- (iii) any employment at work _____

c) is suffering from _____ and
should get this disability controlled* and should be again examined within a period
of _____ months. He/she will appear for re-examination with the result of
test of _____ and the opinion
of _____ specialist from _____

He/she may be permitted/not permitted to carry on his/her during this period



Signature of the Examining Authority
Name and Designation in Block Letters

DR B. N. MOHAPATRA, MBBS, MPH (Mumbai)
Occupational Health Consultant
Trained in ILO Classification of Pneumoconiosis
Trained in Cardiology
Regd. No. 7297 (Orissa), 219 (DGPASLO)

Date: 12/06/2018

Place: U.P.C., BBNR

* Delete whatever not applicable

** ☒ Copy of this certificate shall be handed over to the person concerned and
other copy shall be sent to Manager of the Mine concerned by registered
post and the third copy shall be retained by the examining authority.

Date: 12/06/2018

Place: U.P.C., BBNR

FORM - O (Contd.)

(See Rule 29 F(2) and 29 L)

REPORT OF MEDICAL EXAMINING AUTHORITY

(To be filled in for every medical examination whether period or periodical
or re-examination or after improvement of disability)

Annexure to Certificate No. OF-123 as a result of Medical Examination on 12/06/2018

Identification of mark: BLACKMOLE ON RT CHEEK

1. General Development: GOOD
2. Height: 166 cm. 3. Weight: 48 Kgs.
4. Eyes: (i) Visual acuity-Distant vision (with or without glasses)
Right eye: 6/6 Without Glass Left eye: 6/6 Without Glass
(ii) Any Organic Disease of Eye: NO (iii) Night Blindness: NO
(iv) Color Blindness: NO (v) Squint: NO
(* to be tested in special cases)

5. Ears: (i) Hearing: Right Ear: NORMAL Left Ear: NORMAL
(ii) any organic disease: NO

6. Respiratory System: Chest Measurement: (i) after full inspiration: 98 cm.
(ii) after full expiration: 48 cm.

7. Circulatory System: Blood Pressure: 120/78 mm of Hg. Pulse: 78 Per Minute

8. Abdomen: Tenderness: NO Liver: NOT PALPABLE
Spleen: NOT PALPABLE Tumor: NO

9. Nervous System: History of fits or epilepsy: NO
Paralysis: NO Mental Health: GOOD

10. Locomotor system: NORMAL

11. Skin: NAD

12. Heroin: NO

13. Hydrocele: NO

14. Any other abnormality: NO

15. Urine: Reaction: ACIDIC Albumin: Nil
Sugar: Nil

16. Skiagram of Chest: NORMAL

17. Any other 'C' test considered necessary by examining authority: NO

18. Any opinion of specialist considered necessary: NO

Audiometry:
Left: NORMAL
Right: NORMAL

P.E.T.:
NORMAL

DR B. N. MOHAPATRA, MBBS, MPH (Mumbai)
Occupational Health Consultant
Trained in ILO Classification of Pneumoconiosis
Trained in Cardiology
Regd. No. 7297 (Orissa), 219 (DGPASLO)



UTKAL POLYCLINIC

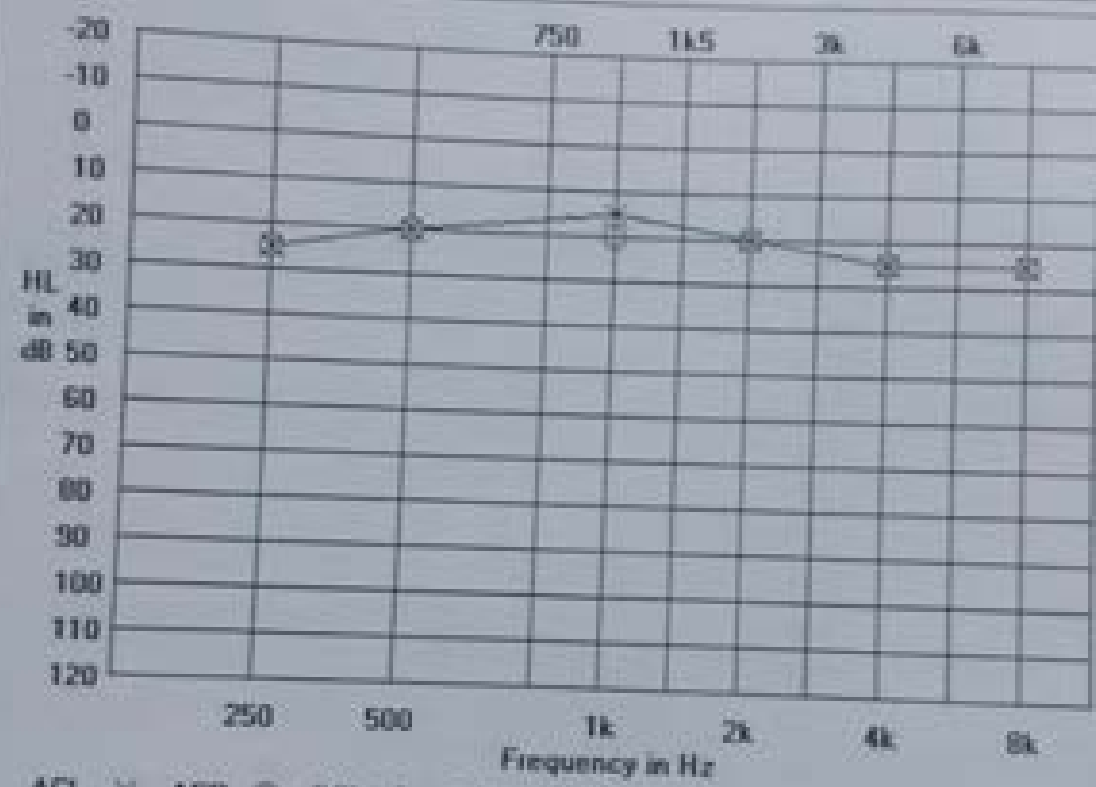
H CENTRE



AI-TATA STEEL MINING LTD., Sukinda Chromite Mine, P.O. - Kalarengatta, Jajpur, Odisha - 755028

AUDIOMETRY REPORT

Cert No.	FAD-0122		
Employee Name	GANESH CHANDRA MOHANTA	Date	13-11-2021
Designation	MAZDOOR (DMRL)	Age/ Sex	49YRS / M
Name of Mines	OSTAPAL CHROMITE MINES		
Name of Industry	FERRO ALLOYS CORPORATION LTD.		
History	NOTHING SUGGESTIVE		



ACL × ACR ○ BCL > BCR < ACLm □ ACRm △ BCLm □ BCRm □

Diagnosis :		
RT. EAR	AC	HEARING SENSITIVITY WITHIN NORMAL LIMITS
	BC	NORMAL
LT. EAR	AC	HEARING SENSITIVITY WITHIN NORMAL LIMITS
	BC	NORMAL

	RT	LT
PTA	20dB	18dB
TEXT		
WTR		
RNE		

Recommendations :

[Signature]
Audiologist

[illegible]

FORM - O

(New Rule 29(1) and 29(3))

REPORT OF MEDICAL EXAMINATION UNDER RULE 29 B

Certificate No. : **TRF-6011**

Certified that, **Shri. ARUNA KUMAR SAMAL**, employed as **SUPERVISOR(RO)** in **SARUABIL CHROMITE MINE** of M/s **TATA STEEL MINING LTD.** Town/Village **01*** has been examined for an initial medical examination. He/She appears to be **45** years of age. The findings of examining authority are given in the attached sheet. It is considered that **Shri. ARUNA KUMAR SAMAL** is **not** suitable for any employment in mines.

