

KLCM/ENV/ 70 /2021

Dtd: 31.05.2021

To

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

Sub.: Submission of Six-monthly compliance report to the conditions stipulated in the grant order of Environmental Clearance (EC) pertaining to Kalarangiatta Chromite Mines of M/s. FACOR LTD.

Ref.: MoEF EC Letter No.: J-11015/38/2006-IA II(M) dtd.06-12-2006

Dear Sir,

With reference to the captioned subject & cited reference, we are herewith submitting six monthly compliance reports pertaining to Kalarangiatta Chromite Mines of M/s FACOR Ltd for the period from October'2020 to March'2021 for your kind perusal.

The Monthly & quarterly Environmental monitoring data for the period October'2020 to Mar'2021 comprising AAQ, Water, Noise & Soil are enclosed herewith as Annexures. The soft copy of the same is being sent to your good office by email.

This is for your Kind information & necessary action.

Thanking You

Yours faithfully,  
for FERRO ALLOYS CORPORATION LTD.



MINES MANAGER  
Encl.: A/a

**Name of the Project** : Kalarangiatta Chromite Mines, M/s. FACOR Ltd.  
**Project Code** : Mining (Non-Coal)  
**Clearance Letter No.with date** : J-11015/183/2007-IA-II (M) dated.13-05-2009  
**Period of Compliance Report** : October,2020 to March,2021

**Specific Condition**

Sl. No.	Condition	Compliance Status
1.	All the conditions stipulated by the State Pollution control Board, Odisha in their consent to establish shall be effectively implemented.	All stipulated conditions are being effectively implemented.
2.	The environmental clearance is granted for opencast mining only. For the underground mining, the project proponent shall obtain separate clearance after getting the mine plan approval from the Indian Bureau of Mines.	Now opencast mining operation is going on. Before starting underground mining the project proponent will obtain separate clearance after getting mining plan approval from the Indian Bureau of Mines.
3.	The environmental clearance is subject to approval of the State Land purposes Dept. Govt. of Odisha for diversion of agricultural land for non-agricultural use.	Till date Agricultural land has not been used for non-agricultural use. Diversion of Agricultural land for non-agricultural use will be done after getting approval from the State Land use Dept., Govt. of Odisha.
4.	The Project proponent shall ensure that no natural watercourse and/or water resources are obstructed due to any mining operations. Adequate measures shall be taken for protection of Damsala Nallah and other seasonal channels, if any emanating from the mine lease, during the course of mining operation.	There is no natural water course or water resource obstructed due to the mining operation. Adequate measures have been taken before discharging the mines pumped out water to Damsala Nallah. Water is being treated in upgraded ETP with Ferrous sulfate depending upon the concentration of Cr <sup>+6</sup> to neutralize its effect before discharging out of the mine lease area.
5.	The topsoil shall temporarily be stored at earmarked site(s) only and it should not be kept unutilized for long. The topsoil shall be used for land reclamation and plantation.	All the generated topsoil has been utilized for land reclamation and plantation purpose & there is no stock presently.
6.	The overburden (OB) generated during the mining operation shall be stacked at earmarked dump site (s) only and it should not be kept active for a long period of time and their phase-wise stabilization shall be carried out. There shall be one external over burden dump having maximum projected height of 30m. Proper terracing of the OB dump maintained to 27°.	The OB generated during the mining operation is being stacked at earmarked dump site. Height of the OB dump is only 19 mtr. The OB dump is not kept active for long period. Overall slope of the OB dump is being maintained below 30°. Bottom inactive slope of the dump have been vegetated with native species to prevent erosion & surface run-off. Monitoring and management of rehabilitated areas of the dump have been continuing until the vegetation becomes self-sustaining.

	<p>The OB dump shall be scientifically vegetated with suitable native species to prevent erosion and surface run off. In critical areas, use of geo textiles shall be undertaken for stabilization of the dump. Monitoring and management of rehabilitated areas shall continue until the vegetation becomes self-sustaining. Compliance status shall be submitted to the Ministry of Environment &amp; Forests and its Regional Office located at Bhubaneswar on six monthly basis</p>	<p>Several precautions have been taken in the dump for its slope stabilization which are given below</p> <ol style="list-style-type: none"> <li>1. Dumping is being carried out in peripheral dumping method by using dozers. In this method the materials are compacted by running of vehicles as well as the dozer.</li> <li>2. The top surface is also maintained to avoid ponding of water which affect the stability of the dump.</li> <li>3. The overburden is stacked in bench form to ensure stability.</li> <li>4. The bench height is maintained at 10 – 15mtrs.</li> <li>5. Various types of plants such as Acacia, Chakunda, Teak, Chhatian etc. have been planted in the inactive portions of the overburden dump.</li> <li>6. The overburden dump has been stabilized by tree plantation in the dead benches after carrying out suitable terracing of size 2 M × 1 M each.</li> <li>7. Grass patching has been developed on the dump slopes to ensure prevention of erosion of soil from the dump slopes due to rainwater.</li> <li>8. Proper drainage system has already been maintained to prevent rain cuts on the dump.</li> <li>9. Proper garland drain is being maintained all around the dump to collect the surface runoff during rain.</li> <li>10. Over the bench surface of the overburden dump yard longitudinal and transverse drains have been made to enable the water to flow to the settling pit through proper drainage system. This not only prevents erosion of overburden dump material but also ensure stability of overburden dump by preventing development of hydro static pressure inside the overburden dump and proper channelization of rainwater for plantation purposes. As a result, the generation of rain cut is very negligible.</li> <li>11. We have already planted 1578 nos. of Saplings to stabilize this overburden dump.</li> <li>12. Garland drain &amp; retaining wall has been constructed all around the dump.</li> </ol>
7.	<p>Catch drains and siltation ponds of appropriate size shall be constructed for the working pit, soil, OB and mineral dumps to arrest flow of silt and sediment directly into the Damsala Nallah and other water bodies. The water so collected should be utilized for watering the mine area, roads, green belt development etc.</p>	<p>2677 metres of garland drains has been constructed around the working pit, OB &amp; mineral dumps with siltation ponds at different intervals to arrest flow of silt &amp; sediments.</p>

	<p>The drains should be regularly de-silted particularly after the monsoon and maintained properly. Garland drains, settling tanks and check dams of appropriate size, gradient and length shall be constructed both around the mine pit and overburden dump to prevent run off of water and flow of sediments directly into the Damsala Nallah and other water bodies and sump capacity should be designed keeping 50% safety margin over and above peak sudden rainfall (based on 50 years of data) and maximum discharge in the area adjoining the mine site. Sump capacity should also provide adequate retention period to allow proper settling of silt material.</p> <p>Storm water return system should be provided. Storm water should not be allowed to go to the effluent treatment plant during high rainfall/super cyclone period. A separate storm water sump for this purpose should be created.</p>	<p>Whenever required, the silts &amp; sediments are being cleaned. Mines pumped-out water is being used for dust suppression and plantation purposes after proper treatment.</p>
8.	<p>Dimension of retaining wall at the toe of the overburden dump and the OB benches within the mine to check run-off and siltation should be based on the rainfall data.</p>	<p>About 2289 mtrs of retaining wall of width 1.5m and height 1.2m has been constructed at toe of the overburden dump to check run-off and siltation.</p>
9.	<p>Effluents containing Cr<sup>+6</sup> shall be treated to meet the prescribed standards before reuse/discharge. Effluent treatment plant should be provided for treatment of mine water discharge and wastewater generated from the workshop and mineral separation plant.</p> <p>Run off from the OB dump and other surface run off should be analyzed for Cr<sup>+6</sup> and in case its concentration is found higher than the permissible limit the water should be treated before reuse/discharge.</p>	<p>An Effluent Treatment Plant has been in operation for treatment of mines discharge water. The concentration of Cr<sup>+6</sup> in treated discharged water is &lt;0.005mg/l. The analysis report of mines final discharge water after treatment in ETP for the period from October 2020 to March 2021 is enclosed in <b>Annexure-1</b>.</p> <p>Small scale mining operation is being carried out with an Excavator &amp; 4 nos. of dumpers. Also, the machineries &amp; vehicles belong to the Contractor. The repairing of these vehicles is being done at outside workshop only. There is no workshop and mineral separation plant. Surface runoff water samples were collected in a settling pit during rainy season and then pumped to the ETP for treatment before final discharge. Mine discharge water through pumping station is pumped to Flash Mixing Tank with ferrous sulfate (FeSO<sub>4</sub>) for reduction of Cr<sup>6+</sup> to Cr<sup>3+</sup>. The effluent is then distributed to Clari-flocculators &amp; the supernatant is passed into the Sand Filters. Now, the filtered water shall be collected in Treated Water Tank and could be disposed of meeting standards stipulated by OSPCB or reused in plantation or haul roads dust suppression.</p>

