



Ref : Envlab/23-24/R-00559

Date : 08.04.2023

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

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

Monitoring Date	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NO _x (µg/m ³)	CO (mg/m ³)	NH ₃ (µg/m ³)	O ₃ (µg/m ³)	C ₆ H ₆ (µg/m ³)	Bap (ng/m ³)	Pb (µg/m ³)	Ni (ng/m ³)	As (ng/m ³)
AAQMS-1: Near Rest Shelter												
03.03.2023	47.3	30.1	14.5	18.1	1.21	21.4	7.6	BDL	BDL	BDL	BDL	BDL
07.03.2023	50.1	32.3	14.1	16.6	1.29	23.1	7.3	BDL	BDL	BDL	BDL	BDL
10.03.2023	54.2	28.9	14.8	17.4	1.31	20.6	6.9	BDL	BDL	BDL	BDL	BDL
14.03.2023	51.6	30.5	14.4	18.3	1.25	22.5	7.5	BDL	BDL	BDL	BDL	BDL
17.03.2023	52.2	31.2	13.7	18.1	1.15	24.1	7.8	BDL	BDL	BDL	BDL	BDL
21.03.2023	50.1	27.6	14.0	17.5	1.13	21.6	6.9	BDL	BDL	BDL	BDL	BDL
24.03.2023	45.6	25.5	13.2	17.2	1.09	20.5	6.5	BDL	BDL	BDL	BDL	BDL
28.03.2023	44.9	26.4	13.5	16.8	1.12	20.4	6.2	BDL	BDL	BDL	BDL	BDL
NAAQ Standard	100	60	80	80	4	400	100	5	01	01	20	06
Monitoring Date	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NO _x (µg/m ³)	CO (mg/m ³)	NH ₃ (µg/m ³)	O ₃ (µg/m ³)	C ₆ H ₆ (µg/m ³)	Bap (ng/m ³)	Pb (µg/m ³)	Ni (ng/m ³)	As (ng/m ³)
AAQMS-2: Near Weigh Bridge												
03.03.2023	63.3	35.7	13.8	8.4	1.21	23.4	7.3	BDL	BDL	BDL	BDL	BDL
07.03.2023	60.1	37.2	13.2	8.1	1.30	21.6	7.7	BDL	BDL	BDL	BDL	BDL
10.03.2023	64.2	36.6	12.8	8.5	1.34	22.4	7.3	BDL	BDL	BDL	BDL	BDL
14.03.2023	62.2	36.2	14.1	8.0	1.29	24.2	6.9	BDL	BDL	BDL	BDL	BDL
17.03.2023	65.1	34.2	14.5	7.8	1.25	23.7	7.4	BDL	BDL	BDL	BDL	BDL
21.03.2023	61.6	33.1	13.9	8.8	1.13	21.4	6.9	BDL	BDL	BDL	BDL	BDL
24.03.2023	59.7	31.6	12.5	7.1	1.17	20.9	6.5	BDL	BDL	BDL	BDL	BDL
28.03.2023	55.4	30.9	12.2	7.2	1.15	21.1	6.2	BDL	BDL	BDL	BDL	BDL
NAAQ Standard	100	60	80	80	4	400	100	5	01	01	20	06
Testing Method	Gravimetric	Gravimetric	Improved West and Geake method	Modified Jacob & Hochheiser (Na-Arsenite)	NDIR 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) PM₁₀ < 20 µg/m³, PM_{2.5} < 10 µg/m³, SO₂ < 4 µg/m³, NO₂ < 6 µg/m³, O₃ < 4 µg/m³, NH₃ < 20 µg/m³, C₆H₆ < 4 µg/m³, Bap < 0.5 ng/m³, As < 1 ng/m³, Ni < 2.5 ng/m³, Pb < 0.02 µg/m³

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- Waste Management Services

Ref : Envlab/23-24/R-00560

Date : 08.04.2023

AMBIENT AIR QUALITY (CORE ZONE) MONITORING REPORT- MAR2023

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

Monitoring Date	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NO _x (µg/m ³)	CO (mg/m ³)	NH ₃ (µg/m ³)	O ₃ (µg/m ³)	C ₆ H ₆ (µg/m ³)	Bap (ng/m ³)	Pb (µg/m ³)	Ni (ng/m ³)	As (ng/m ³)
AAQMS-3: Middle of the Open Cast Quarry												
03.03.2023	74.1	42.5	14.2	15.7	1.22	23.6	7.8	BDL	BDL	BDL	BDL	BDL
07.03.2023	70.6	44.1	14.5	15.1	1.31	22.4	8.2	BDL	BDL	BDL	BDL	BDL
10.03.2023	72.2	43.7	13.6	14.8	1.40	20.9	8.6	BDL	BDL	BDL	BDL	BDL
14.03.2023	75.1	40.1	14.6	15.8	1.36	21.7	7.2	BDL	BDL	BDL	BDL	BDL
17.03.2023	76.2	42.5	14.4	15.3	1.33	23.5	6.9	BDL	BDL	BDL	BDL	BDL
21.03.2023	70.4	39.5	13.3	13.9	1.21	21.1	7.0	BDL	BDL	BDL	BDL	BDL
24.03.2023	68.7	33.6	12.7	14.4	1.25	20.2	6.5	BDL	BDL	BDL	BDL	BDL
28.03.2023	69.3	35.4	12.8	12.6	1.19	20.4	6.2	BDL	BDL	BDL	BDL	BDL
NAAQ Standard	100	60	80	80	4	400	100	5	01	01	20	06
Monitoring Date	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NO _x (µg/m ³)	CO (mg/m ³)	NH ₃ (µg/m ³)	O ₃ (µg/m ³)	C ₆ H ₆ (µg/m ³)	Bap (ng/m ³)	Pb (µg/m ³)	Ni (ng/m ³)	As (ng/m ³)
AAQMS-4: Near COB Plant												
03.03.2023	68.8	48.2	15.2	15.3	1.27	24.1	7.1	BDL	BDL	BDL	BDL	BDL
07.03.2023	69.5	47.0	14.4	14.9	1.32	23.3	6.6	BDL	BDL	BDL	BDL	BDL
10.03.2023	70.1	46.9	13.9	15.6	1.36	25.2	7.5	BDL	BDL	BDL	BDL	BDL
14.03.2023	67.4	47.5	14.7	15.2	1.40	25.7	7.2	BDL	BDL	BDL	BDL	BDL
17.03.2023	65.5	46.6	15.3	14.1	1.22	24.9	6.9	BDL	BDL	BDL	BDL	BDL
21.03.2023	66.3	44.1	13.3	13.9	1.13	20.5	6.3	BDL	BDL	BDL	BDL	BDL
24.03.2023	62.8	40.5	14.2	13.3	1.06	21.2	6.5	BDL	BDL	BDL	BDL	BDL
28.03.2023	60.4	38.4	13.4	12.5	1.11	20.7	6.6	BDL	BDL	BDL	BDL	BDL
NAAQ Standard	100	60	80	80	4	400	100	5	01	01	20	06
Testing Method	Gravimetric	Gravimetric	Improved West and Geake method	Modified Jacob & Hochheiser (Na-Arsenite)	NDIR 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) PM₁₀ <20 µg/m³, PM_{2.5} <10 µg/m³, SO₂ <4 µg/m³, NO_x <6 µg/m³, O₃ <4 µg/m³, NH₃ <20 µg/m³, C₆H₆ <4 µg/m³, Bap <0.5 ng/m³, As < 1 ng/m³, Ni < 2.5 ng/m³, Pb <0.02 µg/m³

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&
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Ref : Envlab/23-24/R-00561

Date : 08.04.2023

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

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

Monitoring Date	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NO _x (µg/m ³)	CO (mg/m ³)	NH ₃ (µg/m ³)	O ₃ (µg/m ³)	C ₆ H ₆ (µg/m ³)	Bap (ng/m ³)	Pb (µg/m ³)	Ni (ng/m ³)	As (ng/m ³)
AAQMS-1: Near Village Ostia												
18.03.2023	65.2	37.5	8.6	14.2	0.52	BDL	6.5	BDL	BDL	BDL	BDL	BDL
AAQMS-2: Near Village Kaposi												
18.03.2023	57.1	36.2	8.2	15.1	0.68	BDL	6.4	BDL	BDL	BDL	BDL	BDL
AAQMS-3: Near Village Kaliapani Township												
18.03.2023	62.7	39.4	9.5	14.1	1.02	BDL	6.6	BDL	BDL	BDL	BDL	BDL
AAQMS-4: Near Village Ostapal												
18.03.2023	59.3	38.8	7.7	13.9	0.65	BDL	5.9	BDL	BDL	BDL	BDL	BDL

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Ref : Envlab/23-24/R-00562

Date: 08.04.2023

AMBIENT AIR QUALITY (BUFFER ZONE) MONITORING REPORT- MAR 23

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

Monit oring Date	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NO _x (µg/m ³)	CO (mg/m ³)	NH ₃ (µg/m ³)	O ₃ (µg/m ³)	C ₆ H ₆ (µg/m ³)	Bap (ng/m ³)	Pb (µg/m ³)	Ni (ng/m ³)	As (ng/m ³)
AAQMS-1: Near Village Ostia												
28.03.2023	64.7	34.7	8.5	13.9	0.55	BDL	6.4	BDL	BDL	BDL	BDL	BDL
AAQMS-2: Near Village Kaposi												
28.03.2023	55.8	33.2	8.2	13.5	0.68	BDL	6.0	BDL	BDL	BDL	BDL	BDL
AAQMS-3: Near Village Kaliapani Township												
28.03.2023	63.1	38.0	9.4	14.2	1.01	BDL	7.1	BDL	BDL	BDL	BDL	BDL
AAQMS-4: Near Village Ostapal												
28.03.2023	56.4	37.3	8.5	13.4	0.54	BDL	6.1	BDL	BDL	BDL	BDL	BDL