He is suffering from _____ and is medically unfit for (i) any employment in mine, or (ii) any employment below ground, or (iii) any employment or work.

c) is suffering from _____ should get this disability cured / controlled* and should be again examined within a period of _____ months. He/she will appear for re-examination with the result of tests of _____ and the opinion of _____ specialist from _____.

He/She may be permitted/not permitted to carry on his/her duty during this period.



Adhaar Card-921728450140

Signature of the Examining Authority
Name and Designation in Block Letters

Dr. Sarat Kumar Pandey
M.D. AFPH, Regd No-7324 (Odisha)
Occupational Health Consultant

Date: 08/02/2023

Place: TATA STEEL, SUKINDA

* Delete whatever not applicable

** One copy of the certificate shall be handed over to the person concerned and other copy shall be sent to the person in the Mine concerned by registered post and the third copy shall be retained by the examining authority.

REPORT OF MEDICAL EXAMINING AUTHORITY

(To be filled in for every mode of examination whether initial or periodical or re-examination or after commencement of disability)

Annexure to Certificate No. **TRF-6011** as a result of Medical Examination on **08 Feb 2023**

Identification of work: **BLACK MOLE OVERLE, LOWER CHEST**

1. General Development: **GOOD FAIR / POOR**

2. Height: **157** cm Weight: **68** kg

3. Eyes: (i) Visual acuity Distant vision (with or Without glasses)

Right Eye: **6/6 Without Glasses**

Left Eye: **6/6 Without Glasses**

(ii) Any Organic Disease of Eye: **NO**

(iii) Night Blindness: **NO**

(iv) Color Blindness: **NO**

(v) Squint: **NO**

(* to be tested in special cases)

5. Ears: (i) Hearing: Right Ear: **NORMAL**

Left Ear: **NORMAL**

(ii) Any Organic Disease: **NO**

6. Respiratory System: Chest Measurement: (i) after full inspiration: **91** cm (ii) after full expiration: **86** cm

7. Circulatory System: Blood Pressure: **114/70** mm of Hg Pulse: **63** Per Minute

8. Abdomen: Tenderness: **NO** Liver: **Not Palpable**

Spleen: **Not Palpable** Tumour: **NO**

9. Nervous system: History of fits or Epilepsy: **No** Paralysis: **NO**

Mental Health: **GOOD**

10. Locomotor System: **NAD**

11. Skin: **NAD**

12. Heroin: **NO**

13. Hydrocele: **NO**

14. Any other abnormality: **NO**

15. Urine: Reaction: **ACIDIC** Albumin: **Nil**

Sugar: **Nil**

16. Skiagram of Chest: **NORMAL**

17. Any other C test considered necessary by examining authority: **NO**

18. Any opinion of specialist considered necessary: **NO**

Audiometry:

Left: **NORMAL**

Right: **NORMAL**

P.E.T. NORMAL

[Signature]
08/02/23

Date: 08/02/2023

Place: TATA STEEL, SUKINDA

Dr. Sarat Kumar Pandey
M.D. AFPH, Regd No-7324 (Odisha)
Occupational Health Consultant
Signature of Examining Authority

Annexure 37

ACTION PLAN FOR NIT ROURKELA HEXAVALENT CHROMIUM REDUCTION STUDY REPORT

Sr.No	Recommendations	Action Plan
1	Discharge of tailing in separate pond	To be implemented & it will be followed in future This practice is being/will be followed since inception of the COB Plant and this practice will be continued.
2	Impervious layer to be laid at the bottom of the tailing dam to prevent the mixing of tailing water to the ground water.	An impervious layer will be laid down along all tailing ponds which will be constructed which will not allow the water to mix with the ground water. This practice is also been followed from earlier.
3	Proper SOP of tailing management should be maintained	It will maintained as per approved Mining Plan . The SOP for disposal is prepared.


Head Environment
Ostapal Chromite Mine

Annexure 38

OCM/ENV/432/2024

DATE: 23.05.2024

To
The Collector,
Jaipur District,
ODISHA

Subject: Annual Report on implementation of Community development Plan for the year 2023-24

Ref: Environment Clearance (Identification No:EC2280010R12081) Condition No.76 of Ostapal Chromite Mines of M/s Ferro Alloys Corporation Limited.

Respected Sir,

Referring to the above cited subject we would like to submit the Annual Report on implementation of Community development Plan for the year 2023-24 for Ostapal Chromite Mine of M/s Ferro Alloys Corporation Limited.

This is for your kind perusal.

Thanking You,

Yours Faithfully

For M/s Ferro Alloys Corporation Limited



**HEAD ENVIRONMENT
OSTAPAL CHROMITE MINE**

Annexure 39

OCMA/NV/445/2024

Date: 28.05.2024

To,
The Joint Director(s)
Ministry of Environment, Forest & Climate Change,
Eastern Regional Office,
Bhubaneswar, Odisha

Sub.: Submission of Six monthly EC compliance report to the conditions stipulated in the grant order of Environmental Clearance (EC) pertaining to Ostapal Chromite Mines of M/s Ferro Alloys Corporation Limited.

Ref.: Environment Clearance Identification No:EC228001OR12081, dated 04.04.2022 of Ostapal Chromite Mine of M/s Ferro Alloys Corporation Limited.

Respected Sir,

With reference to the captioned subject & cited reference, we are herewith submitting six monthly compliance report pertaining to Ostapal Chromite Mines of M/s FACOR Ltd for the period from October 2023 to March 2024 for your kind perusal.

This is for your Kind Perusal.

Thanking You

Yours faithfully,

For Ferro Alloys Corporation LTD


Authorized Signatory
Ostapal Chromite Mines

- CC: 1. The Member Secretary, SEIAA, ODISHA
2. The Member Secretary, State Pollution Control Board, ODISHA
3. The Member Secretary, Central Pollution Control Board, ODISHA

M/s. Ferro Alloys Corporation Ltd. (A subsidiary of Vedanta Ltd.)

Registered Office:

G.P.Nagar, PO : Randia, Dist.: Bhadrak, Odisha, India - 756 135

T :+91-6784 240110/240347, Email: facor.mines@vedanta.co.in / facor.sco@vedanta.co.in

Website: www.facorgroup.in CIN: U45201OR1955PLC008400.

OCM/ENV/ 745 /2024

Annexure 40

Date:30.09.2024

To

The Member Secretary
State Pollution Control Board, Odisha
Paribesh Bhawan, Unit-VIII
BHUBANESWAR-751012

Sub: Submission of Annual Environmental Statement in Form-V for the Year 2023-24 in respect of
Ostapal Chromite Mine M/s. FACOR Ltd.

Dear Sir,

With reference to the captioned subject, we are herewith submitting the Environmental Statement
in the prescribed format Form-V, duly filled in, for the year 2023-24 in respect of Ostapal Chromite
Mine M/s. Ferro Alloys Corporation Limited for your kind perusal

This is for your kind information & perusal please.