10.	Separate impervious concrete pits for disposal of sludge shall be provided for the safe disposal of sludge generated from the mining operations.	Sludge generated from mines contains Low Grade Chrome ore hence it has been stacked along with Low Grade Chrome ore for utilization.
11.	The project proponent shall ensure that the treated effluents conforming to the prescribed standards shall only be discharged.	The mines pumped out water directly collected in the intake tank of ETP through pipeline and then treated by adding FeSO <sub>4</sub> & NaOH dosing. The final treated water is being discharged to outside ML area, conforming to the prescribed standards. For analysis reports refer <b>Annexure-1</b> .
12.	Plantation shall be raised in an area of 12.715 ha. Including 7.5m wide green belt in the safety zone around the mining lease, overburden dump, roads etc. by planting the native species in consultation with the local DFO/Agriculture Dept. The density of the trees should be around 2500 plants per hect.	During the year 2020-21, 1235 nos. of saplings have been planted in the Safety Zone area around the Mining lease and inactive bottom slope of the dump. And a 5.544ha. has been planted till the end of 2020-21. Native species has been planted in consultation with local Forest Dept by maintaining the density 2500plants per Ha..
13.	The void left unfilled in an area of 5.21 ha. shall be converted into the water body. The higher benches of the excavated void/mine pit shall be terraced and plantation done to stabilize the slopes. The slopes of higher benches shall be made gentler for easy accessibility by the local people to use the water body. Peripheral fencing shall be carried out all along the excavated area.	The same will be implemented at the end of mining operation.
14.	Effective safeguard measures, such as regular water sprinkling shall be carried out in critical areas prone to air pollution and having high levels of SPM & RSPM such as around crushing and screening plant, loading and unloading point and all transfer points. Extensive water sprinkling shall be carried out on haul roads. It should be ensured that the Ambient Air Quality parameters conform to the norms prescribed by the Central Pollution Control Board in this regard.	All the parameters of ambient air quality are well within the prescribed limit. Although, regular water sprinkling is being carried out on haul roads, loading & unloading points to control the dust generation at source. There is no crushing and screening plant.
15.	Regular monitoring of water quality upstream and downstream of the Damsala nallah shall be carried out and record of monitored data should be maintained and submitted to the Ministry of Environment	Monitoring of water quality upstream & downstream of the Damsala nallah is being carried out and record of monitoring data are being maintained.

	<p>&amp; Forests, its Regional Office, Bhubaneswar, the Central Ground water Authority, the Regional Director, Central Ground water Board, the State Pollution control Board and the Central Pollution Control Board.</p>	<p>The test reports for the period Oct, 2020 to Mar'2021 are enclosed as <b>AnnexureNo.-2</b>.</p>
<p>16.</p>	<p>The project authority shall implement suitable conservation measures to augment ground water resources in the area in consultation with the Regional Director, Central Ground Water Board.</p>	<p>Three main rain water harvesting structure have been made in Mining premises i.e Check Dam, Garland drain &amp; Settling pond/tank to augment the ground water resources.</p> <div style="display: flex; justify-content: space-around; align-items: center;">   </div> <div style="display: flex; justify-content: space-around; align-items: center;"> <p><b>Settling Pond</b></p> <p><b>Garland drain</b></p> </div>
<p>17.</p>	<p>Regular monitoring of ground water level and quality shall be carried out by establishing a network of existing wells and constructing new piezometers in and around the mining lease during the mining operation.</p> <p>The periodical monitoring {(at least four times in a year- pre-monsoon (April-May), monsoon (August), post-monsoon (November) and winter (January); once in each season)} shall be carried out in consultation with the state ground Water Board/Central Ground Water Authority and the data thus collected may be sent regularly to the MoEF and its Regional Office, Bhubaneswar, the Central Ground Water Authority and the Regional Director, CGWB. If at any stage, it is observed that the ground water table is getting depleted due to the mining activity; necessary corrective measures shall be carried out.</p>	<p>Monitoring of ground water level &amp; quality is being carried out in and around the mining lease and the analysis report is enclosed as <b>Annexure-3 &amp; Annexure No- 4</b></p>
<p>18.</p>	<p>The project proponent shall obtain necessary prior permission of the competent authorities for drawl of requisite quantity of water (surface water and ground water) for the project and effectively implement all the conditions stipulated therein.</p>	<p>NOC has been obtained from Central Ground Water Authority, Ministry of Water Resources, New Delhi vide letter no. 21-4/1457/OR/MIN/2017-1766 dated 12.09.2018 for ground water withdrawal. The stipulated conditions are being effectively implemented. The approved NOC is enclosed as <b>Annexure-5</b>.</p>

19	Suitable rainwater harvesting measures on long term basis shall be planned and implemented in consultation with the Regional Director, CGWB	Rainwater is being collected in pits and pond for suitable rain water harvesting measures. Also roof top rainwater harvesting measure is implemented within the lease area.
20.	Vehicular emissions shall be kept under control and regularly monitored. Measures shall be taken for maintenance of vehicles used in mining operations and in transportation of mineral. The mineral transportation shall be carried out through the covered trucks only and vehicles carrying the mineral shall not be overloaded.	Vehicular emission of all machinery used in mining operations are being monitored regularly and kept under control by rigorous maintenance of all engines & changing of lubricants as per the recommendation of the manufacturer. The HEMMs, with valid PUC certificate are allowed for operation inside the mines.  Transportation of mineral has been done through covered trucks and also avoids overloading.
21	Blasting operation shall be carried out only during the daytime. Controlled blasting shall be practiced. The mitigative measures for control of ground vibrations and to arrest fly rocks and boulders should be implemented.	At present, blasting operation has not been carried out. Excavation has been carried out by machines only.
22	Drills shall either be operated with dust extractors or equipped with water injection system.	Drilling has not been done so far. In future, if drilling is required, then wet drilling practice will be adopted.
23	Mineral handling area shall be provided with adequate number of high efficiency dust extraction system. Loading and unloading areas including all the transfer points should also have efficient dust control arrangements. These should be properly maintained and operated.	Water spraying arrangement is being carried out on mineral handling area, loading & unloading areas to suppress dust generation. The test report of fugitive dust emissions is enclosed as <b>Annexure-6</b> .
24	Sewage treatment plant shall be installed for the colony, ETP shall also be provided for the workshop and waste water generated during the mining operation.	As there is no colony inside lease area, so sewage treatment plant is not necessary. All the mining machineries have been engaged by contractor for mining operation and the maintenance work of their machines have been carried out at outside workshop. Therefore, question of workshop effluent does not arise. An ETP has been established for treatment of mines pumped out water and surface runoff water before discharge to outside leasehold area.
25.	Consent to operate shall be obtained from the State Pollution Control Board, Odisha before starting production from the mine.	Consent to Operate has been obtained from SPCB, Odisha before starting production from the mine. Mining operation has been going on with valid consent to operate obtained from SPCB vide their letter No. 2485/IND-I-CON-6318, Dtd.06-02-2016 for the period up to 31.03.2020.

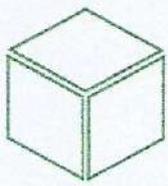
26.	The project authorities should undertake sample survey to generate data on pre-project community health status within a radius of 1 km from proposed mine.	Sample survey for community health status within 1 Km radius from Project area has already been done.
27.	Pre-placement medical examination and periodical medical examination of the workers engaged in the project shall be carried out and records maintained. For the purpose, schedule of health examination of the workers should be drawn and followed accordingly.	Pre-placement medical examination has already been carried out of the workers engaged in the project and the records are being maintained and periodical medical examination is being carried out once in five years.
28.	Provision shall be made for the housing of construction labor within the site with all necessary infrastructure and facilities such as fuel for cooking, mobile toilets, mobile STP, safe drinking water, medical health care, crèche etc. The housing may be in the form of temporary structures to be removed after the completion of the project.	Housing for construction labor is not required, since the laborers are coming from nearby villages.
29	The critical parameters such as SPM, RSPM, NO <sub>x</sub> , In the ambient air within the impact zone, peak particle velocity at 300 m distance or within the nearest habitation, whichever is closure shall be monitored periodically (at least once a month). Further, quality of discharged water shall also be monitored (TDS, DO, pH, suspended particulate matter and Cr <sup>+6</sup> ). The monitored data shall be uploaded on the website as well as displayed on a display board at a suitable location in public domain.	Parameters such as PM <sub>10</sub> , PM <sub>2.5</sub> , NO <sub>x</sub> & SO <sub>2</sub> in the Ambient Air and Quality of discharge water are being monitored. The monitored data is being uploaded in the Company Website and display on a display board installed at the Mines main gate. Blasting operation has not been carried out. Hence peak particle velocity has not been monitored.
30	The project proponent shall take all precautionary measures during mining operation for conservation and protection of endangered fauna namely elephant etc. spotted in the study area. Action plan for conservation of flora and fauna shall be prepared and implemented in consultation with the State Forest and Wildlife Dept. All the safeguard measures brought out in the Wildlife Conservation Plan so prepared specific to this project site shall be effectively implemented. Necessary allocation of funds for implementation of the conservation plan shall be made and the funds so allocated shall be included in the project cost. A copy of action plan shall be submitted to the MoEF and its Regional Office, Bhubaneswar.	The endangered flora and fauna are not spotted in the study area. Hence, action plan for conservation for the same is not required.
31	A final Mine Closure Plan along with details of Corpus Fund shall be submitted to the MoEF 5 years in advance of final mine closure for approval.	The same will be submitted in due time to MOEF for approval

