

**KLCM/ENV/1268 /2023**

**Date: 29.09.2023**

To

The Member Secretary  
State Pollution Control Board, Odisha  
Paribesh Bhawan, Unit-VIII  
BHUBANESWAR – 751 012

Sub: Submission of Annual Environmental Statement in Form-V for the Year 2022-23 in respect of Kalarangiatta Chromite Mine M/s. FACOR Ltd.

Dear Sir,

With reference to the captioned subject, we are herewith submitting the Environmental Statement in the prescribed format Form-V, duly filled in, for the year 2022-23 in respect of Kalarangiatta Chromite Mines M/s. Ferro Alloys Corporation Limited for your kind perusal.

This is for your kind information & perusal please.

Thanking you,

Yours faithfully,  
for Ferro Alloys Corporation Ltd

  
29/9/23  
**Mines Manager**  
**Kalarangiatta Chromite Mines**

Enclosure: As above

Copy to :1) The Regional Officer, OSPCB, Kalinganagar – Jajpur  
2) The Joint Director, MoEF & CC Eastern Regional Office, Bhubaneswar

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

**Registered Office:**

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

T +91-6784 240320/240347, Email: [facor.mines@vedanta.co.in](mailto:facor.mines@vedanta.co.in) / [facor.ccp@vedanta.co.in](mailto:facor.ccp@vedanta.co.in)

Website: [www.facorgroup.in](http://www.facorgroup.in), CIN: U45201OR1955PLC008400.

Sensitivity: Internal (C3)

**FORM –V**

**ENVIRONMENTAL STATEMENT OF KALARANGIATTA CHROMITE MINES OF M/S.FACOR LTD.,  
ENVIRONMENT STATEMENT FOR THE FINANCIAL YEAR ENDING ON 31<sup>ST</sup> MARCH 2023**

**(PART –A)**

i)	Name & Address of the Owner/Occupier of the Industry operation or Process	M/s. FERRO ALLOYS CORPORATION LTD., D.P.Nagar, Randia Bhadrak
ii)	Industry Category Primary – (SIC Code) Secondary – (SIC Code)	CHROMITE MINING INDUSTRY
iii)	Production Capacity – Unit	50,000 TPA Chrome Ore from Mines
iv)	Year of Establishment	03.08.2009
v)	Date of last Environmental Statement submitted	29.09.2022 (For the Financial Year 2021-22)

**(PART – B)**

**WATER & RAW MATERIAL CONSUMPTION**

(i) Water Consumption M<sup>3</sup>/day:

A	<b>WATER CONSUMPTION: FY 2022-23</b>		
	<b>Water Consumption M3/day</b>	<b>Total In a Year (Cub Mt)</b>	<b>Avg Cub mt/Day</b>
	a) Process (Beneficiation plant)	NIL ( NO PROCESS PLANT IN KLCM)	NIL ( NO PROCESS PLANT IN KLCM)
	b) Cooling, dust suppression, afforestation, wheel washing etc	7424	20.33
	c) Domestic	1623	4.4
	<b>Total Consumption</b>	<b>9047</b>	<b>24.73</b>

B	<b>PROCESS WATER CONSUMPTION PER PRODUCT OUTPUT</b>		
	Name of the Products	During the Previous Financial Year 2021-22	During the Current Financial Year 2022-23
	A) Chrome ore from Mines (Cub Mt /MT )	0.33 M3/ MT (49985 MT of ore)	0.18 M3/MT ( 49759 MT of ore)

ii) Raw Material Consumption:

FACOR is involved in extraction of Chrome Ore from Mine /quarry .Mining is not a Manufacturing Process thus there are no such raw materials involved in the process. However, there are number of Indirect raw materials/Consumables used to support the process of Mining & beneficiation of Ore. The details consumable raw materials as follows:

Sl No.	Indirect Raw Materials /consumables	During 2022-23
	Name of the Raw materail/Consumable	
1	Disel (Kilo Liters)	308
2	LPG (Kg)	4560
3	Lubricant Oil (Litres)	2494
4	Grease (Kg)	312
5	Electricity (Consumed) (MWh)	643
6	Electricity (Generated) (MWh)	NIL
7	Explosive (Kg) (Detonator, Safety fuse)	NIL
8	Tyre Nos.	4

**(PART – C)**  
**POLLUTION DISCHARGED TO ENVIRONMENT/UNIT OF OUTPUT**  
**(PARAMETER AS SPECIFIED IN THE CONSENT ISSUED)**

a)	Water *	Annual Avg. in Kg/day	Annual Avg. in mg/l	Annual Avg. (%)
1	Suspended Solids	5.8	8.03	Below prescribed standard
2	Oil & Grease	4.32	6	-do-
3.	B.O.D	9	6.2	-do-
4.	C.O.D	36	34	-do-
5.	Hexavalent Chromium (Cr <sup>+6</sup> )	0.05	0.02	-do-
6.	Total Chromium (Cr)	0.48	0.2	-do-

b) AIR \*\* - Not applicable. since it is a Mining Industry.

NOTE \* All the analyzed parameters of Mines pumped out water are well within the prescribed limit except hexavalent Chromium, for which ETP has been commissioned. Analysis report of inlet and final discharge water (after treatment) is enclosed as **ANNEXURE – 1**.