Thanking you,

Yours faithfully,

For Ferro Alloys Corporation Ltd


Mine Manager
Ostapal Chromite Mine

Enclosure: As above

Copy to:

- 1) The Regional Officer, OSPCB, Kalanganagar-Jaipur
- 2) The Joint Director, MoEF & CC Eastern Regional Office, Bhubaneswar

FORM –V

ENVIRONMENTAL STATEMENT OF OSTAPAL CHROMITE MINES OF M/S.FACOR LTD., ENVIRONMENT STATEMENT FOR THE FINANCIAL YEAR ENDING ON 31ST MARCH 2024

(PART –A)

i)	Name & Address of the Owner/Occupier of the Industry operation or Process	M/s. FERRO ALLOYS CORPORATION LTD., D.P.Nagar, Randia Bhadrak
ii)	Industry Category Primary – (SIC Code) Secondary – (SIC Code)	CHROMITE MINING INDUSTRY
iii)	Production Capacity – Unit	2.4 Lakh TPA Chrome Ore from Mines 1 Lakh TPA Beneficiated Chrome Ore From COB Plant
iv)	Year of Establishment	13 th August, 1985
v)	Date of last Environmental Statement submitted	30.09.2023 (For the Financial Year 2022-23)

(PART – B)

WATER & RAW MATERIAL CONSUMPTION

(i) Water Consumption M³/day:

A	WATER CONSUMPTION: FY 2023-24		
	Water Consumption M3/day	Total In a Year (Cub Mt)	Avg Cub mt/Day
	a) Process (Beneficiation plant)	4,84,986	1328.72
	b) Cooling, dust suppression, afforestation, wheel washing etc	41,253	113.02
	c) Domestic	25,726	70.49
Total Consumption		5,51,965	1512.23

B	PROCESS WATER CONSUMPTION PER PRODUCT OUTPUT		
	Name of the Products	During the Previous Financial Year 2022-23	During the Current Financial Year 2023-24
	a) Chrome ore Concentrate from COB Plant (Cub Mt /MT)	8.13 M3/MT (for 49500 MT CONCENTRATE)	9.75 m3/ MT (for 49712)MT of Concentrate)
	b) Chrome ore from Mines (Cub Mt /MT)	1.91 (239951) MT of ore)	2.30 (239831 MT of ore)

ii) Raw Material Consumption:

FACOR is involved in extraction of Chrome Ore from Mine /quarry .Mining is not a Manufacturing Process thus there are no such raw materials involved in the process. However, there are number of Indirect raw materials/Consumables used to support the process of Mining & beneficiation of Ore. The details consumable raw materials as follows:

Sl No.	Indirect Raw Materials /consumables	During 2023-24
	Name of the Raw materail/Consumable	
1	Disel (Kilo Liters)	1592
2	LPG (Kg)	4978
3	Lubricant Oil (Litres)	1055
4	Electricity (Consumed) (MWh)	2374
5	Electricity (Generated) (MWh)	102
6	Explosive (Kg) (Detonator, Safety fuse)	3450 kg (EXPLOSIVE) (545 Nos)Electric Detonator (100 Nos) Non Electric Detonator

(PART – C)

**POLLUTION DISCHARGED TO ENVIRONMENT/UNIT OF OUTPUT
(PARAMETER AS SPECIFIED IN THE CONSENT ISSUED)**

a)	Water *	Annual Avg. in Kg/day	Annual Avg. in mg/l	Annual Avg. (%)
1	Suspended Solids	38.6	18.69	Below prescribed standard
2	Oil & Grease	16.5	8	-do-
3.	B.O.D	14.5	7	-do-
4.	C.O.D	62	30	-do-
5.	Hexavalent Chromium (Cr ⁺⁶)	0.02	0.01	-do-
6.	Total Chromium (Cr)	0.57	0.28	-do-

b) AIR ** - Not applicable. since it is a Mining Industry.

NOTE * All the analyzed parameters of Mines pumped out water are well within the prescribed limit except hexavalent Chromium, for which ETP has been commissioned. Analysis report of Inlet water and final discharge water (after treatment) is enclosed as **ANNEXURE – I**.

** Air quality analysis report of core & Buffer Zone is enclosed as **ANNEXURE – 2**

(PART – D)
HAZARDOUS WASTES

AS SPECIFIED UNDER HAZARDOUS WASTES/MANAGEMENT & HANDLING RULES, 2008

Sl.No.	Hazardous Wastes	TOTAL QUANTITY (Kg.)	
		During the previous Financial Year 2022-23	During the Current Financial Year 2023-24
(a)	<u>FROM PROCESS:</u>		
I)	Filter & filter materials containing oil	206.8 Kg	205 KG
II)	Used oil/waste oil from vehicles	1240 Kg	772 L
III)	Empty Barrels	110 Kg	70 Kg
(b)	From Pollution Control facilities (ETP Sludge)	10170 Kg	46470 Kg

(PART – E)
SOLID WASTES

Sl.No.	P A R T I C U L A R S	TOTAL QUANTITY	
		During the previous Financial Year 2022-23	During the Current Financial Year 2023-24
(a)	<u>FROM PROCESS:</u>		
I)	Overburden	6.46 Lac M ³	4.17 Lac M ³
II)	Tailings	0.624 Lac Tons	0.738 Lac Tons
(b)	Qty. Recycled/or reutilized within the Unit Sold	NIL	NIL
(c)	Disposed – Overburden	6.46 Lac M ³	4.17 Lac M ³
	Disposed - Tailings	0.603 Lac Tons	0.738 Lac Tons

(PART – F)

Please specify the characteristics (in terms of composition and quantity) of Hazardous as well as Solid wastes and indicate disposal practice adopted for both these categories of wastes.

Sl.No.	Name of Hazardous/ Solid Wastes	Composition	Quantity	Disposal Practice
a) i)	<u>HAZARDOUS WASTES:</u> Filter & filter materials containing oil	-	-	Filter materials generated during repairing & maintenance of vehicles are being stored of in an impervious lined pit for onward disposal authorized agency by SPCB
ii)	Used Oil/Waste oil	-	0.752 KL	Used oil/waste oil from vehicles & transformers have been collected in barrels and kept under a covered shed to sell to a Regd. Authorized Dealer.
iii)	ETP Sludge		46.47 Tons	ETP sludge is being disposed of in impervious lined pit for onward disposed to authorized agency by SPCB.
iv)	Empty Barrel		7 Nos (0.007 MT)	Used As Captive reuse as per guidelines inside the mines (from current year & from opening balance)
b) i)	<u>SOLID WASTES:</u> Overburden	Laterite & weathered ultra-basic rock	4.17 Lac M ³	The solid wastes are generated as overburden is dumped in specified area of non-mineralized zones. After terracing and benching, massive afforestation is being carried out over these dumps.
ii)	Tailings	Sandy with Clay	0.738 Lac Tons	Tailings are being disposed of in Tailing Ponds

(PART – G)

**IMPACT OF THE POLLUTION ABATEMENT MEASURES TAKEN ON CONSERVATION
OF NATURAL RESOURCES AND ON THE COST OF PRODUCTION**

- Fully utilization of Low Grade ore by Beneficiation, use of mine drainage water in beneficiation, recovery of tailing water & recirculation in beneficiation plant. Mine water discharge to outside after treatment.