## GENERAL CONDITIONS

Sl. No.	Condition	Compliance Status
1	No change in mining technology and scope of working should be made without prior approval of the MoEF.	The Mining technology & scope of working will not change without approval of Ministry of Environment & Forest.
2	No change in the calendar plan including excavation, quantum of mineral chromite ore and the waste shall be made.	<p>The calendar plans including excavation, quantum of mineral chromite ore and waste overburden have not been changed.</p> <p>The calendar plan including excavation, quantum of mineral chromite ore and overburden generated during the period April 2020 to March, 2021 is given in <b>Annexure-7</b>.</p>
3	At least four ambient air quality monitoring stations should be established in the core zone as well as in the buffer zone for RSPM, SPM, SO <sub>2</sub> , & NO <sub>x</sub> monitoring. Location of the stations should be decided based on the meteorological data, topographical features and environmentally and ecologically sensitive targets and frequency of monitoring should be undertaken in consultation with the State Pollution Control Board.	Ambient Air quality monitoring stations has already been established in consultation with SPCB.
4	Data on ambient air quality (RSPM, SPM, SO <sub>2</sub> & NO <sub>x</sub> ) should be regularly submitted to the MoEF including its Regional. Office located at Bhubaneswar and the state Pollution Control Board / Central Pollution Control Board once in six months.	Data on Ambient Air Quality Monitoring with respect to PM <sub>10</sub> , PM <sub>2.5</sub> , SO <sub>2</sub> & NO <sub>x</sub> are being carried out. The monitoring reports for the period from October, 2019 to March, 2020 are enclosed as <b>Annexure-8A (Core zone)</b> & <b>Annexure-8B(Buffer zone)</b>
5	Fugitive dust emissions from all the sources should be controlled regularly. Water spraying arrangement on haul roads, loading and unloading and at transfer points should be provided and properly maintained.	Control of fugitive dust emission is being carried out by water spraying on haul roads, loading & unloading points and ore handling yard regularly.
6	Measures should be taken for control of noise levels below 85 dB (A) in the work environment. Workers engaged in operations of HEMM etc. should be provided with ear plugs/muffs.	Control measures such as maintenance of all machines including checking of silencers regularly and changing of engine oil as per recommendation of the manufacturer has been carried out regularly. The workers engaged at noise generating areas are provided with earplugs/muffs. The present noise level at work environment is below 85 dB (A). Sound pressure level at work environment is enclosed as <b>Annexure-9</b> .

7	<p>Industrial wastewater (Workshop &amp; Waste water from the mine) should be properly collected, treated so as to conform to the standards prescribed under GSR 422(E) Dtd. 19<sup>th</sup>May, 1993 and 31<sup>st</sup>December, 1993 or as amended from time to time. Oil and grease trap should be installed before discharge of workshop effluents.</p>	<p>The Mines wastewater is being collected directly in intake tank of the ETP for treatment of Cr<sup>+6</sup> and finally discharged to outside ML area. The analysis of this water shows that all parameters are well within the prescribed limit. The analysis report of mines final discharge water after treatment in ETP is given in <b>Annexure -1</b>. Almost all mining machineries and transporting vehicles are being engaged on contract basis for transportation of OB and chrome ore. The repairing of these vehicles is being done at outside workshop by the contractor. Therefore, question of workshop effluent does not arise.</p>
8	<p>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. Occupational health surveillance of the workers should be undertaken periodically to observe any contractions due to exposure to dust and take corrective measures, if needed.</p>	<p>In addition to water spraying for dust suppression, workers engaged in dusty areas such as dumper drivers, HEMM Operators, are being provided with nose masks as precautionary measure. Training &amp; information on safety, health hazards are being given to all categories of deserved workers. Occupational health surveillance programme of all categories of workers and employees have been conducted periodically.</p>
9	<p>A separate environmental management cell with suitable qualified personnel should be set-up under the control of a Senior Executive, who will report directly to the Head of the Organization.</p>	<p>A separate Environment Management Cell with qualified personnel and well equipped Environment Engineering Laboratory are functioning under the control of Senior Executive. Besides we are carrying out all Environmental monitoring &amp; analysis through a MoEF &amp; NABL accredited laboratory M/S <b>VisionTek Consultancy Services Pvt. Ltd.</b>, Bhubaneswar &amp; the monitoring reports are enclosed in <b>Annexures</b>.</p>
10	<p>The funds earmarked for environmental protection measures should be kept in separate account and should not be diverted for other purpose. Year wise expenditure should be reported to the MoEF and its Regional Office located at Bhubaneswar.</p>	<p>Separate funds provision is made to carryout environmental protection measures. Details of expenses for Environmental protection measures during the year 2020-21 are given in <b>Annexure-10</b>.</p>
11	<p>The project authorities should inform to the Regional Office located at Bhubaneswar regarding date of financial closures and final approval of the project by the concerned authorities and the date of start of land development work.</p>	<p>The date of final approval of the Project is 04.10.2010 by DMS and 23-01-2012 by SPCB.</p>

12	The Regional Office of this Ministry located at Bhubaneswar shall monitor compliance of the stipulated conditions. The project authorities should extend full cooperation to the Officer (s) of the Regional Office by furnishing the requisite data/information/ monitoring reports.	The project authorities will extend full co-operation to the officers of the Regional office by furnishing the requisite data/ information/ monitoring reports.
13	The project proponent shall submit six monthly reports on the status of the implementation of the stipulated environmental safeguards to the MoEF, its Regional Office, Bhubaneswar, CPCB, and SPCB, The project proponent shall upload the status of compliance of the environment clearance conditions on their website and update the same periodically and simultaneously send the same by e-mail to the Regional Office, MoEF, Bhubaneswar.	Implementing the conditions stipulated in the Environmental Clearance letter. The Six-monthly report on Status of compliance of the Environmental Clearance conditions have been submitted to the concerned authorities and the same is being uploaded in our website.



(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 & CC/CPCB & SPCB-A Grade

**Laboratory Services**

Environment Lab  
Food Lab  
Material Lab  
Soil Lab  
Mineral Lab  
&  
Microbiology Lab

- 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-Soil Exploration
- Waste Management Services

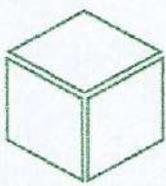
Ref : Envlab/20/R-9564

Date : 01.04.2021

## EFFLUENT WATER DISCHARGE ANALYSIS REPORT- MARCH 2021

1. Name of Client : M/s FERRO ALLOYS CORPORATION LIMITED , BHADRAK
2. Name of the Project : KALARANGIATTA CHROMITE MINES , KALIAPANI, JAJPUR
3. Sampling Location : EW1: ETP Mines Final Discharge Water
4. Method of Sampling : APHA 1060 B
5. Date of Sampling : 25.03.2021
6. Date of Analysis : 26.03.2021 TO 01.04.2021
7. Sample Collected by : VCSPL Representative in presence of Client's Representative

Sl. No.	Parameters	Testing Methods	Unit	Standards (In land Surface water)	Analysis Results
					EW-1
1	Colour	Visual Comparison Method APHA 2120 B; 23 <sup>rd</sup> Edition, 2017	Hazen	Colourless	10
2	Odour	Threshold Odour Method APHA 2150 B; 23 <sup>rd</sup> Edition, 2017	--	Odourless	pungent smell
3	pH at 25°C	pH Meter APHA 4500 H <sup>+</sup> B; 23 <sup>rd</sup> Edition, 2017	--	5.5-9.0	8.28
4	Total Suspended Solids	Gravimetric Method APHA 2540 D; 23 <sup>rd</sup> Edition, 2017	mg/l	100	32
5	Copper as Cu	By AAS Method APHA 3111 B; 23 <sup>rd</sup> Edition, 2017	mg/l	3	<0.05
6	Fluoride as F	Distillation followed by Spectrophotometric Method APHA 4500 F C,D; 23 <sup>rd</sup> Edition, 2017	mg/l	2	0.38
7	Total Residual Chlorine	Iodometric Method APHA 23RD Ed,2017 : 4500Cl, B	mg/l	1	ND
8	Iron as Fe	By AAS Method APHA 3111 B; 23 <sup>rd</sup> Edition, 2017	mg/l	3	0.41
9	Manganese as Mn	By AAS Method APHA 3111 B; 23 <sup>rd</sup> Edition, 2017	mg/l	2	<0.05
10	Nitrate as NO <sub>3</sub>	By UV-Screen Method APHA 4500 NO <sub>3</sub> B; 23 <sup>rd</sup> Edition, 2017	mg/l	10	7.41
11	Phenolic Compounds as C <sub>6</sub> H <sub>5</sub> OH	Distillation Followed by Spectrophotometric Method APHA 5530-B, D; 23 <sup>rd</sup> Edition, 2017	mg/l	1	<0.001
12	Selenium as Se	By AAS Method APHA 3500 Se C; 23 <sup>rd</sup> Edition, 2017	mg/l	0.05	<0.01
13	Cadmium as Cd	By AAS Method APHA 3111 B; 23 <sup>rd</sup> Edition, 2017	mg/l	2.0	<0.001
14	Cyanide as CN	Distillation Followed by Spectrophotometric Method APHA 4500 -CN-C,E; 23 <sup>rd</sup> Edition, 2017	mg/l	0.2	<0.05
15	Lead as Pb	By AAS Method APHA 3111 B; 23 <sup>rd</sup> Edition, 2017	mg/l	0.1	<0.01
16	Mercury as Hg	By AAS Method APHA 3112 B; 23 <sup>rd</sup> Edition, 2017	mg/l	0.01	<0.001
17	Nickel as Ni	By AAS Method APHA 3111 B; 23 <sup>rd</sup> Edition, 2017	mg/l	3	<0.05
18	Arsenic as As	By AAS Method APHA 3114 B; 23 <sup>rd</sup> Edition, 2017	mg/l	0.2	<0.05
19	Total Chromium as Cr	By AAS Method APHA 3111 B; 23 <sup>rd</sup> Edition, 2017	mg/l	2	0.36
20	Zinc as Zn	By AAS Method APHA 3111 B; 23 <sup>rd</sup> Edition, 2017	mg/l	5	0.024
21	Hexavalent Chromium as Cr <sup>16</sup>	By AAS Method APHA 3500 Cr B; 23 <sup>rd</sup> Edition, 2017	mg/l	0.1	<0.001
22	Vanadium as V	By AAS Method APHA 3500 V; 23 <sup>rd</sup> Edition, 2017	mg/l	0.2	<0.001