\*\* Air quality analysis report of core & Buffer Zone is enclosed as **ANNEXURE – 2**

**(PART – D)**  
**HAZARDOUS WASTES**

AS SPECIFIED UNDER HAZARDOUS WASTES/MANAGEMENT & HANDLING RULES, 2008

Sl.No.	Hazardous Wastes	TOTAL QUANTITY (Kg.)	
		During the previous Financial Year 2021-22	During the Current Financial Year 2022-23
(a)	<u>FROM PROCESS:</u>		
I)	Filter & filter materials containing oil	26.5 Kg	22.7 Kg
II)	Used oil/waste oil from vehicles	219.5 Kg	1215 Kg
III)	Used Barrels	-	1 Nos (10kg)
(b)	From Pollution Control facilities (ETP Sludge)	23200 Kg	8670 Kg

**(PART – E)**  
**SOLID WASTES**

Sl.No.	PARTICULARS	TOTAL QUANTITY	
		During the previous Financial Year 2021-22	During the Current Financial Year 2022-23
(a)	<u>FROM PROCESS:</u>		
I)	Overburden	1.62 Lac M <sup>3</sup>	3.59 Lac M <sup>3</sup>
II)	Tailings	NIL	NIL
(b)	Qty. Recycled/or reutilized within the Unit Sold	NIL	NIL
(c)	Disposed – Overburden	1.62 Lac M <sup>3</sup>	3.59 Lac M <sup>3</sup>
	Disposed - Tailings	Nil	NIL

**(PART – F)**

Please specify the characteristics (in terms of composition and quantity) of Hazardous as well as Solid wastes and indicate disposal practice adopted for both these categories of wastes.

Sl.No.	Name of Hazardous/ Solid Wastes	Composition	Quantity	Disposal Practice
a) i)	<u>HAZARDOUS WASTES:</u> Filter & filter materials containing oil	-	0.102 Tons	Filter materials generated during repairing & maintenance of vehicles are being kept of in an impervious lined pit as per guideline
ii)	Used Oil/Waste oil	-	1.26 Tons	Used oil/waste oil from vehicles & transformers have been collected in barrels and kept under a covered shed to sell to a Regd. Authorized Dealer.
iii)	ETP Sludge		13.35 Tons	ETP sludge is being disposed of in impervious lined pit for onward disposed to authorized agency by SPCB.
iv)	Empty barrel		1 Nos (10 kg)	Used As Captive reuse as per guidelines inside the mines
b) i)	<u>SOLID WASTES:</u> Overburden	Laterite & weathered ultra-basic rock	3.59 Lac M <sup>3</sup>	The solid wastes are generated as overburden is dumped in specified area of non-mineralized zones. After terracing and benching, massive afforestation is being carried out over these dumps.

**(PART – G)**

**IMPACT OF THE POLLUTION ABATEMENT MEASURES TAKEN ON CONSERVATION OF NATURAL RESOURCES AND ON THE COST OF PRODUCTION**

- Fully utilization of Low Grade ore by Beneficiation, use of mine drainage water in beneficiation, recovery of tailing water & recirculation in beneficiation plant. Mine water discharge to outside after treatment.

**(PART – H)**

**ADDITIONAL MEASURES/INVESTMENT PROPOSAL FOR ENVIRONMENTAL PROTECTION INCLUDING ABATEMENT OF POLLUTION, PREVENTION OF POLLUTION**

- (a) Expense of Rs. 84.15 lakh during the year 2022-23 for environmental protection including abatement of pollution & prevention of pollution. **Annexure 3** has been attached showing expenses.
- (b) Action taken to monitor the Environmental Parameters Monitoring is being carried out for various Environmental parameters like air ,water , waste water & Noise Level on a regular level.

- (c) Effluent Quality Monitoring System (EQMS) has been installed inside the mines for continuous real time monitoring of ETP Inlet and Outlet Parameters like pH , TSS , Cr6+ .
- (d) One Sewage Treatment Plant (STP) of Capacity of 20 KLD has been installed inside mines for Treatment of Domestic Waste Water. Photo of it has been attached as **Annexure 4**
- (e) Effluent Treatment Plant (ETP) of capacity 400 m3/hr has been installed inside our mines for treatment of mine seepage water and to safely discharge the treated water outside the mine premises. It details has been attached as **Annexure 5**