(PART – H)

**ADDITIONAL MEASURES/INVESTMENT PROPOSAL FOR ENVIRONMENTAL PROTECTION
INCLUDING ABATEMENT OF POLLUTION, PREVENTION OF POLLUTION**

- (a) Expense of Rs. 132.67 lakh during the year 2023-24 for environmental protection including abatement of pollution & prevention of pollution. Expenses and acknowledgment is Attached as **Annexure 3**
- (b) Action taken to monitor the Environmental Parameters Monitoring is being carried out for various Environmental parameters like air ,water , waste water & Noise Level on a regular level.
- (c) Online Ambient Air Quality Monitoring System (AAQMS) has been installed in the mines for continuous and real time monitoring of Various parameters like PM10 ,PM 2.5 , NOx , SO2, CO inside the mines. The photograph of same has been attached as **Annexure 4**
- (d) Effluent Quality Monitoring System (EQMS) has been installed inside the mines for continuous real time monitoring of ETP Inlet and Outlet Parameters like pH , TSS , Cr6+ .
- (e) Two Sewage Treatment Plant (STP) of Capacity of 20 KLD and 10 KLD has been installed inside mines for Treatment of Domestic Waste Water. The photo of the same has been attached as **Annexure 5**
- (f) Effluent Treatment Plant (ETP) of capacity 600 m3/hr has been installed inside our mines for treatment of mine seepage water and to safely discharge the treated water outside the mine premises. The details of the same has been attached with photo as **Annexure 6**

(PART – I)

ANY OTHER PARTICULARS FOR IMPROVING THE QUALITY OF THE ENVIRONMENT

	Action taken for massive afforestation	Extensive plantation program has been done and shall be taken upon available spaces, on dumps, roads, and also surrounding areas. More than 2500 trees has been planted inside mines for better stability of dump and increase of green belt inside the mines.
	Measures taken to control of the fugitive emission at different places of Mines.	In order to suppress the air borne dust from the haulage roads and mine roads, there are arrangements for water spraying system through water tankers and spraying of water is being done in regular intervals in both inside and outside of mine premises
	Action taken for disposal of the excavated material not required for industrial purpose	The overburden waste which are not required for industrial purpose are dumped within the leasehold area at the earmarked site and terraced by forming benches and reclaimed with different plant species.
	Method adopted for controlling of dust pollution due to drilling	<ul style="list-style-type: none">• Wet drilling is being practiced with a jet of water which is continuously directed at the cutting edge to suppress dust

		<p>generation.</p> <ul style="list-style-type: none"> • The cutting tools are being regularly grinded to maintain its sharpness by cross checking against gauges. • Compressed air pressure is being adequately supplied to the cutting tools. • Drill cutting are being regularly cleaned
	Method adopted for controlling of dust pollution due to blasting	Water spraying before & after blasting is being practiced to reduce the possible dust generation.
	Action taken to remove Cr ⁺⁶ from Quarry pumped out water and surface runoff water.	<p>An upgraded ETP is being operating to reduce Cr⁺⁶ from Quarry pumped out water and surface runoff water by dosing FeSO₄ solution.</p> <p>Also enhanced the ETP capacity from 400 KL/Hr to 600 KL/hr for higher amount of water Treatment of mine discharge water.</p>
	Action taken for Reduction of Cr ⁶⁺ with in the lease.	<p>Many Initiatives has been taken to reduce Hexavalent Chromium within the lease area.</p> <ol style="list-style-type: none"> 1. A study conducted along with NIT Rourkela for reduction of Hexavalent Chromium via membrane technology for which the implementation plan is complied & submitted to SPCB 2. Phytoremediation of Waste dump through plantation of 3000 sapling in our dump to reduce Cr from soil and runoff is being conducted by CSIR IMMT Bhubaneswar.

ANNEXURES FOR ENVIRONMENT STATEMENT

ANNEXURE -1 (ETP INLET AND FINAL DISCHARGE REPORT)



Visiontek Consultancy Services Pvt. Ltd.

(Committed For Better Environment)

Certified for : ISO 9001:2015, ISO 14001:2015, ISO 45001:2018 (OH&S), ISO/IEC 17025:2017

Accredited by : NABET-A Grade, MOEF & CPCB & NPB-A Grade

• Infrastructure Engineering
• Water Resource Management
• Environmental & Social Study

• Surface & Sub-surface Investigation
• Quality Control & Project Management
• Renewable Energy

• Agricultural Development
• Information Technology
• Public Health Engineering

• Mine Planning & Design
• Mineral/Sub-salt Exploration
• Waste Management Services

Laboratory Services
Environmental Lab
Food Lab
Microbial Lab
Soil Lab
Metal Lab
Water Lab

Ref : Env/lab/23-24/R- 15356

Date : 05.03.2024

EFFLUENT WATER ANALYSIS REPORT FEB-2024

1. Name of the Client : **MS FERRO ALLOYS CORPORATION LIMITED, BHADRAK**
2. Name of the Project : **OSTAPAL CHROMITE MINES, KALIAPANI JAJPUR**
3. Sampling Location : **WW-E ETP Inlet**
4. Method of sampling : **APHA 1090 B**
5. Date of Sampling : **07.02.2024**
6. Date of Analysis : **08.02.2024 to 14.02.2024**
7. Sample Collected by : **VCSPL Representative in presence of Client representative**

Sl No	Test Parameter	Test Method	Unit	WT-1
1	Color	Visual Comparison Method APHA (2005 Ed.2017) : 2030 B, C	Baran	10
2	Odour	Threshold Odour Test APHA (2005 Ed.2017) : 2150 B		Pungent Small
3	pH at 25°C	pH Meter APHA (2005 Ed.2017) : 4500H-1 B	-	8.5
4	Total Suspended Solids (as TSS)	Gravimetric Method APHA (2005 Ed.2017) : 2540 D	mg/l	60
5	Copper (as Cu)	By AAS Method APHA (2005 Ed.2017) : 3111 B	mg/l	NDL
6	Fluoride (as F)	Distillation followed by Spectrophotometric Method APHA (2005 Ed.2017) : 4500F, C	mg/l	0.43
7	Total Residual Chloride	Mercurimetric Method APHA (2005 Ed.2017) : 4500Cl, B	mg/l	0.22
8	Iron (as Fe)	By AAS Method APHA (2005 Ed.2017) : 3111, B	mg/l	1.04
9	Manganese (as Mn)	Periodate Method APHA (2005 Ed.2017) : 3100 Mn B	mg/l	NDL
10	Nitrate Nitrogen (as NO ₃ -N)	By N Volume Method APHA (2005 Ed.2017) : 4500 NO ₃ -N B	mg/l	1.59
11	Phenolic Compound (as C ₁₂ H ₁₀ O)	Distillation followed by Colorimetric Method APHA (2005 Ed.2017) : 5530 BAO	mg/l	NDL
12	Selenium (as Se)	By AAS Method APHA (2005 Ed.2017) : 3100 Se C	mg/l	NDL
13	Cadmium (as Cd)	AAS Method APHA (2005 Ed.2017) : 3111 B	mg/l	NDL
14	Cyanide (as CN)	Distillation followed by Spectrophotometric Method APHA (2005 Ed.2017) : 4500 CN- C,D	mg/l	NDL
15	Lead (as Pb)	By AAS Method APHA (2005 Ed.2017) : 3111 B	mg/l	NDL
16	Mercury (as Hg)	AAS Method APHA (2005 Ed.2017) : 3112 B	mg/l	NDL
17	Nickel (as Ni)	By AAS Method APHA (2005 Ed.2017) : 3111 B	mg/l	NDL
18	Arsenic (as As)	By AAS Method APHA (2005 Ed.2017) : 3114 B	mg/l	NDL
19	Total Chromium (as Cr)	By AAS Method APHA (2005 Ed.2017) : 3111 B	mg/l	1.42
20	Zinc (as Zn)	By AAS Method APHA (2005 Ed.2017) : 3111 B	mg/l	0.41
21	Hexavalent Chromium (as Cr ⁶⁺)	Diphenyl Carbazide Method APHA (2005 Ed.2017) : 5560 Cr, B	mg/l	0.55



Visiontek Consultancy Services Pvt. Ltd.

