

KLCMENV/ 249 /2020

Date: 20.11.2020

To

The Joint Director (s)
Ministry of Environment, Forest & Climate change
Govt. of India
Eastern Regional Office
BHUBANESWAR

Sub:- Submission of Six monthly report on the status of compliance to the conditions stipulated in the grant of Environmental Clearance Letter No. J-11015/38/2006-IA-II(M), dtd. 06.12.2006 for Kalarangiatta Chromite Mines of M/s. FACOR Ltd.

Dear Sir,

This has reference to the captioned subject, it is to inform you that we are herewith submitting Six monthly compliance reports pertaining to Kalarangiatta Chromite Mines of M/s. FACOR Ltd. for the period from **April, 2020 to September, 2020** along with the Environmental Monitoring data (Ambient Air, Noise, Water & Soil) for your kind perusal. The soft copy of the same is being sent by mail to your good office.

This is for your kind information and necessary action.

Thanking You,

Yours Faithfully,
for FERRO ALLOYS CORPORATION LTD.



MINES MANAGER
Encl: A/a.

CC – The Director (IA), MoEF, 3rd Floor, Indira Paryavaran Bhawan, Jorbagh Road,
New Delhi – 110032.

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 : April,2020 to September,2020

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 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 ⁺⁶ to neutralize its effect before discharging out of the mine lease area.
5.	The top soil 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 top soil 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 21 mtr. The OB dump is not kept active for long period. Overall slope of the OB dump is being maintained below 27°. 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 & 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"> 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. 2. The top surface is also maintained to avoid ponding of water which affect the stability of the dump. 3. The overburden is stacked in bench form to ensure stability. 4. The bench height is maintained at 15mtrs. 5. Various types of plants such as Acacia, Chakunda, Teak, Chhatian etc. have been planted in the inactive portions of the overburden dump. 6. The overburden dump has been stabilized by tree plantation in the dead benches after carrying out suitable terracing of size 2 M × 1 Meach. 7. Grass patching has been developed on the dump slopes to ensure prevention of erosion of soil from the dump slopes due to rainwater. 8. Proper drainage system has already been maintained to prevent rain cuts on the dump. 9. Proper garland drain is being maintained all around the dump to collect the surface runoff during rain. 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 rain water for plantation purposes. As a result the generation of rain cut is very negligible. 11. We have already planted Saplings to stabilize this overburden dump. 12. Garland drain & retaining wall has been constructed all around the dump.
<p>7. 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 developmentetc.</p>	<p>2602metres of garland drains has been constructed around the working pit, OB & mineral dumps with siltation ponds at different intervals to arrest flow of silt & 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 minesite. 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 & 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 1713mtrs 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⁺⁶ shall be treated to meet the prescribed standards before reuse/discharge. Effluent treatment plants should be provided for treatment of mine water discharge and wastewater generated from the workshop and mineral separation plant. Run off from the OB dump and other surface run off should be analyzed for Cr⁺⁶ 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⁺⁶ in treated discharged water is <0.005mg/l. The analysis report of mines final discharge water after treatment in ETP for the period from JULY 20 to SEPTEMBER 20 is enclosed in Annexure-4</p> <p>Small scale mining operation is being carried out with an Excavator & 4 nos. of dumpers. Also the machineries & 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 (FeSO₄) for reduction of Cr⁶⁺ to Cr³⁺. The effluent is then distributed to Clari-flocculators & the supernatant are passed into the Sand Filters. Now, the filtered water shall be collected in Treated Water Tank and could be disposed off meeting standards stipulated by OSPCB or reused in plantation or haul roads dust suppression.</p>

		N.B- The analysis report of mines final discharge water after treatment in ETP for the period from April 20 to June 20 could not be done due to covid -19
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 ₄ & NaOH dosing. The final treated water is being discharged to outside ML area, conforming to the prescribed standards. For analysis JULY 20 to SEPTEMBER 20 reports refer Annexure-4 . N.B-The analysis report of mines final discharge water after treatment in ETP for the period from April 20 to June 20 could not be done due to covid -19
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 saplings have been planted in the Safety Zone area around the Mining lease and inactive bottom slope of the dump. Native species has been planted in consultation with local Forest Dept by maintaining the density 2500plants perHa..
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 down stream of Damsala Nalla shall be carried out and record of monitoring data should be maintained and submitted to the Ministry of Environment & 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.	Monitoring of water quality upstream and down stream of Damsala Nalla is being carried out and record of monitoring data are being maintained. The test reports for the period JULY 20 to SEPTEMBER 20 are enclosed as AnnexureNo.-4 N.B-April 20 to June 20 could not be done due to covid -19
16.	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.	Garland drain water has been collected in pits and pond for recharge to ground water resources.
17.	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. 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.	Monitoring of ground water level & quality is being carried out in and around the mining lease and the analysis report JULY 20 to SEPTEMBER 20 is enclosed as Annexure-8 & Annexure No- 3 N.B- April 20 to June 20 Analysis could not be done due to covid -19
18.	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.	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 Annexure-10 & our online application for renewal acknowledgement application is also enclosed.
19.	Suitable rainwater harvesting measures on long term basis shall be planned and implemented in consultation with the Regional Director, CGWB	Rain water is being collected in pits and pond for Suitable rain water harvesting measures. Also roof top rain water 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 day time. 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 JULY 20 to SEPTEMBER 20 of fugitive dust emissions is enclosed as Annexure-7 N.B-April 20 to June 20 could not be done due to covid -19
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. 3856/IND-I-CON-6318, Dtd.27-03-2020 CONCENT ORDER NO 2742 for the period up to 31.03.2022.
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, NOx, 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 ⁺⁶). 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 ₁₀ , PM _{2.5} , NOx & SO ₂ 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 20 to SEPTEMBER 20 is given in Annexure-11</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 ₂ , & NO _x 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 ₂ & NO _x) 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.	<p>Data on Ambient Air Quality Monitoring with respect to PM₁₀, PM_{2.5}, SO₂ & NO_x are being carried out. The monitoring reports for the period from JULY 20 to SEPTEMBER 20 are enclosed as Annexure-1 (Core zone)& Annexure-2(Buffer zone).</p> <p>N.B-April 20 to June 20 could not be done due to covid -19</p>
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.	<p>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 80 dB (A). Sound pressure level JULY 20 to SEPTEMBER 20 at work environment is enclosed as Annexure-9.</p> <p>N.B-April 20 to June 20 could not be done due to covid -19</p>

7	<p>Industrial waste water (Workshop & Waste water from the mine) should be properly collected, treated so as to conform to the standards prescribed under GSR 422(E) Dtd. 19thMay, 1993 and 31stDecember, 1993 or as amended from time to time. Oil and grease trap should be installed before discharge of workshop effluents.</p>	<p>The Mines waste water is being collected directly in intake tank of the ETP for treatment of Cr⁺⁶ 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 JULY 20 to SEPTEMBER 20 of mines final discharge water after treatment in ETP is given in Annexure -4 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 todustandtakecorrective 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 & 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 & analysis through a MoEF& NABL accredited laboratory M/s. VISIONTEK CONSULTANCY SERVICES PVT. LTD Bhubaneswar & the monitoring reports are enclosed in Annexures.</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 will be produced after completion of the financial year 2020-21and proposed budgeted amount for the year are given in Annexure-12</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.

QUATERLY ANALYSIS REPORT (JULY 2020 TO SEPTEMBER 2020)

ON
ENVIRONMENTAL MONITORING
AT



**KALARANGIATTA CHROMITE MINES
CHROME ORE MINING DIVISION
POST-KALARANGIATTA, PI-755028
DISTRICT –JAJPUR, ODISHA**

M/s FERRO ALLOYS CORPORATION LIMITED

Prepared by:-



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METHODOLOGY OF ENVIRONMENTAL MONITORING STUDY

1.0 INTRODUCTION :

M/s Visiontek Consultancy Services Pvt. Ltd. carried out the environmental monitoring for the **Ferro Alloys Corporation Limited (KALARANGIATTA CHROMITE MINES, KALIAPANI, JAJPUR)**

Environmental monitoring was carried out at various locations inside the plant site. The Monitoring was carried out with respect to the qualities of Ambient Air Quality (Core & Buffer Zone), Ground Water Quality, Effluent Water Quality, Fugitive Dust, Dust Fall, Ground Water Level, Noise Monitoring & Soil Testing.

2.0 STUDY PERIOD:

The Study Was Conducted During Month Of **July 2020 to September 2020.**

3.0 METHODOLOGY:

The environmental monitoring was carried out as per the standard methodology of Bureau of Indian Standard (IS: 11255), American Public Health Association (APHA), & Central Pollution Control Board (CPCB).

4.0 SELECTION OF MONITORING LOCATIONS:

The location for Ambient Air Quality (Core & Buffer Zone), Ground Water Quality, Effluent Water Quality, Fugitive Dust, Dust Fall, Ground Water Level, Noise Monitoring & Soil Testing has been selected by FACOR'S representative.

4.1 AMBIENT AIR QUALITY :

The ambient air quality (AAQ) of the study region was monitored at three locations selected within the premises. Ambient air quality (AAQ) in respect of Particulate Matter (size less than 10 µm or PM₁₀), Particulate matter (size less than 2.5 µm or PM_{2.5}), Sulphur di-oxide (SO₂), Oxides of Nitrogen (NO_x),





Carbon Monoxide (CO), Ozone (O₃), Ammonia (NH₃), Nickel (Ni), Lead (Pb), Arsenic (As), Benzene (C₆H₆) and Benzo(a)Pyrene (BaP). Respirable Dust Sampler (APM 460BL) of ENVIROTECH make, FPS (APM) of ENVIROTECH make, Organic Vapour Sampler, ENVIROTECH make, model APM 850 were used for monitoring of ambient air quality at all the identified locations. The sampling method was carried out as per the guidelines for planning IS: 5182 (part 14): 2000. And the analysis methods are outlined in the table as shown below:

AMBIENT AIR QUALITY ANALYSIS METHOD

SL. NO.	PARAMETER	ANALYSIS METHOD
1.	Particulate Matter (size less than 10 µm or PM ₁₀), µg/m ³	Gravimetric method
2.	Particulate matter (size less than 2.5 µm or PM _{2.5}), µg/m ³	Gravimetric method
3.	Sulphur di-oxide (SO ₂), µg/m ³	Improved west & Geake method
4.	Oxides of Nitrogen (NO _x), µg/m ³	Jacob and Hochheiser Modified method
5.	Carbon Monoxide (CO), mg/m ³	NDIR Spectroscopy method
6.	Ozone (O ₃), µg/m ³	Chemical Method
7.	Ammonia (NH ₃), µg/m ³	Indophenols Blue Method
8.	Benzene (C ₆ H ₆), µg/m ³	Absorption & Desorption followed by GC analysis
9.	Benzo(a) Pyrene (BaP), ng/m ³	Solvent extraction followed by GC analysis.
10.	Nickel (Ni) , ng/m ³	AAS method after sampling
11.	Lead (Pb), µg/m ³	AAS method after sampling
12.	Arsenic(As), ng/m ³	AAS method after sampling

4.1.1 AMBIENT AIR QUALITY SAMPLING STATIONS (CORE ZONE) :

Details of the sampling locations are given below.

Field ID	Station
AAQMS-1	Near Office Building





AAQMS-2	Near ETP
AAQMS-3	At Middle of the Opencast Quarry
AAQMS-4	Near Ore Plot Area

The Detail of Ambient Air Quality (Core Zone) Report is given in the **Annexure-1**.

4.1.2 AMBIENT AIR QUALITY SAMPLING STATIONS (BUFFER ZONE) :

Details of the sampling locations are given below.

Field ID	Station
AAQMS-1	Near Village Bhimtanagar
AAQMS-2	Near Village Ransol
AAQMS-3	Near Kaliapani Township
AAQMS-4	Near Village Godisahi
AAQMS-5	Near Village Baragaji

The Detail of Ambient Air Quality (Buffer Zone) Report is given in the **Annexure-2**.

4.2 WATER QUALITY:

Water quality monitoring was carried out at fourteen waste water locations. Samples were collected manually during study period. Considering several possibilities of interference the poly tetrafluoroethylene (PTFE) sample bottles were used. These bottles were sterilized properly before being used for water sample collection.

The methodology for sample collection, preservation and analysis was as per Standard methods for the Examination of Water and Wastewater, 23RD Edition 2017, APHA.

WATER QUALITY ANALYSIS METHOD

SL.NO.	PARAMETER	ANALYSIS METHOD
1	Colour	Visual Comparison Method APHA 23 RD Ed,2017 : 2120 B, C
2	Odour	Threshold Odour Test APHA 23 RD Ed,2017 :2150 B
3	Taste	Flavor Threshold Test APHA 23 RD Ed,2017 : 2160 C
4	Turbidity	Nephelometric Method APHA 23 RD Ed,2017 :2130 B
5	pH Value	pH Meter APHA 23 RD Ed,2017 : 4500H ⁺ B
6	Total Hardness (as CaCO ₃)	EDTA Titrimetric Method APHA 23 RD Ed,2017 : 2340 C
7	Iron (as Fe)	By AAS Method APHA 23 RD Ed,2017 : 3111, B
8	Chloride (as Cl)	Argentometric Method



KALARANGIATTA CHROMITE MINES
FERRO ALLOYS CORPORATION LTD, BHADRAK

Environmental Monitoring Report

		APHA 23 RD Ed,2017 : 4500Cl ⁻ B
9	Residual, free Chlorine	Iodometric Method APHA 23 RD Ed,2017 : 4500Cl ⁻ B
10	Dissolved Solids	Gravimetric Method APHA 23 RD Ed,2017 : 2540 C
11	Calcium (as Ca)	EDTA Titrimetric Method APHA 23 RD Ed,2017 : 3500Ca B
12	Magnesium (as Mg)	Calculation Method APHA 23 RD Ed,2017 : 3500Mg B
13	Copper (as Cu)	By AAS Method APHA 23 RD Ed,2017: 3111 B
14	Manganese (as Mn)	Persulfate Method APHA 23 RD Ed,2017: 3500Mn B
15	Sulphate (as SO ₄)	Turbidimetric Method APHA 23 RD Ed,2017: 4500 SO ₄ ²⁻ E
16	Nitrate (as NO ₃)	By UV-Screen Method APHA 23 RD Ed,2017: 4500 NO ₃ ⁻ E
17	Fluoride (as F)	Distillation followed by Spectrophotometric Method APHA 23 RD Ed,2017: 4500F ⁻ C
18	Phenolic Compounds (as C ₆ H ₅ OH)	Chloroform Extraction by Colorimetric Method APHA 23 RD Ed,2017: 5530 B,D
19	Mercury (as Hg)	AAS Method APHA 23 RD Ed,2017: 3112 B
20	Cadmium (as Cd)	AAS Method APHA 23 RD Ed,2017: 3111 B
21	Selenium (as Se)	By AAS Method APHA 23 RD Ed,2017: 3500 Se C
22	Arsenic (as As)	By AAS Method APHA 23 RD Ed,2017: 3114 B
23	Cyanide (as CN)	Distillation followed by Spectrophotometric Method APHA 23 RD Ed,2017: 4500 CN ⁻ C,D
24	Lead (as Pb)	By AAS Method APHA 23 RD Ed,2017 3111 B
25	Zinc (as Zn)	By AAS Method APHA 23 RD Ed,2017: 3111 B
26	Anionic Detergents (as MBAS)	Anionic Surfactants as MBAS APHA 23RD Ed,2017: 5540 C
27	Chromium (as Cr ⁺⁶)	Diphenyl Carbazide Method APHA 23 RD Ed,2017: 3500Cr B
28	Mineral Oil	Partition-Gravimetric Method APHA 23 RD Ed,2017: 5520 B
29	Alkalinity	Titration Method APHA 23 RD Ed,2017:2320 B
30	Aluminium as(Al)	AAS Method APHA 23 RD Ed,2017: 3111 D
31	Boron (as B)	Curcumin Method APHA 23 RD Ed,2017: 4500B, B
32	Temperature	By Thermometer APHA 2550 B; 23rd Edition, 2017
33	Dissolved Oxygen	Modified Winkler Method APHA 4500 O. C; 23rd Edition, 2017
34	Biochemical Oxygen Demand as BOD	Oxygen Depletion Method IS 3025 (Part 44):2003
35	Chemical Oxygen Demand as COD	Open Reflux Method



		APHA 5220 B; 23rd Edition, 2017
36	Oil & Grease	Gravimetric Method (Solvent Extraction) APHA 5520 B; 23 rd Edition, 2017
37	Ammonical Nitrogen as N	By TKN Method APHA 4500-NH ₃ C; 23 rd Edition, 2017
38	Total Kjeldahl Nitrogen as N	By TKN Method APHA 4500-Norg C; 23 rd Edition, 2017
39	Sulphide as S	By Methylene Blue Method APHA 4500-S D; 23 rd Edition, 2017
40	Free Ammonia as NH ₃	By Calculation
41	Particulate Size of Suspended Solids	Gravimetric Method APHA 2540 D; 23 rd Edition, 2017
42	Bio-assay Test	Evaluating Acute Toxicity IS 6582 (P-2) 2008
43	Total Suspended Solids	Gravimetric Method APHA 2540 D; 23 rd Edition, 2017
44	Total Coli form as TC	MPN Method APHA 23 rd Ed,2017 : 9221 B

4.2.1 GROUND WATER SAMPLING LOCATIONS :

Detail of the sampling location is given below:

Field ID	Location
GW-1	Tube Well Near TISCO Main Gate
GW-2	Tube Well inside the Lease hold Area
GW-3	Open Well at Ransol Village
GW-4	Tube Well at Bhimta Nagar Village
GW-5	Tube Well at Kalarngiatta Village

The Detailed Ground Water Quality Analysis Report is mentioned in **Annexure-3**.

4.2.2 EFFLUENT WATER SAMPLING LOCATIONS :

Detail of the sampling location is given below:

Field ID	Location
EW-1	ETP Mines Final Discharge Water

The Detailed Effluent Water Quality Analysis Report is mentioned in **Annexure-4**.

4.3 DUST FALL :

Dust Fall monitoring is one aspect of air quality that industrial hygienist use to determine the amount of dust particles present in the workplace, cities or communities over a given period of time. Dust Fall Monitoring carried out by Respirable Dust Sampler at One Location



4.3.1 DUST FALL SAMPLING LOCATIONS:

Details of the sampling locations are given below.

Field ID	Station
DF-1	Near Roof Top of Office Building

The Detail of Dust Fall Report is given in the **Annexure-5**

4.4 SOIL ANALYSIS:

The soil analysis of the study region was monitored at Four selected outside the plant premises. Soil Sampling is based on agriculture field available in the study area. Composite sampling is done following SPCB method. Coning and Quartering method is done & the samples were collected in air locked polythenes following with proper PPE (Personal Protective equipments). Locations of Soil Analysis Stations are as follows:

4.4.1 SOIL ANALYSIS SAMPLING LOCATIONS:

Field ID	Location ID
S-1	Near Ore Plot Area
S-2	Near Truck Parking Area
S-3	Near Dump Area
S-4	Near Lease Hold Area

The Detail of Soil Quality Analysis Report is given in the **Annexure-6**.

4.5 FUGITIVE EMISSION:

The fugitive emission of the study region was monitored at two locations selected within the plant premises. The parameter monitored was Suspended Particulate Matter Using Sampler of ENVIROTECH make: model APM 460 BL of the identified location.

4.5.1 FUGITIVE EMISSION SAMPLING STATIONS:

Detail of the sampling location is given below.

Field ID	Station
F1	Near Mines Ore Plot Area
F2	Near Office

The Detailed **Fugitive Emission Report** is given in the **Annexure-7**.





4.6 GROUND WATER LEVEL MEASUREMENT:

The Ground Water Level Measurement of the study region was monitored at Nine locations selected within the plant premises & Buffer Area . The parameter monitored was Ground water Level Using Pizeometer Sampler of the identified location.

4.6.1 GROUND WATER LEVEL SAMPLING STATIONS:

Detail of the sampling location is given below.

Field ID	Station
GWL1	Tube Well Water Near TISCO Main Gate
GWL2	Tube Well Inside the Lease Hold Area
GWL3	Open Well Water of Ransol
GWL4	Tube Well Water of Kalarangiatta
GWL5	Tube Well Water of Bhimtanagar
GWL6	Open Well Village Goramian
GWL7	Tube Well Near OMC Labour Colony
GWL8	Open Well at Village Chingudipal
GWL9	Open Well at Village Kusumundia

The Detailed **Ground Water Level** is given in the **Annexure-8**

4.7 NOISE LEVEL MONITORING:

Noise Levels were recorded by Digital Sound Level Meter of LUTRON make at two locations within the plant premises. Monitoring was carried out once in a month at each location during the study period for day time and night time. According to CPCB (Noise Pollution (Regulation & Control) rules, 2000 day time is considered from 6.00 am to 10.00 pm and night time is considered from 10.00 pm to 6.00 am.