**(PART – I)**

**ANY OTHER PARTICULARS FOR IMPROVING THE QUALITY OF THE ENVIRONMENT**

	Action taken for massive afforestation	Extensive plantation program has been done and shall be taken upon available spaces, on dumps, roads, and also surrounding areas. More than 2500 trees has been planted inside mines for better stability of dump and increase of green belt inside the mines.
	Measures taken to control of the fugitive emission at different places of Mines.	In order to suppress the air borne dust from the haulage roads and mine roads, there are arrangements for water spraying system through water tankers and spraying of water is being done in regular intervals in both inside and outside of mine premises
	Action taken for disposal of the excavated material not required for industrial purpose	The overburden waste which are not required for industrial purpose are dumped within the leasehold area at the earmarked site and terraced by forming benches and reclaimed with different plant species.
	Method adopted for controlling of dust pollution due to drilling	<ul style="list-style-type: none"> <li>• Wet drilling is being practiced with a jet of water which is continuously directed at the cutting edge to suppress dust generation.</li> <li>• The cutting tools are being regularly grinded to maintain its sharpness by cross checking against gauges.</li> <li>• Compressed air pressure is being adequately supplied to the cutting tools.</li> <li>• Drill cutting are being regularly cleaned</li> </ul>
	Action taken to remove Cr <sup>+6</sup> from Quarry pumped out water and surface runoff water.	An upgraded ETP is being operating to reduce Cr <sup>+6</sup> from Quarry pumped out water and surface runoff water by dosing FeSO <sub>4</sub> solution. Also we have installed the ETP capacity of 400 KL/Hr inside mines

## ANNEXURE 1 (ETP INLET AND OUTLET WATER ANALYSIS REPORT)



# Visiontek Consultancy Services Pvt. Ltd.

(Committed For Better Environment)

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Laboratory Services  
Environment Lab  
Food Lab  
Material Lab  
Soil Lab  
Mineral Lab  
&  
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● Infrastructure Engineering  
● Water Resource Management  
● Environmental & Social Study

● Surface & Sub-Surface Investigation  
● Quality Control & Project Management  
● Renewable Energy

● Agricultural Development  
● Information Technology  
● Public Health Engineering

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

Ref : Envlab/23-24/R-00739

Date : 08.04.2023

### EFFLUENT WATER DISCHARGE ANALYSIS REPORT-MAR 2023

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 INLET
4. Method of Sampling : APHA 1060 B
5. Date of Sampling : 11.03.2023
6. Date of Analysis : 13.03.2023 to 18.03.2023
7. Sample Collected by : VCSPL Representative in presence of Client's Representative

Sl. No.	Parameters	Testing Methods	Unit	Analysis Results
				EW-1
1	Colour	Visual Comparison Method APHA 2120 B; 23 <sup>rd</sup> Edition, 2017	Hazen	15
2	Odour	Threshold Odour Method APHA 2150 B; 23 <sup>rd</sup> Edition, 2017	--	pungent smell
3	pH at 25°C	pH Meter APHA 4500 H <sup>+</sup> B; 23 <sup>rd</sup> Edition, 2017	--	10.3
4	Total Suspended Solids	Gravimetric Method APHA 2540 D; 23 <sup>rd</sup> Edition, 2017	mg/l	76
5	Copper as Cu	By AAS Method APHA 3111 B; 23 <sup>rd</sup> Edition, 2017	mg/l	BDL
6	Fluoride as F	Distillation followed by Spectrophotometric Method APHA 4500 F-C.D; 23 <sup>rd</sup> Edition, 2017	mg/l	0.75
7	Total Residual Chlorine	Iodometric Method APHA 23RD Ed.2017 : 4500Cl, B	mg/l	ND
8	Iron as Fe	By AAS Method APHA 3111 B; 23 <sup>rd</sup> Edition, 2017	mg/l	1.66
9	Manganese as Mn	By AAS Method APHA 3111 B; 23 <sup>rd</sup> Edition, 2017	mg/l	BDL
10	Nitrate as NO <sub>3</sub>	By UV-Screen Method APHA 4500 NO <sub>3</sub> -B; 23 <sup>rd</sup> Edition, 2017	mg/l	16.3
11	Phenolic Compounds as C <sub>6</sub> H <sub>5</sub> OH	Distillation Followed by Spectrophotometric Method APHA 5530-B, D; 23 <sup>rd</sup> Edition, 2017	mg/l	BDL
12	Selenium as Se	By AAS Method APHA 3500 Se C; 23 <sup>rd</sup> Edition, 2017	mg/l	BDL
13	Cadmium as Cd	By AAS Method APHA 3111 B; 23 <sup>rd</sup> Edition, 2017	mg/l	BDL
14	Cyanide as CN	Distillation Followed by Spectrophotometric Method APHA 4500-CN-C.E; 23 <sup>rd</sup> Edition, 2017	mg/l	BDL
15	Lead as Pb	By AAS Method APHA 3111 B; 23 <sup>rd</sup> Edition, 2017	mg/l	BDL
16	Mercury as Hg	By AAS Method APHA 3112 B; 23 <sup>rd</sup> Edition, 2017	mg/l	BDL
17	Nickel as Ni	By AAS Method APHA 3111 B; 23 <sup>rd</sup> Edition, 2017	mg/l	BDL
18	Arsenic as As	By AAS Method APHA 3114 B; 23 <sup>rd</sup> Edition, 2017	mg/l	BDL
19	Total Chromium as Cr	By AAS Method APHA 3111 B; 23 <sup>rd</sup> Edition, 2017	mg/l	1.52
20	Zinc as Zn	By AAS Method APHA 3111 B; 23 <sup>rd</sup> Edition, 2017	mg/l	0.56
21	Hexavalent Chromium as Cr <sup>6+</sup>	By AAS Method APHA 3500 Cr B; 23 <sup>rd</sup> Edition, 2017	mg/l	0.80
22	Vanadium as V	By AAS Method APHA 3500 V; 23 <sup>rd</sup> Edition, 2017	mg/l	BDL
23	Temperature	By Thermometer APHA 2550 B; 23 <sup>rd</sup> Edition, 2017	°C	34

Plot No.- M-22 & 23, Chandaka Industrial Estate, Patia, Bhubaneswar, Khurda, Odisha-751024, India Tel.: 0674-3511721  
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### Laboratory Services

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- Agricultural Development
- Information Technology
- Public Health Engineering

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- Mineral/Sub-Soil Exploration
- Waste Management Services

23	Temperature	By Thermometer APHA 2550 B; 23 <sup>rd</sup> Edition, 2017	°C	Shall not exceed 5°C above the receiving water temperature	35
24	Biochemical Oxygen Demand as BOD	Oxygen Depletion Method IS 3025 (Part 44):2003	mg/l	30	6.2
25	Chemical Oxygen Demand as COD	Open Reflux Method APHA 5220 B; 23 <sup>rd</sup> Edition, 2017	mg/l	250	36
26	Oil & Grease	Gravimetric Method (Solvent Extraction) APHA 5520 B; 23 <sup>rd</sup> Edition, 2017	mg/l	10	6.0
27	Ammonical Nitrogen as N	By TKN Method APHA 4500-NH <sub>3</sub> C; 23rd Edition, 2017	mg/l	50	5.9
28	Total Kjeldahl Nitrogen as N	By TKN Method APHA 4500-N <sub>org</sub> C; 23rd Edition, 2017	mg/l	100	6.2
29	Sulphide as S	By Methylene Blue Method APHA 4500-S D; 23rd Edition, 2017	mg/l	2	BDL
30	Free Ammonia as NH <sub>3</sub>	By Calculation	mg/l	5	3.98
31	Dissolve Phosphate as PO <sub>4</sub>	APHA 23 <sup>rd</sup> Edition 4500 P D	mg/l	5	1.52
32	Particulate Size of Suspended Solids	Gravimetric Method APHA 2540 D; 23 <sup>rd</sup> Edition, 2017	μ	Shall pass 850 micron IS Sieve	<850
33	Bio-assay Test	Evaluating Acute Toxicity IS 6582 (P-2) 2008	%	90% survival of fish after 96 hours in 100% effluent	96% Survival of Fish after 96 Hrs in 100% Effluent

CL – Colorless, ND – Not detected.

BDL (Below detection limit) Values : (Cu<0.02 mg/l, Mn<0.025 mg/l, C<sub>6</sub>H<sub>5</sub>OH<0.05mg/l, Hg<0.004mg/l, Cd<0.01 mg/l, Se<0.001 mg/l, As<0.004 mg/l, Pb<0.02 mg/l, Zn<0.65 mg/l, Cr<sup>6+</sup><0.01 mg/l, Al<0.1 mg/l, B<0.1 mg/l, NO<sub>3</sub><1 mg/l)

*Fagmeh Nagesh*  
Reviewed By



*P. Patil*  
Approved By

Plot No.- M-22 & 23, Chandaka Industrial Estate, Patia, Bhubaneswar, Khurda, Odisha-751024, India Tel.: 0674-3511721  
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● Information Technology  
● Public Health Engineering

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● Mineral/Sub-Soil Exploration  
● Waste Management Services

Ref : Envlab/23-24/R-00738

Date : 08.04.2023

## EFFLUENT WATER DISCHARGE ANALYSIS REPORT- MAR 2023

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 : 11.03.2023
6. Date of Analysis : 13.03.2023 to 18.03.2023
7. Sample Collected by : VCSPL Representative in presence of Client's Representative

Sl. No.	Parameters	Testing Methods	Unit	Standards As Per CTO	Analysis Results EW-1
1	Colour	Visual Comparison Method APHA 2120 B; 23 <sup>rd</sup> Edition, 2017	Hazen	Colourless	<5
2	Odour	Threshold Odour Method APHA 2150 B; 23 <sup>rd</sup> Edition, 2017	--	Odourless	Agreeable
3	pH at 25°C	pH Meter APHA 4500 H <sup>+</sup> B; 23 <sup>rd</sup> Edition, 2017	--	5.5-9.0	8.64
4	Total Suspended Solids	Gravimetric Method APHA 2540 D; 23 <sup>rd</sup> Edition, 2017	mg/l	100	52
5	Copper as Cu	By AAS Method APHA 3111 B; 23 <sup>rd</sup> Edition, 2017	mg/l	3	BDL
6	Fluoride as F	Distillation followed by Spectrophotometric Method APHA 4500 F <sup>-</sup> C,D; 23 <sup>rd</sup> Edition, 2017	mg/l	2	0.41
7	Total Residual Chlorine	Iodometric Method APHA 23RD Ed.2017 : 4500Cl <sub>2</sub> B	mg/l	1	ND
8	Iron as Fe	By AAS Method APHA 3111 B; 23 <sup>rd</sup> Edition, 2017	mg/l	3	0.47
9	Manganese as Mn	By AAS Method APHA 3111 B; 23 <sup>rd</sup> Edition, 2017	mg/l	2	BDL
10	Nitrate as NO <sub>3</sub>	By UV-Screen Method APHA 4500 NO <sub>3</sub> <sup>-</sup> B; 23 <sup>rd</sup> Edition, 2017	mg/l	10	8.2
11	Phenolic Compounds as C <sub>6</sub> H <sub>5</sub> OH	Distillation Followed by Spectrophotometric Method APHA 5530-B, D; 23 <sup>rd</sup> Edition, 2017	mg/l	1	BDL
12	Selenium as Se	By AAS Method APHA 3500 Se C; 23 <sup>rd</sup> Edition, 2017	mg/l	0.05	BDL
13	Cadmium as Cd	By AAS Method APHA 3111 B; 23 <sup>rd</sup> Edition, 2017	mg/l	2.0	BDL
14	Cyanide as CN	Distillation Followed by Spectrophotometric Method APHA 4500 -CN-C,E; 23 <sup>rd</sup> Edition, 2017	mg/l	0.2	BDL
15	Lead as Pb	By AAS Method APHA 3111 B; 23 <sup>rd</sup> Edition, 2017	mg/l	0.1	BDL
16	Mercury as Hg	By AAS Method APHA 3112 B; 23 <sup>rd</sup> Edition, 2017	mg/l	0.01	BDL
17	Nickel as Ni	By AAS Method APHA 3111 B; 23 <sup>rd</sup> Edition, 2017	mg/l	3	BDL
18	Arsenic as As	By AAS Method APHA 3114 B; 23 <sup>rd</sup> Edition, 2017	mg/l	0.2	BDL
19	Total Chromium as Cr	By AAS Method APHA 3111 B; 23 <sup>rd</sup> Edition, 2017	mg/l	2	0.26
20	Zinc as Zn	By AAS Method APHA 3111 B; 23 <sup>rd</sup> Edition, 2017	mg/l	5	0.030
21	Hexavalent Chromium as Cr <sup>+6</sup>	By AAS Method APHA 3500 Cr B; 23 <sup>rd</sup> Edition, 2017	mg/l	0.05	BDL
22	Vanadium as V	By AAS Method APHA 3500 V; 23 <sup>rd</sup> Edition, 2017	mg/l	0.2	BDL

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### Laboratory Services

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

- Infrastructure Engineering
- Surface & Sub-Surface Investigation
- Agricultural Development
- Mine Planning & Design
- Water Resource Management
- Quality Control & Project Management
- Information Technology
- Mineral/Sub-Soil Exploration
- Environmental & Social Study
- Renewable Energy
- Public Health Engineering
- Waste Management Services

24	Dissolved Oxygen	Modified Winkler Method APHA 4500 O. C; 23 <sup>rd</sup> Edition, 2017	mg/l	6.2
25	Biochemical Oxygen Demand as BOD	Oxygen Depletion Method IS 3025 (Part 44):2003	mg/l	10.2
26	Chemical Oxygen Demand as COD	Open Reflux Method APHA 5220 B; 23 <sup>rd</sup> Edition, 2017	mg/l	292
27	Oil & Grease	Gravimetric Method (Solvent Extraction) APHA 5520 B; 23 <sup>rd</sup> Edition, 2017	mg/l	14.0
28	Ammonical Nitrogen as N	By TKN Method APHA 4500-NH <sub>3</sub> C; 23 <sup>rd</sup> Edition, 2017	mg/l	8.8
29	Total Kjeldahl Nitrogen as N	By TKN Method APHA 4500-N <sub>org</sub> C; 23 <sup>rd</sup> Edition, 2017	mg/l	13.1
30	Sulphide as S	By Methylene Blue Method APHA 4500-S D; 23 <sup>rd</sup> Edition, 2017	mg/l	BDL
31	Free Ammonia as NH <sub>3</sub>	By Calculation	mg/l	20.9
32	Dissolve Phosphate	APHA 23 <sup>rd</sup> Edition 4500 P D	mg/l	6.4
33	Particulate Size of Suspended Solids	Gravimetric Method APHA 2540 D; 23 <sup>rd</sup> Edition, 2017	μ	<850
34	Bio-assay Test	Evaluating Acute Toxicity IS 6582 (P-2) 2008	%	No Survival of Fish after 96 Hrs in 100% Effluent

CL – Colorless, ND – Not detected.

BDL (Below detection limit) Values : (Cu<0.02 mg/l, Mn<0.025 mg/l, Cd<0.01 mg/l, Se<0.001 mg/l, As<0.004 mg/l, Pb<0.02 mg/l, Zn<0.65 mg/l, Cr<6<0.01 mg/l, Al<0.1 mg/l, B<0.1 mg/l, NO<sub>3</sub><1 mg/l)

*Fogmal Nay*

Reviewed By



Approved By

*P. Patil*

Plot No.- M-22 & 23, Chandaka Industrial Estate, Patia, Bhubaneswar, Khurda, Odisha-751024, India Tel.: 0674-3511721

E-mail: visiontek@vcspl.org, visiontekin@gmail.com

Visit us at: www.vcspl.org

## ANNEXURE 2 (AIR QUALITY REPORTS CORE AND BUFFER ZONE)



# Visiontek Consultancy Services Pvt. Ltd.

(Committed For Better Environment)

Certified for : ISO 9001:2015, ISO 14001:2015, ISO 45001:2018 (OH&S), ISO/IEC 17025:2017

Accredited by : NABET-A Grade, MOEF & CC/CPCB & SPCB-A Grade

- Infrastructure Engineering
- Water Resource Management
- Environmental & Social Study

- Surface & Sub-Surface Investigation
- Quality Control & Project Management
- Renewable Energy

- Agricultural Development
- Information Technology
- Public Health Engineering

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

**Laboratory Services**

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

Ref : Envlab/23-24/R-00735

Date: 08.04.2023

### AMBIENT AIR QUALITY (BUFFER ZONE) MONITORING REPORT - MAR 2023

Name of Client : M/s FERRO ALLOYS CORPORATION LIMITED , BHADRAK  
 Name of the Project : KALARANGIATTA CHROMITE MINES , KALIAPANI, JAJPUR  
 Monitoring Instruments : RDS (APM 460 BL), FPS (APM 550) Envirotech, CO Monitor, VOC Sampler  
 Sample Collected by : VCSPL Representative in presence of Client's Representative

Monitoring Date	PM <sub>10</sub> (µg/m <sup>3</sup> )	PM <sub>2.5</sub> (µg/m <sup>3</sup> )	SO <sub>2</sub> (µg/m <sup>3</sup> )	NO <sub>x</sub> (µg/m <sup>3</sup> )	CO (mg/m <sup>3</sup> )	O <sub>3</sub> (µg/m <sup>3</sup> )	NH <sub>3</sub> (µg/m <sup>3</sup> )	C <sub>6</sub> H <sub>6</sub> (µg/m <sup>3</sup> )	Bap (ng/m <sup>3</sup> )	Pb (µg/m <sup>3</sup> )	Ni (ng/m <sup>3</sup> )	As (ng/m <sup>3</sup> )
<b>AAQMS-1: Near Village Bhimtanagar</b>												
18.03.2023	54.2	31.4	7.8	13.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
<b>AAQMS-2: Near Village Ransol</b>												
18.03.2023	51.2	29.7	7.2	13.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
<b>AAQMS-3: Near Kaliapani Township</b>												
18.03.2023	48.8	28.8	6.9	12.8	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
<b>AAQMS-4: Near Village Baragaji</b>												
18.03.2023	58.6	34.5	6.3	14.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
<b>AAQMS-5: Near Village Godisahi</b>												
18.03.2023	61.2	33.6	6.7	13.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

*Fajmali Nayak*  
Reviewed By



*P. Patil*  
Approved By

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# Visiontek Consultancy Services Pvt. Ltd.

(Committed For Better Environment)

Certified for : ISO 9001:2015, ISO 14001:2015, ISO 45001:2018 (OH&S), ISO/IEC 17025:2017  
Accredited by : NABET-A Grade, MOEF & CC/CPCB & SPCB-A Grade

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

- Infrastructure Engineering
- Surface & Sub-Surface Investigation
- Agricultural Development
- Mine Planning & Design
- Water Resource Management
- Quality Control & Project Management
- Information Technology
- Mineral/Sub-Soil Exploration
- Environmental & Social Study
- Renewable Energy
- Public Health Engineering
- Waste Management Services

Ref : Envlab/23-24/R-00734

Date : 08.04.2023

## AMBIENT AIR QUALITY (CORE ZONE) MONITORING REPORT- MAR 2023

Name of Client : M/s FERRO ALLOYS CORPORATION LIMITED , BHADRAK  
Name of the Project : KALARANGIATTA CHROMITE MINES , KALIAPANI, JAJPUR  
Monitoring Instruments : RDS (APM 460 BL), FPS (APM 550) Envirotech, CO Monitor, VOC Sampler  
Sample Collected by : VCSPL Representative in presence of Client's Representative

Monitoring Date	PM <sub>10</sub> (µg/m <sup>3</sup> )	PM <sub>2.5</sub> (µg/m <sup>3</sup> )	SO <sub>2</sub> (µg/m <sup>3</sup> )	NO <sub>x</sub> (µg/m <sup>3</sup> )	CO (mg/m <sup>3</sup> )	O <sub>3</sub> (µg/m <sup>3</sup> )	NH <sub>3</sub> (µg/m <sup>3</sup> )	C <sub>6</sub> H <sub>6</sub> (µg/m <sup>3</sup> )	Bap (ng/m <sup>3</sup> )	Pb (µg/m <sup>3</sup> )	Ni (ng/m <sup>3</sup> )	As (ng/m <sup>3</sup> )
<b>AAQMS-3: Near Electrical Substation</b>												
06.03.2023	71.6	42.9	8.7	20.1	0.66	BDL	BDL	BDL	BDL	BDL	BDL	BDL
11.03.2023	74.2	40.6	9.2	20.7	0.57	BDL	BDL	BDL	BDL	BDL	BDL	BDL
13.03.2023	70.9	41.4	9.4	18.6	0.59	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18.03.2023	67.5	37.8	8.1	15.9	0.48	BDL	BDL	BDL	BDL	BDL	BDL	BDL
20.03.2023	64.8	32.9	7.9	15.2	0.45	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Monthly Average	69.8	39.12	8.66	18.1	0.55	BDL	BDL	BDL	BDL	BDL	BDL	BDL
NAAQ Standard	100	60	80	80	4	100	400	5	01	01	20	06
Monitoring Date	PM <sub>10</sub> (µg/m <sup>3</sup> )	PM <sub>2.5</sub> (µg/m <sup>3</sup> )	SO <sub>2</sub> (µg/m <sup>3</sup> )	NO <sub>x</sub> (µg/m <sup>3</sup> )	CO (mg/m <sup>3</sup> )	O <sub>3</sub> (µg/m <sup>3</sup> )	NH <sub>3</sub> (µg/m <sup>3</sup> )	C <sub>6</sub> H <sub>6</sub> (µg/m <sup>3</sup> )	Bap (ng/m <sup>3</sup> )	Pb (µg/m <sup>3</sup> )	Ni (ng/m <sup>3</sup> )	As (ng/m <sup>3</sup> )
<b>AAQMS-4: View Point</b>												
06.03.2023	70.6	40.9	9.5	16.8	0.63	BDL	BDL	BDL	BDL	BDL	BDL	BDL
11.03.2023	73.5	40.6	8.8	16.2	0.59	BDL	BDL	BDL	BDL	BDL	BDL	BDL
13.03.2023	71.1	39.7	8.1	18.1	0.48	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18.03.2023	67.3	35.5	7.7	15.7	0.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL
20.03.2023	65.2	34.1	6.9	14.3	0.43	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Monthly Average	69.54	38.16	8.2	16.22	0.52	BDL	BDL	BDL	BDL	BDL	BDL	BDL
NAAQ Standard	100	60	80	80	4	100	400	5	01	01	20	06
Testing Method	Gravimetric	Gravimetric	Improved West and Geake method	Modified Jacob & Hochheiser (Na-Arsenite)	NDR Spectroscopy	Chemical Method	Indo Phenol Blue Method	Absorption & Desorption followed by GC	Solvent Extraction Followed by GC	AAS Method	AAS Method	AAS Method

BDL (Below Detection Limit) PM<sub>10</sub> <20 µg/m<sup>3</sup>, PM<sub>2.5</sub> <10 µg/m<sup>3</sup>, SO<sub>2</sub> <4 µg/m<sup>3</sup>, NO<sub>x</sub> <6 µg/m<sup>3</sup>, O<sub>3</sub> <4 µg/m<sup>3</sup>, NH<sub>3</sub> <20 µg/m<sup>3</sup>, C<sub>6</sub>H<sub>6</sub> <4 µg/m<sup>3</sup>, Bap <0.5 ng/m<sup>3</sup>, As <1 ng/m<sup>3</sup>, Ni <2.5 ng/m<sup>3</sup>, Pb <0.02 µg/m<sup>3</sup>

Reviewed By  
*Fogme*



Approved By  
*P. Patil*

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

Ref : Envlab/23-24/R-00733

Date : 08.04.2023

## AMBIENT AIR QUALITY (CORE ZONE) MONITORING REPORT- MAR 2023

Name of Client : M/s FERRO ALLOYS CORPORATION LIMITED , BHADRAK  
Name of the Project : KALARANGIATTA CHROMITE MINES , KALIAPANI, JAJPUR  
Monitoring Instruments: RDS (APM 460 BL), FPS (APM 550) Envirotech, CO Monitor, VOC Sampler  
Sample Collected by : VCSPL Representative in presence of Client's Representative

Monitoring Date	PM <sub>10</sub> (µg/m <sup>3</sup> )	PM <sub>2.5</sub> (µg/m <sup>3</sup> )	SO <sub>2</sub> (µg/m <sup>3</sup> )	NO <sub>x</sub> (µg/m <sup>3</sup> )	CO (mg/m <sup>3</sup> )	O <sub>3</sub> (µg/m <sup>3</sup> )	NH <sub>3</sub> (µg/m <sup>3</sup> )	C <sub>6</sub> H <sub>6</sub> (µg/m <sup>3</sup> )	Bap (ng/m <sup>3</sup> )	Pb (µg/m <sup>3</sup> )	Ni (ng/m <sup>3</sup> )	As (ng/m <sup>3</sup> )
	AAQMS-1: Near Office Building											
06.03.2023	53.7	30.6	7.9	16.4	0.55	BDL	BDL	BDL	BDL	BDL	BDL	BDL
11.03.2023	55.8	30.9	8.8	16.2	0.61	BDL	BDL	BDL	BDL	BDL	BDL	BDL
13.03.2023	54.9	33.6	8.3	17.1	0.57	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18.03.2023	52.7	27.8	8.1	15.4	0.45	BDL	BDL	BDL	BDL	BDL	BDL	BDL
20.03.2023	50.1	26.9	7.6	13.3	0.42	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Monthly Average	53.4	29.9	8.14	15.7	0.52	BDL	BDL	BDL	BDL	BDL	BDL	BDL
NAAQ Standard	100	60	80	80	4	100	400	5	01	01	20	06
Monitoring Date	PM <sub>10</sub> (µg/m <sup>3</sup> )	PM <sub>2.5</sub> (µg/m <sup>3</sup> )	SO <sub>2</sub> (µg/m <sup>3</sup> )	NO <sub>x</sub> (µg/m <sup>3</sup> )	CO (mg/m <sup>3</sup> )	O <sub>3</sub> (µg/m <sup>3</sup> )	NH <sub>3</sub> (µg/m <sup>3</sup> )	C <sub>6</sub> H <sub>6</sub> (µg/m <sup>3</sup> )	Bap (ng/m <sup>3</sup> )	Pb (µg/m <sup>3</sup> )	Ni (ng/m <sup>3</sup> )	As (ng/m <sup>3</sup> )
	AAQMS-2: Near ETP											
06.03.2023	56.9	30.9	8.2	17.6	0.55	BDL	BDL	BDL	BDL	BDL	BDL	BDL
11.03.2023	53.8	32.8	7.9	17.2	0.64	BDL	BDL	BDL	BDL	BDL	BDL	BDL
13.03.2023	51.5	34.1	7.3	18.3	0.59	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18.03.2023	49.8	30.6	6.9	15.9	0.52	BDL	BDL	BDL	BDL	BDL	BDL	BDL
20.03.2023	47.6	28.1	6.5	15.2	0.47	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Monthly Average	51.9	32.3	7.4	16.8	0.55	BDL	BDL	BDL	BDL	BDL	BDL	BDL
NAAQ Standard	100	60	80	80	4	100	400	5	01	01	20	06
Testing Method	Gravimetric	Gravimetric	Improved West and Geake method	Modified Jacob & Hochheiser (Na-Arsenite)	NDR Spectroscopy	Chemical Method	Indo Phenol Blue Method	Absorption & Desorption followed by GC	Solvent Extraction Followed by GC	AAS Method	AAS Method	AAS Method

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*Fogmal*  
Reviewed By



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**ANNEXURE 3 ( ENVIRONMENT MANAGEMENT EXPENSES FY 2022-23)**

<b>ENVIRONMENTAL MANAGEMENT EXPENSES FOR THE FY 2022-23 KALARANGIATTA CHROMITE MINE,M/s FACOR LTD</b>		
<b>Sl. No.</b>	<b>I T E M</b>	<b>Expenses for the year 2022-23 (in Rupees ₹)</b>
<b>1</b>	<b>AFFORESTATION FY 2022-23</b>	
I	Inside Mines 2520 Nos. planted for 2022-23	
a)	Seedlings	163,800
b)	Fertilizer/Insecticide/Cow -dung	63,000
c)	Digging of Pits/Planting (Laborcost)	98,700
d)	Post Plantation care(Watering, Weeding, basin making etc.)	338,400
e)	Supervising(2 no. of supervisor)	539,233
	<b>Sub-Total</b>	<b>1,203,133</b>
II.	Outside Mine for Community Plantation	
a)	2150 Nos.Fruit Bearing distributed & Planted	82,500
	<b>(A ) Total</b>	<b>1,285,633</b>
<b>2</b>	<b>WATER MANAGEMENT &amp; TREATMENT</b>	
a)	ETP Operation & Maintenance (including costs of chemical, AMC& Manpower)	2,440,423
b)	STP Installation & Operation	2,113,500
c)	Sludge disposal	69,998
d)	Water sample analysis	52,470
e)	Water Tax Payment	92,156
	<b>(B)Sub-Total</b>	<b>4,676,391</b>
<b>3</b>	<b>AIR MONITORING &amp; DUST SUPPRESSION</b>	
a)	Water spraying at dust generating points by water tanker 1038 No. trip	503,430
b)	Air monitoring charges	1,148,519
	<b>( C ) Sub-Total</b>	<b>1,651,949</b>
<b>4</b>	<b>NOISE MONITORING (D)</b>	<b>4,435</b>
<b>5</b>	<b>USED OIL ANALYSIS ( E )</b>	<b>1,172</b>
<b>6</b>	<b>SOILCONSERVATION &amp; MONITORING</b>	
a)	Soil Analysis	12,672
b)	Use of Geo Textile & Silpauline 3000 Sq. Mt : Geotextile used	276000
c)	Retaining wall 100 mtrs construction	296800
	<b>( F ) Sub-Total</b>	<b>585,472</b>
<b>7</b>	<b>Awareness programme Conducted</b>	
a)	MEMC Week celebration	50,000
b)	World Environment Day celebration	150,000
c)	Prevent Forest Fire	10,000
	<b>(G)Sub-Total</b>	<b>210,000</b>
	<b>Grand Total</b>	<b>8,415,052</b>
<b>Total Expenses is Eighty Four Lakh Fifteen Thousand Fifty Two only</b>		

**ANNEXURE 4 (SEWAGE TREATMENT PLANT OF CAPACITY 20 KLD)**



**Sewage Treatment Plant for treatment of Domestic Waste Water**

**ANNEXURE 5 (EFFLUENT TREATMENT PLANT OF CAPACITY 400M3/HR INSIDE MINES)**



**Effluent Treatment Plant for treatment of Mines Seepage Water**