(Committed For Better Environment)

Certified for : ISO 9001:2015, ISO 14001:2015, ISO 45001:2018 (OHS), ISO/IEC 17025:2017

Accredited by : NABCB-A Grade, MOEF & CC/CPCB & SPCB-A Grade

• Infrastructure Engineering
• Water Resource Management
• Environmental & Social Study

• Surface & Sub-Surface Investigation
• Quality Control & Project Management
• Renewable Energy

• Agricultural Development
• Information Technology
• Public Health Engineering

• Mine Planning & Design
• Mineral Sub-sol Exploration
• Waste Management Services

Laboratory Services
Environmental Lab
Toxicology Lab
Microbiology Lab
Soil Lab
Water Lab
Wastewater Lab

22	Vanadium (as V)	By AAS Method APHA 2377 Ed.2017 1111 D	mg/l	NDL
23	Temperature	By Thermometer APHA 2377 Ed.2017 2550 B	°C	31
24	Dissolved Oxygen	Modified Winkler Method APHA 2377 Ed.2017 4560 G.C	mg/l	5.8
25	Biochemical Oxygen Demand at 20°C	IS 30252-401: 1993 S.A. 2003	mg/l	14.0
26	Chemical Oxygen Demand (as COD)	Open Reflux Method APHA 2377 Ed.2017 4750 C	mg/l	100
27	Oil & Grease (as O & G)	Gravimetric Method (Solvent Extraction) APHA 2377 Ed.2017 4520 B	mg/l	12.0
28	Ammonical Nitrogen (as NH ₄ -N)	TKN Instrument (Distillation) followed by Titrimetric Method APHA 2377 Ed.2017 4500 B14C	mg/l	9.3
29	Total Kjeldahl Nitrogen (as N)	TKN Instrument (Distillation) APHA 2377 Ed.2017 4500 N _{org} C	mg/l	12.8
30	Sulphate (as S)	Inductometric Method APHA 2377 Ed.2017 4500 37	mg/l	NDL
31	Total Ammonia (as NH ₄ -N)	By Calculation	mg/l	10.8
32	Dissolve Phosphate	APHA 2377 Ed.2017 4500 F B	mg/l	9.0
33	Particulate Matter of Suspended Solids	Gravimetric Method APHA 2377 Ed.2017 2540 D	#	<0.50
34	Blue-amy Test	IS 8582 (Part 2) 2003, IS 2 32902-12)	%	No fish mortality after 96 hours in 100% effluent

NDL = Not detectable

NDL values are as follows: Vanadium (20-100) mg/l, Arsenic (0.01-0.05) mg/l, Barium (0.01-0.05) mg/l, Beryllium (0.01-0.05) mg/l, Boron (0.01-0.05) mg/l, Cadmium (0.01-0.05) mg/l, Chromium (0.01-0.05) mg/l, Cobalt (0.01-0.05) mg/l, Copper (0.01-0.05) mg/l, Lead (0.01-0.05) mg/l, Manganese (0.01-0.05) mg/l, Mercury (0.01-0.05) mg/l, Nickel (0.01-0.05) mg/l, Silver (0.01-0.05) mg/l, Strontium (0.01-0.05) mg/l, Thallium (0.01-0.05) mg/l, Vanadium (0.01-0.05) mg/l, Zinc (0.01-0.05) mg/l.

Signature



P. Pati

Approved By

Plot No.- M-22 & 23, Chandaka Industrial Estate, Patia, Bhubaneswar, Khurda, Odisha-751024, India Tel.: 0674-3551721

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Waste Lab

Ref: Eas/ah/23-24/W-15297

Date : 09.02.2024

EFFLUENT WATER DISCHARGE ANALYSIS REPORT FEB 2024

1. Name of the Client : M/S FERRO ALLOYS CORPORATION LIMITED, BHADRAK
2. Name of the Project : OSTAPAL CHROMITE MINES, KALLAPANI, JAIPUR
3. Sampling Location : WW-1, ETP Mines Final Discharge Water
4. Method of sampling : APIEA, 1060 B
5. Date of Sampling : 07.02.2024
6. Date of Analysis : 08.02.2024 to 14.02.2024
7. Sample Collected by : VCSPL Representative in presence of Client representative

Sl. No.	Parameters	Testing Methods	Unit	Standards as Per CPO	Analysis Results
					APIEA
1	Colour	Visual Comparison Method APIEA, 1020 B, 10 th Edition, 2017	Platinum	Colourless	10
2	Odour	Whiskle Odour Method APIEA, 1030 B, 10 th Edition, 2017	---	Odourless	Appreciable
3	pH at 25°C	pH Meter APIEA, 1040 B, 10 th Edition, 2017	---	6.5-8.5	7.26
4	Total Suspended Solids	Gravimetric Method APIEA, 1050 B, 10 th Edition, 2017	mg/l	100	87
5	Copper as Cu	By AAS Method APIEA, 1011 B, 10 th Edition, 2017	mg/l	1	0.03
6	Fluoride as F	Distillation Followed by Spectrophotometric Method APIEA, 1060 F, 10 th Edition, 2017	mg/l	1	0.07
7	Total Dissolved Solids	Gravimetric Method APIEA, 1070 B, 10 th Edition, 2017	mg/l	1	140
8	Iron as Fe	By AAS Method APIEA, 1011 B, 10 th Edition, 2017	mg/l	1	0.40
9	Manganese as Mn	By AAS Method APIEA, 1011 B, 10 th Edition, 2017	mg/l	1	0.03
10	Sodium as Na	By ICP-AES Method APIEA, 1090 Na, 10 th Edition, 2017	mg/l	50	7.11
11	Phosphate Compounds as P (As P)	Distillation Followed by Spectrophotometric Method APIEA, 1020 B, 10 th Edition, 2017	mg/l	1	0.03
12	Selenium as Se	By AAS Method APIEA, 1090 Se, 10 th Edition, 2017	mg/l	0.05	0.03
13	Cadmium as Cd	By AAS Method APIEA, 1011 B, 10 th Edition, 2017	mg/l	0.1	0.03
14	Cyanide as CN	Distillation Followed by Spectrophotometric Method APIEA, 1080 -CN/CN, 10 th Edition, 2017	mg/l	0.5	0.03
15	Lead as Pb	By AAS Method APIEA, 1011 B, 10 th Edition, 2017	mg/l	0.1	0.03
16	Mercury as Hg	By AAS Method APIEA, 1011 B, 10 th Edition, 2017	mg/l	0.01	0.03
17	Nickel as Ni	By AAS Method APIEA, 1011 B, 10 th Edition, 2017	mg/l	1	0.03
18	Arsenic as As	By AAS Method APIEA, 1011 B, 10 th Edition, 2017	mg/l	0.2	0.03
19	Total Chromium as Cr	By AAS Method APIEA, 1011 B, 10 th Edition, 2017	mg/l	1	0.28
20	Zinc as Zn	By AAS Method APIEA, 1011 B, 10 th Edition, 2017	mg/l	1	0.48
21	Dissolved Chromium as Cr ^{VI}	By AAS Method APIEA, 1090 Cr, 10 th Edition, 2017	mg/l	0.05	0.007