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Ref : Envlab/23-24/R-00563

Date: 08.04.2023

GROUND WATER QUALITY ANALYSIS REPORT- MAR 2023

1. Name of Client : M/s FERRO ALLOYS CORPORATION LIMITED , BHADRAK
2. Name of the Project : OSTAPAL CHROMITE MINES , KALIAPANI, JAJPUR
3. Sampling Location : GW1: Bore well Near Work Shop of the Mines
GW2: Bore Well Near Main Gate of OCM
GW3: Open Well Near Ostia Village
4. Method of Sampling: APHA 1060 B
5. Date of Sampling : 28.03.2023
6. Date of Analysis : 29.03.2023 TO 03.04.2023
7. Sample Collected by : VCSPL Representative in presence of Client's Representative

Sl. No.	Parameter	Unit	TEST METHOD	Standard as per IS -10500:2012 Amended on 2015 & 2018		GW1	GW2	GW3
				Acceptabl e Limit	Permissabl e Limit			
Physical Parameter								
1	Colour	Hazen,Max	APHA 23 rd Ed,2017 : 2120 B, C	5	15	<5	<5	<5
2	Odour	--	APHA 23 rd Ed,2017 :2120 B	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
3	pH at 25°C	--	APHA 23 Rd Ed,2017 : 4500H ⁺ B	6.5-8.5	6.5-8.5	6.72	6.91	6.80
3	Taste	--	APHA 23 rd Ed,2017 : 2160 C	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
4	Turbidity	NTU,Max	APHA 2130 B	1	5	0.4	0.5	0.4
5	Dissolved Solids	mg/l,Max	APHA 23 rd Ed,2017 : 2540 C	500	2000	280	321	269
CHEMICAL PARAMETER								
1	Aluminium as(Al)	mg/l,Max	APHA 3500Al B	0.03	0.2	BDL	BDL	BDL
2	Ammonical Nitrogen(NH ₃ .N)	mg/l,Max	APHA 4500 NH ₃ .C	0.5	0.5	BDL	BDL	BDL
3	Anionic Detergents (as MBAS)	mg/l,Max	APHA 5540 C	0.2	1.0	ND	ND	ND
4	Barium(Ba)	mg/l,Max	APFA 3111,B	0.7	0.7	BDL	BDL	BDL
5	Boron (as B)	mg/l,Max	APHA 4500 B,B	0.5	1.0	BDL	BDL	BDL
6	Calcium (as Ca)	mg/l,Max	APHA 23 rd Ed,2017 : 3500Ca B	75	200	42.9	45.3	47.9
7	Chloramines (as Cl ₂)	mg/l,Max	APHA 4500 –Cl G	4.0	4.0	ND	ND	ND
8	Chloride (as Cl)	mg/l,Max	APHA 23 rd Ed,2017 : 4500Cl ⁻ B	250	1000	50	57.5	45.0
9	Copper (as Cu)	mg/l,Max	APHA 3111 B,C	0.05	1.5	BDL	BDL	BDL
10	Fluoride (as F)	mg/l,Max	APHA 4500 F,C	1.0	1.5	0.15	0.18	0.22
11	Residual, free Chlorine	mg/l,Min	APHA 4500 Cl B	0.2	1.0	ND	ND	ND
12	Iron (as Fe)	mg/l,Max	APHA 23 rd Ed,2017 : 3111, B	0.3	0.3	0.27	0.22	0.25
13	Magnesium (as Mg)	mg/l,Max	APHA 3500 Mg B	30	100	18.4	18.7	18.0



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14	Manganese (as Mn)	mg/l,Max	APHA 3500Mn B	0.1	0.3	BDL	BDL	BDL
15	Mineral Oil	mg/l,Max	APHA 5520 B	0.5	0.5	BDL	BDL	BDL
16	Nitrate (as NO ₃)	mg/l,Max	APHA 4500 NO ₃ ⁻ E	45	45	8.4	7.9	6.8
17	Phenolic Compounds(as C ₆ H ₅ OH)	mg/l,Max	APHA 5530 B,D	0.001	0.002	BDL	BDL	BDL
18	Selenium (as Se)	mg/l,Max	APHA 23 rd Ed,2017: 3500 Se C	0.01	0.01	BDL	BDL	BDL
19	Silver(asAg)	mg/l,Max		0.1	0.1	BDL	BDL	BDL
20	Sulphate (as SO ₄)	mg/l,Max	APHA 4500 SO ₄ ²⁻ E	200	400	29.2	30.1	32.2
21	Sulphide (as H ₂ S)	mg/l,Max	0.05	0.05	0.05	ND	ND	ND
22	Alkalinity	mg/l,Max	APHA 2320 B	200	600	145	185	170
23	Total Hardness (as CaCO ₃)	mg/l,Max	APHA 23 rd Ed,2017 : 2340 C	200		183	190	194
24	Zinc (as Zn)	mg/l,Max	APHA 23 rd Ed,2017: 3111 B	5		1.3	2.0	2.1
Toxic Parameters								
1	Chromium (as Cr ⁺⁶)	mg/l,Max	APHA 3500Cr B	0.05	0.05	BDL	BDL	BDL
2	Cadmium as(Cd)	mg/l,Max	APHA 23 rd Ed,2017: 3111 B	0.003	0.003	BDL	BDL	BDL
3	Cyanide as (CN ⁻)	mg/l,Max	APHA 23 rd Ed,2017: 4500 CN ⁻ C,D	0.05	0.05	BDL	BDL	BDL
4	Lead as(Pb)	mg/l,Max	APHA 23 rd Ed,2017 3111 B	0.1	0.1	BDL	BDL	BDL
5	Mercury as (Hg)	mg/l,Max	APHA 23 rd Ed,2017: 3111 B	0.001	0.001	BDL	BDL	BDL
6	Nickel (Ni)	mg/l,Max	IS 5185 (Part-22)	0.02	0.02	BDL	BDL	BDL
7	Arsenic as (As)	mg/l,Max	APHA 23 rd Ed,2017: 3114 B	0.01	0.01	BDL	BDL	BDL
8	Polychlorinated biphenyls	mg/l,Max	APHA 23 rd Ed,2017 :6440 B	0.0005	0.0005	ND	ND	ND
9	Polyaromatic hydrocarbons (PAH)	mg/l,Max	APHA 23 rd Ed,2017 :6440 B	0.0001	0.0001	ND	ND	ND
10	Total Chromium	mg/l,Max	APHA 3500Cr B	0.05	0.05	BDL	BDL	BDL
11	Bromoform	mg/l,Max	APHA 6232	0.1	0.1	ND	ND	ND
12	Dibromochloromethane	mg/l,Max	APHA 6232	0.1	0.1	ND	ND	ND
13	Bromodichloromethane	mg/l,Max	APHA 6232	0.06	0.06	ND	ND	ND
14	Chloroform	mg/l,Max	APHA 6232	0.2	0.2	ND	ND	ND
15	Molybdenum (Mo)	mg/l,Max	IS 3025 (Part 2)	0.07	0.07	BDL	BDL	BDL
Bacteriological Parameter								
1	Total Coliform	MPN/100 ml	APHA 23 rd Ed,2017: 9221 B	Shall not be detectable in any 100 ml sample		ABSENT	ABSENT	ABSENT



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PESTICIDES							
1	Endosulfan à	µg/l,Max	APHA 23rd edition: 6630 C	0.4	<0.005	<0.005	<0.005
2	Endosulfan ß	µg/l,Max	APHA 23rd edition: 6630 C	0.4	<0.005	<0.005	<0.005
3	Endosulfan sulphate	µg/l,Max	APHA 23rd edition: 6630 C	0.4	<0.005	<0.005	<0.005
4	Alachlor	µg/l, Max	APHA 23rd edition: 6630 C	20	<0.01	<0.01	<0.01
5	Atrazine	µg/l, Max	APHA 23rd edition: 6630 C	2.0	<0.01	<0.01	<0.01
6	Aldrin	µg/l, Max	APHA 23rd edition: 6630 C	0.03	<0.01	<0.01	<0.01
8	Alpha HCH	µg/l, Max	APHA 23rd edition: 6630 C	0.01	<0.01	<0.01	<0.01
9	Beta HCH	µg/l, Max	APHA 23rd edition: 6630 C	0.04	<0.01	<0.01	<0.01
10	Delta HCH	µg/l, Max	APHA 23rd edition: 6630 C	0.04	<0.01	<0.01	<0.01
11	Butachlor	µg/l, Max	APHA 23rd edition: 6630 C	125.0	<0.01	<0.01	<0.01
12	Chloropyriphos	µg/l, Max	APHA 23rd edition: 6630 C	30.0	<0.01	<0.01	<0.01
13	2,4-Dichlorophenoxyacetic acid	µg/l, Max	APHA 23rd edition: 6630 C	30.0	<0.05	<0.05	<0.05
14	p p DDE	µg/l, Max	APHA 23rd edition: 6630 C	1.0	<0.05	<0.05	<0.05
15	p p DDD	µg/l, Max	APHA 23rd edition: 6630 C	1.0	<0.05	<0.05	<0.05
16	p p DDT	µg/l, Max	APHA 23rd edition: 6630 C	1.0	<0.05	<0.05	<0.05
17	o p DDE	µg/l, Max	APHA 23rd edition: 6630 C	1.0	<0.05	<0.05	<0.05
18	o p DDD	µg/l, Max	APHA 23rd edition: 6630 C	1.0	<0.05	<0.05	<0.05
19	o p DDT	µg/l, Max	APHA 23rd edition: 6630 C	1.0	<0.05	<0.05	<0.05
20	Ethion	µg/l, Max	APHA 23rd edition: 6630 C	3.0	<0.01	<0.01	<0.01
21	Lindane	µg/l, Max	APHA 23rd edition: 6630 C	2.0	<0.01	<0.01	<0.01
22	Isoproturon	µg/l, Max	APHA 23rd edition: 6630 C	9.0	<0.01	<0.01	<0.01
23	Malathion	µg/l, Max	APHA 23rd edition: 6630 C	190.0	<0.01	<0.01	<0.01
24	Methyl parathion	µg/l, Max	APHA 23rd edition: 6630 C	0.3	<0.01	<0.01	<0.01
25	Monocrotophos	µg/l, Max	APHA 23rd edition: 6630 C	1.0	<0.01	<0.01	<0.01
26	Phorate	µg/l, Max	APHA 23rd edition: 6630 C	2.0	<0.01	<0.01	<0.01