# 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

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- Infrastructure Engineering
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- Quality Control & Project Management
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- Agricultural Development
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- Public Health Engineering

- Mine Planning & Design
- Mineral/Sub-Soil Exploration
- Waste Management Services

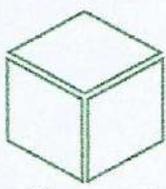
Laboratory Services  
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 Soil Lab  
 Mineral Lab  
 &  
 Microbiology Lab

Ref : Envlab/20/R-9564

Date : 01.04.2021

23	Temperature	By Thermometer APHA 2550 B; 23 <sup>rd</sup> Edition, 2017	°C	Shall not exceed 5°C above the receiving water temperature	32
24	Dissolved Oxygen	Modified Winkler Method APHA 4500 O. C; 23 <sup>rd</sup> Edition, 2017	mg/l	--	6.6
25	Biochemical Oxygen Demand as BOD	Oxygen Depletion Method IS 3025 ( Part 44 );2003	mg/l	30	6.4
26	Chemical Oxygen Demand as COD	Open Reflux Method APHA 5220 B; 23 <sup>rd</sup> Edition, 2017	mg/l	250	23
27	Oil & Grease	Gravimetric Method (Solvent Extraction) APHA 5520 B; 23 <sup>rd</sup> Edition, 2017	mg/l	10	4.6
28	Ammonical Nitrogen as N	By TKN Method APHA 4500-NH <sub>3</sub> C; 23 <sup>rd</sup> Edition, 2017	mg/l	50	2.1
29	Total Kjeldahl Nitrogen as N	By TKN Method APHA 4500-N <sub>org</sub> C; 23 <sup>rd</sup> Edition, 2017	mg/l	100	5.8
30	Sulphide as S	By Methylene Blue Method APHA 4500-S D; 23 <sup>rd</sup> Edition, 2017	mg/l	2	<0.001
31	Free Ammonia as NH <sub>3</sub>	By Calculation	mg/l	10	5.2
32	Particulate Size of Suspended Solids	Gravimetric Method APHA 2540 D; 23 <sup>rd</sup> Edition, 2017	μ	Shall pass 850 micron IS Sieve	<850
33	Bio-assay Test	Evaluating Acute Toxicity IS 6582 (P-2) 2008	%	90% survival of fish after 96 hours in 100% effluent	98% Survival of Fish after 96 Hrs in 100% Effluent





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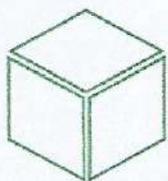
Ref : Envlab/20/R-9565

Date : 01.04.2021

## SURFACE WATER QUALITY ANALYSIS REPORT- MARCH-2021

1. Name of Client : M/s FERRO ALLOYS CORPORATION LIMITED , BHADRAK'
2. Name of the Project : KALARANGIATTA CHROMITE MINES , KALIAPANI, JAJPUR
3. Sampling Location : SW1: Damsala Nallah Upstream Water ( 100 mtr Up)  
SW2: Damsala Nallah Downstream Water (100 mtr Up)  
(with impact of other mines discharge)
4. Method of Sampling : APHA 1060 B
5. Date of Sampling : 25.03.2021
6. Date of Analysis : 26.03.2021 TO 31.03.2021
7. Sample Collected by : VCSPL Representative in presence of Client's Representative

Sl. No	Parameter	Testing Method	Unit	Standards as per IS-2296:1992 Class -'C'	Analysis Results	
					SW-1	SW-2
1	Colour (max)	Visual Comparison Method APHA 23 <sup>RD</sup> Ed,2017 : 2120 B, C	Hazen	300	<5	5
2	pH Value	pH Meter APHA 23 <sup>RD</sup> Ed,2017 : 4500H' B	--	6.0-9.0	7.34	7.18
3	Suspended solids	Gravimetric Method APHA 23 <sup>RD</sup> Ed,2017 : 2540 D	mg/l	--	52	82
4	Dissolved Oxygen (minimum)	Modified Winkler Method APHA 23 <sup>RD</sup> Ed,2017 : 2540 C	mg/l	4.0	7.2	6.4
5	Turbidity	Nephelometric Method APHA 23 <sup>RD</sup> Ed,2017 : 2130 B	NTU	--	8.9	11.2
6	Chloride (max)	Titrimetric Method APHA 23 <sup>RD</sup> Ed,2017 : 4500Cl' B	mg/l	600	8.4	9.2
7	Total Dissolved Solids	Gravimetric Method APHA 23 <sup>RD</sup> Ed,2017 : 2540 C	mg/l	1500	92	121
8	BOD (3) days at 27°C (max)	IS 3025(P-44) : 1993 RA 2003	mg/l	3.0	BDL	BDL
9	Arsenic as As	By AAS Method APHA 23 <sup>RD</sup> Ed,2017 : 3114 B	mg/l	0.2	BDL	BDL
10	Lead as Pb(max)	By AAS Method APHA 23 <sup>RD</sup> Ed,2017 3111 B	mg/l	0.1	BDL	BDL
11	Cadmium as Cd (max)	By AAS Method APHA 23 <sup>RD</sup> Ed,2017 : 3111 B	mg/l	0.01	BDL	BDL
12	Hexa Chromium as Cr <sup>+6</sup>	Diphenyl Carbazide Method APHA 23 <sup>RD</sup> Ed,2017 : 3500Cr B	mg/l	0.05	BDL	BDL
13	Copper as Cu (max)	By AAS Method APHA 23 <sup>RD</sup> Ed,2017 : 3111 B	mg/l	1.5	BDL	BDL
14	Zinc as Zn(max)	By AAS Method APHA 23 <sup>RD</sup> Ed,2017 : 3111 B	mg/l	15	BDL	BDL
15	Selenium as Se (max)	By AAS Method APHA 23 <sup>RD</sup> Ed,2017 : 3500 Se C	mg/l	0.05	BDL	BDL
16	Cyanide as CN (max)	Distillation followed by Spectrophotometric Method APHA 23 <sup>RD</sup> Ed,2017 : 4500 CN' C,D	mg/l	0.05	ND	ND
17	Fluoride as F (max)	Distillation followed by Spectrophotometric Method APHA 23 <sup>RD</sup> Ed,2017 : 4500F C	mg/l	1.5	0.18	0.24
18	Sulphates (SO <sub>4</sub> ) (max)	Turbidimetric Method APHA 23 <sup>RD</sup> Ed,2017 : 4500 SO <sub>4</sub> <sup>2-</sup> E	mg/l	400	0.86	0.92



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Laboratory Services

Environment Lab  
Food Lab  
Material Lab  
Soil Lab  
Mineral Lab  
&  
Microbiology Lab

● 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

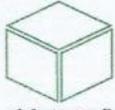
● Mine Planning & Design  
● Mineral/Sub-Soil Exploration  
● Waste Management Services

Ref : Envlab/20/R-9565

Date : 01.04.2021

19	Phenolic Compounds as C <sub>6</sub> H <sub>5</sub> OH (max)	<b>Chloroform Extraction By Colorimetric Method</b> APHA 23 <sup>RD</sup> Ed,2017: 5530 B,D	mg/l	0.005	BDL	BDL
20	Iron as Fe (max)	<b>By AAS Method</b> APHA 23 <sup>RD</sup> Ed,2017: 3500Fe, B	mg/l	0.5	0.71	0.046
21	Nitrate as NO <sub>3</sub> (max)	<b>By UV-Screen Method</b> APHA 23 <sup>RD</sup> Ed,2017: 4500 NO <sub>3</sub> E	mg/l	50	2.6	2.1
22	Anionic Detergents (max)	<b>Anionic Surfactants as MBAS</b> APHA 23 <sup>RD</sup> Ed,2017: 5540 C	mg/l	1.0	ND	ND
23	Total Coli form	<b>By Multiple Tube Fermentation Technique</b> APHA 23 <sup>RD</sup> Ed,2017: 9221 B	MPN/ 100 ml	5000	1200	1600





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Laboratory Services  
Environment Lab  
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Mineral Lab  
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Microbiology Lab

Ref : Envlab/20/R-9569

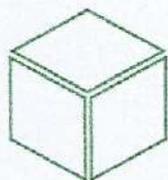
Date : 01.04.2021

## GROUND WATER LEVEL REPORT- MARCH 2021

1. Name of Client : M/s FERRO ALLOYS CORPORATION LIMITED , BHADRAK
2. Name of the Project : KALARANGIATTA CHROMITE MINES , KALIAPANI, JAJPUR
3. Sample Collected by : VCSPL Representative in presence of Client's Representative

SL.No.	Locations	DOS	Unit	Analysis Result
1	Tube Well Water Near TISCO Main Gate	25.03.2021	mt/bgl	7.6
2	Tube Well Inside the Lease Hold Area	25.03.2021	mt/bgl	8.1
3	Open Well Water of Ransol	25.03.2021	mt/bgl	8.2
4	Tube Well Water of Kalarangiatta	25.03.2021	mt/bgl	8.3
5	Tube Well Water of Bhimtanagar	25.03.2021	mt/bgl	8.2
6	Open Well Village Goramian	25.03.2021	mt/bgl	7.8
7	Tube Well Near OMC Labour Colony	25.03.2021	mt/bgl	8.4
8	Open Well at Village Chingudipal	25.03.2021	mt/bgl	8.3
9	Open Well at Village Kusumundia	25.03.2021	mt/bgl	7.7





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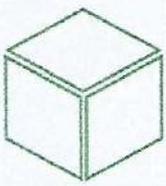
Ref : Envlab/20/R-9562

Date : 01.04.2021

## GROUND WATER QUALITY ANALYSIS REPORT- MARCH 2021

- Name of Client : M/s FERRO ALLOYS CORPORATION LIMITED , BHADRAK
- Name of the Project : KALARANGIATTA CHROMITE MINES , KALIAPANI, JAJPUR
- Sampling Location : GW1: Tube Well Near TISCO Main Gate  
GW2: Tube Well inside the Lease hold Area  
GW3: Open Well at Ransol Village
- Method of Sampling : APHA 1060 B
- Date of Analysis : 26.03.2021 TO 31.03.2021
- Sample Collected by : VCSPL Representative in presence of Client's Representative

Sl. No.	Parameter	Testing Method	Unit	Standard as per IS -10500:2012 Amended on 2015 & 2018		Analysis Result		
				Permissible Limit	Permissible Limit	GW1	GW2	GW3
						DOS: 25.03.2021	DOS: 25.03.2021	DOS: 25.03.2021
<b>Essential Characteristics</b>								
1	Colour	Visual Comparison Method APHA 23 <sup>RD</sup> Ed,2017 : 2120 B, C	Hazen	5	15	<5	<5	<5
2	Odour	Threshold Odour Test APHA 23 <sup>RD</sup> Ed,2017 : 2150 B	--	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
3	Taste	Flavor Threshold Test APHA 23 <sup>RD</sup> Ed,2017 : 2160 C	--	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
4	Turbidity	Nephelometric Method APHA 23 <sup>RD</sup> Ed,2017 : 2130 B	NTU	1	5	6.8	5.2	6.4
5	pH Value at 25°C	pH Meter APHA 23 <sup>RD</sup> Ed,2017 : 4500H <sup>+</sup> B	--	6.5-8.5	No Relaxation	6.4	6.42	6.91
6	Total Hardness (as CaCO <sub>3</sub> )	EDTA Titrimetric Method APHA 23 <sup>RD</sup> Ed,2017 : 2340 C	mg/l	200	600	192	190	194
7	Iron (as Fe)	By AAS Method APHA 23 <sup>RD</sup> Ed,2017 : 3111, B	mg/l	1.0	No Relaxation	0.26	0.32	0.31
8	Chloride (as Cl <sup>-</sup> )	Argentometric Method APHA 23 <sup>RD</sup> Ed,2017 : 4500Cl <sup>-</sup> B	mg/l	250	1000	42	36	48
9	Residual, free Chlorine	Iodometric Method APHA 23 <sup>RD</sup> Ed,2017 : 4500Cl <sup>-</sup> B	mg/l	0.2	1	ND	ND	ND
<b>Desirable Characteristics</b>								
10	Dissolved Solids	Gravimetric Method APHA 23 <sup>RD</sup> Ed,2017 : 2540 C	mg/l	500	2000	310	286	308
11	Calcium (as Ca)	EDTA Titrimetric Method APHA 23 <sup>RD</sup> Ed,2017 : 3500Ca B	mg/l	75	200	54.8	50.6	60.8
12	Magnesium (as Mg)	Calculation Method APHA 23 <sup>RD</sup> Ed,2017 : 3500Mg B	mg/l	30	100	21.8	21.2	24.1
13	Copper (as Cu)	By AAS Method APHA 23 <sup>RD</sup> Ed,2017 : 3111 B	mg/l	0.05	1.5	<0.05	<0.05	<0.05
14	Manganese (as Mn)	Persulfate Method APHA 23 <sup>RD</sup> Ed,2017 : 3500Mn B	mg/l	0.1	0.3	<0.05	<0.05	<0.05
15	Sulphate (as SO <sub>4</sub> )	Turbidimetric Method APHA 23 <sup>RD</sup> Ed,2017 : 4500 SO <sub>4</sub> <sup>2-</sup> E	mg/l	200	400	34.0	31.2	31.8
16	Nitrate (as NO <sub>3</sub> )	By UV-Screen Method APHA 23 <sup>RD</sup> Ed,2017 : 4500 NO <sub>3</sub> <sup>-</sup> E	mg/l	45	No Relaxation	7.6	7.2	7.4
17	Fluoride (as F)	Distillation followed by Spectrophotometric Method APHA 23 <sup>RD</sup> Ed,2017 : 4500F C	mg/l	1.0	1.5	0.21	0.16	0.24
18	Phenolic Compounds (as C <sub>6</sub> H <sub>5</sub> OH)	Chloroform Extraction by Colorimetric Method APHA 23 <sup>RD</sup> Ed,2017 : 5530 B,D	mg/l	0.001	0.002	<0.001	<0.001	<0.001
19	Mercury (as Hg)	AAS Method APHA 23 <sup>RD</sup> Ed,2017 : 3112 B	mg/l	0.001	No Relaxation	<0.002	<0.002	<0.002
20	Cadmium (as Cd)	AAS Method APHA 23 <sup>RD</sup> Ed,2017 : 3111 B	mg/l	0.003	No Relaxation	<0.001	<0.001	<0.001



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Ref : Envlab/20/R-9562

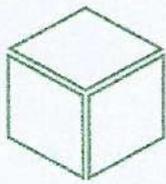
Date : 01.04.2021

21	Selenium (as Se)	By AAS Method APHA 23 <sup>RD</sup> Ed,2017: 3500 Se C	mg/l	0.01	No Relaxation	<0.01	<0.01	<0.01
22	Arsenic (as As)	By AAS Method APHA 23 <sup>RD</sup> Ed,2017: 3114 B	mg/l	0.01	No Relaxation	<0.01	<0.01	<0.01
23	Cyanide (as CN)	Distillation followed by Spectrophotometric Method APHA 23 <sup>RD</sup> Ed,2017: 4500 CN C,D	mg/l	0.05	No Relaxation	<0.05	<0.05	<0.05
24	Lead (as Pb)	By AAS Method APHA 23 <sup>RD</sup> Ed,2017 3111 B	mg/l	0.01	No Relaxation	<0.01	<0.01	<0.01
25	Zinc (as Zn)	By AAS Method APHA 23 <sup>RD</sup> Ed,2017: 3111 B	mg/l	5	15	<0.05	<0.05	<0.05
26	Anionic Detergents (as MBAS)	Anionic Surfactants as MBAS APHA 23 <sup>RD</sup> Ed,2017: 5540 C	mg/l	0.2	—	ND	ND	ND
27	Mineral Oil	Partition-Gravimetric Method APHA 23 <sup>RD</sup> Ed,2017: 5520 B	mg/l	0.5	No Relaxation	ND	ND	ND
28	Alkalinity	Titration Method APHA 23 <sup>RD</sup> Ed,2017:2320 B	mg/l	200	600	220	212	226
29	Aluminium as( Al)	AAS Method APHA 23 <sup>RD</sup> Ed,2017: 3111 D	mg/l	0.03	0.2	<0.001	<0.001	<0.001
30	Boron (as B)	Curcumin Method APHA 23 <sup>RD</sup> Ed,2017: 4500B, B	mg/l	0.5	2.4	<0.1	<0.1	<0.1
31	Total Coli form as TC	MPN Method APHA 23 <sup>RD</sup> Ed,2017 : 9221 b	MPN/ 100ml	Shall not be detectable in any 100ml sample	—	180	130	120

CL - Colourless, U/O - Unobjectionable, ND - Not detected.