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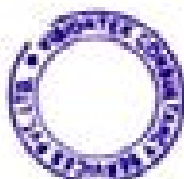
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21	Vanadium as V	By AAS Method APHA 1500 V, 19 th Edition, 2017	mg/l	0.2	NDL
22	Temperature	By Thermometer APHA 1500 B, 19 th Edition, 2017	°C	Shall not exceed 6°C above the monitoring water temperature	30
23	Biochemical Oxygen Demand as BOD ₅	Oxygen Depletion Method IS 9025 Part 45 & 2005	mg/l	10	1.0
24	Chemical Oxygen Demand as COD	Open Reflux Method APHA 5210 B, 19 th Edition, 2017 Closed Reflux Method (Potassium Dichromate) APHA 5200 B, 19 th Edition, 2017	mg/l	150	30.0
25	UO & Gross	By TKN Method APHA 4500 N _{org} C, 19 th Edition, 2017	mg/l	50	0.5
26	Total Kjeldahl Nitrogen as N	By TKN Method APHA 4500 N _{org} C, 19 th Edition, 2017	mg/l	100	1.0
27	Sulphide as S	By Methylene Blue Method APHA 4500 S, 19 th Edition, 2017	mg/l	5	NDL
28	Free Ammonia as NH ₃	By Calculation	mg/l	4	0.05
29	Dissolve Phosphate as P _T	APHA 4500 P, 19 th Edition, 2017	mg/l	5	1.0
30	Particulate Load of Suspended Solids	Cross Section Method APHA 1500 TS, 19 th Edition, 2017	g	Shall pass 600 micron IS Sieve	<0.05
31	Bioassay Test	Bioassaying Acute Toxicity IS 9025 Part 20 2005	%	100% survival of fish after 96 hours in 100% effluent	100% survival of fish after 96 hrs in 100% effluent

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1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 2679, 2680, 26



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ANNEXURE -2 (AIR QUALITY MONITORING REPORT CORE & BUFFER ZONE)



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Ref : Env/ah/23-24/R-15349

Date : 05.02.2024

AMBIENT AIR QUALITY (CORE ZONE) MONITORING REPORT- FEB 2024

1. Name of Client: **MINERALS ALLIANCE CORPORATION LIMITED, BHADRAK**
2. Name of the Project: **OSTAPAL CHROMITE MINES, KALLAPANI, JAIPUR**
3. Monitoring Instruments: **RDS (APM 400 BL), FPS (APM 550) Environment, CO Monitor, VOC Sampler**
4. Sample Collected by: **VCSP, Representative in presence of Client's Representative**

Monitoring Date	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (ppm)	NO ₂ (ppm)	CO (ppm)	HC (ppm)	CH ₄ (ppm)	CO ₂ (ppm)	Temp (°C)	W. (mm)	U _w (m/s)	U ₁₀ (m/s)
A AQMS-1: Near Rest Shelter												
03.02.2024	42.9	21.6	14.9	15.6	1.20	20.2	6.6	810	810	810	810	810
07.02.2024	45.3	23.1	13.7	15.4	1.15	21.3	7.2	810	810	810	810	810
09.02.2024	41.6	20.9	13.9	14.8	1.11	20.8	6.3	810	810	810	810	810
15.02.2024	44.8	22.7	14.1	14.9	1.08	20.5	7.1	810	810	810	810	810
16.02.2024	46.2	23.1	14.4	15.5	1.20	21.2	7.2	810	810	810	810	810
21.02.2024	45.5	22.9	13.5	13.9	1.18	21.6	6.8	810	810	810	810	810
27.02.2024	43.7	22.8	13.8	14.1	1.23	20.9	6.5	810	810	810	810	810
29.02.2024	42.8	21.7	14.1	15.2	1.24	20.5	6.9	810	810	810	810	810
NAAQ Standard	100	60	80	80	4	400	100	1	40	40	20	30
Monitoring Date	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (ppm)	NO ₂ (ppm)	CO (ppm)	HC (ppm)	CH ₄ (ppm)	CO ₂ (ppm)	Temp (°C)	W. (mm)	U _w (m/s)	U ₁₀ (m/s)
A AQMS-2: Near Weigh Bridge												
03.02.2024	60.2	30.5	13.5	11.2	1.17	21.1	6.8	810	810	810	810	810
07.02.2024	55.2	28.8	12.8	10.6	1.22	20.5	7.1	810	810	810	810	810
09.02.2024	51.8	26.2	13.2	10.9	1.15	20.2	6.9	810	810	810	810	810
15.02.2024	53.9	27.1	13.9	11.2	1.13	21.3	6.3	810	810	810	810	810
16.02.2024	56.7	28.4	14.1	9.8	1.05	20.6	6.5	810	810	810	810	810
21.02.2024	61.2	31.3	12.7	10.6	1.16	20.9	7.2	810	810	810	810	810
27.02.2024	58.8	29.9	13.8	10.2	1.12	21.3	7.1	810	810	810	810	810
29.02.2024	55.4	28.2	12.2	11.1	1.15	21.5	6.7	810	810	810	810	810
NAAQ Standard	100	60	80	80	4	400	100	1	40	40	20	30
Testing Method	Gravimetric	Gravimetric	Impactor Based Colorimetric	Impactor Based Colorimetric	Non-Dispersion	Chemical Method	Auto-Analyzer Based Method	Non-Dispersive Infrared Spectroscopy (NDIR)	Impactor Based Colorimetric	Auto Method	Auto Method	Auto Method

NDIR (Detection Limit) : CO (ppm) : 0.001, PM₁₀ (µg/m³) : 0.1, PM_{2.5} (µg/m³) : 0.01, SO₂ (ppm) : 0.01, NO₂ (ppm) : 0.01, CH₄ (ppm) : 0.01, CO₂ (ppm) : 0.01, Temp (°C) : 0.1, W. (mm) : 0.1, U_w (m/s) : 0.1, U₁₀ (m/s) : 0.1


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Biodiversity Lab

Ref : Env/lab/23-24/R- 15350

Date : 05.03.2024

AMBIENT AIR QUALITY (CORE ZONE) MONITORING REPORT- FEB 2024

1. Name of Client : M/s FERROD ALLOYS CORPORATION LIMITED, BHILAIKANK
2. Name of the Project : OSTAPAL CHROMITE MINES, KALIAPANI, JAIPUR
3. Monitoring Instruments : RDS (APM 400 HL), FPS (APM 550) Envirotech, CO Monitor, VOC Sampler
4. Sample Collected by : VCSPL Representative in presence of Client's Representative