Reviewed by:



Approved By



P. Patra



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- Quality Control & Project Management
- Renewable Energy

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 Mineral Lab
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 Microbiology Lab

Ref : Envlab/23-24/R-00564

Date: 08.04.2023

GROUND WATER QUALITY ANALYSIS REPORT- MAR 2022

1. Name of Client : M/s FERRO ALLOYS CORPORATION LIMITED , BHADRAK
2. Name of the Project : OSTAPAL CHROMITE MINES , KALIAPANI, JAJPUR
3. Sampling Location : GW4: Open Well Near Ostapal Village
 GW5: Tube Well inside the Shiva Temple of Village Gurujanga
 GW6: Tube Well outside Shiva Temple of Village Gurujanga
4. Method of Sampling: APHA 1060 B
5. Date of Sampling : 28.03.2023
6. Date of Analysis : 29.03.2023 TO 03.04.2023
7. Sample Collected by : VCSPL Representative in presence of Client's Representative

Sl. No.	Parameter	Unit	TEST METHOD	Standard as per IS -10500:2012 Amended on 2015 & 2018		GW4	GW5	GW6
				Acceptabl e Limit	Permissabl e Limit			
Physical Parameter								
1	Colour	Hazen,Max	APHA 23 rd Ed,2017 : 2120 B, C	5	15	<5	<5	<5
2	Odour	--	APHA 23 rd Ed,2017 :2120 B	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
3	pH at 25°C	--	APHA 23 ^{Rnd} Ed,2017 : 4500H ⁺ B	6.5-8.5	6.5-8.5	7.22	7.30	7.25
3	Taste	--	APHA 23 rd Ed,2017 : 2160 C	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
4	Turbidity	NTU,Max	APHA 2130 B	1	5	0.6	0.7	0.5
5	Dissolved Solids	mg/l,Max	APHA 23 rd Ed,2017 : 2540 C	500	2000	198	143	119
CHEMICAL PARAMETER								
1	Aluminium as(Al)	mg/l,Max	APHA 3500Al B	0.03	0.2	BDL	BDL	BDL
2	Ammonical Nitrogen(NH ₃ .N)	mg/l,Max	APHA 4500 NH ₃ .C	0.5	0.5	BDL	BDL	BDL
3	Anionic Detergents (as MBAS)	mg/l,Max	APHA 5540 C	0.2	1.0	ND	ND	ND
4	Barium(Ba)	mg/l,Max	APFA 3111,B	0.7	0.7	BDL	BDL	BDL
5	Boron (as B)	mg/l,Max	APHA 4500 B,B	0.5	1.0	BDL	BDL	BDL
6	Calcium (as Ca)	mg/l,Max	APHA 23 rd Ed,2017 : 3500Ca B	75	200	32.3	32.1	20.7
7	Chloramines (as Cl ₂)	mg/l,Max	APHA 4500 –Cl G	4.0	4.0	ND	ND	ND
8	Chloride (as Cl)	mg/l,Max	APHA 23 rd Ed,2017 : 4500Cl ⁻ B	250	1000	45	60	55
9	Copper (as Cu)	mg/l,Max	APHA 3111 B,C	0.05	1.5	BDL	BDL	BDL
10	Fluoride (as F)	mg/l,Max	APHA 4500 F,C	1.0	1.5	0.012	0.021	0.018
11	Residual, free Chlorine	mg/l,Min	APHA 4500 Cl B	0.2	1.0	ND	ND	ND



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12	Iron (as Fe)	mg/l,Max	APHA 23 rd Ed,2017 : 3111, B	0.3	0.3	0.28	0.25	0.19
13	Magnesium (as Mg)	mg/l,Max	APHA 3500 Mg B	30	100	7.31	3.12	5.91
14	Manganese (as Mn)	mg/l,Max	APHA 3500Mn B	0.1	0.3	BDL	BDL	BDL
15	Mineral Oil	mg/l,Max	APHA 5520 B	0.5	0.5	BDL	BDL	BDL
16	Nitrate (as NO ₃)	mg/l,Max	APHA 4500 NO ₃ ⁻ E	45	45	1.44	0.82	0.75
17	Phenolic Compounds(as C ₆ H ₅ OH)	mg/l,Max	APHA 5530 B,D	0.001	0.002	BDL	BDL	BDL
18	Selenium (as Se)	mg/l,Max	APHA 23 rd Ed,2017: 3500 Se C	0.01	0.01	BDL	BDL	BDL
19	Silver(asAg)	mg/l,Max		0.1	0.1	BDL	BDL	BDL
20	Sulphate (as SO ₄)	mg/l,Max	APHA 4500 SO ₄ ²⁻ E	200	400	4.8	3.9	4.5
21	Sulphide (as H ₂ S)	mg/l,Max	0.05	0.05	0.05	ND	ND	ND
22	Alkalinity	mg/l,Max	APHA 2320 B	200	600	145	185	170
23	Total Hardness (as CaCO ₃)	mg/l,Max	APHA 23 rd Ed,2017 : 2340 C	200	600	111	93	76
24	Zinc (as Zn)	mg/l,Max	APHA 23 rd Ed,2017: 3111 B	5	15	2.4	2.0	2.1
Toxic Parameters								
1	Chromium (as Cr ⁺⁶)	mg/l,Max	APHA 3500Cr B	0.05	0.05	BDL	BDL	BDL
2	Cadmium as(Cd)	mg/l,Max	APHA 23 rd Ed,2017: 3111 B	0.003	0.003	BDL	BDL	BDL
3	Cyanide as (CN ⁻)	mg/l,Max	APHA 23 rd Ed,2017: 4500 CN ⁻ C,D	0.05	0.05	BDL	BDL	BDL
4	Lead as(Pb)	mg/l,Max	APHA 23 rd Ed,2017 3111 B	0.1	0.1	BDL	BDL	BDL
5	Mercury as (Hg)	mg/l,Max	APHA 23 rd Ed,2017: 3111 B	0.001	0.001	BDL	BDL	BDL
6	Nickel (Ni)	mg/l,Max	IS 5185 (Part-22)	0.02	0.02	BDL	BDL	BDL
7	Arsenic as (As)	mg/l,Max	APHA 23 rd Ed,2017: 3114 B	0.01	0.01	BDL	BDL	BDL
8	Polychlorinated biphenyls	mg/l,Max	APHA 23 rd Ed,2017 :6440 B	0.0005	0.0005	ND	ND	ND
9	Polyaromatic hydrocarbons (PAH)	mg/l,Max	APHA 23 rd Ed,2017 :6440 B	0.0001	0.0001	ND	ND	ND
10	Total Chromium	mg/l,Max	APHA 3500Cr B	0.05	0.05	BDL	BDL	BDL
11	Bromoform	mg/l,Max	APHA 6232	0.1	0.1	ND	ND	ND
12	Dibromochloromethane	mg/l,Max	APHA 6232	0.1	0.1	ND	ND	ND
13	Bromodichloromethane	mg/l,Max	APHA 6232	0.06	0.06	ND	ND	ND
14	Chloroform	mg/l,Max	APHA 6232	0.2	0.2	ND	ND	ND
15	Molybdenum (Mo)	mg/l,Max	IS 3025 (Part 2)	0.07	0.07	BDL	BDL	BDL
Bacteriological Parameter								
1	Total Coliform	MPN/100 ml	APHA 23 rd Ed,2017: 9221 B	Shall not be detectable in any 100 ml sample		ABSENT	ABSENT	ABSENT



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● Information Technology
● Public Health Engineering

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

PESTICIDES							
1	Endosulfan à	µg/l,Max	APHA 23rd edition: 6630 C	0.4	<0.005	<0.005	<0.005
2	Endosulfan ß	µg/l,Max	APHA 23rd edition: 6630 C	0.4	<0.005	<0.005	<0.005
3	Endosulfan sulphate	µg/l,Max	APHA 23rd edition: 6630 C	0.4	<0.005	<0.005	<0.005
4	Alachlor	µg/l, Max	APHA 23rd edition: 6630 C	20	<0.01	<0.01	<0.01
5	Atrazine	µg/l, Max	APHA 23rd edition: 6630 C	2.0	<0.01	<0.01	<0.01
6	Aldrin	µg/l, Max	APHA 23rd edition: 6630 C	0.03	<0.01	<0.01	<0.01
8	Alpha HCH	µg/l, Max	APHA 23rd edition: 6630 C	0.01	<0.01	<0.01	<0.01
9	Beta HCH	µg/l, Max	APHA 23rd edition: 6630 C	0.04	<0.01	<0.01	<0.01
10	Delta HCH	µg/l, Max	APHA 23rd edition: 6630 C	0.04	<0.01	<0.01	<0.01
11	Butachlor	µg/l, Max	APHA 23rd edition: 6630 C	125.0	<0.01	<0.01	<0.01
12	Chloropyriphos	µg/l, Max	APHA 23rd edition: 6630 C	30.0	<0.01	<0.01	<0.01
13	2,4-Dichlorophenoxyacetic acid	µg/l, Max	APHA 23rd edition: 6630 C	30.0	<0.05	<0.05	<0.05
14	p p DDE	µg/l, Max	APHA 23rd edition: 6630 C	1.0	<0.05	<0.05	<0.05
15	p p DDD	µg/l, Max	APHA 23rd edition: 6630 C	1.0	<0.05	<0.05	<0.05
16	p p DDT	µg/l, Max	APHA 23rd edition: 6630 C	1.0	<0.05	<0.05	<0.05
17	o p DDE	µg/l, Max	APHA 23rd edition: 6630 C	1.0	<0.05	<0.05	<0.05
18	o p DDD	µg/l, Max	APHA 23rd edition: 6630 C	1.0	<0.05	<0.05	<0.05
19	o p DDT	µg/l, Max	APHA 23rd edition: 6630 C	1.0	<0.05	<0.05	<0.05
20	Ethion	µg/l, Max	APHA 23rd edition: 6630 C	3.0	<0.01	<0.01	<0.01
21	Lindane	µg/l, Max	APHA 23rd edition: 6630 C	2.0	<0.01	<0.01	<0.01
22	Isoproturon	µg/l, Max	APHA 23rd edition: 6630 C	9.0	<0.01	<0.01	<0.01
23	Malathion	µg/l, Max	APHA 23rd edition: 6630 C	190.0	<0.01	<0.01	<0.01
24	Methyl parathion	µg/l, Max	APHA 23rd edition: 6630 C	0.3	<0.01	<0.01	<0.01
25	Monocrotophos	µg/l, Max	APHA 23rd edition: 6630 C	1.0	<0.01	<0.01	<0.01
26	Phorate	µg/l, Max	APHA 23rd edition: 6630 C	2.0	<0.01	<0.01	<0.01

Fagmalu
Nagar

Reviewed by:



Approved By

P. Patra



Ref : Envlab/23-24/R-00565

Date: 08.04.2023

GROUND WATER QUALITY ANALYSIS REPORT- MAR 2023

1. Name of Client : M/s FERRO ALLOYS CORPORATION LIMITED , BHADRAK
2. Name of the Project : OSTAPAL CHROMITE MINES , KALIAPANI, JAJPUR
3. Sampling Location : GW7: Eastern Side of the Quarry (PZ-1)
GW8: Southern Side of the Quarry (PZ-2)
GW9: Western Side of the Quarry (PZ-3)
4. Method of Sampling: APHA 1060 B
5. Date of Sampling : 28.03.2023
6. Date of Analysis : 29.03.2023 TO 03.04.2023
7. Sample Collected by : VCSPL Representative in presence of Client's Representative

Sl. No.	Parameter	Unit	TEST METHOD	Standard as per IS -10500:2012 Amended on 2015 & 2018		GW7	GW8	GW9
				Acceptabl e Limit	Permissabl e Limit			
Physical Parameter								
1	Colour	Hazen,Max	APHA 23 rd Ed,2017 : 2120 B, C	5	15	<5	<5	<5
2	Odour	--	APHA 23 rd Ed,2017 :2120 B	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
3	pH at 25°C	--	APHA 23 ^{Rnd} Ed,2017 : 4500H ⁺ B	6.5-8.5	6.5-8.5	7.22	7.39	7.36
3	Taste	--	APHA 23 rd Ed,2017 : 2160 C	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
4	Turbidity	NTU,Max	APHA 2130 B	1	5	0.4	0.6	0.8
5	Dissolved Solids	mg/l,Max	APHA 23 rd Ed,2017 : 2540 C	500	2000	231	180	167
CHEMICAL PARAMETER								
1	Aluminium as(Al)	mg/l,Max	APHA 3500Al B	0.03	0.2	BDL	BDL	BDL
2	Ammonical Nitrogen(NH ₃ .N)	mg/l,Max	APHA 4500 NH ₃ .C	0.5	0.5	BDL	BDL	BDL
3	Anionic Detergents (as MBAS)	mg/l,Max	APHA 5540 C	0.2	1.0	ND	ND	ND
4	Barium(Ba)	mg/l,Max	APFA 3111,B	0.7	0.7	BDL	BDL	BDL
5	Boron (as B)	mg/l,Max	APHA 4500 B,B	0.5	1.0	BDL	BDL	BDL
6	Calcium (as Ca)	mg/l,Max	APHA 23 rd Ed,2017 : 3500Ca B	75	200	30.4	29.7	28.6
7	Chloramines (as Cl ₂)	mg/l,Max	APHA 4500 –Cl G	4.0	4.0	ND	ND	ND
8	Chloride (as Cl)	mg/l,Max	APHA 23 rd Ed,2017 : 4500Cl ⁻ B	250	1000	45	50	42.5
9	Copper (as Cu)	mg/l,Max	APHA 3111 B,C	0.05	1.5	BDL	BDL	BDL
10	Fluoride (as F)	mg/l,Max	APHA 4500 F,C	1.0	1.5	0.016	0.010	0.018
11	Residual, free Chlorine	mg/l,Min	APHA 4500 Cl B	0.2	1.0	ND	ND	ND
12	Iron (as Fe)	mg/l,Max	APHA 23 rd Ed,2017 : 3111, B	0.3	0.3	0.26	0.22	0.18
13	Magnesium (as Mg)	mg/l,Max	APHA 3500 Mg B	30	100	12.7	9.2	5.7
14	Manganese (as Mn)	mg/l,Max	APHA 3500Mn B	0.1	0.3	BDL	BDL	BDL



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

15	Mineral Oil	mg/l,Max	APHA 5520 B	0.5	0.5	BDL	BDL	BDL
16	Nitrate (as NO ₃)	mg/l,Max	APHA 4500 NO ₃ ⁻ E	45	45	1.44	0.82	0.75
17	Phenolic Compounds(as C ₆ H ₅ OH)	mg/l,Max	APHA 5530 B,D	0.001	0.002	BDL	BDL	BDL
18	Selenium (as Se)	mg/l,Max	APHA 23 rd Ed,2017: 3500 Se C	0.01	0.01	BDL	BDL	BDL
19	Silver(asAg)	mg/l,Max		0.1	0.1	BDL	BDL	BDL
20	Sulphate (as SO ₄)	mg/l,Max	APHA 4500 SO ₄ ²⁻ E	200	400	4.8	3.9	4.5
21	Sulphide (as H ₂ S)	mg/l,Max	0.05	0.05	0.05	ND	ND	ND
22	Alkalinity	mg/l,Max	APHA 2320 B	200	600	65	50	55
23	Total Hardness (as CaCO ₃)	mg/l,Max	APHA 23 rd Ed,2017 : 2340 C	200	600	128	112	95
24	Zinc (as Zn)	mg/l,Max	APHA 23 rd Ed,2017: 3111 B	5	15	3.2	4.4	4.2

Toxic Parameters

1	Chromium (as Cr ⁺⁶)	mg/l,Max	APHA 3500Cr B	0.05	0.05	BDL	BDL	BDL
2	Cadmium as(Cd)	mg/l,Max	APHA 23 rd Ed,2017: 3111 B	0.003	0.003	BDL	BDL	BDL
3	Cyanide as (CN ⁻)	mg/l,Max	APHA 23 rd Ed,2017: 4500 CN ⁻ C,D	0.05	0.05	BDL	BDL	BDL
4	Lead as(Pb)	mg/l,Max	APHA 23 rd Ed,2017 3111 B	0.1	0.1	BDL	BDL	BDL
5	Mercury as (Hg)	mg/l,Max	APHA 23 rd Ed,2017: 3111 B	0.001	0.001	BDL	BDL	BDL
6	Nickel (Ni)	mg/l,Max	IS 5185 (Part-22)	0.02	0.02	BDL	BDL	BDL
7	Arsenic as (As)	mg/l,Max	APHA 23 rd Ed,2017: 3114 B	0.01	0.01	BDL	BDL	BDL
8	Polychlorinated biphenyls	mg/l,Max	APHA 23 rd Ed,2017 :6440 B	0.0005	0.0005	ND	ND	ND
9	Polyaromatic hydrocarbons (PAH)	mg/l,Max	APHA 23 rd Ed,2017 :6440 B	0.0001	0.0001	ND	ND	ND
10	Total Chromium	mg/l,Max	APHA 3500Cr B	0.05	0.05	BDL	BDL	BDL
11	Bromoform	mg/l,Max	APHA 6232	0.1	0.1	ND	ND	ND
12	Dibromochloromethane	mg/l,Max	APHA 6232	0.1	0.1	ND	ND	ND
13	Bromodichloromethane	mg/l,Max	APHA 6232	0.06	0.06	ND	ND	ND
14	Chloroform	mg/l,Max	APHA 6232	0.2	0.2	ND	ND	ND
15	Molybdenum (Mo)	mg/l,Max	IS 3025 (Part 2)	0.07	0.07	BDL	BDL	BDL

Bacteriological Parameter

1	Total Coliform	MPN/100 ml	APHA 23 rd Ed,2017: 9221 B	Shall not be detectable in any 100 ml sample	ABSENT	ABSENT	ABSENT
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● Waste Management Services

PESTICIDES							
1	Endosulfan à	µg/l,Max	APHA 23rd edition: 6630 C	0.4	<0.005	<0.005	<0.005
2	Endosulfan ß	µg/l,Max	APHA 23rd edition: 6630 C	0.4	<0.005	<0.005	<0.005
3	Endosulfan sulphate	µg/l,Max	APHA 23rd edition: 6630 C	0.4	<0.005	<0.005	<0.005
4	Alachlor	µg/l, Max	APHA 23rd edition: 6630 C	20	<0.01	<0.01	<0.01
5	Atrazine	µg/l, Max	APHA 23rd edition: 6630 C	2.0	<0.01	<0.01	<0.01
6	Aldrin	µg/l, Max	APHA 23rd edition: 6630 C	0.03	<0.01	<0.01	<0.01
8	Alpha HCH	µg/l, Max	APHA 23rd edition: 6630 C	0.01	<0.01	<0.01	<0.01
9	Beta HCH	µg/l, Max	APHA 23rd edition: 6630 C	0.04	<0.01	<0.01	<0.01
10	Delta HCH	µg/l, Max	APHA 23rd edition: 6630 C	0.04	<0.01	<0.01	<0.01
11	Butachlor	µg/l, Max	APHA 23rd edition: 6630 C	125.0	<0.01	<0.01	<0.01
12	Chloropyriphos	µg/l, Max	APHA 23rd edition: 6630 C	30.0	<0.01	<0.01	<0.01
13	2,4-Dichlorophenoxyacetic acid	µg/l, Max	APHA 23rd edition: 6630 C	30.0	<0.05	<0.05	<0.05
14	p p DDE	µg/l, Max	APHA 23rd edition: 6630 C	1.0	<0.05	<0.05	<0.05
15	p p DDD	µg/l, Max	APHA 23rd edition: 6630 C	1.0	<0.05	<0.05	<0.05
16	p p DDT	µg/l, Max	APHA 23rd edition: 6630 C	1.0	<0.05	<0.05	<0.05
17	o p DDE	µg/l, Max	APHA 23rd edition: 6630 C	1.0	<0.05	<0.05	<0.05
18	o p DDD	µg/l, Max	APHA 23rd edition: 6630 C	1.0	<0.05	<0.05	<0.05
19	o p DDT	µg/l, Max	APHA 23rd edition: 6630 C	1.0	<0.05	<0.05	<0.05
20	Ethion	µg/l, Max	APHA 23rd edition: 6630 C	3.0	<0.01	<0.01	<0.01
21	Lindane	µg/l, Max	APHA 23rd edition: 6630 C	2.0	<0.01	<0.01	<0.01
22	Isoproturon	µg/l, Max	APHA 23rd edition: 6630 C	9.0	<0.01	<0.01	<0.01
23	Malathion	µg/l, Max	APHA 23rd edition: 6630 C	190.0	<0.01	<0.01	<0.01
24	Methyl parathion	µg/l, Max	APHA 23rd edition: 6630 C	0.3	<0.01	<0.01	<0.01
25	Monocrotophos	µg/l, Max	APHA 23rd edition: 6630 C	1.0	<0.01	<0.01	<0.01
26	Phorate	µg/l, Max	APHA 23rd edition: 6630 C	2.0	<0.01	<0.01	<0.01

Fagmali Naga

Reviewed by:



Approved By

P. Patil



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&
Microbiology Lab

Ref : Envlab/23-24/R-00566

Date : 08.04.2023

EFFLUENT WATER ANALYSIS REPORT MAR 2022

1. Name of the Client : M/s FERRO ALLOYS CORPORATION LIMITED , BHADRAK
2. Name of the Project : OSTAPAL CHROMITE MINES , KALIAPANI, JAJPUR
3. Sampling Location : WW-1: 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 representative

Sl No	Test Parameter	Test Method	Unit	WW-1
1	Color	Visual Comparison Method APHA 23 RD Ed,2017 : 2120 B, C	Hazen	10
2	Odour	Threshold Odour Test APHA 23 RD Ed,2017 :2150 B		Pungent Smell
3	pH at 25°C	pH Meter APHA 23 RD Ed,2017 : 4500H+ B	--	9.8
4	Total Suspended Solids (as TSS)	Gravimetric Method APHA 23 RD Ed,2017 : 2540 D	mg/l	59
5	Copper (as Cu)	By AAS Method APHA 23 RD Ed,2017 3111 B	mg/l	BDL
6	Fluoride (as F)	Distillation followed by Spectrophotometric Method APHA 23 RD Ed,2017: 4500F- C	mg/l	0.53
7	Total Residual Chloride	Iodometric Method APHA 23 RD Ed,2017 : 4500CL, B	mg/l	0.22
8	Iron (as Fe)	By AAS Method APHA 23 RD Ed,2017 : 3111, B	mg/l	1.70
9	Manganese (as Mn)	Persulfate Method APHA 23 RD Ed,2017: 3500Mn B	mg/l	BDL
10	Nitrate Nitrogen (as NO ₃)	By UV-Screen Method APHA 23 RD Ed,2017: 4500 NO ₃ ⁻ E	mg/l	13.4
11	Phenolic Compound (as C ₆ H ₅ OH)	Chloroform Extraction by Colorimetric Method APHA 23 RD Ed,2017: 5530 B,D	mg/l	BDL
12	Selenium (as Se)	By AAS Method APHA 23 RD Ed,2017: 3500 Se C	mg/l	BDL
13	Cadmium (as Cd)	AAS Method APHA 23 RD Ed,2017: 3111 B	mg/l	BDL
14	Cyanide (as CN)	Distillation followed by Spectrophotometric Method APHA 23 RD Ed,2017: 4500 CN- C,D	mg/l	BDL
15	Lead (as Pb)	By AAS Method APHA 23 RD Ed,2017 3111 B	mg/l	BDL
16	Mercury (as Hg)	AAS Method APHA 23 RD Ed,2017: 3112 B	mg/l	BDL
17	Nickel (as Ni)	By AAS Method APHA 23 RD Ed,2017 3111 B	mg/l	BDL
18	Arsenic (as As)	By AAS Method APHA 23 RD Ed,2017: 3114 B	mg/l	BDL
19	Total Chromium (as Cr)	By AAS Method APHA 23 RD Ed,2017 3111 B	mg/l	1.42
20	Zinc (as Zn)	By AAS Method APHA 23 RD Ed,2017 3111 B	mg/l	0.43
21	Hexavalent Chromium (as Cr ⁺⁶)	Diphenyl Carbazide Method APHA 23 RD Ed,2017: 3500Cr B	mg/l	0.68



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22	Vanadium (as V)	By AAS Method APHA 23 RD Ed,2017 3111 D	mg/l	BDL
23	Temperature	By Thermometer APHA 23 RD Ed,2017 2550 B	°C	34
24	Dissolved Oxygen	Modified Winkler Method APHA 23 RD Ed,2017: 4500 O, C	mg/l	5.7
25	Biochemical Oxygen Demand as BOD(3days at 27° C)	IS 3025(P-44) : 1993 RA 2003	mg/l	13.2
26	Chemical Oxygen Demand (as COD)	Open Reflux Method APHA 23 RD Ed,2017: 5220 C	mg/l	244
27	Oil & Grease (as O & G)	Gravimetric Method (Solvent Extraction) APHA 23 RD Ed,2017:5520-B	mg/l	16.0
28	Ammonical Nitrogen (as NH ₃ -N)	TKN Instrument (Distillation) followed by Titrimetric Method APHA 23 RD Ed,2017 : 4500NH ₃ C	mg/l	8.2
29	Total Kjeldahl Nitrogen (as N)	TKN Instrument (Digestion) APHA 23 RD Ed,2017: 4500 N _{ORG} C	mg/l	13.4
30	Sulphide (as S)	Iodometric Method APHA 23 RD Ed,2017 : 4500 S ²⁻	mg/l	BDL
31	Free Ammonia (as NH ₃)	By Calculation	mg/l	18.7
32	Dissolve Phosphate	APHA 23 rd Edition 4500 P D	mg/l	10.3
33	Particulate Size of Suspended Solids	Gravimetric Method APHA 23 RD Ed,2017 : 2540 D	μ	<850
34	Bio- assay Test	IS 6582 (Part 2) 2001, Ed.2.1(2002-12)	%	No fish Survived after 96 hours in 100% effluent

CL – Colorless, ND – Not detected.

BDL (Below detection limit) Values : (Cu<0.02 mg/l, Mn<0.025 mg/l, C₆H₅OH<0.05 mg/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<0.03 mg/l, Cr⁺⁶<0.01 mg/l, Al<0.1 mg/l, B<0.1 mg/l, NO₃1 mg/l)

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Ref: Envlab/23-24/R-00567

Date : 08.04.2023

EFFLUENT WATER DISCHARGE ANALYSIS REPORT MAR 2023

1. Name of the Client : **M/s FERRO ALLOYS CORPORATION LIMITED, BHADRAK**
2. Name of the Project : **OSTAPAL CHROMITE MINES , KALIAPANI, JAJPUR**
3. Sampling Location : **WW-1: 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 representative**

Sl. No.	Parameters	Testing Methods	Unit	Standards As Per CTO	Analysis Results
					EW-1
1	Colour	Visual Comparison Method APHA 2120 B; 23 rd Edition, 2017	Hazen	Colourless	>5
2	Odour	Threshold Odour Method APHA 2150 B; 23 rd Edition, 2017	--	Odourless	Agreeable
3	pH at 25°C	pH Meter APHA 4500 H ⁺ B; 23 rd Edition, 2017	--	5.5-9.0	7.68
4	Total Suspended Solids	Gravimetric Method APHA 2540 D; 23 rd Edition, 2017	mg/l	100	40
5	Copper as Cu	By AAS Method APHA 3111 B; 23 rd Edition, 2017	mg/l	3	BDL
6	Fluoride as F	Distillation followed by Spectrophotometric Method APHA 4500 F ⁻ C,D; 23 rd Edition, 2017	mg/l	2	0.35
7	Total Residual Chlorine	Iodometric Method APHA 23RD Ed, 2017 : 4500Cl ₂ B	mg/l	1	ND
8	Iron as Fe	By AAS Method APHA 3111 B; 23 rd Edition, 2017	mg/l	3	0.44
9	Manganese as Mn	By AAS Method APHA 3111 B; 23 rd Edition, 2017	mg/l	2	BDL
10	Nitrate as NO ₃	By UV-Screen Method APHA 4500 NO ₃ ⁻ B; 23 rd Edition, 2017	mg/l	10	7.05
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	BDL
12	Selenium as Se	By AAS Method APHA 3500 Se C; 23 rd Edition, 2017	mg/l	0.05	BDL
13	Cadmium as Cd	By AAS Method APHA 3111 B; 23 rd Edition, 2017	mg/l	2.0	BDL
14	Cyanide as CN	Distillation Followed by Spectrophotometric Method APHA 4500 -CN-C,E; 23 rd Edition, 2017	mg/l	0.2	BDL
15	Lead as Pb	By AAS Method APHA 3111 B; 23 rd Edition, 2017	mg/l	0.1	BDL
16	Mercury as Hg	By AAS Method APHA 3112 B; 23 rd Edition, 2017	mg/l	0.01	BDL
17	Nickel as Ni	By AAS Method APHA 3111 B; 23 rd Edition, 2017	mg/l	3	BDL
18	Arsenic as As	By AAS Method APHA 3114 B; 23 rd Edition, 2017	mg/l	0.2	BDL
19	Total Chromium as Cr	By AAS Method APHA 3111 B; 23 rd Edition, 2017	mg/l	2	0.21
20	Zinc as Zn	By AAS Method APHA 3111 B; 23 rd Edition, 2017	mg/l	5	0.027
21	Hexavalent Chromium as Cr ⁺⁶	By AAS Method APHA 3500 Cr B; 23 rd Edition, 2017	mg/l	0.05	BDL



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22	Vanadium as V	By AAS Method APHA 3500 V; 23 rd Edition, 2017	mg/l	0.2	BDL
23	Temperature	By Thermometer APHA 2550 B; 23 rd Edition, 2017	°C	Shall not exceed 5°C above the receiving water temperature	33
24	Biochemical Oxygen Demand as BOD	Oxygen Depletion Method IS 3025 (Part 44):2003	mg/l	30	4.6
25	Chemical Oxygen Demand as COD	Open Reflux Method APHA 5220 B; 23 rd Edition, 2017	mg/l	250	34
26	Oil & Grease	Gravimetric Method (Solvent Extraction) APHA 5520 B; 23 rd Edition, 2017	mg/l	10	8.0
27	Ammonical Nitrogen as N	By TKN Method APHA 4500-NH ₃ C; 23 rd Edition, 2017	mg/l	50	4.7
28	Total Kjeldahl Nitrogen as N	By TKN Method APHA 4500-N _{org} C; 23 rd Edition, 2017	mg/l	100	5.1
29	Sulphide as S	By Methylene Blue Method APHA 4500-S D; 23 rd Edition, 2017	mg/l	2	BDL
30	Free Ammonia as NH ₃	By Calculation	mg/l	5	0.44
31	Dissolve Phosphate as PO ₄	APHA 23rd Edition 4500 P D	mg/l	5	1.6
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	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, C₆H₅OH<0.05 mg/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<0.03 mg/l, Cr⁺⁶<0.01 mg/l, Al<0.1 mg/l, B<0.1 mg/l, NO₃1 mg/l)

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Ref : Envlab/23-24/R-00568

Date : 08.04.2023

SOIL QUALITY ANALYSIS REPORT- MAR 2023

1. Name of Client : M/s FERRO ALLOYS CORPORATION LIMITED , BHADRAK
2. Name of the Project : OSTAPAL CHROMITE MINES , KALIAPANI, JAJPUR
3. Sampling Location : S1 : East Side Quarry
S2 : West Side Quarry
S3 : North Side Quarry
S4 : South Side Quarry
4. Date of Sampling : 28.03.2023
5. Date of Analysis : 29.03.2023 to 03.03.2023
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

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Ref : Envlab/23-24/R-00569

Date : 08.04.2023

NOISE QUALITY ANALYSIS REPORT- MAR 2023

1. Name of Client : M/s FERRO ALLOYS CORPORATION LIMITED , BHADRAK
2. Name of the Project : OSTAPAL CHROMITE MINES , KALIAPANI, JAJPUR
3. Date of Sampling : 01.03.2023
4. Sample Collected by : VCSPL Representative in presence of Client's Representative

Location ID	Location	Result in dB (A)	
		Day Time (6.00 am to 10.00pm)	Night Time (10.00pm to 6.00 am)
N1	Open Cast Quarry	71.1	60.5
N2	COB Plant	66.2	59.4
N3	Mines Loading & Unloading	64.7	61.3
N4	At Project Site	68.2	62.5
N5	Ostapal Village	52.7	42.3
N6	Gurujanga Village	52.6	44.8
N7	Gurujanga Village II	53.4	43.6
N8	Sukurangi Village	52.9	42.4
N9	Talangi Village	51.1	44.9
N10	Sukurangi Village II	52.7	43.7
N11	Kaliapani Village	51.6	40.4
N12	Kaliapani Colony	52.6	43.9
N13	Ostia Village	53.2	44.1

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

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Ref : Envlab/23-24/R-00570

Date : 08.04.2023

GROUND WATER LEVEL REPORT- MAR 2023

1. Name of Client : M/s FERRO ALLOYS CORPORATION LIMITED , BHADRAK
2. Name of the Project : OSTAPAL CHROMITE MINES , KALIAPANI, JAJPUR
3. **Date of Sampling** : 28.03.2023
4. Sample Collected by : VCSPL Representative in presence of Client's Representative

SL. No.	Locations	Unit	DOS	Analysis Result
1	Bore well Near Workshop of Mines	mt/bgl	28.03.2023	11.3
2	Bore well Near Main Gate of OCM	mt/bgl	28.03.2023	10.5
3	Open Well Near Ostia Village	mt/bgl	28.03.2023	5.3
4	Open Well Near Ostapal Village	mt/bgl	28.03.2023	5.2
5	Tube well inside Shiva Temple of the Village Gurujanga	mt/bgl	28.03.2023	11.0
6	Tube well outside Shiva Temple of the Village Gurujanga	mt/bgl	28.03.2023	11.3
7	Eastern side of the Quarry (PZ-1)	mt/bgl	28.03.2023	5.4
8	Southern side of the Quarry (PZ-2)	mt/bgl	28.03.2023	4.7
9	Watsternside of the Quarry (PZ-3)	mt/bgl	28.03.2023	5.1

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Ref : Envlab/23-24/R-00571

Date : 08.04.2023

FUGITIVE EMISSION ANALYSIS REPORT- MAR 2023

1. Name of Client : M/s FERRO ALLOYS CORPORATION LIMITED , BHADRAK
2. Name of the Project : OSTAPAL CHROMITE MINES , KALIAPANI, JAJPUR
3. Sampling Location : F1- Near Mines Ore Plot Area
F2- Near COB Plant Area
F3- Near Mines Loading & Unloading Point
4. Method of Sampling: IS 5182(P-5) 1975 RA 2014
5. Date of Sampling : 21.03.2023
6. Date of Analysis : 22.03.2023 to 25.03.2023
7. Sample Collected by : VCSPL Representative in presence of Client's Representative

SL. No.	Test Parameters	Test Method	Standard as per MoEF & CC Notification 03 rd Feb,2006	Unit	Analysis Result		
					F1	F2	F3
1	Suspended Particulate Matter as SPM	IS 5182 (P-4)1999 RA 2014 Gravimetric Method	1200	µg/m ³	137	216	175

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Ref : Envlab/23-24/R-00572

Date : 08.04.2023

DUST FALL ANALYSIS REPORT- MAR 2023

1. Name of Client : M/s FERRO ALLOYS CORPORATION LIMITED , BHADRAK
2. Name of the Project : OSTAPAL CHROMITE MINES , KALIAPANI, JAJPUR
3. Sampling Location : DF1-Near Roof Top of Office Building
4. Date of Sampling : 29.03.2023
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

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Ref : Envlab/23-24/R-00573

Date : 08.04.2023

MEASUREMENT OF GROUND WATER QUALITY ANALYSIS REPORT MAR 2023

1. Name of Client : M/s FERRO ALLOYS CORPORATION LIMITED , BHADRAK
2. Name of the Project : OSTAPAL CHROMITE MINES , KALIAPANI, JAJPUR
3. Sampling Location : GW1:Bore well Near Workshop of the Mines
GW2:Bore well Near Main Gate
GW3: Open Well Near Ostia Village
GW4:Open Well Near Ostapal Village
GW5:Tube Well Inside Shiv Temple of Gurujanga Village
4. Method of Sampling : APHA 1060 B
5. Date of Sampling : 28.03.2023
6. Date of Analysis : 29.03.2023 to 01.04.2023
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

BDL value:0.01 mg/l

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Ref : Envlab/23-24/R-00574

Date : 08.04.2023

MEASUREMENT OF GROUND WATER QUALITY ANALYSIS REPORT MAR 2023

- Name of Client : M/s FERRO ALLOYS CORPORATION LIMITED , BHADRAK
- Name of the Project : OSTAPAL CHROMITE MINES , KALIAPANI, JAJPUR
- Sampling Location : GW6 :Tube Well Outside Shiv Temple of Gurujanga Village
GW7:Eastern Side of the Quarry (PZ-1)
GW8: Southern Side of the Quarry (PZ-2)
GW9:Western Side of the Quarry (PZ-3)
- Method of Sampling : APHA 1060 B
- Date of Sampling : 28.03.2023
- Date of Analysis : 29.03.2023 to 03.04.2023
- 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	GW6	GW7	GW8	GW9
1	Hexavalent Chromium as Cr ₆₊	By AAS Method APHA 23 RD Ed,2017: 3500 Cr B	mg/l	--	--	BDL	BDL	BDL	BDL

BDL Value-0.01 mg/l

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Ref : Envlab/23-24/R-00575

Date : 08.04.2023

STP WATER QUALITY ANALYSIS REPORT- MARCH 2023

Name of Client : M/s FERRO ALLOYS CORPORATION LIMITED , BHADRAK

Name of the Project : OSTAPAL CHROMITE MINES , KALIAPANI, JAJPUR

Sampling Location: W1: 20 KLD STP Near Dispensary

W2: 10 KLD STP Near Office

Method of Sampling: APHA 1060 B

Date of Sampling: 28.03.2023

Date of Analysis: 29.03.2023 to 01.04.2023

SL. NO	PARAMETERS	Unit of Measurement	Method of Testing	MOEF & CC Standard Dt:13.10.2017	RESULTS	
					W1	W2
1	pH Value (at 25°C)	--	APHA 4500H ⁺ B	6.5-9.0	7.20	7.23
2	Suspended Solids	mg/l	APHA 2540 D	<100	89	85
3	Oil & Grease	mg/l	APHA 5520 B	--	4.8	3.2
4	BOD(3) days at 27°C	mg/l	APHA 5210 B	30	6.6	5.5
5	COD	mg/l	APHA 5220 C	--	16	9
6	Total Chromium (as Cr)	mg/l	APHA 3111 B	--	<0.01	<0.01
7	Feecal Coliform	MPN/100ml	APHA 9221 E	<1000	38	31

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Ref : Envlab/23-24/R-00576

Date : 08.04.2023

STPMBBR BASIN WATER QUALITY ANALYSIS REPORT- MARCH 2023

Name of Client : M/s FERRO ALLOYS CORPORATION LIMITED , BHADRAK

Name of the Project : OSTAPAL CHROMITE MINES , KALIAPANI, JAJPUR

Sampling Location:: W1: MBBR BASIN 20 KLD STP Near Dispensary

W2: MBBR BASIN 10 KLD STP Near Office

Method of Sampling: APHA 1060 B

Date of Sampling: 28.03.2023

Date of Analysis: 29.03.2023 to 01.04.2023

SL.NO.	Parameters	Unit of Measurement	Standard Operating Range	W1	W2
1	pH Value (at 25°C)	--	6.5-8.0	6.70	6.63
2	MLSS	mg/l	2300-2500	2338	2342
3	MLVSS	mg/l	2700-3200	2796	2818
4	DO	mg/l	1.0-2.0	1.6	1.3

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Ref : Envlab/23-24/R-00577

Date: 08.04.2023

SOURCE EMISSION ANALYSIS REPORT-MARCH 2023

Name & Address of the Client: Ostapal Chromite Mines (M/S Ferro Alloys Corporation Limited), Sukinda, Jajpur

Sample Type : Stack Sample

Date of Sampling : 31.03.2023

Date of Analysis : 01.04.2023 to 03.04.2023

Sampling Done by : VISIONTEK CONSULTANCY SERVICE PVT LTD

Sl.No.	Parameters	Stack-1 COB DG I	Stack-1 COB DG II	Stack-1 COB DG III	CPCB Standard for DG ≥ 800KW (≥ 1000KVA)
		Capacity: 550 KVA	Capacity: 285 KVA	Capacity: 100 KVA	
1	Stack °C	175	180	173	--
2	Stack Velocity m/sec	15.67	14.84	15.16	--
3	Particulate Matter (P M), mg/Nm ³	69	60	64	75g/Nm ³
4	Oxides of Nitrogen (N Ox), ppm	71	52	63	710 ppm
5	Carbon Monoxide, m g/Nm ³	53.2	50.1	50.5	150mg/Nm ³
6	Non Methyl Hydro Carbon as C, mg/Nm ³	23.7	22.8	23..7	100mg/Nm ³

The results stated in the test report are refer only to the sample tested. Test report shall not be reproduced in full without written approval of the Company

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Ref : Envlab/23-24/R-00579

Date: 08.04.2023

SURFACE WATER QUALITY ANALYSIS REPORT- MAR 2023

- Name of Client : M/s FERRO ALLOYS CORPORATION LIMITED , BHADRAK
- Name of the Project : OSTAPAL CHROMITE MINES , KALIAPANI, JAJPUR
- Sampling Location : SW1:Damsala Nallah Upstream Water (100 mtr Up)
SW2: Damsala Nallah Downstream Water (100 mtr Down)
(With impact of other mines discharge)
- Method of Sampling : APHA 1060 B
- Date of Sampling : 28.03.2023
- Date of Analysis : 29.03.2023 to 03.04.2023
- 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	7.21	7.26
3	Suspended solids	Gravimetric Method APHA 23 RD Ed,2017 : 2540 D	mg/l	--	55	68
4	Dissolved Oxygen (minimum)	Modified Winkler Method APHA 23 RD Ed,2017 : 2540 C	mg/l	4.0	6.0	6.3
5	Turbidity	Nephelometric Method APHA 23 RD Ed,2017: 2130 B	NTU	--	2.2	3.4
6	Chloride (max)	Titrimetric Method APHA 23 RD Ed,2017: 4500Cl ⁻ B	mg/l	600	22.5	30
7	Total Dissolved Solids	Gravimetric Method APHA 23 RD Ed,2017: 2540 C	mg/l	1500	112	131
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	<0.01	<0.01
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	mg/l	0.05	BDL	BDL
17	Fluoride as F (max)	Distillation followed by Spectrophotometric Method APHA 23 RD Ed,2017: 4500F ⁻ C	mg/l	1.5	0.25	0.31
18	Sulphates (SO ₄) (max)	Turbidimetric Method APHA 23 RD Ed,2017: 4500 SO ₄ ²⁻ F	mg/l	400	0.89	1.46



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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	0.059	0.072
21	Nitrate as NO ₃ , (max)	By UV-Screen Method APHA 23 RD Ed,2017: 4500 NO ₃ ⁻ E	mg/l	50	2.8	3.2
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	920	1600

CL – Colorless, ND – Not detected.

BDL (Below detection limit) Values : (Cu<0.02 mg/l, Mn<0.025 mg/l, C₆H₅OH<0.05 mg/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<0.03 mg/l, Cr⁺⁶<0.01 mg/l, Al<0.1 mg/l, B<0.1 mg/l, NO₃1 mg/l)

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Ref : Envlab/23-24/R-00580

Date : 08.04.2023

Silica Content in AAQ

Name of Client : M/s FERRO ALLOYS CORPORATION LIMITED , BHADRAK

Name of the Project : OSTAPAL CHROMITE MINES , KALIAPANI, JAJPUR

Sample Collected By : VCSPL representative in presence of Client's representative

Sl. No.	Date of monitoring	Sampler attached to person	Personal Respirable Dust (mg/m ³)	Respirable free Silica (%)
1	29.03.2023	DINABANDHU MAHANATA	0.58	2.2
2	29.03.2023	RANA PINGUA	0.60	2.5
3	29.03.2023	BUDHURAM LINGU	0.66	1.9
4	29.03.2023	PURNA CHANDRA DEHURY	0.61	2.0

DGMS Standards: Average concentration during each shift 3 mg/m³ where free silica in air borne dust is 5% or less.

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Ref : Envlab/23-24/R-00581

Date : 08.04.2023

HAZARDOUS WASTE ANALYSIS REPORT

Name of Client : M/s FERRO ALLOYS CORPORATION LIMITED , BHADRAK

Name of the Sample : S1:Used Oil of Ostapal Chromite Mines

Date of Sampling : 28.03.2023

Date of Analysis : 29.03.2023 to 03.04.2023

SL. No.	Name of the Parameters	Unit	Conc. Limit as per schedule-II of Hazardous waste Rule,2016	Analysis Result S1
1	Arsenic	mg/kg	5.0	<0.004
2	Cadmium	mg/kg	1.0	0.54
3	Chromium and/or chromium(III) compound	mg/kg	5.0	1.87
4	Lead	mg/kg	5.0	0.46
5	Manganese	mg/kg	10.0	<0.05
6	Mercury	mg/kg	0.2	<0.002
7	Selenium	mg/kg	1.0	<0.001
8	Cobalt	mg/kg	80.0	<0.05
9	Copper	mg/kg	25.0	0.39
10	Molybdenum	mg/kg	35.0	<1.0
11	Nickel	mg/kg	20.0	0.55
12	Zinc	mg/kg	250.0	<5.0
13	Fluoride	mg/kg	180.0	1.2
14	Polychlorinated Biphenyls (PCBs)	mg/kg	<2	0.6
15	Polyaromatic Hydrocarbons (PAH)	%	6.0	0.8
Hazardous Characteristics as per Schedule-II Class C of Hazardous Waste Rule,2016				
16	Flammable	--	--	Liquid
17	Corrosive(pH)	--	--	5.4
18	Reactive or Explosive	--	--	Reactive

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Ref : Envlab/23-24/R-00582

Date: 08.04.2023

DRINKING WATER QUALITY ANALYSIS REPORT- MAR 2023

1. Name of Client : M/s FERRO ALLOYS CORPORATION LIMITED , BHADRAK
2. Name of the Project : OSTAPAL CHROMITE MINES , KALIAPANI, JAJPUR
3. Sampling Location : DW1: Administration Building
DW2: Canteen
DW3: COB
4. Method of Sampling : APHA 1060 B
5. Date of Sampling : 28.03.2023
6. Date of Analysis : 29.03.2023 TO 03.04.2023
7. Sample Collected by : VCSPL Representative in presence of Client's Representative

Sl. No.	Parameter	Unit	TEST METHOD	Standard as per IS -10500:2012 Amended on 2015 & 2018		GW1	GW2	GW3
				Acceptabl e Limit	Permissabl e Limit			
Physical Parameter								
1	Colour	Hazen,Max	APHA 23 rd Ed,2017 : 2120 B, C	5	15	<5	<5	<5
2	Odour	--	APHA 23 rd Ed,2017 :2120 B	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
3	pH at 25 ^o C	--	APHA 23 Rd Ed,2017 : 4500H ⁺ B	6.5-8.5	6.5-8.5	7.28	7.31	7.38
3	Taste	--	APHA 23 rd Ed,2017 : 2160 C	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
4	Turbidity	NTU,Max	APHA 2130 B	1	5	0.6	0.4	0.7
5	Dissolved Solids	mg/l,Max	APHA 23 rd Ed,2017 : 2540 C	500	2000	117	126	120
CHEMICAL PARAMETER								
1	Aluminium as(Al)	mg/l,Max	APHA 3500Al B	0.03	0.2	BDL	BDL	BDL
2	Ammonical Nitrogen(NH ₃ .N)	mg/l,Max	APHA 4500 NH ₃ .C	0.5	0.5	BDL	BDL	BDL
3	Anionic Detergents (as MBAS)	mg/l,Max	APHA 5540 C	0.2	1.0	ND	ND	ND
4	Barium(Ba)	mg/l,Max	APFA 3111,B	0.7	0.7	BDL	BDL	BDL
5	Boron (as B)	mg/l,Max	APHA 4500 B,B	0.5	1.0	BDL	BDL	BDL
6	Calcium (as Ca)	mg/l,Max	APHA 23 rd Ed,2017 : 3500Ca B	75	200	44.7	40.6	38.5
7	Chloramines (as Cl ₂)	mg/l,Max	APHA 4500 –Cl G	4.0	4.0	ND	ND	ND
8	Chloride (as Cl)	mg/l,Max	APHA 23 rd Ed,2017 : 4500Cl ⁻ B	250	1000	45	37.5	52.5
9	Copper (as Cu)	mg/l,Max	APHA 3111 B,C	0.05	1.5	BDL	BDL	BDL
10	Fluoride (as F)	mg/l,Max	APHA 4500 F,C	1.0	1.5	0.03	0.02	0.03
11	Residual, free Chlorine	mg/l,Min	APHA 4500 Cl B	0.2	1.0	ND	ND	ND



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12	Iron (as Fe)	mg/l,Max	APHA 23 rd Ed,2017 : 3111, B	1.0	1.0	0.18	0.2	0.23
13	Magnesium (as Mg)	mg/l,Max	APHA 3500 Mg B	30	100	3.0	2.58	3.13
14	Manganese (as Mn)	mg/l,Max	APHA 3500Mn B	0.1	0.3	BDL	BDL	BDL
15	Mineral Oil	mg/l,Max	APHA 5520 B	0.5	0.5	BDL	BDL	BDL
16	Nitrate (as NO ₃)	mg/l,Max	APHA 4500 NO ₃ ⁻ E	45	45			
17	Phenolic Compounds(as C ₆ H ₅ OH)	mg/l,Max	APHA 5530 B,D	0.001	0.002	BDL	BDL	BDL
18	Selenium (as Se)	mg/l,Max	APHA 23 rd Ed,2017: 3500 Se C	0.01	0.01	BDL	BDL	BDL
19	Silver(asAg)	mg/l,Max		0.1	0.1	BDL	BDL	BDL
20	Sulphate (as SO ₄)	mg/l,Max	APHA 4500 SO ₄ ²⁻ E	200	400			
21	Sulphide (as H ₂ S)	mg/l,Max	0.05	0.05	0.05	ND	ND	ND
22	Alkalinity	mg/l,Max	APHA 2320 B	200	600	65	50	45
23	Total Hardness (as CaCO ₃)	mg/l,Max	APHA 23 rd Ed,2017 : 2340 C	200	200	124	112	109
24	Zinc (as Zn)	mg/l,Max	APHA 23 rd Ed,2017: 3111 B	5	5	2.22	3.05	2.16
Toxic Parameters								
1	Chromium (as Cr ⁺⁶)	mg/l,Max	APHA 3500Cr B	0.05	0.05	BDL	BDL	BDL
2	Cadmium as(Cd)	mg/l,Max	APHA 23 rd Ed,2017: 3111 B	0.003	0.003	BDL	BDL	BDL
3	Cyanide as (CN ⁻)	mg/l,Max	APHA 23 rd Ed,2017: 4500 CN ⁻ C,D	0.05	0.05	BDL	BDL	BDL
4	Lead as(Pb)	mg/l,Max	APHA 23 rd Ed,2017 3111 B	0.1	0.1	BDL	BDL	BDL
5	Mercury as (Hg)	mg/l,Max	APHA 23 rd Ed,2017: 3111 B	0.001	0.001	BDL	BDL	BDL
6	Nickel (Ni)	mg/l,Max	IS 5185 (Part-22)	0.02	0.02	BDL	BDL	BDL
7	Arsenic as (As)	mg/l,Max	APHA 23 rd Ed,2017: 3114 B	0.01	0.01	BDL	BDL	BDL
8	Polychlorinated biphenyls	mg/l,Max	APHA 23 rd Ed,2017 :6440 B	0.0005	0.0005	ND	ND	ND
9	Polyaromatic hydrocarbons (PAH)	mg/l,Max	APHA 23 rd Ed,2017 :6440 B	0.0001	0.0001	ND	ND	ND
10	Total Chromium	mg/l,Max	APHA 3500Cr B	0.05	0.05	BDL	BDL	BDL
11	Bromoform	mg/l,Max	APHA 6232	0.1	0.1	ND	ND	ND
12	Dibromochloromethane	mg/l,Max	APHA 6232	0.1	0.1	ND	ND	ND
13	Bromodichloromethane	mg/l,Max	APHA 6232	0.06	0.06	ND	ND	ND
14	Chloroform	mg/l,Max	APHA 6232	0.2	0.2	ND	ND	ND
15	Molybdenum (Mo)	mg/l,Max	IS 3025 (Part 2)	0.07	0.07	BDL	BDL	BDL
Bacteriological Parameter								
1	Total Coliform	MPN/100 ml	APHA 23 rd Ed,2017: 9221 B	Shall not be detectable in any 100 ml sample		ABSENT	ABSENT	ABSENT



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PESTICIDES							
1	Endosulfan à	µg/l,Max	APHA 23rd edition: 6630 C	0.4	<0.005	<0.005	<0.005
2	Endosulfan ß	µg/l,Max	APHA 23rd edition: 6630 C	0.4	<0.005	<0.005	<0.005
3	Endosulfan sulphate	µg/l,Max	APHA 23rd edition: 6630 C	0.4	<0.005	<0.005	<0.005
4	Alachlor	µg/l, Max	APHA 23rd edition: 6630 C	20	<0.01	<0.01	<0.01
5	Atrazine	µg/l, Max	APHA 23rd edition: 6630 C	2.0	<0.01	<0.01	<0.01
6	Aldrin	µg/l, Max	APHA 23rd edition: 6630 C	0.03	<0.01	<0.01	<0.01
8	Alpha HCH	µg/l, Max	APHA 23rd edition: 6630 C	0.01	<0.01	<0.01	<0.01
9	Beta HCH	µg/l, Max	APHA 23rd edition: 6630 C	0.04	<0.01	<0.01	<0.01
10	Delta HCH	µg/l, Max	APHA 23rd edition: 6630 C	0.04	<0.01	<0.01	<0.01
11	Butachlor	µg/l, Max	APHA 23rd edition: 6630 C	125.0	<0.01	<0.01	<0.01
12	Chloropyriphos	µg/l, Max	APHA 23rd edition: 6630 C	30.0	<0.01	<0.01	<0.01
13	2,4-Dichlorophenoxyacetic acid	µg/l, Max	APHA 23rd edition: 6630 C	30.0	<0.05	<0.05	<0.05
14	p p DDE	µg/l, Max	APHA 23rd edition: 6630 C	1.0	<0.05	<0.05	<0.05
15	p p DDD	µg/l, Max	APHA 23rd edition: 6630 C	1.0	<0.05	<0.05	<0.05
16	p p DDT	µg/l, Max	APHA 23rd edition: 6630 C	1.0	<0.05	<0.05	<0.05
17	o p DDE	µg/l, Max	APHA 23rd edition: 6630 C	1.0	<0.05	<0.05	<0.05
18	o p DDD	µg/l, Max	APHA 23rd edition: 6630 C	1.0	<0.05	<0.05	<0.05
19	o p DDT	µg/l, Max	APHA 23rd edition: 6630 C	1.0	<0.05	<0.05	<0.05
20	Ethion	µg/l, Max	APHA 23rd edition: 6630 C	3.0	<0.01	<0.01	<0.01
21	Lindane	µg/l, Max	APHA 23rd edition: 6630 C	2.0	<0.01	<0.01	<0.01
22	Isoproturon	µg/l, Max	APHA 23rd edition: 6630 C	9.0	<0.01	<0.01	<0.01
23	Malathion	µg/l, Max	APHA 23rd edition: 6630 C	190.0	<0.01	<0.01	<0.01
24	Methyl parathion	µg/l, Max	APHA 23rd edition: 6630 C	0.3	<0.01	<0.01	<0.01
25	Monocrotophos	µg/l, Max	APHA 23rd edition: 6630 C	1.0	<0.01	<0.01	<0.01
26	Phorate	µg/l, Max	APHA 23rd edition: 6630 C	2.0	<0.01	<0.01	<0.01

N.B: All Parameters are within standard, so it is potable water

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