Locations of Noise level monitoring stations are as follows:

4.7.1 NOISE LEVEL SAMPLING STATIONS:

Field ID	Location ID
N-1	Near Middle of the Quarry
N-2	Near Office Building

The Detailed Noise Measurement Report is given in **Annexure-9**.





KALARANGIATTA CHROMITE MINES
FERRO ALLOYS CORPORATION LTD, BHADRAK

Environmental Monitoring Report

Annexure-1

AMBIENT AIR QUALITY ANALYSIS REPORT
(CORE ZONE)



Visiontek Consultancy Services Pvt. Ltd.
Bhubaneswar.



Ref : Envlab/20/R-3721

Date : 07.09.2020

AMBIENT AIR QUALITY(CORE ZONE) MONITORING REPORT- JULY 2020

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 (Cz)-1: Near Office Building
AAQ (Cz)-2: Near ETP
AAQ (Cz)-3: At Middle of the Opencast Quarry
AAQ (Cz)-4: Near Ore Plot Area
4. Method of Sampling : IS 5182(P-5) 1975 RA 2014
5. Date of Sampling : 13.07.2020
6. Date of Analysis : 15.07.2020 TO 16.07.2020
7. Monitoring Instruments : RDS (APM 460 BL), FPS (APM 550) Envirotech, CO Monitor, VOC Sampler
8. 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
Particulate matter(size less than10µm) or PM ₁₀	µg / m ³	IS 5182 (P-22) 2006 RA 2017 Gravimetric Method	100	58.8	61.8	66.8	54.2
Particulate matter(size less than10µm) or PM _{2.5}	µg / m ³	VCSPL/AAQ-SOP/001 Date: 01.12.2019 Gravimetric Method	60	23.6	28.8	32.6	18.8
Sulphur dioxide as SO ₂	µg / m ³	IS 5182 (P-2) 2001 RA 2017 Improved West and Geake Method	80	5.8	5.6	7.8	4.1
Oxides of Nitrogen as NO _x	µg / m ³	IS 5182 (P-6) 2006 RA 2017 Modified Jacob & Hochheiser Method(Na-Arsenite)	80	11.8	11.8	13.8	10.2
Carbon Monoxide as CO	mg / m ³	IS 5182 (P-10) 2006 RA 2017 NDIR Spectroscopy	4	0.16	0.22	0.26	0.16



M. Panda



Priya Mishra



Ref : Envlab/20/R-3721

Date : 07.09.2020

Ammonia as NH ₃	µg / m ³	VCSPL/SOP-AAQ/001, Dated 01.12.2019 ISC 401, 3 rd ed 1999 Indo Phenol Blue Method	400	BDL	BDL	BDL	BDL
Ozone as O ₃	µg / m ³	VCSPL/SOP-AAQ/001, Dated 01.12.2019 ISC 411, 3 rd ed 1999 Chemical Method	100	4.8	5.2	4.2	BDL
Arsenic as As	ng/ m ³	IS 5182 (Part-22), RA2019 AAS Method After Sampling	06	BDL	BDL	BDL	BDL
Lead as Pb	µg / m ³	IS 5182(Part 22) RA2019 AAS Method After Sampling	01	BDL	BDL	BDL	BDL
Nickel as Ni	ng/ m ³	IS 5182 (Part-22), RA2019 AAS Method After Sampling	20	BDL	BDL	BDL	BDL
Benzene as C ₆ H ₆	µg / m ³	IS 5182 (Part 11):2017 Absorption & Desorption followed by GC analysis	05	BDL	BDL	BDL	BDL
Benzo-Pyrene as Bap	ng/ m ³	IS 5182 (Part 12):2017 Solvent extraction followed by Gas Chromatography analysis	01	BDL	BDL	BDL	BDL

BDL Values: SO₂< 4 µg/m³, NO_x< 9 µg/m³, O₃<4 µg/m³, Ni<0.01 ng/m³, As < 0.001 ng/m³, C₆H₆<0.001 µg/m³, BaP<0.002 ng/m³, Pb<0.001 µg/m³, CO-<0.1 mg/m³



Prepared By

Manda



Reviewed By

Puja Mishra



Figure-01: Graph Showing Avg. AAQ Concentration (AAOMS(Cz)-1:Near Office Building) within study area for the month of July 2020

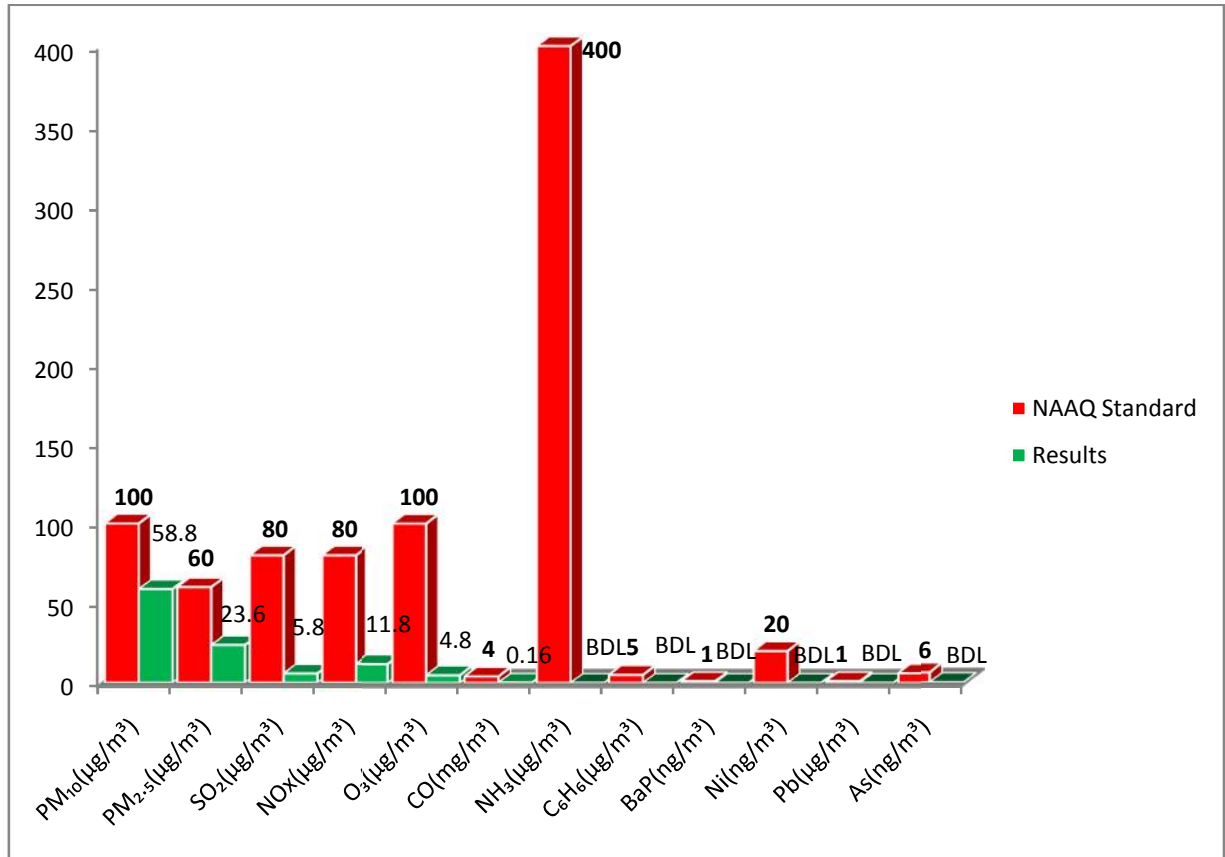




Figure-02: Graph Showing Avg. AAQ Concentration (AAOMS(Cz)-2:Near ETP) within study area for the month of July 2020

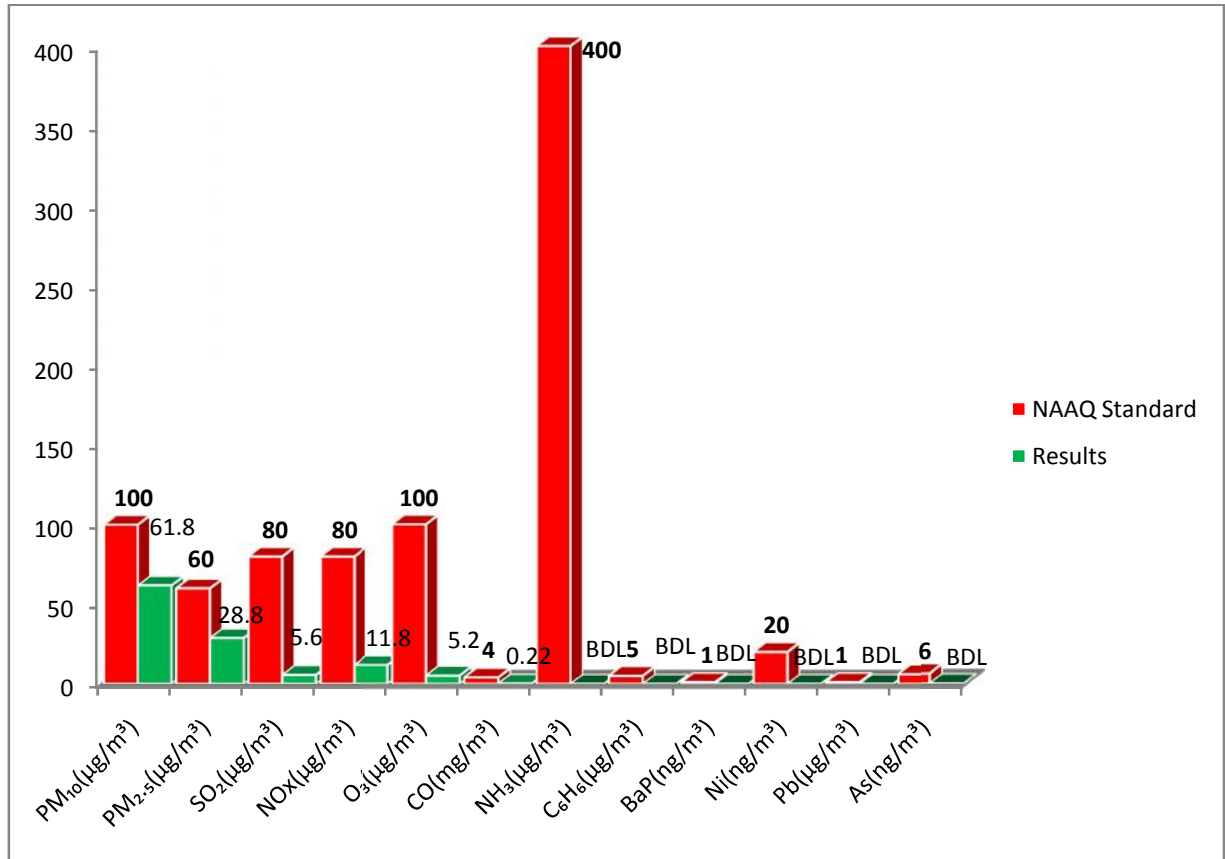




Figure-03: Graph Showing Avg. AAO Concentration (AAOMS(Cz)-3:At Middle of the Open Cast Quarry) within study area for the month of July 2020

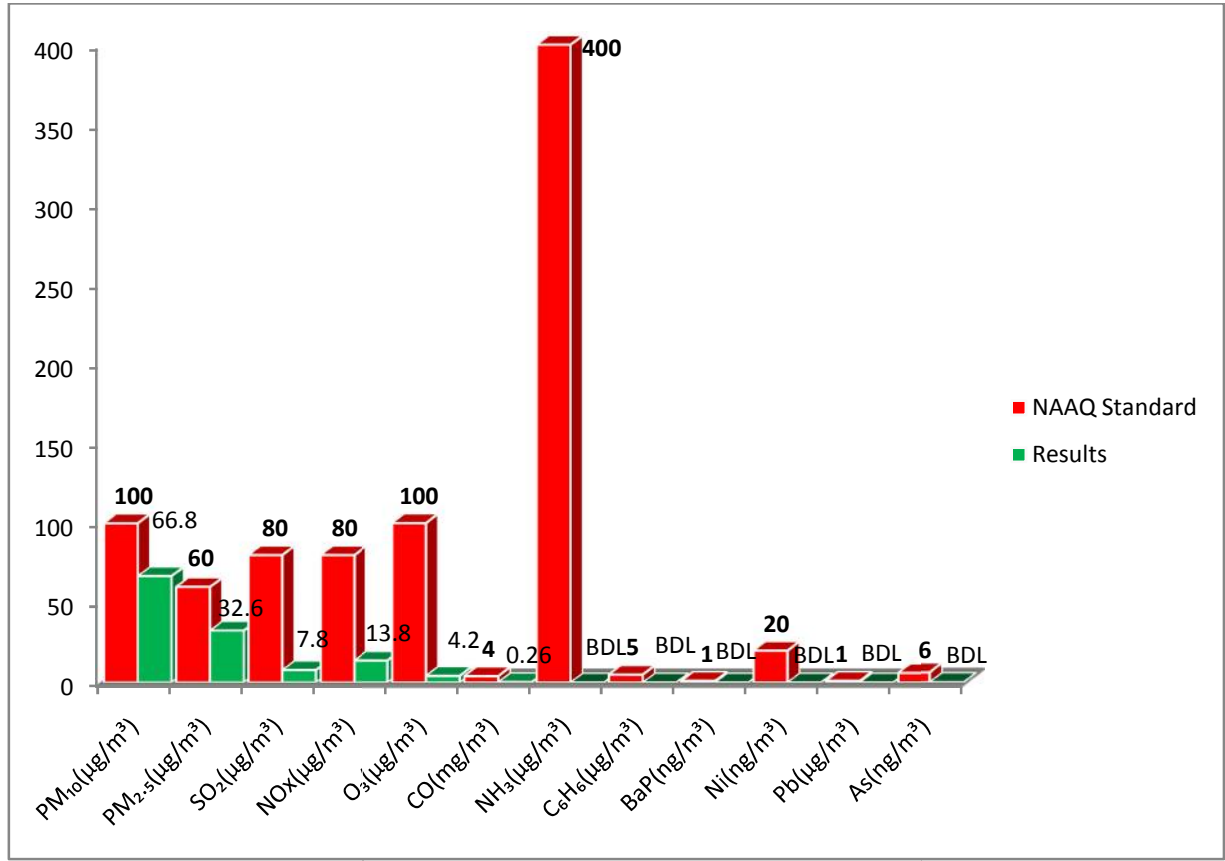
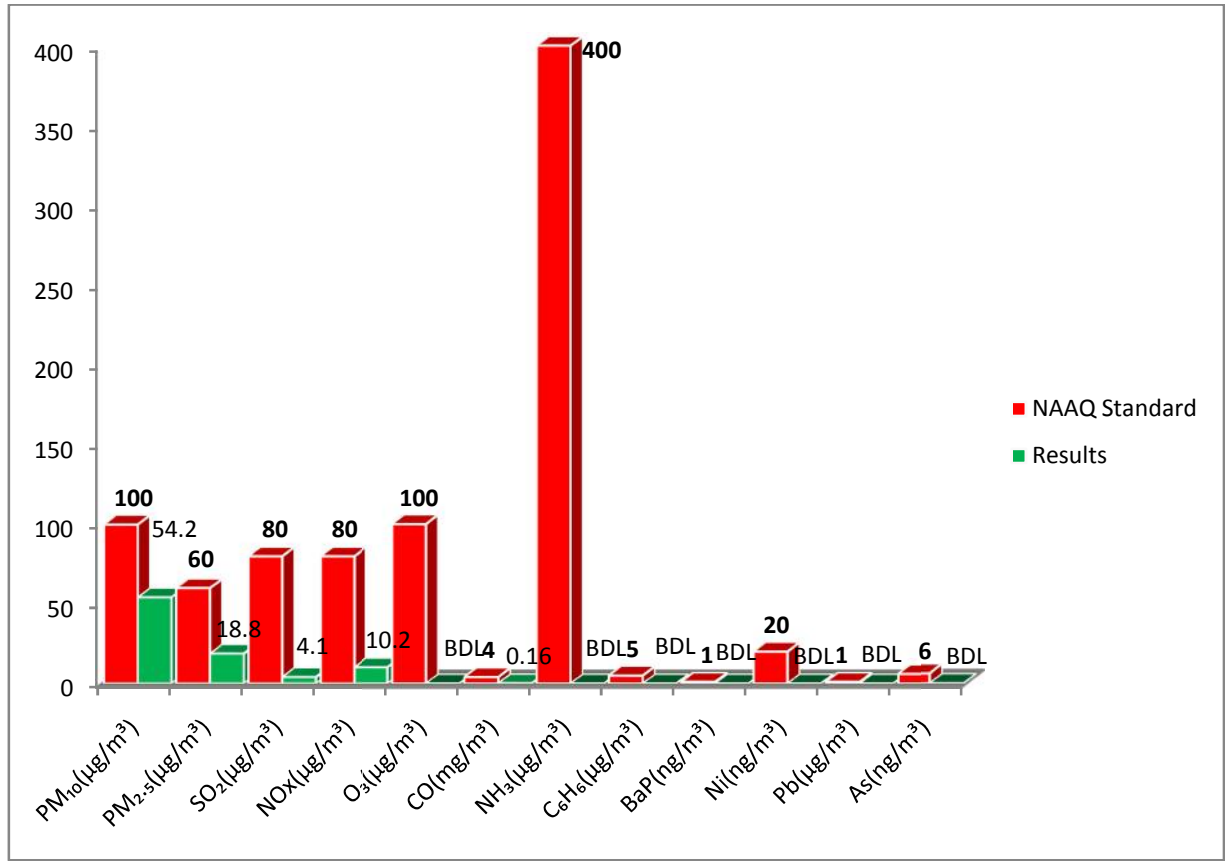




Figure-04: Graph Showing Avg. AAQ Concentration (AAQMS(Cz)-4:Near Ore Plot Area) within study area for the month of July 2020





Ref : Envlab/20/R-3723

Date : 07.09.2020

AMBIENT AIR QUALITY(CORE ZONE) MONITORING REPORT- AUGUST 2020

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 (Cz)-1: Near Office Building**
AAQ (Cz)-2: Near ETP
AAQ (Cz)-3: At Middle of the Opencast Quarry
AAQ (Cz)-4: Near Ore Plot Area
4. Method of Sampling : **IS 5182(P-5) 1975 RA 2014**
5. Date of Sampling : **18.08.2020**
6. Date of Analysis : **20.08.2020 TO 21.08.2020**
7. Monitoring Instruments : **RDS (APM 460 BL), FPS (APM 550) Envirotech, CO Monitor, VOC Sampler**
8. 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
Particulate matter(size less than10µm) or PM ₁₀	µg / m ³	IS 5182 (P-22) 2006 RA 2017 Gravimetric Method	100	64.8	70.2	73.2	60.6
Particulate matter(size less than10µm) or PM _{2.5}	µg / m ³	VCSPL/AAQ-SOP/001 Date: 01.12.2019 Gravimetric Method	60	28.2	32.8	36	22.8
Sulphur dioxide as SO ₂	µg / m ³	IS 5182 (P-2) 2001 RA 2017 Improved West and Geake Method	80	6.6	7.1	8.6	4.8
Oxides of Nitrogen as NO _x	µg / m ³	IS 5182 (P-6) 2006 RA 2017 Modified Jacob & Hochheiser Method(Na-Arsenite)	80	13.2	14.2	14.4	11.4
Carbon Monoxide as CO	mg / m ³	IS 5182 (P-10) 2006 RA 2017 NDIR Spectroscopy	4	0.24	0.31	0.35	0.23



M. Panda



Priya Mohanty



Ref : Envlab/20/R-3723

Date : 07.09.2020

Ammonia as NH ₃	µg / m ³	VCSPL/SOP-AAQ/001, Dated 01.12.2019 ISC 401, 3 rd ed 1999 Indo Phenol Blue Method	400	BDL	BDL	BDL	BDL
Ozone as O ₃	µg / m ³	VCSPL/SOP-AAQ/001, Dated 01.12.2019 ISC 411, 3 rd ed 1999 Chemical Method	100	5.4	6.2	4.8	BDL
Arsenic as As	ng/ m ³	IS 5182 (Part-22), RA2019 AAS Method After Sampling	06	BDL	BDL	BDL	BDL
Lead as Pb	µg / m ³	IS 5182(Part 22) RA2019 AAS Method After Sampling	01	BDL	BDL	BDL	BDL
Nickel as Ni	ng/ m ³	IS 5182 (Part-22), RA2019 AAS Method After Sampling	20	BDL	BDL	BDL	BDL
Benzene as C ₆ H ₆	µg / m ³	IS 5182 (Part 11):2017 Absorption & Desorption followed by GC analysis	05	BDL	BDL	BDL	BDL
Benzo-Pyrene as Bap	ng/ m ³	IS 5182 (Part 12):2017 Solvent extraction followed by Gas Chromatography analysis	01	BDL	BDL	BDL	BDL

BDL Values: SO₂< 4 µg/m³, NO_x< 9 µg/m³, O₃<4 µg/m³, Ni<0.01 ng/m³, As < 0.001 ng/m³, C₆H₆<0.001 µg/m³, BaP<0.002 ng/m³, Pb<0.001 µg/m³, CO-<0.1 mg/m³



Prepared By

Manda



Reviewed By

Puja Mishra



Figure-01: Graph Showing Avg. AAQ Concentration (AAOMS(Cz)-1:Near Office Building) within study area for the month of August 2020

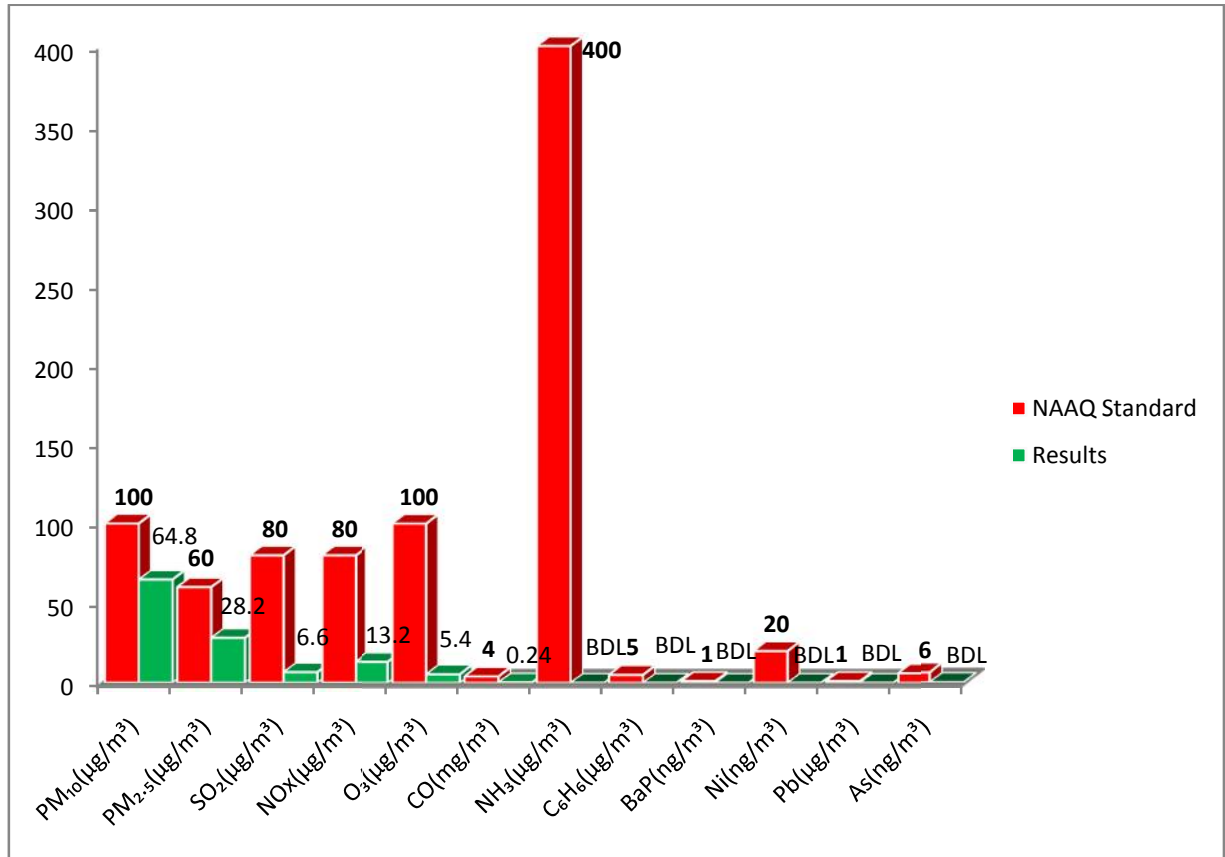




Figure-02: Graph Showing Avg. AAQ Concentration (AAOMS(Cz)-2:Near ETP) within study area for the month of August 2020

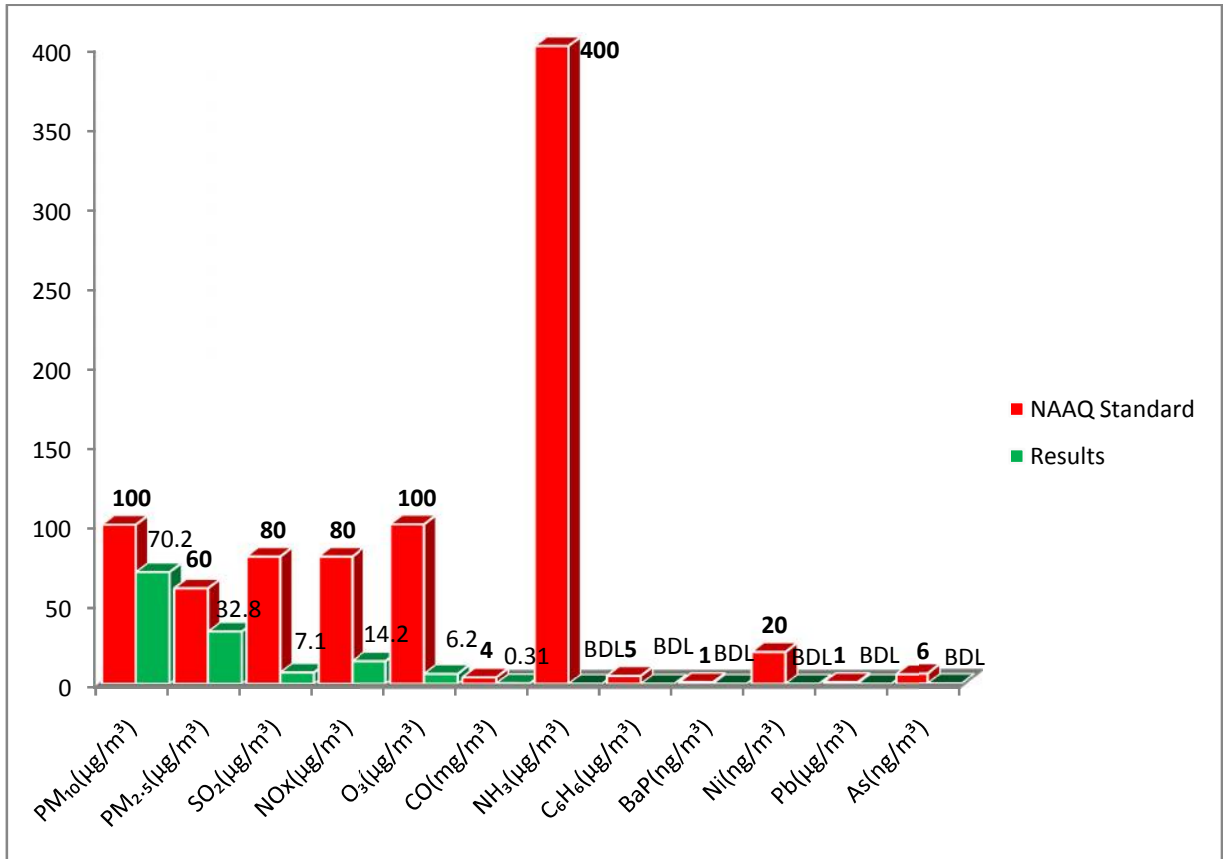




Figure-03: Graph Showing Avg. AAO Concentration (AAOMS(Cz)-3:At Middle of the Open Cast Quarry) within study area for the month of August 2020

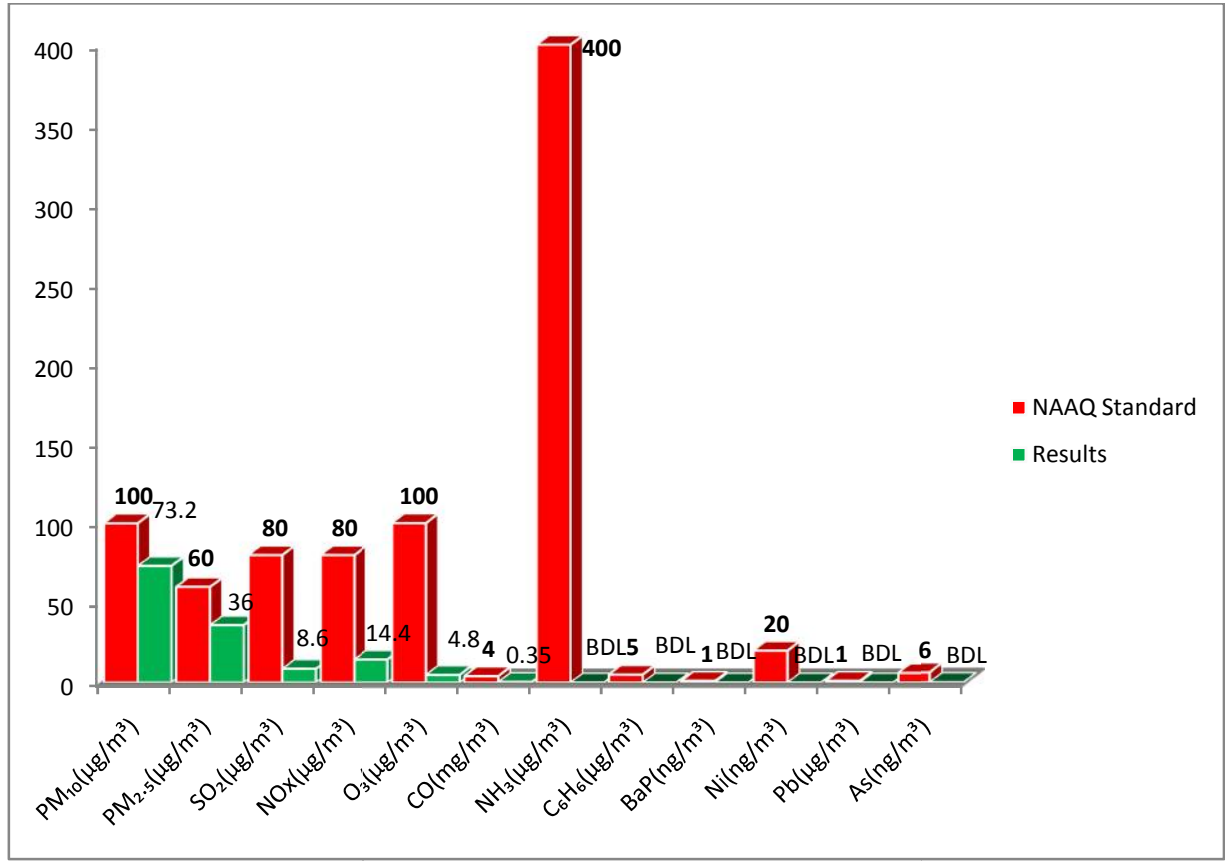
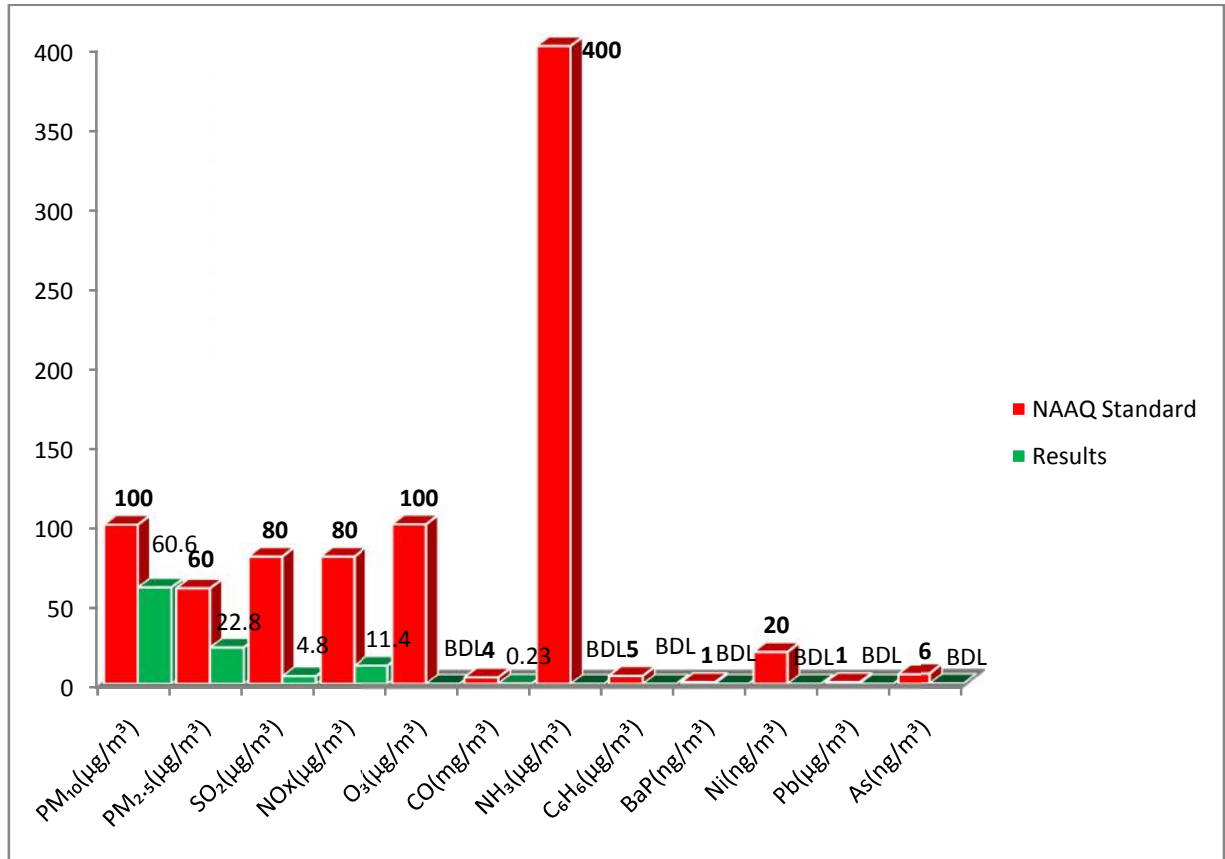




Figure-04: Graph Showing Avg. AAQ Concentration (AAQMS(Cz)-4:Near Ore Plot Area) within study area for the month of August 2020





Ref : Envlab/20/R-4612

Date : 10.10.2020

AMBIENT AIR QUALITY (CORE ZONE) MONITORING REPORT- SEPTEMBER 2020

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 (Cz)-1: Near Office Building
AAQ (Cz)-2: Near ETP
AAQ (Cz)-3: At Middle of the Opencast Quarry
AAQ (Cz)-4: Near Ore Plot Area
4. Method of Sampling : IS 5182(P-5) 1975 RA 2014
5. Date of Sampling : 21.09.2020
6. Date of Analysis : 23.09.2020 TO 26.09.2020
7. Monitoring Instruments : RDS (APM 460 BL), FPS (APM 550) Envirotech, CO Monitor, VOC Sampler
8. 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
Particulate matter(size less than10µm) or PM ₁₀	µg / m ³	IS 5182 (P-22) 2006 RA 2017 Gravimetric Method	100	71.8	78.8	79.2	68.8
Particulate matter(size less than10µm) or PM _{2.5}	µg / m ³	VCSPL/AAQ-SOP/001 Date: 01.12.2019 Gravimetric Method	60	42.8	50.2	51.4	42.0
Sulphur dioxide as SO ₂	µg / m ³	IS 5182 (P-2) 2001 RA 2017 Improved West and Geake Method	80	6.8	7.4	9.2	5.6
Oxides of Nitrogen as NO _x	µg / m ³	IS 5182 (P-6) 2006 RA 2017 Modified Jacob & Hochheiser Method(Na-Arsenite)	80	13.8	15.2	14.8	12.6
Carbon Monoxide as CO	mg / m ³	IS 5182 (P-10) 2006 RA 2017 NDIR Spectroscopy	4	0.28	0.36	0.44	0.31



M. Panda



Puja Mohanty

Page No 1 of 2



Ref : Envlab/20/R-4612

Date : 10.10.2020

Ammonia as NH ₃	µg / m ³	VCSPL/SOP-AAQ/001, Dated 01.12.2019 ISC 401, 3 rd ed 1999 Indo Phenol Blue Method	400	BDL	BDL	BDL	BDL
Ozone as O ₃	µg / m ³	VCSPL/SOP-AAQ/001, Dated 01.12.2019 ISC 411, 3 rd ed 1999 Chemical Method	100	7.8	6.9	5.6	BDL
Arsenic as As	ng/ m ³	IS 5182 (Part-22), RA2019 AAS Method After Sampling	06	BDL	BDL	BDL	BDL
Lead as Pb	µg / m ³	IS 5182(Part 22) RA2019 AAS Method After Sampling	01	BDL	BDL	BDL	BDL
Nickel as Ni	ng/ m ³	IS 5182 (Part-22), RA2019 AAS Method After Sampling	20	BDL	BDL	BDL	BDL
Benzene as C ₆ H ₆	µg / m ³	IS 5182 (Part 11):2017 Absorption & Desorption followed by GC analysis	05	BDL	BDL	BDL	BDL
Benzo-Pyrene as Bap	ng/ m ³	IS 5182 (Part 12):2017 Solvent extraction followed by Gas Chromatography analysis	01	BDL	BDL	BDL	BDL

BDL Values: SO₂< 4 µg/m³, NO_x< 9 µg/m³, O₃<4 µg/m³, Ni<0.01 ng/m³, As < 0.001 ng/m³, C₆H₆<0.001 µg/m³, BaP<0.002 ng/m³, Pb<0.001 µg/m³, CO-<0.1 mg/m³



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Puja Mishra



Figure-01: Graph Showing Avg. AAQ Concentration (AAOMS(Cz)-1:Near Office Building) within study area for the month of September 2020

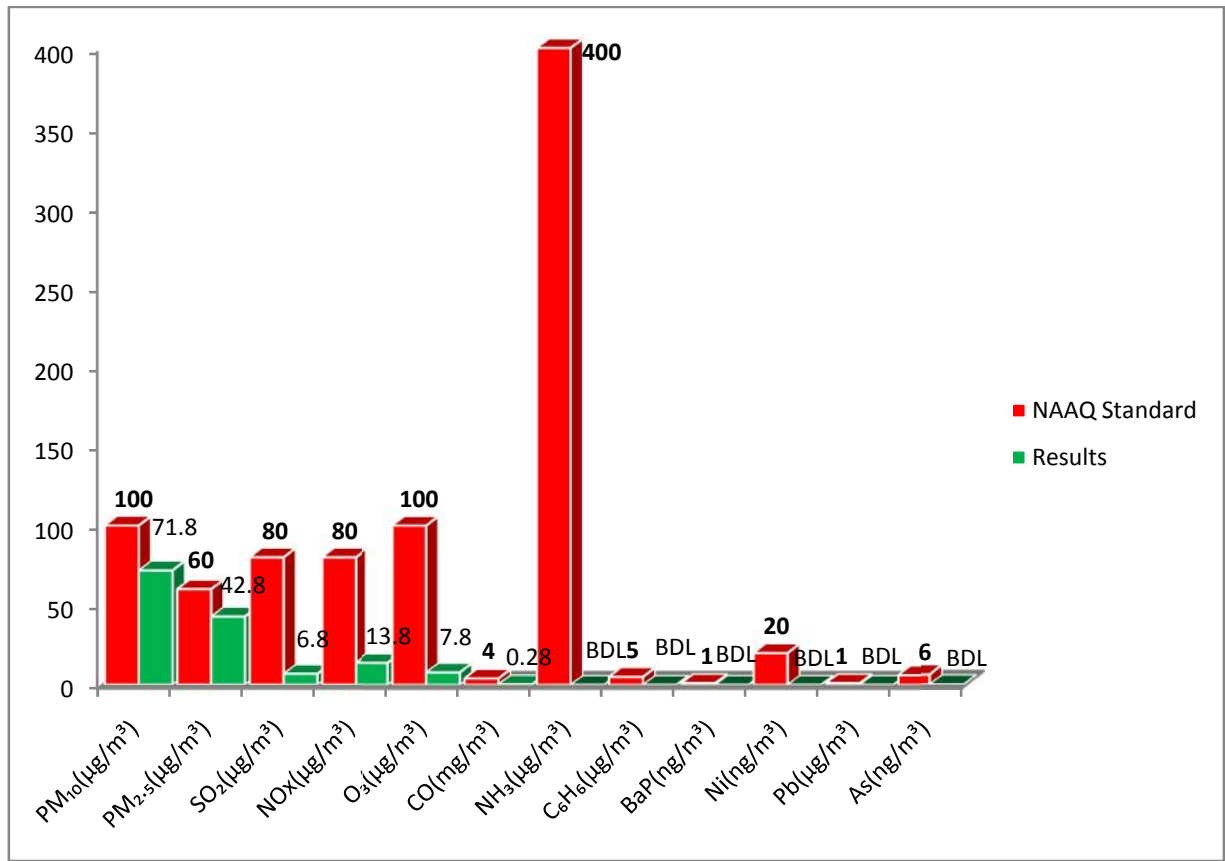




Figure-02: Graph Showing Avg. AAQ Concentration (AAOMS(Cz)-2:Near ETP) within study area for the month of September 2020

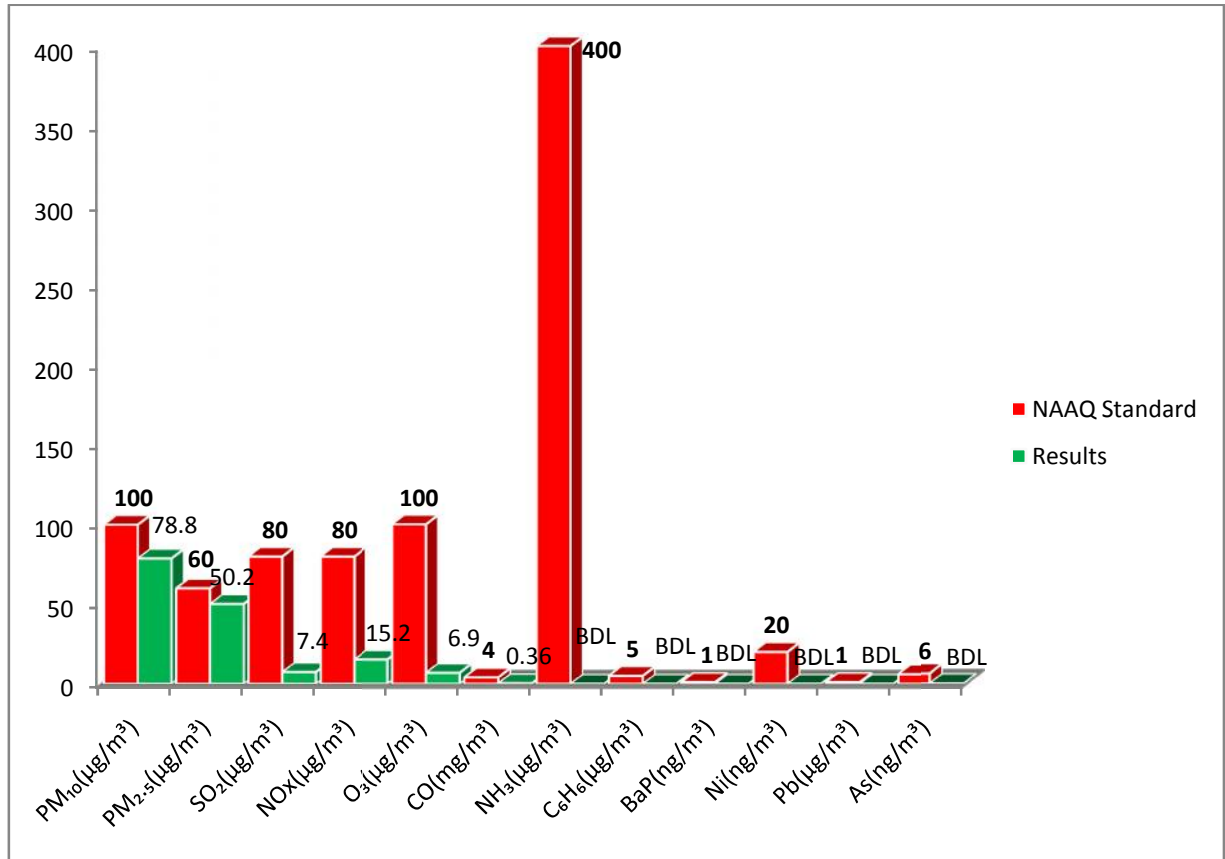




Figure-03: Graph Showing Avg. AAQ Concentration (AAQMS(Cz)-3:At Middle of the Open Cast Quarry) within study area for the month of September 2020

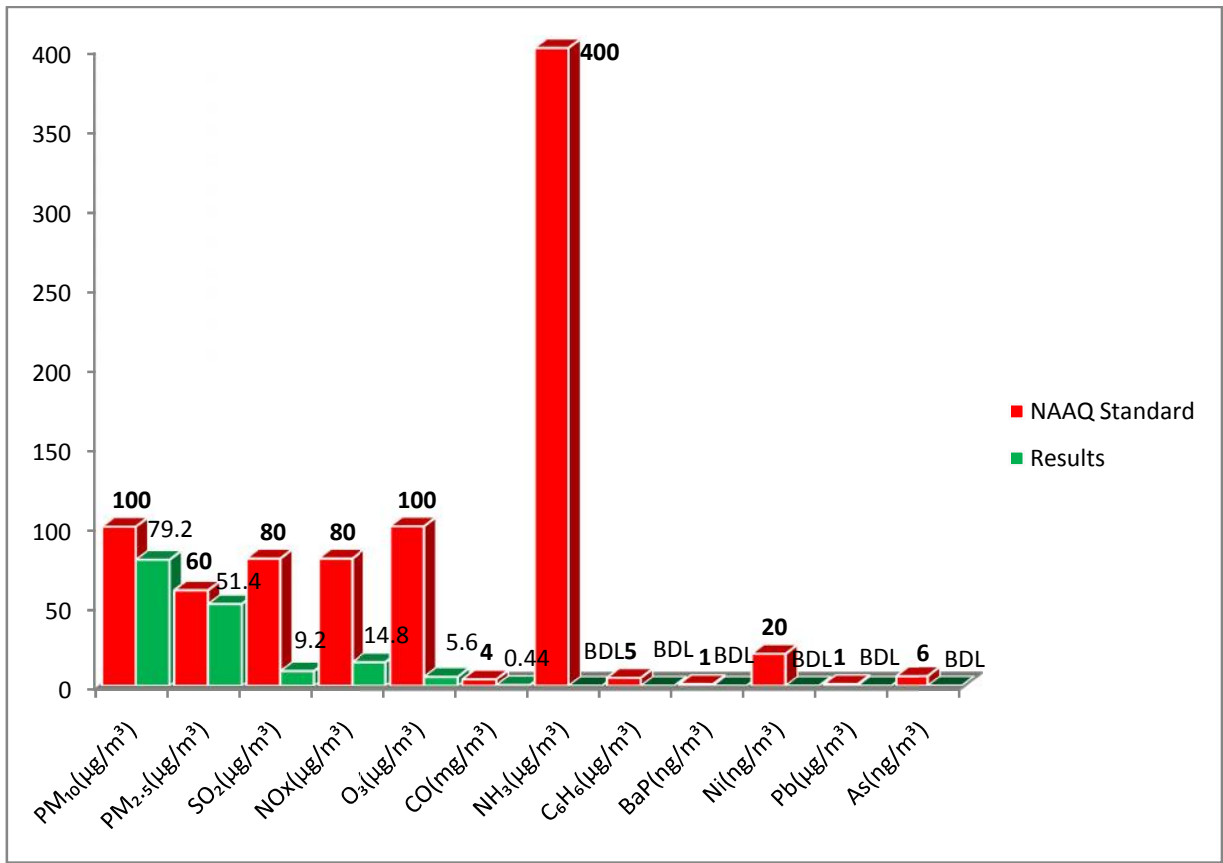
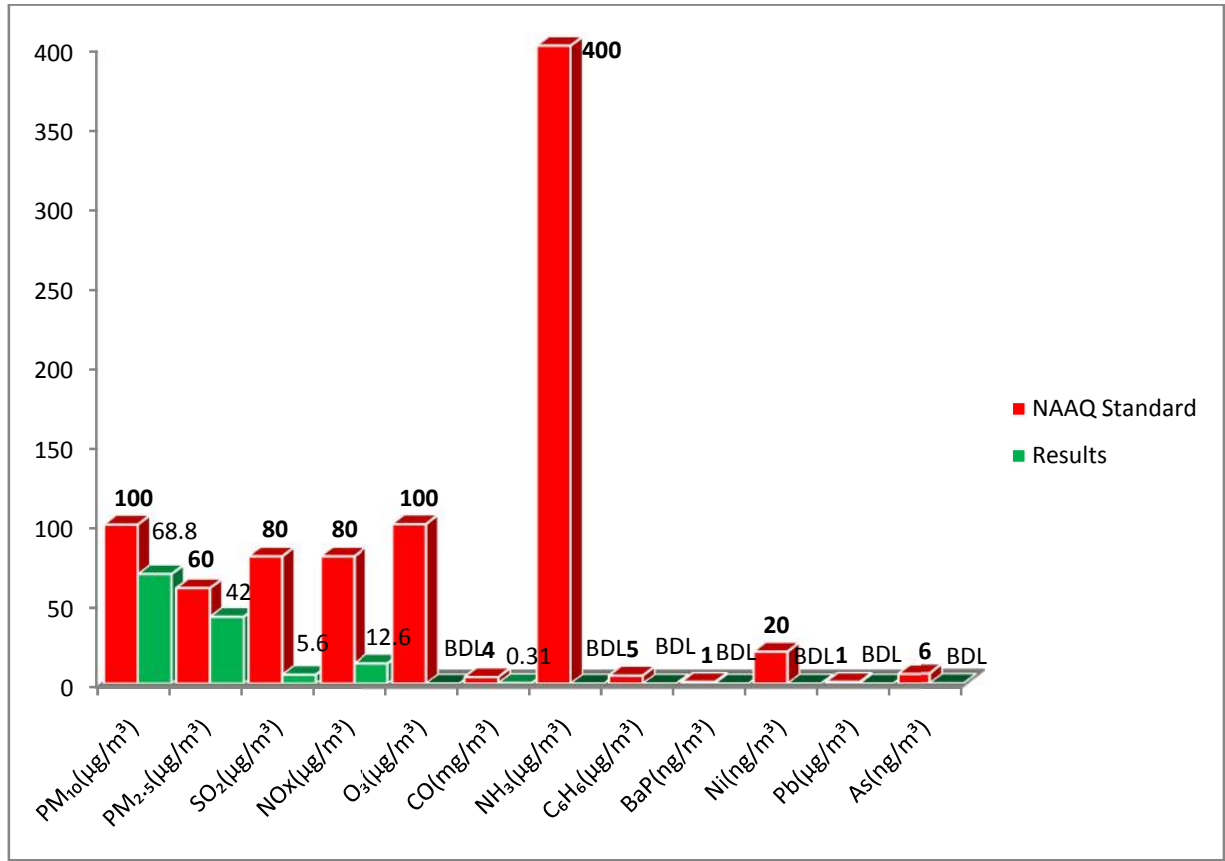




Figure-04: Graph Showing Avg. AAQ Concentration (AAQMS(Cz)-4:Near Ore Plot Area) within study area for the month of September 2020





Annexure-2

AMBIENT AIR QUALITY ANALYSIS REPORT
(BUFFER ZONE)





Ref : Envlab/20/R-3722

Date : 07.09.2020

AMBIENT AIR QUALITY(BUFFER ZONE) MONITORING REPORT- JULY 2020

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
AAQ (Bz)-2: Near Village Ransol
AAQ (Bz)-3: Near Kaliapani Township
AAQ (Bz)-4: Near Village Godisahi
AAQ (Bz)-5: Near Village Baragaji
4. Method of Sampling : IS 5182(P-5) 1975 RA 2014
5. Date of Sampling : 14.07.2020
6. Date of Analysis : 16.07.2020 TO 17.07.2020
7. Monitoring Instruments : RDS (APM 460 BL), FPS (APM 550) Envirotech, CO Monitor, VOC Sampler
8. 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
Particulate matter(size less than 10µm) or PM ₁₀	µg / m ³	IS 5182 (P-22) 2006 RA 2017 Gravimetric Method	100	50.8	39.6	80.6	35.8	35.8
Particulate matter(size less than 10µm) or PM _{2.5}	µg / m ³	VCSPL/AAQ-SOP/001 Date: 01.12.2019 Gravimetric Method	60	20.8	18	42.6	16.2	17.2
Sulphur dioxide as SO ₂	µg / m ³	IS 5182 (P-2) 2001 RA 2017 Improved West and Geake Method	80	4.2	3.2	9.4	3.4	4.2
Oxides of Nitrogen as NO _x	µg / m ³	IS 5182 (P-6) 2006 RA 2017 Modified Jacob & Hochheiser Method(Na-Arsenite)	80	10.1	6.1	16.6	4.4	8.8
Carbon Monoxide as CO	mg / m ³	IS 5182 (P-10) 2006 RA 2017 NDIR Spectroscopy	4	BDL	BDL	1.26	BDL	BDL



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Puja Mohanty



Ref : Envlab/20/R-372 2

Date : 07.09.2020

Ammonia as NH ₃	µg / m ³	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 ₃	µg / m ³	VCSPL/SOP-AAQ/001, Dated 01.12.2019 ISC 411, 3rd ed 1999 Chemical Method	100	BDL	BDL	5.1	BDL	8.2
Arsenic as As	ng/ m ³	IS 5182 (Part-22), RA2019 AAS Method After Sampling	06	BDL	BDL	BDL	BDL	BDL
Lead as Pb	µg / m ³	IS 5182(Part 22) RA2019 AAS Method After Sampling	01	BDL	BDL	BDL	BDL	BDL
Nickel as Ni	ng/ m ³	IS 5182 (Part-22), RA2019 AAS Method After Sampling	20	BDL	BDL	BDL	BDL	BDL
Benzene as C ₆ H ₆	µg / m ³	IS 5182 (Part 11):2017 Absorption & Desorption followed by GC analysis	05	BDL	BDL	BDL	BDL	BDL
Benzo-Pyrene as Bap	ng/ m ³	IS 5182 (Part 12):2017 Solvent extraction followed by Gas Chromatography analysis	01	BDL	BDL	BDL	BDL	BDL

BDL Values: SO₂< 4 µg/m³, NO_x< 9 µg/m³, O₃<4 µg/m³, Ni<0.01 ng/m³, As < 0.001 ng/m³, C₆H₆<0.001 µg/m³, BaP<0.002 ng/m³, Pb<0.001 µg/m³, CO-<0.1 mg/m³



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Figure-01: Graph Showing Avg. AAQ Concentration (AAOMS(Bz)-1:Near Village Bhimtanagar) within study area for the month of July 2020

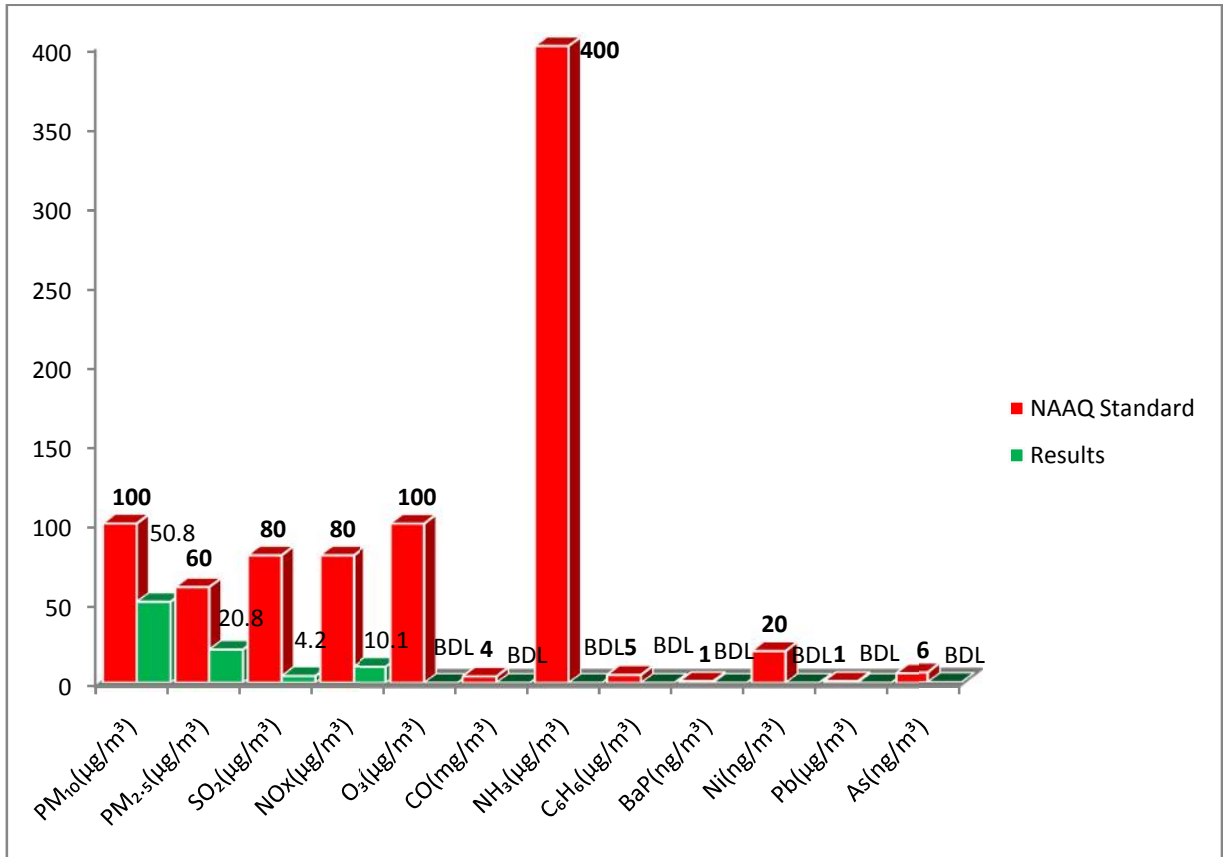




Figure-02: Graph Showing Avg. AAQ Concentration (AAOMS(Bz)-2:Near Village Ransol) within study area for the month of July 2020

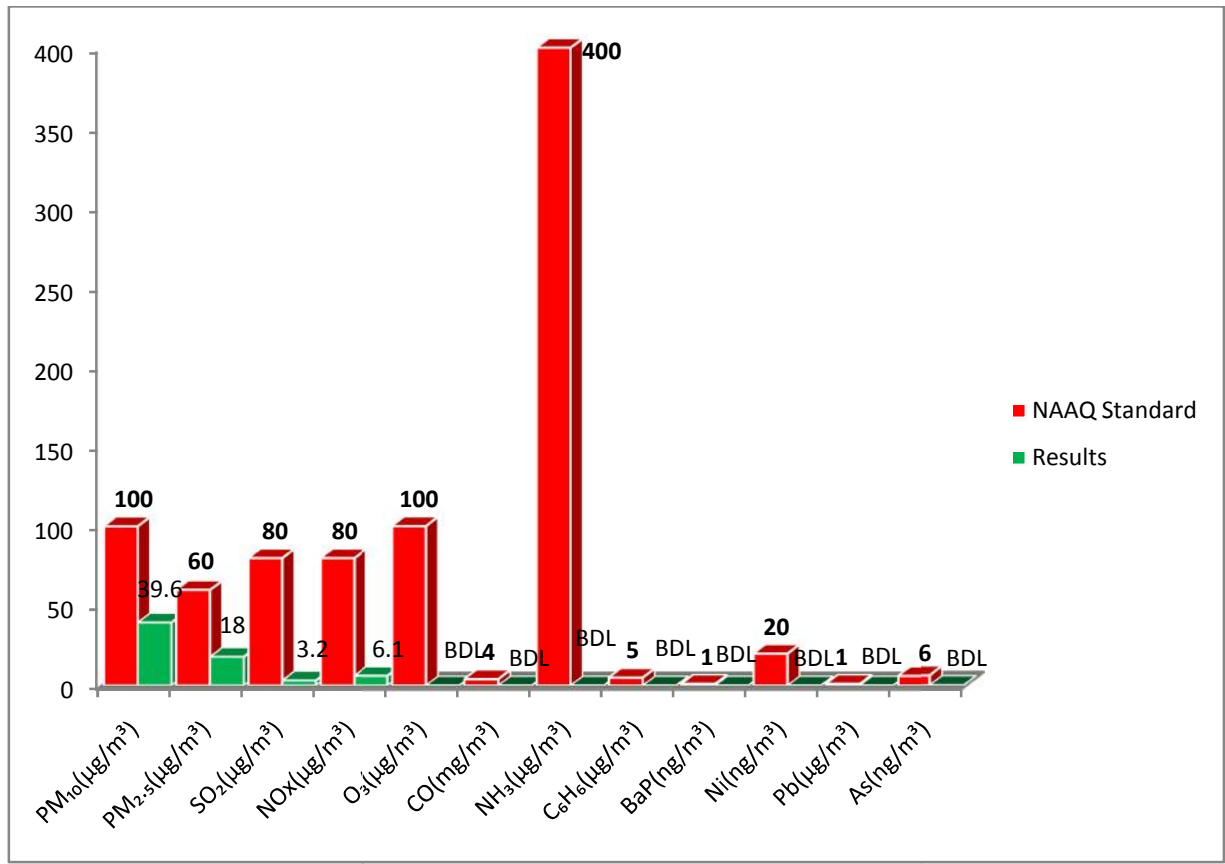




Figure-03: Graph Showing Avg. AAQ Concentration (AAQMS(Bz)-3:Near Kaliapani Township) within study area for the month of July 2020

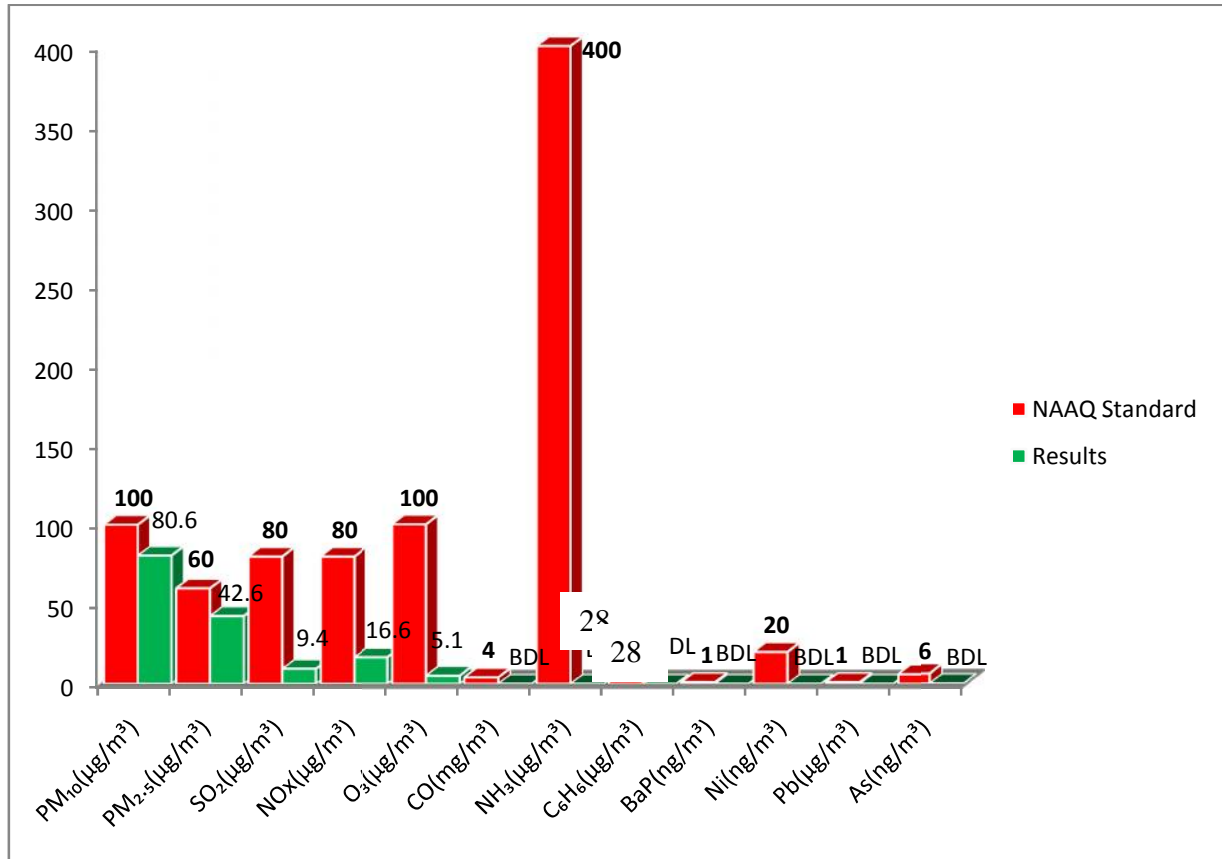




Figure-04: Graph Showing Avg. AAQ Concentration (AAQMS(Bz)-4:Near Village Godisahi) within study area for the month of July 2020

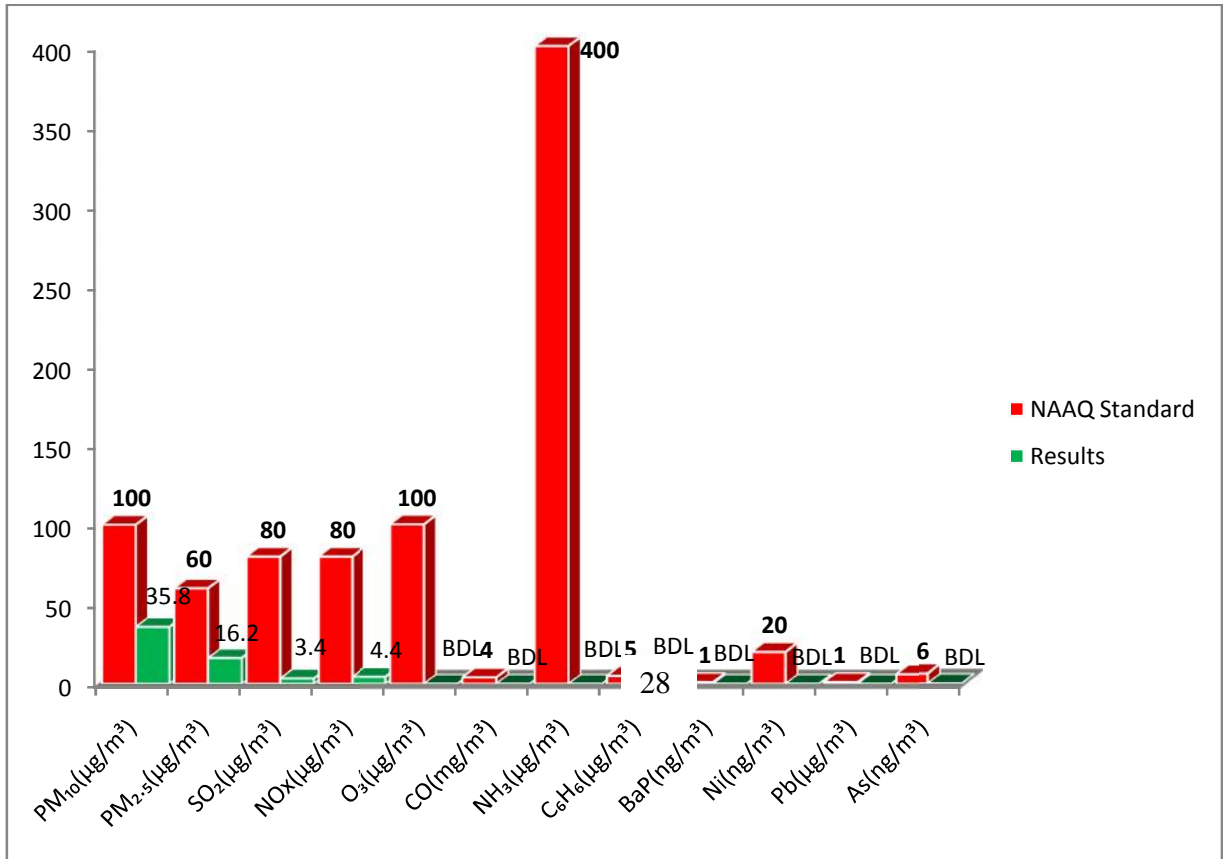
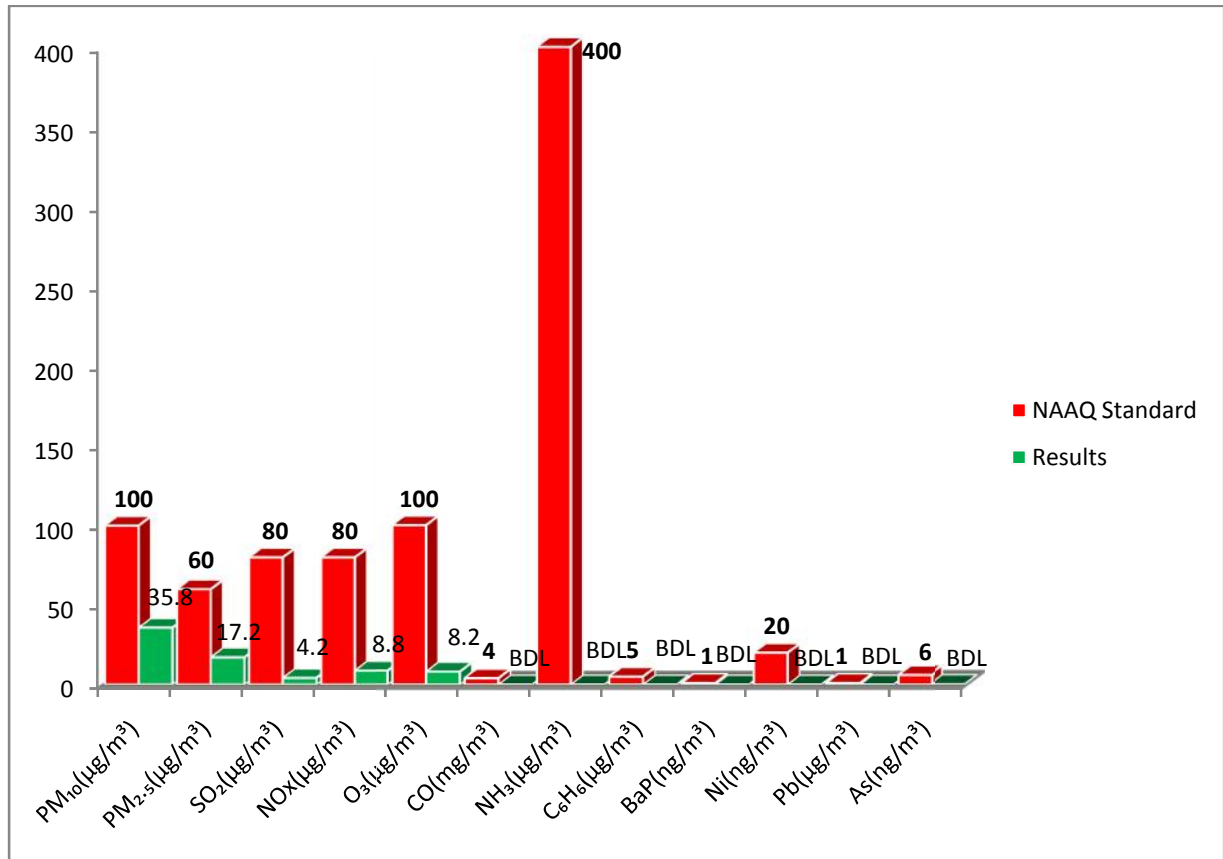




Figure-05: Graph Showing Avg. AAQ Concentration (AAQMS(Bz)-5:Near Village Baragaji) within study area for the month of July 2020





Ref : Envlab/20/R-3724

Date : 07.09.2020

AMBIENT AIR QUALITY(BUFFER ZONE) MONITORING REPORT- AUGUST 2020

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
AAQ (Bz)-2: Near Village Ransol
AAQ (Bz)-3: Near Kaliapani Township
AAQ (Bz)-4: Near Village Godisahi
AAQ (Bz)-5: Near Village Baragaji
4. Method of Sampling : IS 5182(P-5) 1975 RA 2014
5. Date of Sampling : 25.08.2020
6. Date of Analysis : 26.08.2020 TO 27.08.2020
7. Monitoring Instruments : RDS (APM 460 BL), FPS (APM 550) Envirotech, CO Monitor, VOC Sampler
8. 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
Particulate matter(size less than 10µm) or PM ₁₀	µg / m ³	IS 5182 (P-22) 2006 RA 2017 Gravimetric Method	100	53.6	41.8	81.2	28	36.8
Particulate matter(size less than 10µm) or PM _{2.5}	µg / m ³	VCSPL/AAQ-SOP/001 Date: 01.12.2019 Gravimetric Method	60	24.4	20.8	44.2	18.1	17.8
Sulphur dioxide as SO ₂	µg / m ³	IS 5182 (P-2) 2001 RA 2017 Improved West and Geake Method	80	4.8	3.8	9.8	3.8	4.6
Oxides of Nitrogen as NO _x	µg / m ³	IS 5182 (P-6) 2006 RA 2017 Modified Jacob & Hochheiser Method(Na-Arsenite)	80	10.6	6.6	17.1	4.6	9.1
Carbon Monoxide as CO	mg / m ³	IS 5182 (P-10) 2006 RA 2017 NDIR Spectroscopy	4	BDL	BDL	1.21	BDL	BDL



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Puja Mohanty



Ref : Envlab/20/R-3724

Date : 07.09.2020

Ammonia as NH ₃	µg / m ³	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 ₃	µg / m ³	VCSPL/SOP-AAQ/001, Dated 01.12.2019 ISC 411, 3rd ed 1999 Chemical Method	100	BDL	BDL	5.2	BDL	8.8
Arsenic as As	ng / m ³	IS 5182 (Part-22), RA2019 AAS Method After Sampling	06	BDL	BDL	BDL	BDL	BDL
Lead as Pb	µg / m ³	IS 5182 (Part 22) RA2019 AAS Method After Sampling	01	BDL	BDL	BDL	BDL	BDL
Nickel as Ni	ng / m ³	IS 5182 (Part-22), RA2019 AAS Method After Sampling	20	BDL	BDL	BDL	BDL	BDL
Benzene as C ₆ H ₆	µg / m ³	IS 5182 (Part 11):2017 Absorption & Desorption followed by GC analysis	05	BDL	BDL	BDL	BDL	BDL
Benzo-Pyrene as Bap	ng / m ³	IS 5182 (Part 12):2017 Solvent extraction followed by Gas Chromatography analysis	01	BDL	BDL	BDL	BDL	BDL

BDL Values: SO₂< 4 µg/m³, NO_x< 9 µg/m³, O₃<4 µg/m³, Ni<0.01 ng/m³, As < 0.001 ng/m³, C₆H₆<0.001 µg/m³, BaP<0.002 ng/m³, Pb<0.001 µg/m³, CO<0.1 mg/m³



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M. Panda



Reviewed By

Puja Mohanty



Figure-01: Graph Showing Avg. AAQ Concentration (AAQMS(Bz)-1:Near Village Bhimtanagar) within study area for the month of August-2020

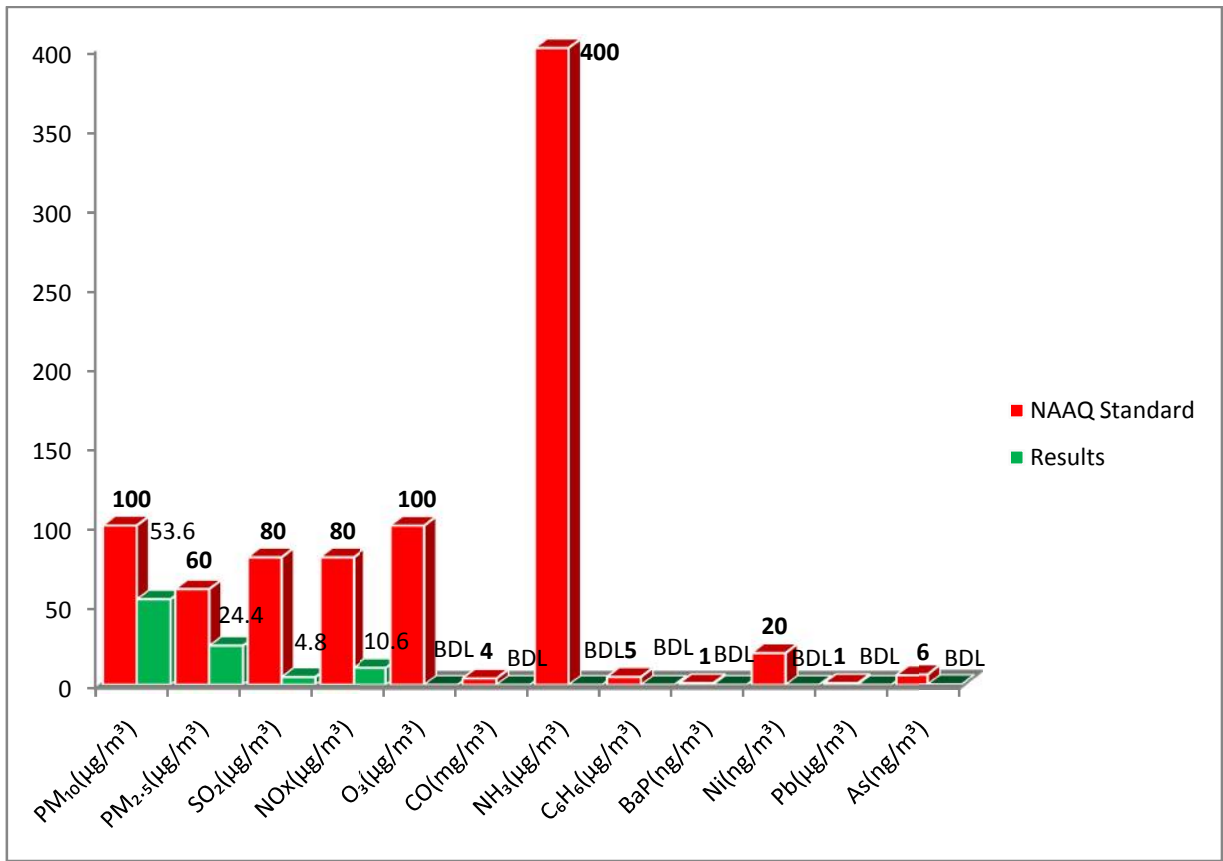




Figure-02: Graph Showing Avg. AAQ Concentration (AAOMS(Bz)-2:Near Village Ransol) within study area for the month of August- 2020

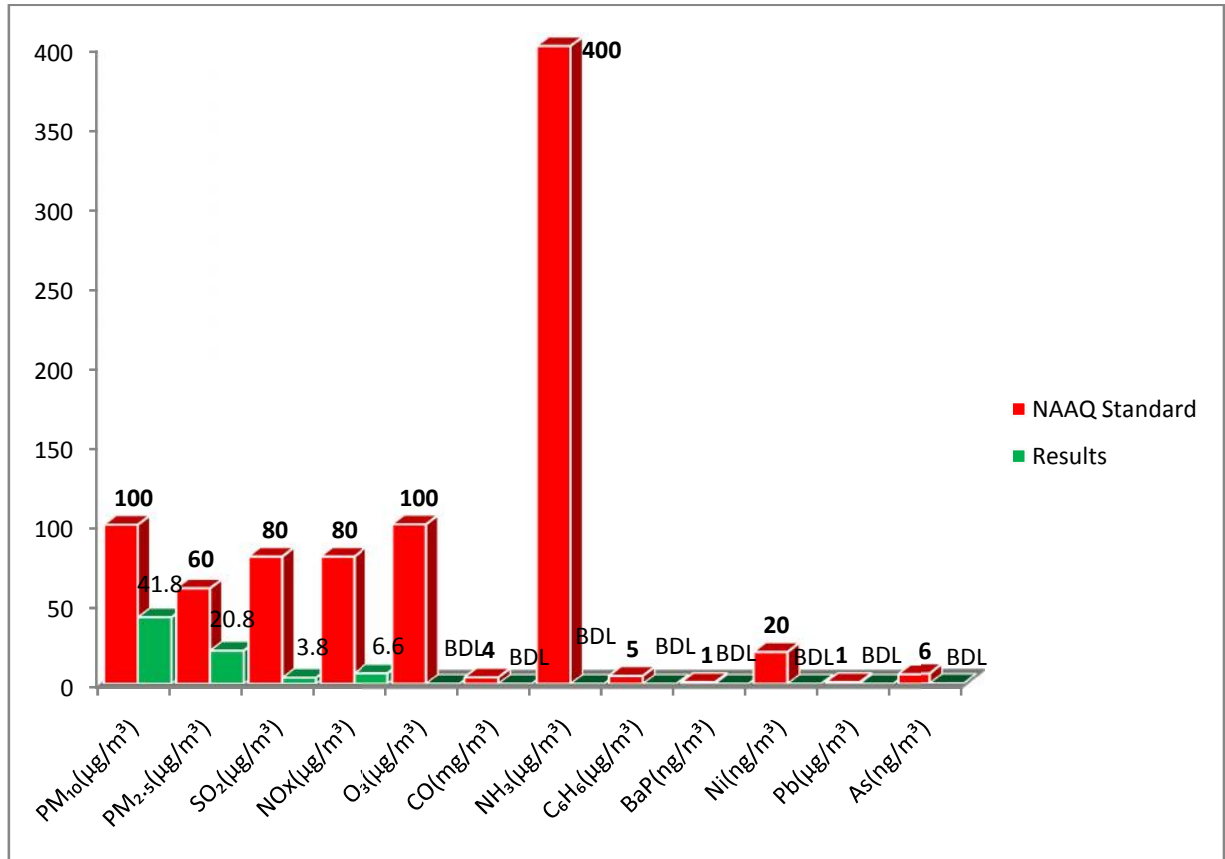




Figure-03: Graph Showing Avg. AAQ Concentration (AAQMS(Bz)-3:Near Kaliapani Township) within study area for the month of August- 2020

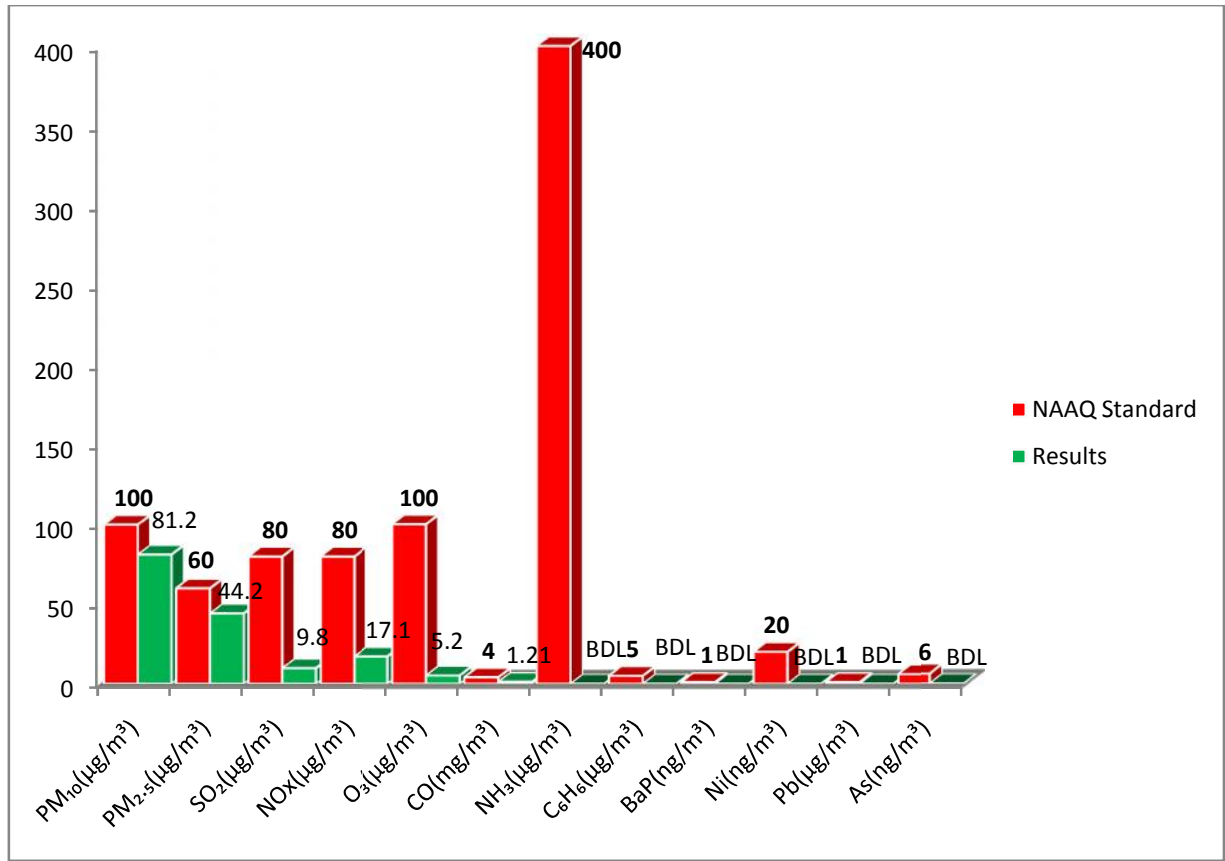




Figure-04: Graph Showing Avg. AAQ Concentration (AAQMS(Bz)-4:Near Village Godisahi) within study area for the month of August- 2020

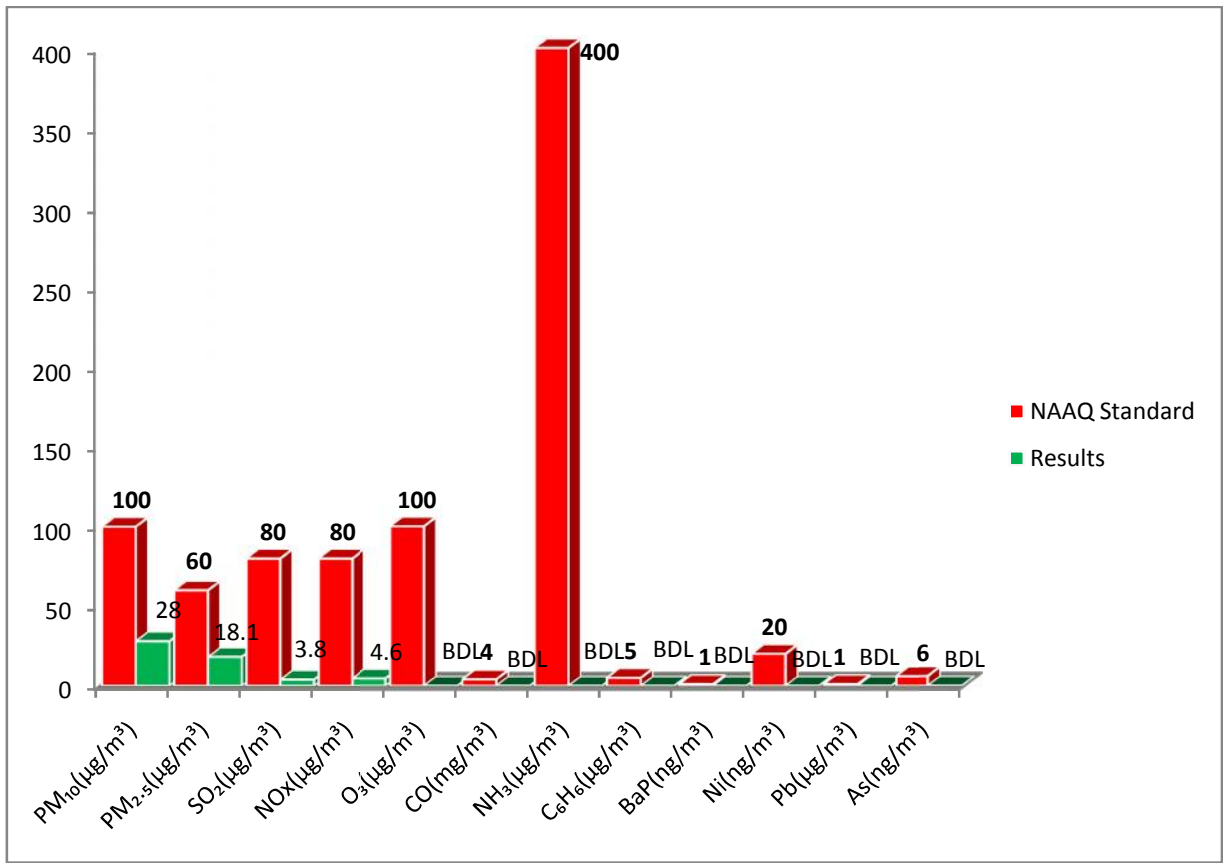
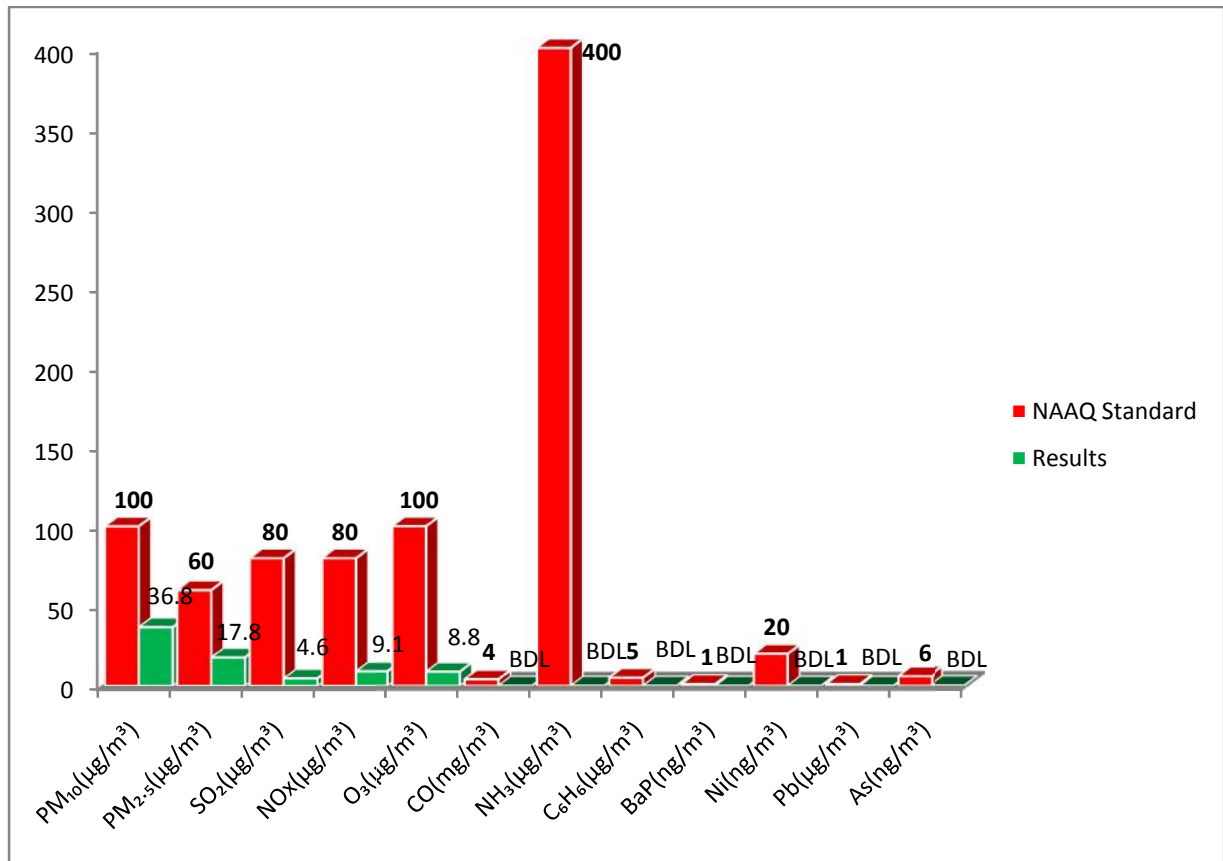




Figure-05: Graph Showing Avg. AAQ Concentration (AAQMS(Bz)-5:Near Village Baragaji) within study area for the month of August- 2020





Ref : Envlab/20/R-4613

Date : 10.10.2020

AMBIENT AIR QUALITY (BUFFER ZONE) MONITORING REPORT- SEPTEMBER 2020

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
AAQ (Bz)-2: Near Village Ransol
AAQ (Bz)-3: Near Kaliapani Township
AAQ (Bz)-4: Near Village Godisahi
AAQ (Bz)-5: Near Village Baragaji
4. Method of Sampling : IS 5182(P-5) 1975 RA 2014
5. Date of Sampling : 22.09.2020
6. Date of Analysis : 23.09.2020 TO 26.09.2020
7. Monitoring Instruments : RDS (APM 460 BL), FPS (APM 550) Envirotech, CO Monitor, VOC Sampler
8. 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
Particulate matter (size less than 10µm) or PM ₁₀	µg / m ³	IS 5182 (P-22) 2006 RA 2017 Gravimetric Method	100	56.0	44.0	72.8	32.6	36.0
Particulate matter (size less than 10µm) or PM _{2.5}	µg / m ³	VCSPL/AAQ-SOP/001 Date: 01.12.2019 Gravimetric Method	60	34.0	28.2	38.8	16.0	18.0
Sulphur dioxide as SO ₂	µg / m ³	IS 5182 (P-2) 2001 RA 2017 Improved West and Geake Method	80	5.4	4.8	9.2	2.9	4.6
Oxides of Nitrogen as NO _x	µg / m ³	IS 5182 (P-6) 2006 RA 2017 Modified Jacob & Hochheiser Method (Na-Arsenite)	80	11.8	8.4	16.2	4.8	9.1
Carbon Monoxide as CO	mg / m ³	IS 5182 (P-10) 2006 RA 2017 NDIR Spectroscopy	4	BDL	BDL	1.3	BDL	BDL



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Puja Mohanty



Ref : Envlab/20/R-4613

Date : 10.10.2020

Ammonia as NH ₃	µg / m ³	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 ₃	µg / m ³	VCSPL/SOP-AAQ/001, Dated 01.12.2019 ISC 411, 3rd ed 1999 Chemical Method	100	BDL	BDL	4.6	BDL	7.8
Arsenic as As	ng / m ³	IS 5182 (Part-22), RA2019 AAS Method After Sampling	06	BDL	BDL	BDL	BDL	BDL
Lead as Pb	µg / m ³	IS 5182 (Part 22) RA2019 AAS Method After Sampling	01	BDL	BDL	BDL	BDL	BDL
Nickel as Ni	ng / m ³	IS 5182 (Part-22), RA2019 AAS Method After Sampling	20	BDL	BDL	BDL	BDL	BDL
Benzene as C ₆ H ₆	µg / m ³	IS 5182 (Part 11):2017 Absorption & Desorption followed by GC analysis	05	BDL	BDL	BDL	BDL	BDL
Benzo-Pyrene as Bap	ng / m ³	IS 5182 (Part 12):2017 Solvent extraction followed by Gas Chromatography analysis	01	BDL	BDL	BDL	BDL	BDL

BDL Values: SO₂< 4 µg/m³, NO_x< 9 µg/m³, O₃<4 µg/m³, Ni<0.01 ng/m³, As < 0.001 ng/m³, C₆H₆<0.001 µg/m³, BaP<0.002 ng/m³, Pb<0.001 µg/m³, CO-<0.1 mg/m³



M. Panda



Puja Mohanty



Figure-01: Graph Showing Avg. AAQ Concentration (AAOMS(Bz)-1:Near Village Bhimtanagar) within study area for the month of September- 2020

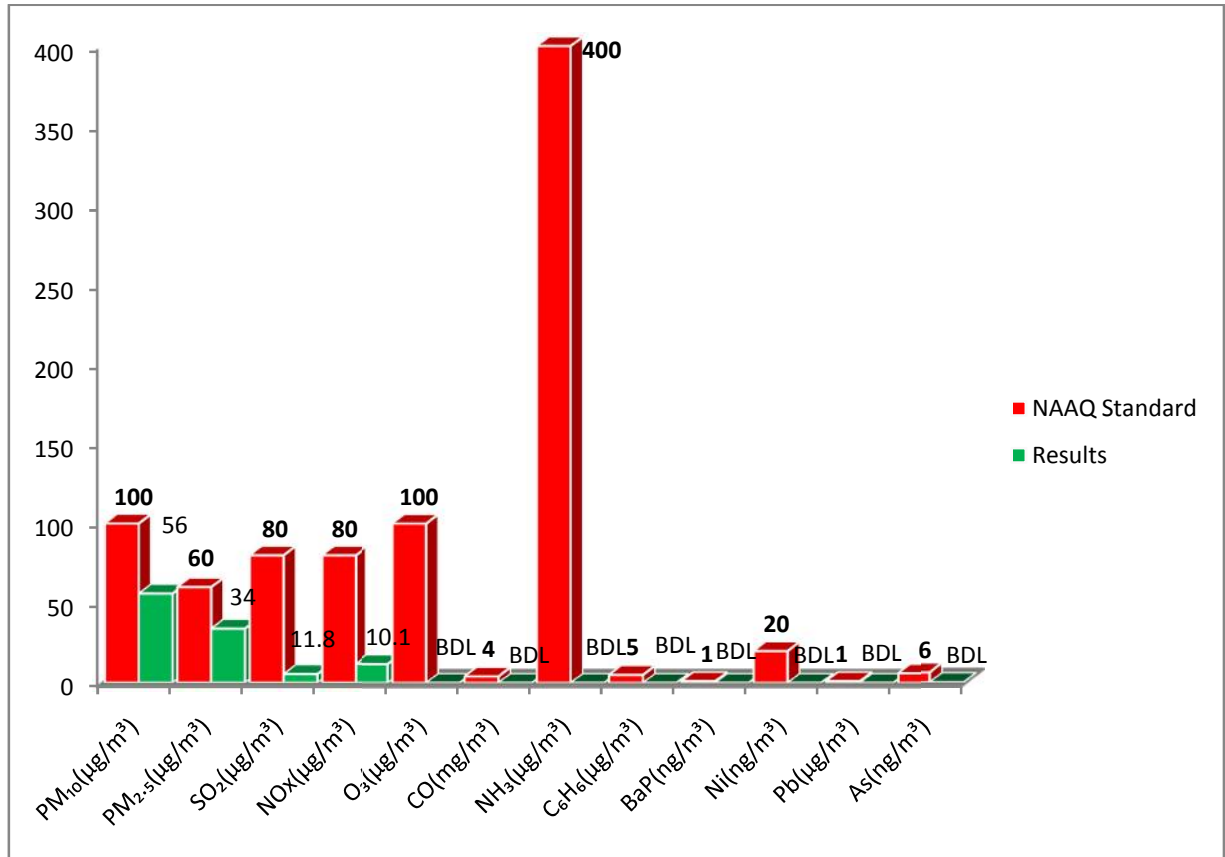




Figure-02: Graph Showing Avg. AAQ Concentration (AAOMS(Bz)-2:Near Village Ransol) within study area for the month of September- 2020

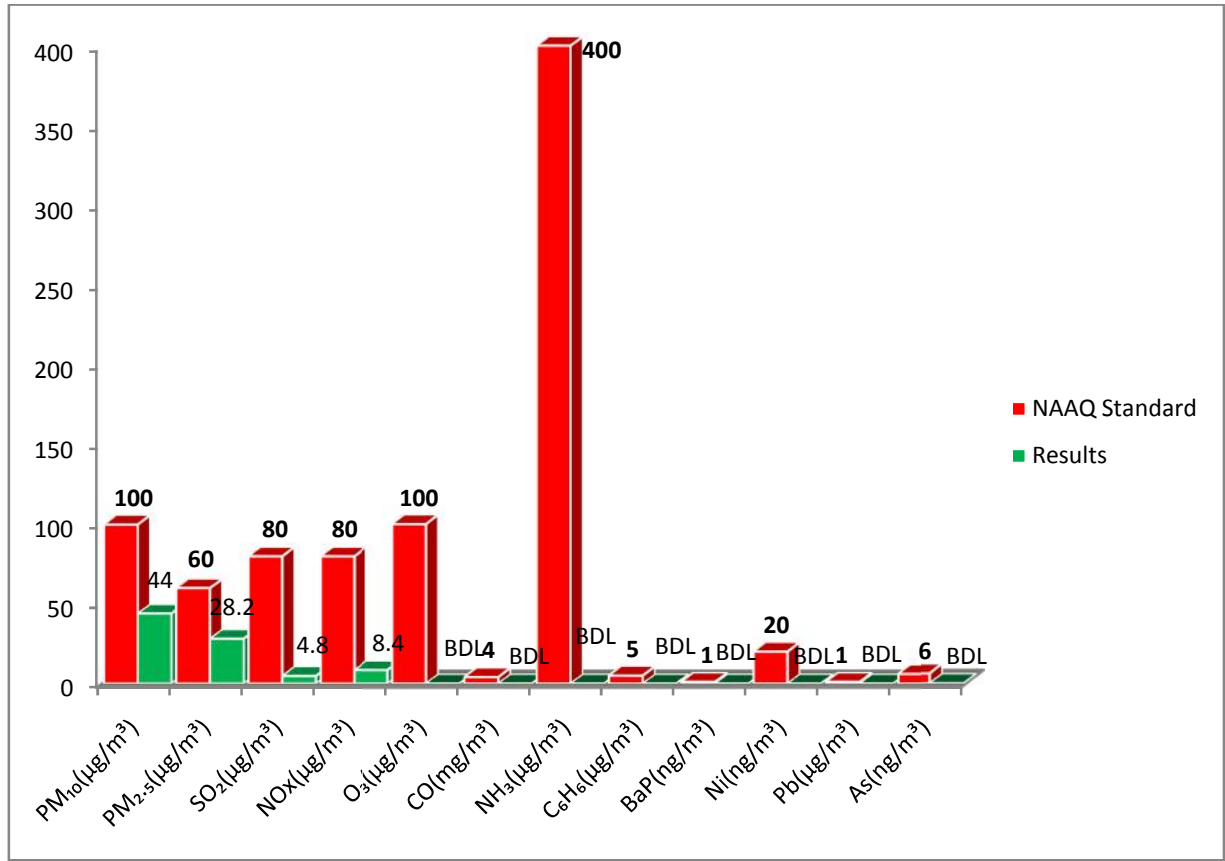




Figure-03: Graph Showing Avg. AAQ Concentration (AAQMS(Bz)-3:Near Kaliapani Township) within study area for the month of September 2020

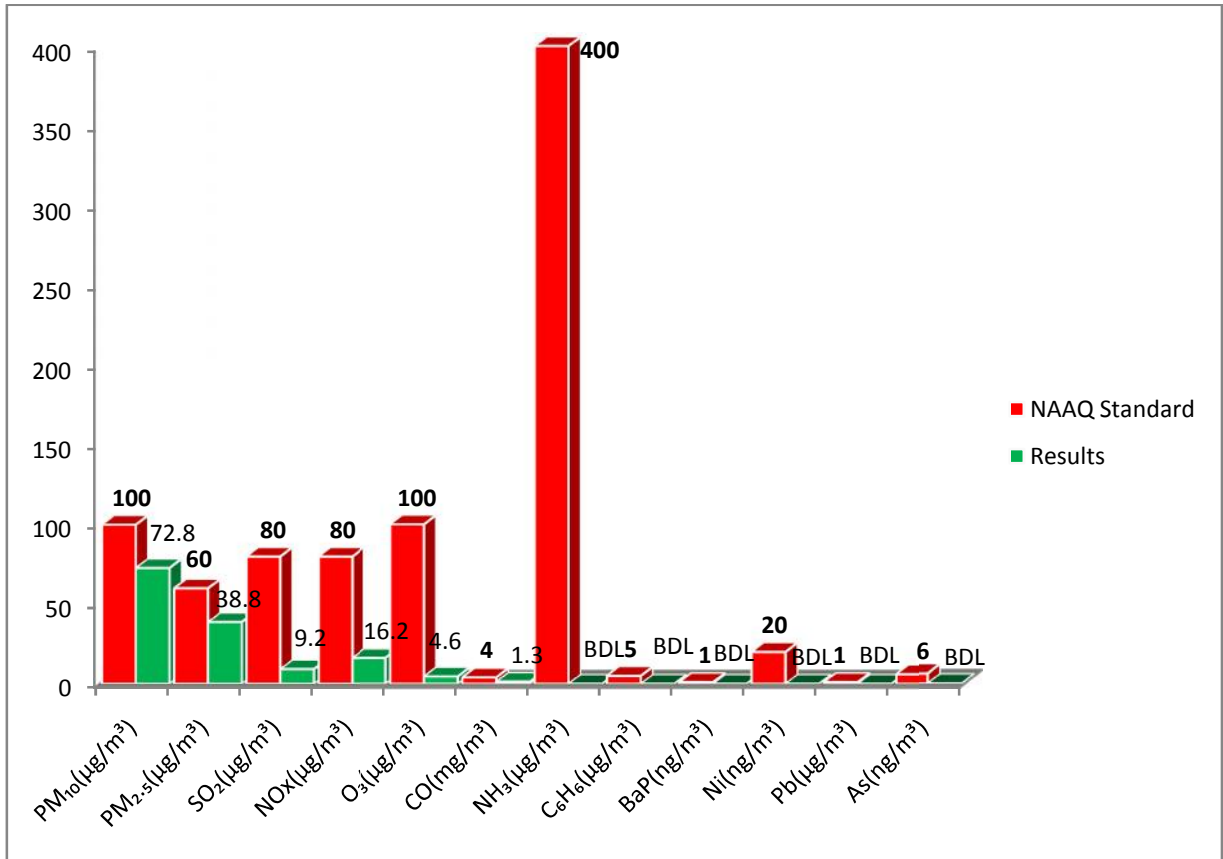




Figure-04: Graph Showing Avg. AAQ Concentration (AAQMS(Bz)-4:Near Village Godisahi) within study area for the month of September- 2020

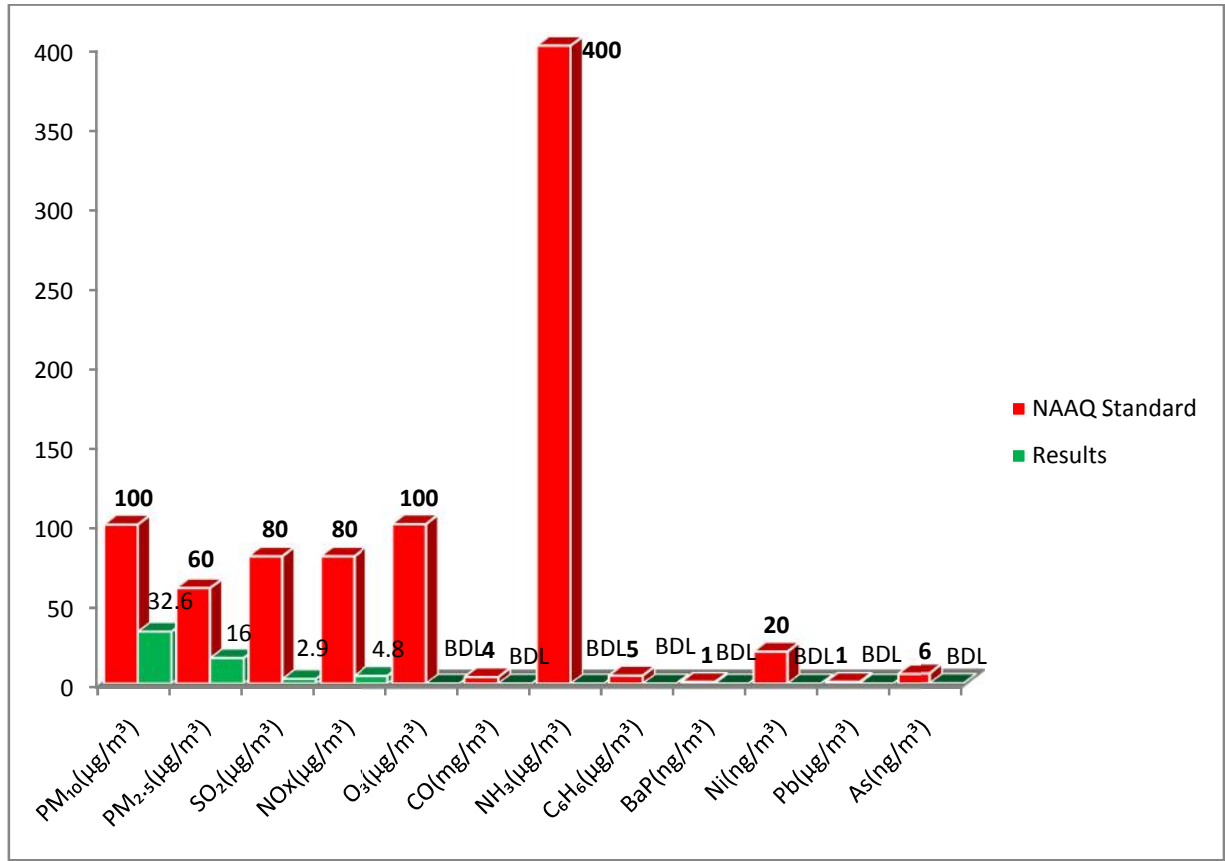
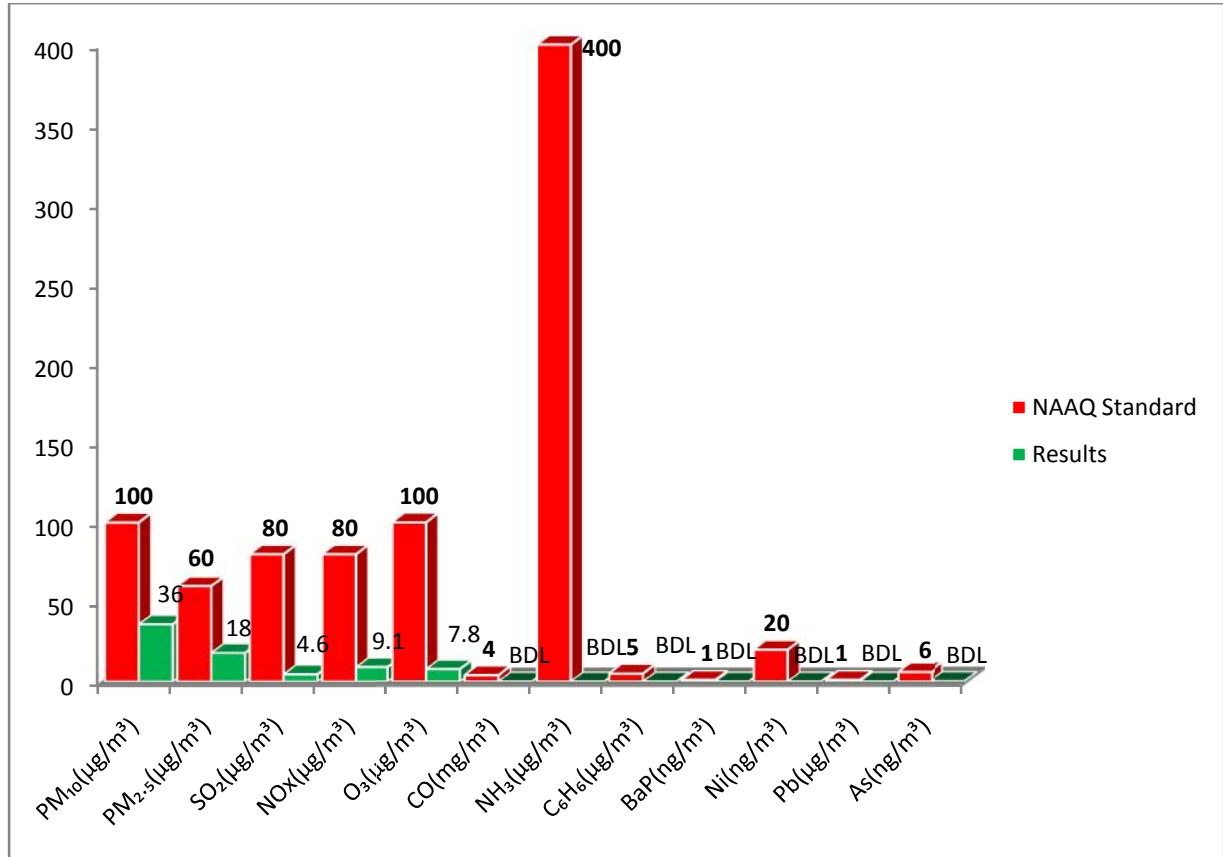




Figure-05: Graph Showing Avg. AAQ Concentration (AAQMS(Bz)-5:Near Village Baragaji) within study area for the month of September- 2020





KALARANGIATTA CHROMITE MINES
FERRO ALLOYS CORPORATION LTD, BHADRAK

Environmental Monitoring Report

Annexure-3

GROUND WATER QUALITY ANALYSIS REPORT



Visiontek Consultancy Services Pvt. Ltd.
Bhubaneswar.



Ref : Envlab/20/R-4614

Date : 10.10.2020

GROUND WATER QUALITY ANALYSIS REPORT- SEPTEMBER 2020

1. Name of Client : **M/s FERRO ALLOYS CORPORATION LIMITED , BHADRAK**
2. Name of the Project : **KALARANGIATTA CHROMITE MINES , KALIAPANI, JAJPUR**
3. Sampling Location : **GW1: Tube Well Near TISCO Main Gate**
GW2: Tube Well inside the Lease hold Area
GW3: Open Well at Ransol Village
4. Method of Sampling : **APHA 1060 B**
5. Date of Sampling : **22.09.2020**
6. Date of Analysis : **23.09.2020 TO 29.09.2020**
7. 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
Essential Characteristics								
1	Colour	Visual Comparison Method APHA 23 RD Ed,2017 : 2120 B, C	Hazen	5	15	<5	<5	<5
2	Odour	Threshold Odour Test APHA 23 RD Ed,2017 :2150 B	--	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
3	Taste	Flavor Threshold Test APHA 23 RD Ed,2017 : 2160 C	--	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
4	Turbidity	Nephelometric Method APHA 23 RD Ed,2017 :2130 B	NTU	1	5	6.8	5.7	7.1
5	pH Value	pH Meter APHA 23 RD Ed,2017 : 4500H ⁺ B	--	6.5-8.5	No Relaxation	6.8	6.7	7.1
6	Total Hardness (as CaCO ₃)	EDTA Titrimetric Method APHA 23 RD Ed,2017 : 2340 C	mg/l	200	600	192	188	210
7	Iron (as Fe)	By AAS Method APHA 23 RD Ed,2017 : 3111, B	mg/l	1.0	No Relaxation	0.27	0.29	0.26
8	Chloride (as Cl)	Argentometric Method APHA 23 RD Ed,2017 : 4500Cl B	mg/l	250	1000	36	32	42
9	Residual, free Chlorine	Iodometric Method APHA 23 RD Ed,2017 : 4500Cl, B	mg/l	0.2	1	ND	ND	ND
Desirable Characteristics								
10	Dissolved Solids	Gravimetric Method APHA 23 RD Ed,2017 : 2540 C	mg/l	500	2000	306	288	312
11	Calcium (as Ca)	EDTA Titrimetric Method APHA 23 RD Ed,2017 : 3500Ca B	mg/l	75	200	52.8	49.6	54.2
12	Magnesium (as Mg)	Calculation Method APHA 23 RD Ed,2017 : 3500Mg B	mg/l	30	100	18.0	15.6	21.2
13	Copper (as Cu)	By AAS Method APHA 23 RD Ed,2017: 3111 B	mg/l	0.05	1.5	<0.05	<0.05	<0.05
14	Manganese (as Mn)	Persulfate Method APHA 23 RD Ed,2017: 3500Mn B	mg/l	0.1	0.3	<0.05	<0.05	<0.05
15	Sulphate (as SO ₄)	Turbidimetric Method APHA 23 RD Ed,2017: 4500 SO ₄ ²⁻ E	mg/l	200	400	30.2	28.7	31.6
16	Nitrate (as NO ₃)	By UV-Screen Method APHA 23 RD Ed,2017: 4500 NO ₃ ⁻ E	mg/l	45	No Relaxation	7.2	6.6	7.4
17	Fluoride (as F)	Distillation followed by Spectrophotometric Method APHA 23 RD Ed,2017: 4500F C	mg/l	1.0	1.5	0.16	0.14	0.18
18	Phenolic Compounds (as C ₆ H ₅ OH)	Chloroform Extraction by Colorimetric Method APHA 23 RD 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 RD Ed,2017: 3112 B	mg/l	0.001	No Relaxation	<0.002	<0.002	<0.002
20	Cadmium (as Cd)	AAS Method APHA 23 RD Ed,2017: 3111 B	mg/l	0.003	No Relaxation	<0.001	<0.001	<0.001



Ref : Envlab/20/R-4614

Date : 10.10.2020

21	Selenium (as Se)	By AAS Method APHA 23 RD 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 RD 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 RD 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 RD 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 RD 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 RD Ed,2017: 5540 C	mg/l	0.2	--	ND	ND	ND
27	Mineral Oil	Partition-Gravimetric Method APHA 23 RD Ed,2017: 5520 B	mg/l	0.5	No Relaxation	ND	ND	ND
28	Alkalinity	Titration Method APHA 23 RD Ed,2017:2320 B	mg/l	200	600	214.0	206.0	218.0
29	Aluminium as(Al)	AAS Method APHA 23 RD Ed,2017: 3111 D	mg/l	0.03	0.2	<0.001	<0.001	<0.001
30	Boron (as B)	Curcumin Method APHA 23 RD 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 RD Ed,2017 : 9221 b	MPN/ 100ml	Shall not be detectable in any 100ml sample	--	160.0	110.0	60.0

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, Cr⁶⁺<0.05 mg/l, Al<0.001 mg/l, B<0.01 mg/l, NO₃<0.01 mg/l)



Manda



Pooja Mohanty



Ref : Envlab/20/R-4615

Date : 10.10.2020

GROUND WATER QUALITY ANALYSIS REPORT- SEPTEMBER 2020

- 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 Sampling : 22.09.2020
- Date of Analysis : 23.09.2020 TO 29.09.2020
- 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
Essential Characteristics							
1	Colour	Visual Comparison Method APHA 23 RD Ed,2017 : 2120 B, C	Hazen	5	15	<5	<5
2	Odour	Threshold Odour Test APHA 23 RD Ed,2017 :2150 B	--	Agreeable	Agreeable	Agreeable	Agreeable
3	Taste	Flavor Threshold Test APHA 23 RD Ed,2017 : 2160 C	--	Agreeable	Agreeable	Agreeable	Agreeable
4	Turbidity	Nephelometric Method APHA 23 RD Ed,2017 :2130 B	NTU	1	5	10.2	8.6
5	pH Value	pH Meter APHA 23 RD Ed,2017 : 4500H ⁺ B	--	6.5-8.5	No Relaxation	6.86	6.78
6	Total Hardness (as CaCO ₃)	EDTA Titrimetric Method APHA 23 RD Ed,2017 : 2340 C	mg/l	200	600	190.0	182.0
7	Iron (as Fe)	By AAS Method APHA 23 RD Ed,2017 : 3111, B	mg/l	1.0	No Relaxation	0.41	0.32
8	Chloride (as Cl)	Argentometric Method APHA 23 RD Ed,2017 : 4500Cl B	mg/l	250	1000	34.0	30.0
9	Residual, free Chlorine	Iodometric Method APHA 23 RD Ed,2017 : 4500Cl, B	mg/l	0.2	1	ND	ND
Desirable Characteristics							
10	Dissolved Solids	Gravimetric Method APHA 23 RD Ed,2017 : 2540 C	mg/l	500	2000	312.0	306.0
11	Calcium (as Ca)	EDTA Titrimetric Method APHA 23 RD Ed,2017 : 3500Ca B	mg/l	75	200	56.0	54.0
12	Magnesium (as Mg)	Calculation Method APHA 23 RD Ed,2017 : 3500Mg B	mg/l	30	100	20.8	18.6
13	Copper (as Cu)	By AAS Method APHA 23 RD Ed,2017: 3111 B	mg/l	0.05	1.5	<0.05	<0.05
14	Manganese (as Mn)	Persulfate Method APHA 23 RD Ed,2017: 3500Mn B	mg/l	0.1	0.3	<0.05	<0.05
15	Sulphate (as SO ₄)	Turbidimetric Method APHA 23 RD Ed,2017: 4500 SO ₄ ²⁻ E	mg/l	200	400	31.8	30.2
16	Nitrate (as NO ₃)	By UV-Screen Method APHA 23 RD Ed,2017: 4500 NO ₃ ⁻ E	mg/l	45	No Relaxation	8.1	7.2
17	Fluoride (as F)	Distillation followed by Spectrophotometric Method APHA 23 RD Ed,2017: 4500F C	mg/l	1.0	1.5	0.18	0.15
18	Phenolic Compounds (as C ₆ H ₅ OH)	Chloroform Extraction by Colorimetric Method APHA 23 RD Ed,2017: 5530 B,D	mg/l	0.001	0.002	<0.001	<0.001
19	Mercury (as Hg)	AAS Method APHA 23 RD Ed,2017: 3112 B	mg/l	0.001	No Relaxation	<0.002	<0.002
20	Cadmium (as Cd)	AAS Method APHA 23 RD Ed,2017: 3111 B	mg/l	0.003	No Relaxation	<0.001	<0.001
21	Selenium (as Se)	By AAS Method APHA 23 RD Ed,2017: 3500 Se C	mg/l	0.01	No Relaxation	<0.01	<0.01



Ref : Envlab/20/R-4615

Date : 10.10.2020

22	Arsenic (as As)	By AAS Method APHA 23 RD 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 RD 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 RD Ed,2017: 3111 B	mg/l	0.01	No Relaxation	<0.01	<0.01
25	Zinc (as Zn)	By AAS Method APHA 23 RD Ed,2017: 3111 B	mg/l	5	15	<0.05	<0.05
26	Anionic Detergents (as MBAS)	Anionic Surfactants as MBAS APHA 23 RD Ed,2017: 5540 C	mg/l	0.2	--	ND	ND
27	Mineral Oil	Partition-Gravimetric Method APHA 23 RD Ed,2017: 5520 B	mg/l	0.5	No Relaxation	ND	ND
28	Alkalinity	Titration Method APHA 23 RD Ed,2017:2320 B	mg/l	200	600	210.0	184.0
29	Aluminium as(Al)	AAS Method APHA 23 RD Ed,2017: 3111 D	mg/l	0.03	0.2	<0.001	<0.001
30	Boron (as B)	Curcumin Method APHA 23 RD Ed,2017: 4500B, B	mg/l	0.5	2.4	<0.1	<0.1
31	Total Coliform as TC	MPN Method APHA 23 RD Ed,2017 : 9221 b	MPN/100ml	Shall not be detectable in any 100ml sample	--	120.0	110.0

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)



M. Panda



Puja Mohanty



Ref : Envlab/20/R-4618

Date : 10.10.2020

MEASUREMENT OF GROUND WATER QUALITY ANALYSIS REPORT SEPTEMBER 2020

1. Name of Client : M/s FERRO ALLOYS CORPORATION LIMITED , BHADRAK
2. Name of the Project : KALARANGIATTA CHROMITE MINES , KALIAPANI, JAJPUR
3. Sampling Location : **GW1:** Tube Well Near TISCO Main Gate
GW2: Tube Well inside the Lease hold Area
GW3: Open Well at Ransol Village
GW4: Tube Well at Kalarangiatta Village
GW5: Tube Well at Bhimta Nagar Village
4. Method of Sampling : **APHA 1060 B**
5. **Date of Sampling** : **22.09.2020**
6. Date of Analysis : **23.09.2020 TO 29.09.2020**
7. 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				
				Acceptable Limit	Permissible Limit	GW1	GW2	GW3	GW4	GW5
1	Hexavalent Chromium as Cr ⁶⁺	By AAS Method APHA 23 RD Ed,2017: 3500 Cr B	mg/l	--	--	BDL	BDL	BDL	BDL	BDL

Note :BDL Value : Cr⁶⁺ <0.05 mg/l.



M. Panda



Puja Mohanty



KALARANGIATTA CHROMITE MINES
FERRO ALLOYS CORPORATION LTD, BHADRAK

Environmental Monitoring Report

Annexure-4

EFFLUENT WATER QUALITY ANALYSIS REPORT



Ref : Envlab/20/R-4616

Date : 10.10.2020

EFFLUENT WATER DISCHARGE ANALYSIS REPORT- SEPTEMBER 2020

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** : **22.09.2020**
6. **Date of Analysis** : **23.09.2020 TO 29.09.2020**
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 rd Edition, 2017	Hazen	Colourless	05
2	Odour	Threshold Odour Method APHA 2150 B; 23 rd Edition, 2017	--	Odourless	pungent smell
3	pH at 25 ^o C	pH Meter APHA 4500 H ⁺ B; 23 rd Edition, 2017	--	5.5-9.0	8.2
4	Total Suspended Solids	Gravimetric Method APHA 2540 D; 23 rd Edition, 2017	mg/l	100	18.0
5	Copper as Cu	By AAS Method APHA 3111 B; 23 rd Edition, 2017	mg/l	3	<0.05
6	Fluoride as F	Distillation followed by Spectrophotometric Method APHA 4500 F C,D; 23 rd Edition, 2017	mg/l	2	0.26
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 rd Edition, 2017	mg/l	3	0.31
9	Manganese as Mn	By AAS Method APHA 3111 B; 23 rd Edition, 2017	mg/l	2	<0.05
10	Nitrate as NO ₃	By UV-Screen Method APHA 4500 NO ₃ B; 23 rd Edition, 2017	mg/l	10	7.26
11	Phenolic Compounds as C ₆ H ₅ OH	Distillation Followed by Spectrophotometric Method APHA 5530-B, D; 23 rd Edition, 2017	mg/l	1	<0.001
12	Selenium as Se	By AAS Method APHA 3500 Se C; 23 rd Edition, 2017	mg/l	0.05	<0.01
13	Cadmium as Cd	By AAS Method APHA 3111 B; 23 rd Edition, 2017	mg/l	2.0	<0.001
14	Cyanide as CN	Distillation Followed by Spectrophotometric Method APHA 4500 -CN-C,E; 23 rd Edition, 2017	mg/l	0.2	<0.05
15	Lead as Pb	By AAS Method APHA 3111 B; 23 rd Edition, 2017	mg/l	0.1	<0.01
16	Mercury as Hg	By AAS Method APHA 3112 B; 23 rd Edition, 2017	mg/l	0.01	<0.001
17	Nickel as Ni	By AAS Method APHA 3111 B; 23 rd Edition, 2017	mg/l	3	<0.05
18	Arsenic as As	By AAS Method APHA 3114 B; 23 rd Edition, 2017	mg/l	0.2	<0.05
19	Total Chromium as Cr	By AAS Method APHA 3111 B; 23 rd Edition, 2017	mg/l	2	0.24
20	Zinc as Zn	By AAS Method APHA 3111 B; 23 rd Edition, 2017	mg/l	5	0.018
21	Hexavalent Chromium as Cr ⁺⁶	By AAS Method APHA 3500 Cr B; 23 rd Edition, 2017	mg/l	0.1	<0.001
22	Vanadium as V	By AAS Method APHA 3500 V; 23 rd Edition, 2017	mg/l	0.2	<0.001



Ref : Envlab/20/R-4616

Date : 10.10.2020

23	Temperature	By Thermometer APHA 2550 B; 23 rd Edition, 2017	°C	Shall not exceed 5 th C above the receiving water temperature	30
24	Dissolved Oxygen	Modified Winkler Method APHA 4500 O. C; 23 rd Edition, 2017	mg/l	--	7.2
25	Biochemical Oxygen Demand as BOD	Oxygen Depletion Method IS 3025 (Part 44):2003	mg/l	30	6.1
26	Chemical Oxygen Demand as COD	Open Reflux Method APHA 5220 B; 23 rd Edition, 2017	mg/l	250	18.0
27	Oil & Grease	Gravimetric Method (Solvent Extraction) APHA 5520 B; 23 rd Edition, 2017	mg/l	10	4.6
28	Ammonical Nitrogen as N	By TKN Method APHA 4500-NH ₃ C; 23 rd Edition, 2017	mg/l	50	1.2
29	Total Kjeldahl Nitrogen as N	By TKN Method APHA 4500-N _{org} C; 23 rd Edition, 2017	mg/l	100	5.2
30	Sulphide as S	By Methylene Blue Method APHA 4500-S D; 23 rd Edition, 2017	mg/l	2	<0.001
31	Free Ammonia as NH ₃	By Calculation	mg/l	10	5.2
32	Particulate Size of Suspended Solids	Gravimetric Method APHA 2540 D; 23 rd 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	92% Survival of Fish after 96 Hrs in 100% Effluent



Manda



Puja Mohanty



Ref : Envlab/20/R-4617

Date : 10.10.2020

SURFACE WATER QUALITY ANALYSIS REPORT- SEPTEMBER 2020

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 : **22.09.2020**
6. Date of Analysis : **23.09.2020 TO 29.09.2020**
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 RD Ed,2017 : 2120 B, C	Hazen	300	<5	5
2	pH Value	pH Meter APHA 23 RD Ed,2017 : 4500H ⁺ B	--	6.0-9.0	7.4	7.2
3	Suspended solids	Gravimetric Method APHA 23 RD Ed,2017 : 2540 D	mg/l	--	42.0	80.0
4	Dissolved Oxygen (minimum)	Modified Winkler Method APHA 23 RD Ed,2017 : 2540 C	mg/l	4.0	7.4	7.1
5	Turbidity	Nephelometric Method APHA 23 RD Ed,2017: 2130 B	NTU	--	8.0	12.0
6	Chloride (max)	Titrimetric Method APHA 23 RD Ed,2017: 4500Cl ⁻ B	mg/l	600	7.0	8.0
7	Total Dissolved Solids	Gravimetric Method APHA 23 RD Ed,2017: 2540 C	mg/l	1500	90.0	110.0
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 RD Ed,2017: 3114 B	mg/l	0.2	BDL	BDL
10	Lead as Pb(max)	By AAS Method APHA 23 RD Ed,2017 3111 B	mg/l	0.1	BDL	BDL
11	Cadmium as Cd (max)	By AAS Method APHA 23 RD Ed,2017: 3111 B	mg/l	0.01	BDL	BDL
12	Hexa Chromium as Cr ⁺⁶	Diphenyl Carbazide Method APHA 23 RD Ed,2017: 3500Cr B	mg/l	0.05	BDL	BDL
13	Copper as Cu (max)	By AAS Method APHA 23 RD Ed,2017: 3111 B	mg/l	1.5	BDL	BDL
14	Zinc as Zn(max)	By AAS Method APHA 23 RD Ed,2017: 3111 B	mg/l	15	BDL	BDL
15	Selenium as Se (max)	By AAS Method APHA 23 RD Ed,2017: 3500 Se C	mg/l	0.05	BDL	BDL
16	Cyanide as CN (max)	Distillation followed by Spectrophotometric Method APHA 23 RD Ed,2017: 4500 CN ⁻ C,D	mg/l	0.05	ND	ND
17	Fluoride as F (max)	Distillation followed by Spectrophotometric Method APHA 23 RD Ed,2017: 4500F C	mg/l	1.5	0.12	0.16
18	Sulphates (SO ₄) (max)	Turbidimetric Method APHA 23 RD Ed,2017: 4500 SO ₄ ²⁻ E	mg/l	400	0.81	0.94



Ref : Envlab/20/R-4617

Date : 10.10.2020

19	Phenolic Compounds as C ₆ H ₅ OH (max)	Chloroform Extraction By Colorimetric Method APHA 23 RD Ed,2017: 5530 B,D	mg/l	0.005	BDL	BDL
20	Iron as Fe (max)	By AAS Method APHA 23 RD Ed,2017: 3500Fe, B	mg/l	0.5	0.64	0.058
21	Nitrate as NO ₃ (max)	By UV-Screen Method APHA 23 RD Ed,2017: 4500 NO ₃ E	mg/l	50	1.8	1.5
22	Anionic Detergents (max)	Anionic Surfactants as MBAS APHA 23 RD Ed,2017: 5540 C	mg/l	1.0	ND	ND
23	Total Coli form	By Multiple Tube Fermentation Technique APHA 23 RD Ed,2017: 9221 B	MPN/ 100 ml	5000	1220.0	1840.0



Reviewed By

M. Anand



Approved By

Puja Mishra



KALARANGIATTA CHROMITE MINES
FERRO ALLOYS CORPORATION LTD, BHADRAK

Environmental Monitoring Report

Annexure-5

DUSTFALL MEASUREMENT ANALYSIS REPORT



Ref : Envlab/20/R-4623

Date : 10.10.2020

DUSTFALL ANALYSIS REPORT- SEPTEMBER 2020

1. Name of Client : M/s FERRO ALLOYS CORPORATION LIMITED , BHADRAK
2. Name of the Project : KALARANGIATTA CHROMITE MINES , KALIAPANI, JAJPUR
3. Sampling Location : DF1- Near Roof Top of Office Building
4. Date of Sampling : 23.09.2020
5. Sample Collected by : VCSPL Representative in presence of Client's Representative

SL.No.	Parameters	Unit (mg of deposit per square meter per day)	Analysis Result
			DF1
1	Mercury as Hg	mg/m ² d	ND
2	Nickel as Ni	mg/m ² d	ND
3	Cobalt as CO	mg/m ² d	ND
4	Arsenic as As	mg/m ² d	ND



M. Panda



Puja Mohanty



Annexure-6

SOIL QUALITY ANALYSIS REPORT



Ref : Envlab/20/R-4619

Date : 10.10.2020

SOIL QUALITY ANALYSIS REPORT- SEPTEMBER 2020

1. Name of Client : M/s FERRO ALLOYS CORPORATION LIMITED , BHADRAK
2. Name of the Project : KALARANGIATTA CHROMITE MINES , KALIAPANI, JAJPUR
3. Sampling Location : S1 : Near Ore Plot Area
S2 : Near Truck Parking Area
S3 : Near Dump Area
S4 : Near Lease Hold Area
4. Date of Sampling : 22.09.2020
5. Date of Analysis : 23.09.2020 TO 29.09.2020
6. Sample Collected by : VCSPL Representative in presence of Client's Representative

Sl. No.	Name of the Parameters	Unit	Testing Method	Analysis Result			
				S1	S2	S3	S4
1	Mercury as Hg	mg/kg	EPA 3050B, 7000B Rev 02, 1996	ND	ND	ND	ND
2	Nickel as Ni	mg/kg	EPA 3050B, 7000B Rev 02, 1996	ND	ND	ND	ND
3	Cobalt as CO	mg/kg	EPA 3050B, 7000B Rev 02, 1996	ND	ND	ND	ND
4	Arsenic as As	mg/kg	EPA 3050B, 7000B Rev 02, 1996	ND	ND	ND	ND

BDL Value : Ni <50 mg/kg, CO < 10 mg/kg, As < 10 mg/kg, Hg <10 mg/kg



Reviewed By

M. Panda



Approved By

Puja Mohanty



KALARANGIATTA CHROMITE MINES
FERRO ALLOYS CORPORATION LTD, BHADRAK

Environmental Monitoring Report

Annexure-7

FUGITIVE EMISSION MONITORING REPORT



Visiontek Consultancy Services Pvt. Ltd.
Bhubaneswar.



Ref : Envlab/20/R-4622

Date : 10.10.2020

FUGITIVE EMISSION ANALYSIS REPORT- SEPTEMBER 2020

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 : 23.09.2020
6. Date of Analysis : 24.09.2020
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	$\mu\text{g}/\text{m}^3$	218.0	312.0



M. Mohan



Puja Mohanty



KALARANGIATTA CHROMITE MINES
FERRO ALLOYS CORPORATION LTD, BHADRAK

Environmental Monitoring Report

Annexure-8

GROUND WATER LEVEL MONITORING
REPORT



Ref : Envlab/20/R-4621

Date : 10.10.2020

GROUND WATER LEVEL REPORT- SEPTEMBER 2020

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 : 24.09.2020
4. Sample Collected by : VCSPL Representative in presence of Client's Representative

SL.No.	Locations	Unit	Analysis Result
1	Tube Well Water Near TISCO Main Gate	mt/bgl	7.5
2	Tube Well Inside the Lease Hold Area	mt/bgl	8.2
3	Open Well Water of Ransol	mt/bgl	8.4
4	Tube Well Water of Kalarangiatta	mt/bgl	8.6
5	Tube Well Water of Bhimtanagar	mt/bgl	8.1
6	Open Well Village Goramian	mt/bgl	7.8
7	Tube Well Near OMC Labour Colony	mt/bgl	8.4
8	Open Well at Village Chingudipal	mt/bgl	8.4
9	Open Well at Village Kusumundia	mt/bgl	7.2



Reviewed By

M. Panda



Approved By

Puja Mishra



KALARANGIATTA CHROMITE MINES
FERRO ALLOYS CORPORATION LTD, BHADRAK

Environmental Monitoring Report

Annexure-9

NOISE QUALITY MONITORING REPORT



Ref : Envlab/20/R-4620

Date : 10.10.2020

NOISE QUALITY ANALYSIS REPORT- SEPTEMBER 2020

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 : 22.09.2020
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		72.0	64.8
N2	Near Office Building		63.0	59.2

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



M. Panda



Puja Mohanty



Visiontek Consultancy Services Pvt. Ltd

(An Enviro Engineering Consulting Cell)

Plot No.-M22&M23, Chandaka Industrial Estate, Patia , Bhubaneswar-751024

Tel.: 0674-3511721

E-mail : visiontekin@gmail.com, visiontekin@yahoo.co.in, Visit us at : www.vcspl.org

Committed For Better Environment



ISO 9001:2015
ISO 14001:2015
ISO 45001:2018 (OH&S)
ISO/IEC 17025:2005

Regional Director



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

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

स्वच्छ सुरक्षित जल - सुन्दर खुशहाल कल

CONSERVE WATER - SAVE LIFE

- 00-330-1111A
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) 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

Gmail

FACOR OSTAPAL <facor.ostapal@gmail.com>

Your Renewal Application Submitted Successfully

1 message

no-reply-cgwa@gov.in <no-reply-cgwa@gov.in>
To: facor.ostapal@gmail.com

Fri, Jun 12, 2020 at 2:16 PM

Dear KALARANGIATTACHROMITEMINES ,

Your Application Submitted Successfully. Your Application Detail are :
Application Number :21-4/1457/OR/MIN/2017
Applied for Renewal of NOC Number :CGWA/NOC/MIN/ORIG/2018/3980
Applied For Renewal :1st
Name of Industry :KALARANGIATTA CHROMITE MINES OF M/S FACOR LTD.
Please note your application number for future reference.

This is system generated mail. Please do not reply.

**CALENDAR PLAN INCLUDING EXCAVATION, QUANTUM OF MINERAL CHROMITE AND WASTE
GENERATED DURING THE PERIOD 2020 – 21 (APRIL, 2020 TO SEPTEMBER, 2020) OF
KALARANGIATTA CHROMITE MINES**

SL. NO.	MATERIALS	CALENDAR PLAN PER ANNUM (2020-21)	QUANTITY GENERATED DURING THE PERIOD FROM (April, 2020 to September, 2020)
01.	CHROME ORE ROM (MT)	49931	15840
02.	WASTE OVER BURDEN (M ³)	146970	36163


Mines Manager
Kalarangiatta Chromite Mines
M/s. FACOR LTD.

DETAILS OF EXPENDITURE INCURRED ON ENVIRONMENTAL PROTECTION MEASURES DURING THE YEAR 2020-21 AND PROPOSED BUDGETED AMOUNT FOR THE YEAR 2020-21 OF KALARANGIATTA CHROMITE MINES

Sl. No.	ITEM	Proposed budgeted amount for the year 2020-21 (In Rs.)
1.	AFFORESTATION	
a)	Seedlings @ Rs. 70/- each	1,28,898.00
b)	Fertilizer/Insecticide/Cow dung @ Rs. 20/- each	36,800.00
c)	Digging of Pits/Planting, Labour cost @ Rs. 40/- each	73,359.00
d)	Post Plantation care @ Rs. 120/- (Watering, Weeding, Basin Making etc)	2,20,968.00
e)	Supervising & Watchman	
	Sub-Total	4,59,925.00
2.	WATER MANAGEMENT & TREATMENT	
a)	ETP Operation & Maintenance (including costs of chemical & Manpower)	20,19,820.00
b)	Power Consumption	2,13,551.00
c)	Sludge disposal	35,907.00
d)	Water sample analysis	40,559.00
	Sub-Total	23,09,837.00
3.	DUST SUPPRESSION & AIR MONITORING	
a)	Water spraying at dust generating points by water tanker	4,93,886.00
b)	Environmental Monitoring (Air & Noise monitoring charges) & analysis by M/s. Environmental Research and Services (India) Pvt. Ltd., Bhubaneswar.	1,92,280.00
	Sub-Total	6,86,166.00
	Grand Total	34,55,928.00


Mines Manager
Kalarangiatta Chromite Mines
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