Monitoring Date	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NO ₂ (µg/m ³)	CO (ppm)	NO (ppm)	O ₃ (ppm)	CO ₂ (ppm)	Temp (°C)	PH	W (µg/m ³)	As (µg/m ³)
AQMIS-3: Middle of the Open Cast Quarry												
03.02.2024	48.5	33.1	14.1	16.1	1.20	21.6	6.8	RDH	RDH	RDH	RDH	RDH
07.02.2024	40.9	31.4	13.4	14.8	1.14	20.9	7.2	RDH	RDH	RDH	RDH	RDH
09.02.2024	43.3	32.4	13.9	15.2	1.19	21.3	7.1	RDH	RDH	RDH	RDH	RDH
15.02.2024	64.1	32.8	14.5	16.3	1.23	21.5	6.2	RDH	RDH	RDH	RDH	RDH
20.02.2024	65.2	33.6	14.2	15.9	1.22	20.5	6.9	RDH	RDH	RDH	RDH	RDH
23.02.2024	59.7	30.1	13.3	15.5	1.09	22.1	6.6	RDH	RDH	RDH	RDH	RDH
27.02.2024	62.3	31.5	13.9	14.8	1.15	21.9	7.1	RDH	RDH	RDH	RDH	RDH
29.02.2024	43.8	32.8	14.6	15.7	1.25	21.5	6.5	RDH	RDH	RDH	RDH	RDH
NAAQ Standard	100	60	80	16,400	4	400	100	1	40	40	20	40
Monitoring Date	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NO ₂ (µg/m ³)	CO (ppm)	NO (ppm)	O ₃ (ppm)	CO ₂ (ppm)	Temp (°C)	PH	W (µg/m ³)	As (µg/m ³)
AQMIS-4: Near COB Plant												
03.02.2024	60.6	30.5	13.3	16.4	1.10	20.2	6.6	RDH	RDH	RDH	RDH	RDH
07.02.2024	58.9	30.1	13.8	15.9	1.22	21.6	7.1	RDH	RDH	RDH	RDH	RDH
09.02.2024	41.5	31.6	14.1	15.2	1.19	20.9	6.8	RDH	RDH	RDH	RDH	RDH
15.02.2024	59.7	30.9	14.5	16.3	1.11	20.5	6.3	RDH	RDH	RDH	RDH	RDH
20.02.2024	55.4	28.8	13.7	16.7	1.16	21.1	7.2	RDH	RDH	RDH	RDH	RDH
23.02.2024	46.3	28.9	13.3	14.2	1.14	20.3	6.9	RDH	RDH	RDH	RDH	RDH
27.02.2024	58.9	29.4	14.2	15.5	1.23	20.8	6.5	RDH	RDH	RDH	RDH	RDH
29.02.2024	60.1	30.4	13.8	15.1	1.12	20.2	6.8	RDH	RDH	RDH	RDH	RDH
NAAQ Standard	100	60	80	80	4	400	100	1	40	40	20	40
Testing Method	gravimetric	gravimetric	Impersonal Gravimetric (400 ml/min)	Impersonal Gravimetric (400 ml/min)	Non-Spectrophotometric	Chemical Method	Non-Spectrophotometric	Non-Spectrophotometric	Temperature & Humidity measured by sensor	Temperature measured by sensor	acid Method	acid Method

SDC (Station Downwind) Limit: PM₁₀ = 30 µg/m³, PM_{2.5} = 10 µg/m³, SO₂ = 40 µg/m³, NO₂ = 40 µg/m³, CO = 4 ppm, NO = 1 ppm, O₃ = 1 ppm, Temp = 40 °C, PH = 4.0, W = 10 µg/m³, As = 1 µg/m³





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Laboratory Services
Environmental Lab
Food Lab
Metallurgical Lab
Soil Lab
Microbiology
&
Molecular Lab

Ref : Env/lab/23-24/R-15251

Date : 05.03.2024

AMBIENT AIR QUALITY (BUFFER ZONE) MONITORING REPORT- FEB 2024

- 1 Name of Client : MA FERRO ALLOYS CORPORATION LIMITED , BHADRAK
- 2 Name of the Project : OSTAPAL CHROMITE MINES , KALIAPANE, JAJPUR
- 3 Monitoring Instruments : RDS (APM 400 BL), FPS (APM 550) Envirotech, CO Monitor, VOC Sampler
- 4 Sample Collected by : VCSPL Representative in presence of Client's Representative

Monitoring Date	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NO ₂ (µg/m ³)	CO (mg/m ³)	NO _x (µg/m ³)	O ₃ (µg/m ³)	CO ₂ (µg/m ³)	Sp ₃ (µg/m ³)	PH ₃ (µg/m ³)	Si (µg/m ³)	As (µg/m ³)
A-1 (PM10-1): Near Village Chata												
16.02.2024	89.1	30.1	7.0	11.7	0.74	0.04	1.8	0.04	0.04	0.04	0.04	0.04
A-2 (PM10-2): Near Village Kapsat												
16.02.2024	51.7	20.0	7.1	14.1	0.70	0.04	1.4	0.04	0.04	0.04	0.04	0.04
A-3 (PM10-3): Near Village Kaliapane Township												
16.02.2024	58.7	23.3	8.0	11.9	0.74	0.04	1.5	0.04	0.04	0.04	0.04	0.04
A-4 (PM10-4): Near Village Chapat												
16.02.2024	54.0	18.5	7.0	14.0	0.70	0.04	1.1	0.04	0.04	0.04	0.04	0.04


Reviewed By: 


Approved By: 



Visiontek Consultancy Services Pvt. Ltd.

(Committed For Better Environment)

Complied for : ISO 9001:2015, ISO 14001:2015, ISO 45001:2018 (OHSAS), ISO/IEC 17024:2007

Accredited by : NABET-A Grade, MOEF & CPCPB & SPCB-A Grade

• Instrumentation Engineering
• Water Resource Management
• Environmental & Social Study

• Surface & Sub-Surface Investigation
• Quality Control & Project Management
• Renewable Energy

• Agricultural Development
• Information Technology
• Public Health Engineering

• Mine Planning & Design
• Mineral/Sub-sol Exploration
• Waste Management Services

Laboratory Services
Environmental Lab
Food Lab
Industrial Lab
Soil Lab
Microbiology Lab
&
Wastewater Lab

Ref : Kav/lab/23-24/90-15302

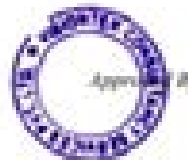
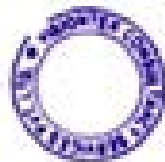
Date: 05.03.2024

AMBIENT AIR QUALITY (BUFFER ZONE) MONITORING REPORT- FEB 24

- 1 Name of Client : M/s FERRO ALLOYS CORPORATION LIMITED, BHADRAK
- 2 Name of the Project : OSTAPAL CHROMITE MINES, KALLAPANI, JALPUR
- 3 Monitoring Instruments : RDS (APM 460 II), FPS (APM 150) Tensiwatch, CO Monitor, VOC Sampler
- 4 Sample Collected by : VCSPL Representative in presence of Client's Representative

Month Year Time	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NO ₂ (µg/m ³)	O ₃ (µg/m ³)	NO _x (µg/m ³)	O ₂ (µg/m ³)	CO ₂ (µg/m ³)	Bag (µg/m ³)	PH (µg/m ³)	H ₂ (µg/m ³)	As (µg/m ³)
AQMS-1: Near Village Dalia												
28.02.2024	62.1	32.1	7.7	12.2	6.56	824	6.6	804	804	818	804	818
AQMS-2: Near Village Kogani												
28.02.2024	97.6	24.6	7.2	11.8	6.68	818	7.9	804	804	818	804	818
AQMS-3: Near Village Kallapani Township												
28.02.2024	89.2	38.1	7.8	13.3	6.77	818	6.2	804	804	818	804	818
AQMS-4: Near Village Dargal												
28.02.2024	94.8	28.2	6.2	11.7	6.66	818	6.2	804	804	818	804	818

Reviewed By



P. Patil

ANNEXURE – 3 (ENVIRONMENT MANAGEMENT EXPENSES AUDITED STATEMENT)



CERTIFICATE

TO WHOM SO EVER IT MAY CONCERN

We hereby certify from examination of the books of accounts and other relevant records of the applicant M/s Ferro Alloys Corporation Limited, GSTIN 21AAAC799943C3 that the company has incurred expenditures of INR Rs 2,62,27,840/- [Two Crore Sixty-two Lakh Twenty-Seven Thousand Eight Hundred Four Rupees Only] for below mentioned details during the financial year 2023-24 for Odapal Chromite Mine.