BDL (Below detection limit) Values : (Cu<0.05 mg/l, Mn<0.005 mg/l, C<sub>6</sub>H<sub>5</sub>OH<0.001 mg/l, Hg<0.005mg/l, Cd<0.001 mg/l, Se<0.001 mg/l, As<0.001 mg/l, Pb<0.01 mg/l, Zn<0.05 mg/l, Cr<sup>6+</sup><0.05 mg/l, Al<0.001 mg/l, B<0.01 mg/l, NO<sub>3</sub><0.01 mg/l)





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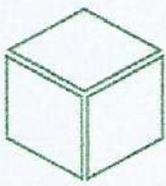
Ref : Envlab/20/R-9563

Date : 01.04.2021

## GROUND WATER QUALITY ANALYSIS REPORT- MARCH 2021

- Name of Client : M/s FERRO ALLOYS CORPORATION LIMITED , BHADRAK
- Name of the Project : KALARANGIATTA CHROMITE MINES , KALIAPANI, JAJPUR
- Sampling Location : GW4: Tube Well at Kalarangiatta Village  
GW5: Tube Well at Bhimta Nagar Village
- Method of Sampling : APHA 1060 B
- Date of Analysis : 26.03.2021 TO 01.04.2021
- Sample Collected by : VCSPL Representative in presence of Client's Representative

Sl. No.	Parameter	Testing Method	Unit	Standard as per IS -10500:2012 Amended on 2015 & 2018		Analysis Result	
				Permissible Limit	Acceptable Limit	GW4	GW5
						DOS: 25.03.2021	DOS: 25.03.2021
<b>Essential Characteristics</b>							
1	Colour	Visual Comparison Method APHA 23 <sup>RD</sup> Ed,2017 : 2120 B, C	Hazen	5	15	<5	<5
2	Odour	Threshold Odour Test APHA 23 <sup>RD</sup> Ed,2017 :2150 B	--	Agreeable	Agreeable	Agreeable	Agreeable
3	Taste	Flavor Threshold Test APHA 23 <sup>RD</sup> Ed,2017 : 2160 C	--	Agreeable	Agreeable	Agreeable	Agreeable
4	Turbidity	Nephelometric Method APHA 23 <sup>RD</sup> Ed,2017 :2130 B	NTU	1	5	11.6	10.8
5	pH Value at 25°C	pH Meter APHA 23 <sup>RD</sup> Ed,2017 : 4500H* B	--	6.5-8.5	No Relaxation	6.96	6.89
6	Total Hardness (as CaCO <sub>3</sub> )	EDTA Titrimetric Method APHA 23 <sup>RD</sup> Ed,2017 : 2340 C	mg/l	200	600	198	192
7	Iron (as Fe)	By AAS Method APHA 23 <sup>RD</sup> Ed,2017 : 3111, B	mg/l	1.0	No Relaxation	0.48	0.44
8	Chloride (as Cl )	Argentometric Method APHA 23 <sup>RD</sup> Ed,2017 : 4500Cl B	mg/l	250	1000	32	30
9	Residual, free Chlorine	Iodometric Method APHA 23 <sup>RD</sup> Ed,2017 : 4500Cl, B	mg/l	0.2	1	ND	ND
<b>Desirable Characteristics</b>							
10	Dissolved Solids	Gravimetric Method APHA 23 <sup>RD</sup> Ed,2017 : 2540 C	mg/l	500	2000	321	312
11	Calcium (as Ca )	EDTA Titrimetric Method APHA 23 <sup>RD</sup> Ed,2017 : 3500Ca B	mg/l	75	200	60	54
12	Magnesium (as Mg)	Calculation Method APHA 23 <sup>RD</sup> Ed,2017 : 3500Mg B	mg/l	30	100	23.4	20.8
13	Copper (as Cu)	By AAS Method APHA 23 <sup>RD</sup> Ed,2017: 3111 B	mg/l	0.05	1.5	<0.05	<0.05
14	Manganese (as Mn)	Persulfate Method APHA 23 <sup>RD</sup> Ed,2017: 3500Mn B	mg/l	0.1	0.3	<0.05	<0.05
15	Sulphate (as SO <sub>4</sub> )	Turbidimetric Method APHA 23 <sup>RD</sup> Ed,2017: 4500 SO <sub>4</sub> <sup>2-</sup> E	mg/l	200	400	32.4	31.2
16	Nitrate (as NO <sub>3</sub> )	By UV-Screen Method APHA 23 <sup>RD</sup> Ed,2017: 4500 NO <sub>3</sub> ; E	mg/l	45	No Relaxation	8.6	7.8
17	Fluoride (as F)	Distillation followed by Spectrophotometric Method APHA 23 <sup>RD</sup> Ed,2017: 4500F C	mg/l	1.0	1.5	0.21	0.18
18	Phenolic Compounds (as C <sub>6</sub> H <sub>5</sub> OH)	Chloroform Extraction by Colorimetric Method APHA 23 <sup>RD</sup> Ed,2017: 5530 B,D	mg/l	0.001	0.002	<0.001	<0.001
19	Mercury (as Hg)	AAS Method APHA 23 <sup>RD</sup> Ed,2017: 3112 B	mg/l	0.001	No Relaxation	<0.002	<0.002
20	Cadmium (as Cd)	AAS Method APHA 23 <sup>RD</sup> Ed,2017: 3111 B	mg/l	0.003	No Relaxation	<0.001	<0.001
21	Selenium (as Se)	By AAS Method APHA 23 <sup>RD</sup> Ed,2017: 3500 Se C	mg/l	0.01	No Relaxation	<0.01	<0.01



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Ref : Envlab/20/R-9563

Date : 01.04.2021

22	Arsenic (as As)	By AAS Method APHA 23 <sup>RD</sup> Ed,2017: 3114 B	mg/l	0.01	No Relaxation	<0.01	<0.01
23	Cyanide (as CN)	Distillation followed by Spectrophotometric Method APHA 23 <sup>RD</sup> Ed,2017: 4500 CN C,D	mg/l	0.05	No Relaxation	<0.05	<0.05
24	Lead (as Pb)	By AAS Method APHA 23 <sup>RD</sup> Ed,2017 3111 B	mg/l	0.01	No Relaxation	<0.01	<0.01
25	Zinc (as Zn)	By AAS Method APHA 23 <sup>RD</sup> Ed,2017: 3111 B	mg/l	5	15	<0.05	<0.05
26	Anionic Detergents (as MBAS)	Anionic Surfactants as MBAS APHA 23 <sup>RD</sup> Ed,2017: 5540 C	mg/l	0.2	--	ND	ND
27	Mineral Oil	Partition-Gravimetric Method APHA 23 <sup>RD</sup> Ed,2017: 5520 B	mg/l	0.5	No Relaxation	ND	ND
28	Alkalinity	Titration Method APHA 23 <sup>RD</sup> Ed,2017:2320 B	mg/l	200	600	220	180
29	Aluminium as( Al)	AAS Method APHA 23 <sup>RD</sup> Ed,2017: 3111 D	mg/l	0.03	0.2	<0.001	<0.001
30	Boron (as B)	Curcumin Method APHA 23 <sup>RD</sup> Ed,2017: 4500B, B	mg/l	0.5	2.4	<0.1	<0.1
31	Total Coliform as TC	MPN Method APHA 23 <sup>RD</sup> Ed,2017 : 9221 b	MPN/ 100ml	Shall not be detectable in any 100ml sample	--	160	110

CL - Colourless, U/O - Unobjectionable, ND - Not detected.

BDL (Below detection limit) Values : (Cu<0.05 mg/l, Mn<0.005 mg/l, C6H5OH<0.001 mg/l, Hg<0.005mg/l, Cd<0.001 mg/l, Se<0.001 mg/l, As<0.001 mg/l, Pb<0.01 mg/l, Zn<0.05 mg/l, Cr+6<0.05 mg/l, Al<0.001 mg/l, B<0.01 mg/l, NO3<0.01 mg/l)





भारत सरकार  
केन्द्रीय भूमि जल प्राधिकरण  
जल संसाधन, नदी विकास  
और गंगा संरक्षण मंत्रालय

Government of India  
Central Ground Water Authority  
Ministry of Water Resources,  
River Development & Ganga Rejuvenation

Regional Director

File No: - 21-4/1457/OR/MIN/2017 - 1766

NOC No: - CGWA/NOC/MIN/ORIG/2018/3980

Date:- 12 SEP 2018

To

M/s Facor Ltd.  
Kalarangiatta Chromite Mines, C/O Ostapal Chromite Mines,  
AT Gurujang, PO Kaliapani, Block Sukinda,  
District Jajapur, Odisha - 755028

**Sub: - NOC for ground water withdrawal to M/s Facor Ltd. in respect of their existing "Kalarangiatta Chromite Mines" located at AT/PO Kalarangiatta, Village Kalarangiata (CT), Block Sukinda, District Jajapur, Odisha – reg.**

Refer to your application for grant of NOC for ground water withdrawal dated 27/12/2017. Based on recommendations of Regional Director, Central Ground Water Board, Central Ground Water Board, South Eastern Region, Bhubaneswar vide his letter dated 17/06/2018 and further deliberations on the subject, the NOC of Central Ground Water Authority for ground water withdrawal is hereby accorded to **M/s Facor Ltd. in respect of their existing "Kalarangiatta Chromite Mines" located at AT/PO Kalarangiatta, Village Kalarangiata (CT), Block Sukinda, District Jajapur, Odisha.** The NOC is valid from 07/08/2018 to 06/08/2020 and is subject to the following conditions:-

1. The firm may abstract **20 cu.m/day** of ground water (and not exceeding **7,300 cu.m/year**) through one (1) existing bore well and **700 cu.m/day** (not exceeding **2,55,500 cu.m/year**) through dewatering mine seepage through one (1) existing mine pit on account of mining intersecting the water table. The total withdrawal should not exceed **720 cu.m/day** (not exceeding **2,62,800 cu.m/year**). No additional dewatering and ground water abstraction structure shall be constructed for this purpose without prior approval of the CGWA. Any unexpected variation in inflow of ground water into the mine pit should be reported to the concerned Regional Director, Central Ground Water Board, South Eastern Region, Bhubaneswar.
2. The well and dewatering structure shall be fitted with digital water meters by the firm at its own cost and monitoring of monthly ground water abstraction data of each water abstraction structure shall be recorded in a log book. Compliance to this condition shall be reported within one month from the date of issue of this letter.
3. **M/s Facor Ltd.**, in consultation with the Regional Director, Central Ground Water Board, South Eastern Region, Bhubaneswar shall implement ground water recharge measures atleast to the tune of **43,690 cu.m/year** as proposed, for augmenting the ground water resources of the area where post monsoon water level is more than 5 meter below ground level. Firm shall report the compliance within six months from the date of issuance of this letter. Firm shall also undertake periodic maintenance of recharge structures at its own cost.
4. The photographs of the recharge structures after completion of construction of the same shall be furnished immediately to the Regional Director, Central Ground Water Board, South Eastern Region, Bhubaneswar for verification under intimation to this office.

18/11, Jamnagar House, Mansingh Road, New Delhi-110011  
Phone : (011) 23383561 Fax : 23382051, 23386743  
Website: [www.cgwa.noc.gov.in](http://www.cgwa.noc.gov.in)

स्वच्छ सुरक्षित जल - सुन्दर खुशहाल कल

CONSERVE WATER - SAVE LIFE

5. The firm, at its own cost, shall construct two (2) observation wells (piezometers) at suitable locations and install digital water level recorders along the periphery of the mine for monthly ground water level monitoring. Further, the firm shall execute ground water level monitoring four (4) times a year (January, May, August and November) in core and buffer zone by establishing sufficient number of key wells in consultation with the Regional Director, Central Ground Water Board, South Eastern Region, Bhubaneswar. Firm shall install telemetry system on one of its piezometers and share the user ID and password of the telemetry system with the Regional Director, Central Ground Water Board, South Eastern Region, Bhubaneswar.
6. The ground water quality shall be monitored once in a year (during pre monsoon period).
7. The monitoring data in respect of S. No. 2, 5 & 6 shall be submitted to the Regional Director, Central Ground Water Board, South Eastern Region, Bhubaneswar on regular basis at least once in a year.
8. The firm shall ensure proper recycling and reuse of waste water after adequate treatment.
9. Action taken report in respect of S. No. 1 to 8 shall be submitted to CGWA within one year period.
10. The NOC is liable to be cancelled in case of non-compliance of any of the conditions as mentioned in S. No. 1 to 9.
11. This NOC is subject to prevailing Central/State Government rules/laws or Court orders related to construction of tubewell/ground water withdrawal/construction of recharge or conservation structure/discharge of effluents or any such matter as applicable.
12. The firm shall report self compliance online in the website ([www.cgwa-noc.gov.in](http://www.cgwa-noc.gov.in)) within one year from the date of issue of this NOC.
13. This NOC does not absolve the applicant / proponent of this obligation / requirement to obtain other statutory and administrative clearances from other statutory and administrative authorities.
14. The 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 be taking decisions independently of the NOC.



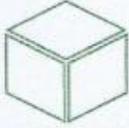
Regional Director

**Copy to:**

1. The Member Secretary, Odisha Pollution Control Board, Paribesh Bhawan, A/118, Nilakantha Nagar, Unit- VIII, Bhubaneswar- 751012, Odisha **with a request to ensure that the conditions mentioned in the NOC are complied by the firm in consultation with the District Collector & Magistrate, District Jajapur, Odisha.**
2. The District Collector & Magistrate, District Jajapur, Odisha for necessary action.
3. The Regional Director, Central Ground Water Board, South Eastern Region, Bhubaneswar. This has reference to your recommendation dated 17/06/2018.
4. Guard File 2018-19.



Regional Director



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- 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-Soil Exploration
- Waste Management Services

Laboratory Services  
 Environment Lab  
 Food Lab  
 Material Lab  
 Soil Lab  
 Mineral Lab  
 &  
 Microbiology Lab

Ref : Envlab/20/R-9570

Date : 01.04.2021

## FUGITIVE EMISSION ANALYSIS REPORT- MARCH 2021

1. Name of Client : M/s FERRO ALLOYS CORPORATION LIMITED , BHADRAK
2. Name of the Project : KALARANGIATTA CHROMITE MINES , KALIAPANI, JAJPUR
3. Sampling Location : F1- Near Mines Ore Plot Area  
F2- Near Office
4. Method of Sampling : IS 5182(P-5) 1975 RA 2014
5. Date of Sampling : 25.03.2021
6. Date of Analysis : 26.03.2021 TO 27.03.2021
7. Sample Collected by : VCSPL Representative in presence of Client's Representative

SL. No.	Test Parameters	Test Method	Unit	Analysis Result	
				F1	F2
1	Suspended Particulate Matter as SPM	IS 5182 (P-4)1999 RA 2014 Gravimetric Method	$\mu\text{g}/\text{m}^3$	232.0	314.0



**CALENDAR PLAN INCLUDING PRODUCTION & EXCAVATION**  
**KALARANGIATTA CHROMITE MINES**  
**FOR THE YEAR 2020-2021**

<b>ITEM</b>	<b>TARGET FY 2020-21</b>	<b>ACHIEVEMENT FY 2020-21</b>
ORE	49931.00	49860.00
OVERBURDEN	146970.00	106721.658

- 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-Soil Exploration
- Waste Management Services

Laboratory Services  
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 Soil Lab  
 Mineral Lab  
 &  
 Microbiology Lab

Ref : Envlab/20/R-7449

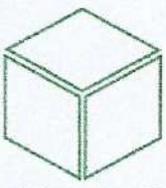
Date : 04.02.2021

## AMBIENT AIR QUALITY (CORE ZONE) MONITORING REPORT- JANUARY-2021

- Name of Client : M/s FERRO ALLOYS CORPORATION LIMITED , BHADRAK
- Name of the Project : KALARANGIATTA CHROMITE MINES , KALIAPANI, JAJPUR
- Sampling Location : AAQ (Cz)-1: Near Office Building (DOS : 30.01.2021)  
 AAQ (Cz)-2: Near ETP (DOS : 29.01.2021)  
 AAQ (Cz)-3: Near Electrical Substation (DOS : 30.01.2021)  
 AAQ (Cz)-4: Near Weigh Bridge (DOS : 29.01.2021)
- Method of Sampling : IS 5182(P-5) 1975 RA 2014
- Date of Analysis : 01.02.2021 TO 03.02.2021
- Monitoring Instruments : RDS (APM 460 BL), FPS (APM 550) Envirotech, CO Monitor, VOC Sampler
- Sample Collected by : VCSPL Representative in presence of Client's Representative

Parameters Analyzed	Unit	Testing Methods	NAAQ Standard	Analysis Result			
				AAQ(Cz)-1	AAQ(Cz)-2	AAQ(Cz)-3	AAQ(Cz)-4
				DOS: 30.01.2021	DOS: 29.01.2021	DOS: 30.01.2021	DOS: 29.01.2021
Particulate matter(size less than10µm) or PM <sub>10</sub>	µg / m <sup>3</sup>	IS 5182 (P-22) 2006 RA 2017 Gravimetric Method	100	72.1	79.4	79.8	70.2
Particulate matter(size less than10µm) or PM <sub>2.5</sub>	µg / m <sup>3</sup>	VCSPL/AAQ-SOP/001 Date: 01.12.2019 Gravimetric Method	60	44.6	50.6	50.8	42.8
Sulphur dioxide as SO <sub>2</sub>	µg / m <sup>3</sup>	IS 5182 (P-2) 2001 RA 2017 Improved West and Geake Method	80	7.1	7.8	9.4	6.2
Oxides of Nitrogen as NO <sub>x</sub>	µg / m <sup>3</sup>	IS 5182 (P-6) 2006 RA 2017 Modified Jacob & Hochheiser Method(Na-Arsenite)	80	14.2	15.6	15.2	13.2
Carbon Monoxide as CO	mg / m <sup>3</sup>	IS 5182 (P-10) 2006 RA 2017 NDIR Spectroscopy	4	0.32	0.38	0.46	0.38





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Soil Lab  
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&  
Microbiology Lab

- 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-Soil Exploration
- Waste Management Services

Ref : Envlab/20/R-7449

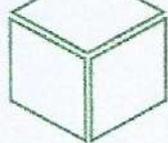
Date : 04.02.2021

Ammonia as NH <sub>3</sub>	µg / m <sup>3</sup>	VC SPL/SOP-AAQ/001, Dated 01.12.2019 ISC 401, 3 <sup>rd</sup> ed 1999 <b>Indo Phenol Blue Method</b>	400	BDL	BDL	BDL	BDL
Ozone as O <sub>3</sub>	µg / m <sup>3</sup>	VC SPL/SOP-AAQ/001, Dated 01.12.2019 ISC 411, 3 <sup>rd</sup> ed 1999 <b>Chemical Method</b>	100	8.1	6.8	5.4	BDL
Arsenic as As	ng / m <sup>3</sup>	IS 5182 (Part-22), RA2019 <b>AAS Method After Sampling</b>	06	BDL	BDL	BDL	BDL
Lead as Pb	µg / m <sup>3</sup>	IS 5182(Part 22) RA2019 <b>AAS Method After Sampling</b>	01	BDL	BDL	BDL	BDL
Nickel as Ni	ng / m <sup>3</sup>	IS 5182 (Part-22), RA2019 <b>AAS Method After Sampling</b>	20	BDL	BDL	BDL	BDL
Benzene as C <sub>6</sub> H <sub>6</sub>	µg / m <sup>3</sup>	IS 5182 (Part 11):2017 <b>Absorption &amp; Desorption followed by GC analysis</b>	05	BDL	BDL	BDL	BDL
Benzo-Pyrene as BaP	ng / m <sup>3</sup>	IS 5182 (Part 12):2017 <b>Solvent extraction followed by Gas Chromatography analysis</b>	01	BDL	BDL	BDL	BDL

BDL Values: SO<sub>2</sub>< 4 µg/m<sup>3</sup>, NO<sub>x</sub>< 9 µg/m<sup>3</sup>, O<sub>3</sub><4 µg/m<sup>3</sup>, Ni<0.01 ng/m<sup>3</sup>, As < 0.001 ng/m<sup>3</sup>, C<sub>6</sub>H<sub>6</sub><0.001 µg/m<sup>3</sup>, BaP<0.002 ng/m<sup>3</sup>, Pb<0.001 µg/m<sup>3</sup>, CO-<0.1 mg/m<sup>3</sup>



Page No 2 of 2



- 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-Soil Exploration
- Waste Management Services



Ref : Envlab/20/R-9561

Date : 01.04.2021

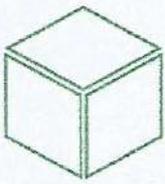
## AMBIENT AIR QUALITY (BUFFER ZONE) MONITORING REPORT- MARCH-2021

1. Name of Client : M/s FERRO ALLOYS CORPORATION LIMITED , BHADRAK
2. Name of the Project : KALARANGIATTA CHROMITE MINES , KALIAPANI, JAJPUR
3. Sampling Location : AAQ (Bz)-1: Near Village Bhimtanagar (DOS : 25.03.2021)  
AAQ (Bz)-2: Near Village Ransol (DOS: 24.03.2021)  
AAQ (Bz)-3: Near Kaliapani Township (DOS: 24.03.2021)  
AAQ (Bz)-4: Near Village Godisahi (DOS: 25.03.2021)  
AAQ (Bz)-5: Near Village Baragaji (DOS: 24.03.2021)
4. Method of Sampling : IS 5182(P-5) 1975 RA 2014
5. Date of Analysis : 26.03.2021 TO 31.03.2021
6. Monitoring Instruments : RDS (APM 460 BL), FPS (APM 550) Envirotech, CO Monitor, VOC Sampler
7. Sample Collected by : VCSPL Representative in presence of Client's Representative

Parameters Analyzed	Unit	Testing Methods	NAAQ Standard	Analysis Result				
				AAQ(Bz)-1	AAQ(Bz)-2	AAQ(Bz)-3	AAQ(Bz)-4	AAQ(Bz)-5
				DOS : 25.03.21	DOS : 24.03.21	DOS : 24.03.21	DOS : 25.03.21	DOS : 24.03.21
Particulate matter(size less than 10µm) or PM <sub>10</sub>	µg / m <sup>3</sup>	IS 5182 (P-22) 2006 RA 2017 Gravimetric Method	100	58.8	53.2	70.6	50.6	48.8
Particulate matter(size less than 10µm) or PM <sub>2.5</sub>	µg / m <sup>3</sup>	VCSPL/AAQ-SOP/001 Date: 01.12.2019 Gravimetric Method	60	36.8	30.2	45.2	28.6	22.8
Sulphur dioxide as SO <sub>2</sub>	µg / m <sup>3</sup>	IS 5182 (P-2) 2001 RA 2017 Improved West and Geake Method	80	6.8	6.4	10.8	5.8	6.3
Oxides of Nitrogen as NO <sub>x</sub>	µg / m <sup>3</sup>	IS 5182 (P-6) 2006 RA 2017 Modified Jacob & Hochheiser Method (Na-Arsenite)	80	13.8	11.2	16.2	6.4	11.2
Carbon Monoxide as CO	mg / m <sup>3</sup>	IS 5182 (P-10) 2006 RA 2017 NDIR Spectroscopy	4	BDL	BDL	2.6	BDL	BDL



Page No 1 of 2



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- Agricultural Development
- Information Technology
- Public Health Engineering

- Mine Planning & Design
- Mineral/Sub-Soil Exploration
- Waste Management Services

Ref : Envlab/20/R-9561

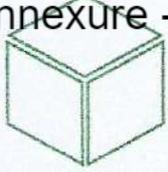
Date : 01.04.2021

Ammonia as NH <sub>3</sub>	as μg / m <sup>3</sup>	VCSPL/SOP-AAQ/001, Dated 01.12.2019 ISC 401, 3rd ed 1999 Indo Phenol Blue Method	400	BDL	BDL	BDL	BDL	BDL
Ozone as O <sub>3</sub>	μg / m <sup>3</sup>	VCSPL/SOP-AAQ/001, Dated 01.12.2019 ISC 411, 3rd ed 1999 Chemical Method	100	BDL	BDL	7.6	BDL	10.1
Arsenic as As	ng / m <sup>3</sup>	IS 5182 (Part-22), RA2019 AAS Method After Sampling	06	BDL	BDL	BDL	BDL	BDL
Lead as Pb	μg / m <sup>3</sup>	IS 5182(Part 22) RA2019 AAS Method After Sampling	01	BDL	BDL	BDL	BDL	BDL
Nickel as Ni	ng / m <sup>3</sup>	IS 5182 (Part-22), RA2019 AAS Method After Sampling	20	BDL	BDL	BDL	BDL	BDL
Benzene as C <sub>6</sub> H <sub>6</sub>	μg / m <sup>3</sup>	IS 5182 (Part 11):2017 Absorption & Desorption followed by GC analysis	05	BDL	BDL	BDL	BDL	BDL
Benzo-Pyrene as Bap	ng / m <sup>3</sup>	IS 5182 (Part 12):2017 Solvent extraction followed by Gas Chromatography analysis	01	BDL	BDL	BDL	BDL	BDL

BDL Values: SO<sub>2</sub>< 4 μg/m<sup>3</sup>, NO<sub>x</sub>< 9 μg/m<sup>3</sup>, O<sub>3</sub><4 μg/m<sup>3</sup>, Ni<0.01 ng/m<sup>3</sup>, As < 0.001 ng/m<sup>3</sup>, C<sub>6</sub>H<sub>6</sub><0.001 μg/m<sup>3</sup>, BaP<0.002 ng/m<sup>3</sup>, Pb<0.001 μg/m<sup>3</sup>, CO-<0.1 mg/m<sup>3</sup>



Page No 2 of 2



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- Agricultural Development
- Information Technology
- Public Health Engineering

- Mine Planning & Design
- Mineral/Sub-Soil Exploration
- Waste Management Services

Ref : Envlab/20/R-9568

Date : 01.04.2021

## NOISE QUALITY ANALYSIS REPORT- MARCH 2021

1. Name of Client : M/s FERRO ALLOYS CORPORATION LIMITED , BHADRAK
2. Name of the Project : KALARANGIATTA CHROMITE MINES , KALIAPANI, JAJPUR
3. Date of Sampling : 25.03.2021
4. Sample Collected by : VCSPL Representative in presence of Client's Representative

Location ID	Location	Ambient	Result in dB (A)	
			Day Time (6.00 am to 10.00pm)	Night Time (10.00pm to 6.00 am)
N1	Near Middle of the Quarry		68.8	62.0
N2	Near Office Building		62.0	50.0

### AMBIENT NOISE LEVEL STANDARD

Category Area/Zone	Limit in dB (A)	
	Day Time (6.00 am to 10.00pm)	Night Time (10.00pm to 6.00 am)
Industrial Area	75	70
Residential Area	55	45
Commercial Area	65	55
Silence Zone	50	40



## Annexure No.-10

DETAILS OF EXPENDITURE INCURRED ON ENVIRONMENTAL PROTECTION MEASURES DURING THE YEAR 2020-21 KALARANGIATTA CHROMITE MINES		
Sl. No.	ITEM	Expenses for the year 2020-21 (in Rupees ₹)
<b>1</b>	<b>AFFORESTATION 1235 FY 21</b>	
a)	Seedlings @ ₹ 60/ - each	74,100
b)	Fertilizer/Insecticide/Cow - dung(@ ₹ 20)	24,700
c)	Digging of Pits/Planting (Labor cost) @ ₹35	43,225
d)	Post Plantation care @ ₹ 120/ - (Watering, Weeding, basin making etc.)	1,48,200
e)	Supervising	4,90,000
	Sub-Total	7,80,225
<b>2</b>	<b>WATER MANAGEMENT &amp; TREATMENT</b>	
a)	ETP Operation & Maintenance (including costs of chemical & Manpower)	11,97,336
b)	Power Consumption	81,005
c)	Sludge disposal	32,093
d)	Water sample analysis	38,600
	Sub-Total	13,49,034
<b>3</b>	<b>DUST SUPPRESSION &amp; AIR MONITORING</b>	
a)	Water spraying at dust 1075 trips (FY 21) generating points by water tanker.	6,28,760
b)	Air monitoring charges	1,62,000
c)	Noise level measurement	800
	Sub-Total	7,91,560
	<b>Grand Total</b>	<b>29,20,819</b>