Sl No.	Particulars	Amount in (INR)
1	Environment Management Expenses	1,32,67,593
2	Occupational Health & Safety	26,27,459
3	Corporate Environment Responsibility	1,13,32,788
	Total	2,62,27,840

Note: The Expenditure figures are certified on the basis of un-audited financial statements and the accounts maintained by the applicant.

For Vinod Singhal & Co LLP
Chartered Accountants

CA Satyajeet Panigrahi
(Partner)
Membership No-316245
UDIN- 24316245BKAUYY6238
Date : 27/05/2024
Place : KHORDA



Plot No N3/289, IRC Village, Bhubaneswar-751013, Odisha
Ph: +91- 8270367253
• Email: satyajeetpanigrahi@vsc.co.in • Website : www.vsc.co.in
(Registered under the Limited Liability Partnership Act, 2008 on Conversion from
Vinod Singhal & Co. w.e.f. 04.07.2019 with LLPIN / AAP-7982)

ANNEXURE 4 : ONLINE AMBIENT AIR QUALITY MONITORING SYSTEM



Online AAQMS installed at mines for continuous monitoring of parameters like CO , SO₂, PM₁₀, PM_{2.5} and NO_x.

ANNEXURE 5 (SEWAGE TREATMENT PLANT (STP) INSIDE MINE)

SEWAGE TREATMENT PLANT (20KLD)



SEWAGE TREATMENT PLANT (10 KLD)





STP has been installed inside our mines premises for treatment of Domestic Waste Water

ANNEXURE 6 (EFFLUENT TREATMENT PLANT OF CAPACITY 600M3/HR INSIDE MINE)



ETP OF 600M3/HR CAPACITY INSTALLED INSIDE MINES FOR TREATMENT OF HEXVALENT CHROMIUM (CR6+) WATER .

 <p>सर्वोच्च Govt. of India सर्वोच्च अधिकारी Ministry of Labour & Employment सर्वोच्च अधिकारी Directorate-General of Mines Safety</p> 
NO: 180020 SEZ Bhubaneswar Region Exemp 2021 8922 Date: 28/05/2021

From

Director of Mines Safety,
Bhubaneswar Region

To

Agent,
Ostapal Chromite Mine,
M/s Ferro Alloys Corporation Limited,
P.O. Kaliapani,
Dist: Jajpur (Odisha)- 755047.

Subject: Permission under Regulation 106(2)(b) of the Metalliferous Mines Regulations, 1961 for using Heavy Earth Moving Machineries (HEMMs) in conjunction with deep hole blasting at Ostapal Chromite Mine of M/s Ferro Alloys Corporation Limited.

Sir,

Please refer to your application no.142526 dated 23.03.2021 and plans/sections submitted therewith, on the above subject.

The matter has since been examined on the basis of information furnished in your application under reference and as shown on the plans and sections submitted by you.

In exercise of the powers conferred on the Chief Inspector of Mines (also designated as Director-General of Mines Safety) under the provisions of Regulations 106(2)(b) of the Metalliferous Mines Regulations, 1961 and by virtue of authorisation granted to me by the Chief Inspector of Mines (also designated as Director-General of Mines Safety) under Section 6(1) of the Mines Act, 1952, I, in supersession of permission granted earlier on the above subject, hereby permit you to work Ostapal Chromite Mine of M/s Ferro Alloys Corporation Limited, by deployment of Heavy Earth Moving Machineries (HEMMs) in conjunction with deep hole blasting within the mine boundary as marked by points A, A/1, B, B/1, C, C/1, C/2, D, D/1, D/2, D/3, D/4, D/5, D/6, D/7, D/8, D/9, E, E/1, E/2, E/3, E/4 & closes at A on plan No. OCM/SP-2/3/DGMS/02/2021 dated 28.02.2021 subject to the conditions as stipulated herein, being strictly complied with:

1.0 GENERAL:

1.1 Except where otherwise provided for in this conditional permission, all Provisions of the Metalliferous Mines Regulations, 1961 shall be strictly complied with.

1.2 Safety Management Plan shall be prepared and maintained as per the DGMS Circular No. 05 of 2016.

1.3 No working shall be made or extended within 45 m of any building/structure of permanent nature, not belonging to owner of the mine without permission in writing from this Directorate under Regulation 109 of the Metalliferous Mines Regulations, 1961.

1.4 No deep hole blasting shall be done within 300m of any surface buildings, structures, public roads, etc, not belonging to the owner unless separate permission under relevant Regulation 164 of Metalliferous Mines Regulations, 1961 is obtained from this Directorate. Owners of structures and dwellings, not belonging to the owner of the mine and habitants/occupants of such dwellings/buildings shall be indemnified against damage to property/injury to persons, if any, arising out of blasting operations.

1.5 The mine shall be kept under the charge of a person holding First Class Manager's Certificate of Competency under the Metalliferous Mines Regulations, 1961, who shall be assisted by adequate number of Assistant Managers, Surveyors, Foremen, Mining Mates and Engineers as per the said Regulations. The manager shall exercise daily personal supervision in the mine and he shall not take up any appointment in any capacity whatsoever in another mine. Where by reason of absence or for any other reason the Manager is unable to exercise daily personal supervision, a person holding a valid Manager's Certificate shall be authorized to act as Manager of the Mine in compliance with Regulation 34(7) and if no such qualified person is available, the mine workings shall be kept suspended.

1.6 No person shall be employed in the mine unless his attendance is recorded in the registers maintained in prescribed Form at the time when the person, against whom the entry is made, enters or leaves the mine as required under Section 48 of the Mines Act, 1952 and Rule 78 of the Mines Rules, 1955 read with DGMS Circular No.01 of 2017. The entries in the Form shall be made at suitable points in the premises of the mine at reasonable distance from work place by a person who is paid by the Owner or the Agent and is answerable to the Manager and not by a contractor's employee.

1.7 No work whatsoever shall be done where the provision of Regulation 127 of the Metalliferous Mines Regulations, 1961 are attracted due to the presence of river, jore, reservoir and nallah in the vicinity. The entire ground lying within 15.0 m of HFL of all the rivers, nallas, water reservoirs and jores shall be filled up and raised and consolidated to a R.L. of at least 3.0m above the highest flood level.

1.8 Emergency Management Plan shall be prepared and implemented as per the DGMS (Tech.) (S&T) Circular No. 08 of 2016.

2.0 OPENCAST WORKINGS:

2.1 Height and Width of Benches: