



- Infrastructure Engineering
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- Environmental & Social Study

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- 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- 12215

Date : 07.12.2023

## GROUND WATER LEVEL REPORT- NOV 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** : 24.11.2023
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	24.11.2023	4.10
2	Bore well Near Main Gate of OCM	mt/bgl	24.11.2023	5.38
3	Open Well Near Ostia Village	mt/bgl	24.11.2023	5.6
4	Open Well Near Ostapal Village	mt/bgl	24.11.2023	6.1
5	Tube well inside Shiva Temple of the Village Gurujanga	mt/bgl	24.11.2023	10.5
6	Tube well outside Shiva Temple of the Village Gurujanga	mt/bgl	24.11.2023	6.8
7	Eastern side of the Quarry (PZ-1)	mt/bgl	24.11.2023	6.2
8	Southern side of the Quarry (PZ-2)	mt/bgl	24.11.2023	5.7
9	Watsternside of the Quarry (PZ-3)	mt/bgl	24.11.2023	6.0

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- Public Health Engineering

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

Ref : Envlab/23-24/R- 09153

Date : 06.10.2023

## AMBIENT AIR QUALITY (CORE ZONE) MONITORING REPORT- SEP 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 <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> )	NH <sub>3</sub> (µg/m <sup>3</sup> )	O <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-3: Near COB Plant											
12.09.2023	61.9	31.8	14.1	15.1	1.19	21.4	7.2	BDL	BDL	BDL	BDL	BDL
15.09.2023	63.3	33.2	14.5	14.7	1.02	20.8	6.9	BDL	BDL	BDL	BDL	BDL
19.09.2023	59.4	30.5	13.9	15.2	1.17	20.3	6.5	BDL	BDL	BDL	BDL	BDL
22.09.2023	60.8	31.1	12.7	13.9	1.15	21.2	6.0	BDL	BDL	BDL	BDL	BDL
26.09.2023	62.3	32.3	13.1	14.3	1.11	21.8	6.8	BDL	BDL	BDL	BDL	BDL
29.09.2023	59.5	30.1	13.6	13.8	1.09	21.3	6.6	BDL	BDL	BDL	BDL	BDL
<b>NAAQ Standard</b>	<b>100</b>	<b>60</b>	<b>80</b>	<b>80</b>	<b>4</b>	<b>400</b>	<b>100</b>	<b>5</b>	<b>01</b>	<b>01</b>	<b>20</b>	<b>06</b>
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/m<sup>3</sup>, PM 2.5 <10 µg/m<sup>3</sup>, SO<sub>2</sub> <4 µg/m<sup>3</sup>, NO<sub>2</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>

Fagmali  
Nagar  
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Approved By

P. Patil



# Visiontek Consultancy Services Pvt. Ltd.

(Committed For Better Environment)

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

### Laboratory Services

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- 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- 09154

Date : 06.10.2023

## AMBIENT AIR QUALITY (BUFFER ZONE) MONITORING REPORT- SEP 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 <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> )	NH <sub>3</sub> (µg/m <sup>3</sup> )	O <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 Village Ostia											
23.09.2023	58.9	30.1	6.6	13.4	0.55	BDL	6.2	BDL	BDL	BDL	BDL	BDL
AAQMS-2: Near Village Kaposi												
23.09.2023	56.1	28.9	7.2	12.8	0.58	BDL	5.4	BDL	BDL	BDL	BDL	BDL
AAQMS-3: Near Village Kaliapani Township												
23.09.2023	54.4	27.6	7.9	12.3	0.69	BDL	6.1	BDL	BDL	BDL	BDL	BDL
AAQMS-4: Near Village Ostapal												
23.09.2023	53.2	27.1	7.2	12.6	0.55	BDL	5.7	BDL	BDL	BDL	BDL	BDL

Fagmali Nayak

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- Infrastructure Engineering
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- Agricultural Development
- Information Technology
- Public Health Engineering

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

Ref : Envlab/23-24/R-09155

Date: 06.10.2023

## AMBIENT AIR QUALITY (BUFFER ZONE) MONITORING REPORT- SEP 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 <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> )	NH <sub>3</sub> (µg/m <sup>3</sup> )	O <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 Village Ostia												
28.09.2023	61.5	31.1	7.1	12.7	0.55	BDL	5.5	BDL	BDL	BDL	BDL	BDL
AAQMS-2: Near Village Kaposi												
28.09.2023	57.2	29.9	7.2	11.6	0.52	BDL	5.7	BDL	BDL	BDL	BDL	BDL
AAQMS-3: Near Village Kaliapani Township												
28.09.2023	58.9	29.8	7.4	12.2	0.74	BDL	5.4	BDL	BDL	BDL	BDL	BDL
AAQMS-4: Near Village Ostapal												
28.09.2023	54.9	28.3	7.0	12.7	0.54	BDL	6.1	BDL	BDL	BDL	BDL	BDL

*Fagmali Nayak*  
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- Infrastructure Engineering
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- Public Health Engineering

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

Ref : Envlab/23-24/R- 10255

Date : 06.11.2023

## AMBIENT AIR QUALITY (CORE ZONE) MONITORING REPORT- OCT 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 <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> )	NH <sub>3</sub> (µg/m <sup>3</sup> )	O <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 Rest Shelter											
06.10.2023	46.4	23.6	12.9	14.4	1.18	20.8	7.1	BDL	BDL	BDL	BDL	BDL
10.10.2023	44.9	25.1	13.3	15.6	1.24	21.3	6.6	BDL	BDL	BDL	BDL	BDL
13.10.2023	47.1	24.8	13.8	15.1	1.21	20.9	6.3	BDL	BDL	BDL	BDL	BDL
16.10.2023	43.5	22.9	14.2	14.9	1.12	21.5	7.4	BDL	BDL	BDL	BDL	BDL
18.10.2023	46.1	23.1	14.5	15.3	1.19	22.4	6.8	BDL	BDL	BDL	BDL	BDL
20.10.2023	48.2	25.2	13.9	14.5	1.13	22.7	6.5	BDL	BDL	BDL	BDL	BDL
26.10.2023	41.4	24.4	14.4	15.6	1.15	21.1	7.4	BDL	BDL	BDL	BDL	BDL
30.10.2023	45.3	24.9	14.7	15.2	1.18	22.2	7.1	BDL	BDL	BDL	BDL	BDL
NAAQ Standard	100	60	80	80	4	400	100	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> )	NH <sub>3</sub> (µg/m <sup>3</sup> )	O <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 Weigh Bridge											
06.10.2023	59.5	30.4	12.8	11.3	1.06	20.8	6.8	BDL	BDL	BDL	BDL	BDL
10.10.2023	61.2	31.2	13.1	10.6	1.14	21.1	7.2	BDL	BDL	BDL	BDL	BDL
13.10.2023	56.7	28.9	12.6	11.1	1.16	20.5	6.9	BDL	BDL	BDL	BDL	BDL
16.10.2023	60.9	30.9	13.5	11.4	1.08	21.3	6.9	BDL	BDL	BDL	BDL	BDL
18.10.2023	62.3	32.2	12.9	10.7	1.10	21.6	7.1	BDL	BDL	BDL	BDL	BDL
20.10.2023	58.9	30.6	12.3	10.5	1.07	20.2	7.3	BDL	BDL	BDL	BDL	BDL
26.10.2023	59.4	31.1	13.7	11.3	1.13	20.9	6.5	BDL	BDL	BDL	BDL	BDL
30.10.2023	57.1	29.5	13.1	11.2	1.15	20.5	6.8	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) 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>2</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>

*B. B. B.*

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*P. Patil*



- Infrastructure Engineering
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- Renewable Energy

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- Information Technology
- Public Health Engineering

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

Ref : Envlab/23-24/R- 10256

Date : 06.11.2023

## AMBIENT AIR QUALITY (CORE ZONE) MONITORING REPORT- OCT 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 <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> )	NH <sub>3</sub> (µg/m <sup>3</sup> )	O <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-3: Near COB Plant											
06.10.2023	60.7	32.2	13.7	15.5	1.16	20.9	7.0	BDL	BDL	BDL	BDL	BDL
10.10.2023	62.3	31.9	14.1	14.9	1.21	21.7	6.7	BDL	BDL	BDL	BDL	BDL
13.10.2023	58.9	30.1	14.8	15.1	1.25	22.8	6.9	BDL	BDL	BDL	BDL	BDL
16.10.2023	60.1	30.7	14.4	14.8	1.14	22.3	6.2	BDL	BDL	BDL	BDL	BDL
18.10.2023	56.7	28.9	13.9	15.1	1.18	23.1	7.1	BDL	BDL	BDL	BDL	BDL
20.10.2023	59.5	30.6	14.5	14.7	1.22	21.7	6.9	BDL	BDL	BDL	BDL	BDL
26.10.2023	61.7	32.8	13.7	14.5	1.11	22.5	7.0	BDL	BDL	BDL	BDL	BDL
30.10.2023	62.3	33.1	13.9	13.9	1.06	21.8	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) 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>2</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>

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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  
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- Renewable Energy

- Agricultural Development
- Information Technology
- Public Health Engineering

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

Ref : Envlab/23-24/R- 10257

Date : 06.11.2023

## AMBIENT AIR QUALITY (BUFFER ZONE) MONITORING REPORT- OCT 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 <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> )	NH <sub>3</sub> (µg/m <sup>3</sup> )	O <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 Village Ostia												
13.10.2023	58.6	29.7	6.8	13.6	0.58	BDL	6.3	BDL	BDL	BDL	BDL	BDL
AAQMS-2: Near Village Kaposi												
13.10.2023	55.9	28.4	7.0	12.2	0.56	BDL	5.6	BDL	BDL	BDL	BDL	BDL
AAQMS-3: Near Village Kaliapani Township												
13.10.2023	54.8	27.9	7.5	12.9	0.66	BDL	6.0	BDL	BDL	BDL	BDL	BDL
AAQMS-4: Near Village Ostapal												
13.10.2023	54.1	27.5	7.1	12.5	0.57	BDL	5.8	BDL	BDL	BDL	BDL	BDL

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Ref : Envlab/23-24/R-10258

Date: 06.11.2023



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## AMBIENT AIR QUALITY (BUFFER ZONE) MONITORING REPORT- OCT 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

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> )	NH <sub>3</sub> (µg/m <sup>3</sup> )	O <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 Village Ostia												
27.10.2023	62.2	31.4	7.0	13.1	0.56	BDL	5.7	BDL	BDL	BDL	BDL	BDL
AAQMS-2: Near Village Kaposi												
27.10.2023	58.1	30.2	7.3	11.5	0.54	BDL	5.8	BDL	BDL	BDL	BDL	BDL
AAQMS-3: Near Village Kaliapani Township												
27.10.2023	59.1	30.7	7.2	12.2	0.71	BDL	5.5	BDL	BDL	BDL	BDL	BDL
AAQMS-4: Near Village Ostapal												
27.10.2023	55.3	28.6	7.1	12.6	0.55	BDL	6.3	BDL	BDL	BDL	BDL	BDL

*Bab*

Reviewed By



*P. Patil*

Approved By







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

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- 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- 12204

Date : 07.12.2023

## AMBIENT AIR QUALITY (CORE ZONE) MONITORING REPORT- NOV 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 <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> )	NH <sub>3</sub> (µg/m <sup>3</sup> )	O <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 Rest Shelter											
03.11.2023	44.8	22.7	14.1	15.4	1.13	20.9	7.1	BDL	BDL	BDL	BDL	BDL
07.11.2023	42.9	22.1	13.6	14.9	1.18	21.3	6.5	BDL	BDL	BDL	BDL	BDL
11.11.2023	45.1	23.3	13.2	15.5	1.20	21.5	6.9	BDL	BDL	BDL	BDL	BDL
14.11.2023	40.6	20.9	14.1	16.1	1.24	20.6	7.2	BDL	BDL	BDL	BDL	BDL
17.11.2023	39.4	20.2	12.9	15.3	1.15	21.5	6.8	BDL	BDL	BDL	BDL	BDL
21.11.2023	41.3	21.6	13.5	14.8	1.21	22.0	7.0	BDL	BDL	BDL	BDL	BDL
24.11.2023	44.2	23.1	12.7	15.0	1.18	21.3	6.8	BDL	BDL	BDL	BDL	BDL
28.11.2023	45.6	23.6	13.1	14.2	1.19	20.8	6.5	BDL	BDL	BDL	BDL	BDL
<b>NAAQ Standard</b>	<b>100</b>	<b>60</b>	<b>80</b>	<b>80</b>	<b>4</b>	<b>400</b>	<b>100</b>	<b>5</b>	<b>01</b>	<b>01</b>	<b>20</b>	<b>06</b>
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> )	NH <sub>3</sub> (µg/m <sup>3</sup> )	O <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 Weigh Bridge											
03.11.2023	59.7	30.6	13.7	11.1	1.23	20.7	6.7	BDL	BDL	BDL	BDL	BDL
07.11.2023	61.4	31.2	12.9	10.8	1.18	21.5	6.4	BDL	BDL	BDL	BDL	BDL
11.11.2023	60.9	31.3	13.5	10.3	1.12	21.1	6.1	BDL	BDL	BDL	BDL	BDL
14.11.2023	58.8	29.9	13.6	11.2	1.05	22.3	6.3	BDL	BDL	BDL	BDL	BDL
17.11.2023	62.2	32.4	12.8	11.5	1.17	20.4	6.9	BDL	BDL	BDL	BDL	BDL
21.11.2023	56.3	28.4	13.1	10.6	1.12	21.9	6.2	BDL	BDL	BDL	BDL	BDL
24.11.2023	59.1	30.3	12.2	9.9	1.15	21.2	6.0	BDL	BDL	BDL	BDL	BDL
28.11.2023	55.4	28.1	11.9	10.5	1.11	20.7	6.6	BDL	BDL	BDL	BDL	BDL
<b>NAAQ Standard</b>	<b>100</b>	<b>60</b>	<b>80</b>	<b>80</b>	<b>4</b>	<b>400</b>	<b>100</b>	<b>5</b>	<b>01</b>	<b>01</b>	<b>20</b>	<b>06</b>
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/m<sup>3</sup>, PM 2.5 <10 µg/m<sup>3</sup>, SO<sub>2</sub> <4 µg/m<sup>3</sup>, NO<sub>2</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>

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- Mineral/Sub-Soil Exploration
- Waste Management Services

Ref : Envlab/23-24/R- 12205

Date : 07.12.2023

## AMBIENT AIR QUALITY (CORE ZONE) MONITORING REPORT- NOV 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 <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> )	NH <sub>3</sub> (µg/m <sup>3</sup> )	O <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-3: Near COB Plant											
03.11.2023	60.6	30.4	13.3	14.8	1.20	20.6	6.6	BDL	BDL	BDL	BDL	BDL
07.11.2023	61.3	31.6	12.9	15.1	1.21	21.1	7.2	BDL	BDL	BDL	BDL	BDL
11.11.2023	57.2	28.9	14.4	14.7	1.17	22.0	7.0	BDL	BDL	BDL	BDL	BDL
14.11.2023	60.1	30.2	13.6	14.3	1.15	21.4	6.2	BDL	BDL	BDL	BDL	BDL
17.11.2023	58.9	30.7	14.4	15.5	1.10	20.3	6.9	BDL	BDL	BDL	BDL	BDL
21.11.2023	59.2	31.2	14.5	14.9	1.20	21.6	6.8	BDL	BDL	BDL	BDL	BDL
24.11.2023	58.8	30.6	13.7	13.6	1.14	22.1	7.2	BDL	BDL	BDL	BDL	BDL
28.11.2023	56.3	28.2	13.5	14.1	1.22	20.8	6.3	BDL	BDL	BDL	BDL	BDL
<b>NAAQ Standard</b>	<b>100</b>	<b>60</b>	<b>80</b>	<b>80</b>	<b>4</b>	<b>400</b>	<b>100</b>	<b>5</b>	<b>01</b>	<b>01</b>	<b>20</b>	<b>06</b>
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) 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>

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

Ref : Envlab/23-24/R-12206

Date : 07.12.2023

## AMBIENT AIR QUALITY (BUFFER ZONE) MONITORING REPORT- NOV 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 <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> )	NH <sub>3</sub> (µg/m <sup>3</sup> )	O <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 Village Ostia											
15.11.2023	58.8	30.1	7.1	14.2	0.52	BDL	6.6	BDL	BDL	BDL	BDL	BDL
AAQMS-2: Near Village Kaposi												
15.11.2023	56.1	28.4	7.0	13.9	0.61	BDL	6.2	BDL	BDL	BDL	BDL	BDL
AAQMS-3: Near Village Kaliapani Township												
15.11.2023	57.3	29.3	8.3	13.4	0.77	BDL	6.1	BDL	BDL	BDL	BDL	BDL
AAQMS-4: Near Village Ostapal												
15.11.2023	55.9	28.6	7.4	12.8	0.58	BDL	5.8	BDL	BDL	BDL	BDL	BDL

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- Mineral/Sub-Soil Exploration
- Waste Management Services

Ref : Envlab/23-24/R- 12207

Date: 07.12.2023

## AMBIENT AIR QUALITY (BUFFER ZONE) MONITORING REPORT- NOV 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 <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> )	NH <sub>3</sub> (µg/m <sup>3</sup> )	O <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 Village Ostia												
23.11.2023	62.2	31.7	7.4	12.5	0.54	BDL	6.2	BDL	BDL	BDL	BDL	BDL
AAQMS-2: Near Village Kaposi												
23.11.2023	57.4	29.6	7.5	12.0	0.63	BDL	5.7	BDL	BDL	BDL	BDL	BDL
AAQMS-3: Near Village Kaliapani Township												
23.11.2023	58.6	30.3	8.1	13.3	0.82	BDL	5.4	BDL	BDL	BDL	BDL	BDL
AAQMS-4: Near Village Ostapal												
23.11.2023	55.6	29.4	7.3	13.1	0.57	BDL	6.0	BDL	BDL	BDL	BDL	BDL

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- Mineral/Sub-Soil Exploration
- Waste Management Services

Ref : Envlab/23-24/R- 12208

Date: 07.12.2023

## GROUND WATER QUALITY ANALYSIS REPORT- NOV 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 : 03.11.2023
6. Date of Analysis : 04.11.2023 TO 10.11.2023
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
				Acceptable Limit	Permissible Limit			
<b>Physical Parameter</b>								
1	Colour	Hazen,Max	APHA 23 <sup>rd</sup> Ed,2017 : 2120 B, C	5	15	<5	<5	<5
2	Odour	--	APHA 23 <sup>rd</sup> Ed,2017 :2120 B	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
3	pH at 25 <sup>o</sup> C	--	APHA 23 <sup>rd</sup> Ed,2017 : 4500H <sup>+</sup> B	6.5-8.5	6.5-8.5	6.71	6.88	6.95
3	Taste	--	APHA 23 <sup>rd</sup> Ed,2017 : 2160 C	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
4	Turbidity	NTU,Max	APHA 2130 B	1	5	0.6	0.5	0.7
5	Dissolved Solids	mg/l,Max	APHA 23 <sup>rd</sup> Ed,2017 : 2540 C	500	2000	277	337	281
<b>CHEMICAL PARAMETER</b>								
1	Aluminium as( Al)	mg/l,Max	APHA 3500Al B	0.03	0.2	BDL	BDL	BDL
2	Ammonical Nitrogen(NH <sub>3</sub> .N)	mg/l,Max	APHA 4500 NH <sub>3</sub> .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 <sup>rd</sup> Ed,2017 : 3500Ca B	75	200	38.2	40.6	43.8
7	Chloramines (as Cl <sub>2</sub> )	mg/l,Max	APHA 4500 -Cl G	4.0	4.0	ND	ND	ND
8	Chloride (as Cl )	mg/l,Max	APHA 23 <sup>rd</sup> Ed,2017 : 4500Cl <sup>-</sup> B	250	1000	50	35	45
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	0.18	0.15	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 <sup>rd</sup> Ed,2017 : 3111, B	1.0	1.0	0.33	0.28	0.31
13	Magnesium (as Mg)	mg/l,Max	APHA 3500 Mg B	30	100	20.5	17.6	17.9



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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 <sub>3</sub> )	mg/l,Max	APHA 4500 NO <sub>3</sub> <sup>-</sup> E	45	45	7.1	8.2	6.5
17	Phenolic Compounds(as C <sub>6</sub> H <sub>5</sub> OH)	mg/l,Max	APHA 5530 B,D	0.001	0.002	BDL	BDL	BDL
18	Selenium (as Se)	mg/l,Max	APHA 23 <sup>rd</sup> 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 <sub>4</sub> )	mg/l,Max	APHA 4500 SO <sub>4</sub> <sup>2-</sup> E	200	400	22.9	27.4	30.7
21	Sulphide (as H <sub>2</sub> S)	mg/l,Max	0.05	0.05	0.05	ND	ND	ND
22	Alkalinity	mg/l,Max	APHA 2320 B	200	600	100	145	160
23	Total Hardness (as CaCO <sub>3</sub> )	mg/l,Max	APHA 23 <sup>rd</sup> Ed,2017 : 2340 C	200	600	180	174	183
24	Zinc (as Zn)	mg/l,Max	APHA 23 <sup>rd</sup> Ed,2017: 3111 B	5	15	1.1	1.45	2.18
<b>Toxic Parameters</b>								
1	Chromium (as Cr <sup>+6</sup> )	mg/l,Max	APHA 3500Cr B	0.05	0.05	BDL	BDL	BDL
2	Cadmium as( Cd)	mg/l,Max	APHA 23 <sup>rd</sup> Ed,2017: 3111 B	0.003	0.003	BDL	BDL	BDL
3	Cyanide as (CN <sup>-</sup> )	mg/l,Max	APHA 23 <sup>rd</sup> Ed,2017: 4500 CN <sup>-</sup> C,D	0.05	0.05	BDL	BDL	BDL
4	Lead as( Pb)	mg/l,Max	APHA 23 <sup>rd</sup> Ed,2017 3111 B	0.1	0.1	BDL	BDL	BDL
5	Mercury as (Hg)	mg/l,Max	APHA 23 <sup>rd</sup> 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 <sup>rd</sup> Ed,2017: 3114 B	0.01	0.01	BDL	BDL	BDL
8	Polychlorinated biphenyls	mg/l,Max	APHA 23 <sup>rd</sup> Ed,2017 :6440 B	0.0005	0.0005	ND	ND	ND
9	Polyaromatic hydrocarbons (PAH)	mg/l,Max	APHA 23 <sup>rd</sup> 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
<b>Bacteriological Parameter</b>								
1	Total Coliform	MPN/100 ml	APHA 23 <sup>rd</sup> 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



- Infrastructure Engineering
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- 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-12209

Date: 07.12.2023

## GROUND WATER QUALITY ANALYSIS REPORT- NOV 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 : 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 : 03.11.2023
6. Date of Analysis : 04.11.2023 TO 10.11.2023
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
				Acceptable Limit	Permissible Limit			
<b>Physical Parameter</b>								
1	Colour	Hazen,Max	APHA 23 <sup>rd</sup> Ed,2017 : 2120 B, C	5	15	<5	<5	<5
2	Odour	--	APHA 23 <sup>rd</sup> Ed,2017 :2120 B	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
3	pH at 25 <sup>o</sup> C	--	APHA 23 <sup>rd</sup> Ed,2017 : 4500H <sup>+</sup> B	6.5-8.5	6.5-8.5	7.20	7.24	7.21
3	Taste	--	APHA 23 <sup>rd</sup> Ed,2017 : 2160 C	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
4	Turbidity	NTU,Max	APHA 2130 B	1	5	0.4	0.7	0.8
5	Dissolved Solids	mg/l,Max	APHA 23 <sup>rd</sup> Ed,2017 : 2540 C	500	2000	183	160	142
<b>CHEMICAL PARAMETER</b>								
1	Aluminium as( Al)	mg/l,Max	APHA 3500Al B	0.03	0.2	BDL	BDL	BDL
2	Ammonical Nitrogen(NH <sub>3</sub> .N)	mg/l,Max	APHA 4500 NH <sub>3</sub> .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 <sup>rd</sup> Ed,2017 : 3500Ca B	75	200	30.8	32.7	20.9
7	Chloramines (as Cl <sub>2</sub> )	mg/l,Max	APHA 4500 -Cl G	4.0	4.0	ND	ND	ND
8	Chloride (as Cl )	mg/l,Max	APHA 23 <sup>rd</sup> Ed,2017 : 4500Cl B	250	1000	45	65	50
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	0.024	0.028	0.023
11	Residual, free Chlorine	mg/l,Min	APHA 4500 Cl B	0.2	1.0	ND	ND	ND





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- Information Technology
- Public Health Engineering

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

12	Iron (as Fe)	mg/l,Max	APHA 23 <sup>rd</sup> Ed,2017 : 3111, B	1.0	1.0	0.31	0.28	0.27
13	Magnesium (as Mg)	mg/l,Max	APHA 3500 Mg B	30	100	12.6	4.5	8.9
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 <sub>3</sub> )	mg/l,Max	APHA 4500 NO <sub>3</sub> <sup>-</sup> E	45	45	1.33	0.81	0.88
17	Phenolic Compounds(as C <sub>6</sub> H <sub>5</sub> OH)	mg/l,Max	APHA 5530 B,D	0.001	0.002	BDL	BDL	BDL
18	Selenium (as Se)	mg/l,Max	APHA 23 <sup>rd</sup> 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 <sub>4</sub> )	mg/l,Max	APHA 4500 SO <sub>4</sub> <sup>2-</sup> E	200	400	6.7	4.5	4.2
21	Sulphide (as H <sub>2</sub> S)	mg/l,Max	0.05	0.05	0.05	ND	ND	ND
22	Alkalinity	mg/l,Max	APHA 2320 B	200	600	130	150	125
23	Total Hardness (as CaCO <sub>3</sub> )	mg/l,Max	APHA 23 <sup>rd</sup> Ed,2017 : 2340 C	200	600	129	100	89
24	Zinc (as Zn)	mg/l,Max	APHA 23 <sup>rd</sup> Ed,2017: 3111 B	5	15	2.16	2.65	2.32
<b>Toxic Parameters</b>								
1	Chromium (as Cr <sup>+6</sup> )	mg/l,Max	APHA 3500Cr B	0.05	0.05	BDL	BDL	BDL
2	Cadmium as( Cd)	mg/l,Max	APHA 23 <sup>rd</sup> Ed,2017: 3111 B	0.003	0.003	BDL	BDL	BDL
3	Cyanide as (CN <sup>-</sup> )	mg/l,Max	APHA 23 <sup>rd</sup> Ed,2017: 4500 CN <sup>-</sup> C,D	0.05	0.05	BDL	BDL	BDL
4	Lead as( Pb)	mg/l,Max	APHA 23 <sup>rd</sup> Ed,2017 3111 B	0.1	0.1	BDL	BDL	BDL
5	Mercury as (Hg)	mg/l,Max	APHA 23 <sup>rd</sup> 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 <sup>rd</sup> Ed,2017: 3114 B	0.01	0.01	BDL	BDL	BDL
8	Polychlorinated biphenyls	mg/l,Max	APHA 23 <sup>rd</sup> Ed,2017 :6440 B	0.0005	0.0005	ND	ND	ND
9	Polyaromatic hydrocarbons (PAH)	mg/l,Max	APHA 23 <sup>rd</sup> 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
<b>Bacteriological Parameter</b>								
1	Total Coliform	MPN/100 ml	APHA 23 <sup>rd</sup> Ed,2017: 9221 B	Shall not be detectable in any 100 ml sample		ABSENT	ABSENT	ABSENT



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- Renewable Energy

- Agricultural Development
- 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

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- Public Health Engineering

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

Ref : Envlab/23-24/R-12210

Date: 07.12.2023

## GROUND WATER QUALITY ANALYSIS REPORT- NOV 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 : 03.11.2023
6. Date of Analysis : 04.11.2023 TO 10.11.2023
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
				Acceptable Limit	Permissible Limit			
<b>Physical Parameter</b>								
1	Colour	Hazen,Max	APHA 23 <sup>rd</sup> Ed,2017 : 2120 B, C	5	15	<5	<5	<5
2	Odour	--	APHA 23 <sup>rd</sup> Ed,2017 :2120 B	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
3	pH at 25 <sup>o</sup> C	--	APHA 23 <sup>rd</sup> Ed,2017 : 4500H <sup>+</sup> B	6.5-8.5	6.5-8.5	7.33	7.28	7.25
3	Taste	--	APHA 23 <sup>rd</sup> Ed,2017 : 2160 C	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
4	Turbidity	NTU,Max	APHA 2130 B	1	5	0.4	0.8	0.5
5	Dissolved Solids	mg/l,Max	APHA 23 <sup>rd</sup> Ed,2017 : 2540 C	500	2000	241	189	194
<b>CHEMICAL PARAMETER</b>								
1	Aluminium as( Al)	mg/l,Max	APHA 3500Al B	0.03	0.2	BDL	BDL	BDL
2	Ammonical Nitrogen(NH <sub>3</sub> .N)	mg/l,Max	APHA 4500 NH <sub>3</sub> .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 <sup>rd</sup> Ed,2017 : 3500Ca B	75	200	29.4	30.2	27.4
7	Chloramines (as Cl <sub>2</sub> )	mg/l,Max	APHA 4500 -Cl G	4.0	4.0	ND	ND	ND
8	Chloride (as Cl )	mg/l,Max	APHA 23 <sup>rd</sup> Ed,2017 : 4500Cl- B	250	1000	40	45	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	0.023	0.017	0.028
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 <sup>rd</sup> Ed,2017 : 3111, B	1.0	1.0	0.31	0.38	0.36
13	Magnesium (as Mg)	mg/l,Max	APHA 3500 Mg B	30	100	14.7	12.5	10.1
14	Manganese (as Mn)	mg/l,Max	APHA 3500Mn B	0.1	0.3	BDL	BDL	BDL



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- Waste Management Services

15	Mineral Oil	mg/l,Max	APHA 5520 B	0.5	0.5	BDL	BDL	BDL
16	Nitrate (as NO <sub>3</sub> )	mg/l,Max	APHA 4500 NO <sub>3</sub> <sup>-</sup> E	45	45	1.29	0.95	0.81
17	Phenolic Compounds(as C <sub>6</sub> H <sub>5</sub> OH)	mg/l,Max	APHA 5530 B,D	0.001	0.002	BDL	BDL	BDL
18	Selenium (as Se)	mg/l,Max	APHA 23 <sup>rd</sup> 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 <sub>4</sub> )	mg/l,Max	APHA 4500 SO <sub>4</sub> <sup>2-</sup> E	200	400	4.7	3.6	4.4
21	Sulphide (as H <sub>2</sub> S)	mg/l,Max	0.05	0.05	0.05	ND	ND	ND
22	Alkalinity	mg/l,Max	APHA 2320 B	200	600	40	55	75
23	Total Hardness (as CaCO <sub>3</sub> )	mg/l,Max	APHA 23 <sup>rd</sup> Ed,2017 : 2340 C	200	600	134	127	110
24	Zinc (as Zn)	mg/l,Max	APHA 23 <sup>rd</sup> Ed,2017: 3111 B	5	15	3.0	4.4	4.2
<b>Toxic Parameters</b>								
1	Chromium (as Cr <sup>+6</sup> )	mg/l,Max	APHA 3500Cr B	0.05	0.05	BDL	BDL	BDL
2	Cadmium as( Cd)	mg/l,Max	APHA 23 <sup>rd</sup> Ed,2017: 3111 B	0.003	0.003	BDL	BDL	BDL
3	Cyanide as (CN <sup>-</sup> )	mg/l,Max	APHA 23 <sup>rd</sup> Ed,2017: 4500 CN <sup>-</sup> C,D	0.05	0.05	BDL	BDL	BDL
4	Lead as( Pb)	mg/l,Max	APHA 23 <sup>rd</sup> Ed,2017 3111 B	0.1	0.1	BDL	BDL	BDL
5	Mercury as (Hg)	mg/l,Max	APHA 23 <sup>rd</sup> 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 <sup>rd</sup> Ed,2017: 3114 B	0.01	0.01	BDL	BDL	BDL
8	Polychlorinated biphenyls	mg/l,Max	APHA 23 <sup>rd</sup> Ed,2017 :6440 B	0.0005	0.0005	ND	ND	ND
9	Polyaromatic hydrocarbons (PAH)	mg/l,Max	APHA 23 <sup>rd</sup> 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
<b>Bacteriological Parameter</b>								
1	Total Coliform	MPN/100 ml	APHA 23 <sup>rd</sup> Ed,2017: 9221 B	Shall not be detectable in any 100 ml sample		ABSENT	ABSENT	ABSENT



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- Information Technology
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- 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

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- Waste Management Services

Ref : Envlab/23-24/R- 12211

Date : 07.12.2023

## EFFLUENT WATER ANALYSIS REPORT NOV 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 Inlet
4. Method of sampling : APHA 1060 B
5. Date of Sampling : 03.11.2023
6. Date of Analysis : 04.11.2023 to 10.11.2023
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 <sup>RD</sup> Ed,2017 : 2120 B, C	Hazen	10
2	Odour	Threshold Odour Test APHA 23 <sup>RD</sup> Ed,2017 :2150 B		Pungent Smell
3	pH at 25°C	pH Meter APHA 23 <sup>RD</sup> Ed,2017 : 4500H+ B	--	8.4
4	Total Suspended Solids (as TSS)	Gravimetric Method APHA 23 <sup>RD</sup> Ed,2017 : 2540 D	mg/l	65
5	Copper (as Cu)	By AAS Method APHA 23 <sup>RD</sup> Ed,2017 3111 B	mg/l	BDL
6	Fluoride (as F)	Distillation followed by Spectrophotometric Method APHA 23 <sup>RD</sup> Ed,2017: 4500F- C	mg/l	0.68
7	Total Residual Chloride	Iodometric Method APHA 23 <sup>RD</sup> Ed,2017 : 4500Cl, B	mg/l	0.23
8	Iron (as Fe)	By AAS Method APHA 23 <sup>RD</sup> Ed,2017 : 3111, B	mg/l	1.59
9	Manganese (as Mn)	Persulfate Method APHA 23 <sup>RD</sup> Ed,2017: 3500Mn B	mg/l	BDL
10	Nitrate Nitrogen (as NO <sub>3</sub> )	By UV-Screen Method APHA 23 <sup>RD</sup> Ed,2017: 4500 NO <sub>3</sub> <sup>-</sup> E	mg/l	14.1
11	Phenolic Compound (as C <sub>6</sub> H <sub>5</sub> OH)	Chloroform Extraction by Colorimetric Method APHA 23 <sup>RD</sup> Ed,2017: 5530 B,D	mg/l	BDL
12	Selenium (as Se)	By AAS Method APHA 23 <sup>RD</sup> Ed,2017: 3500 Se C	mg/l	BDL
13	Cadmium (as Cd)	AAS Method APHA 23 <sup>RD</sup> Ed,2017: 3111 B	mg/l	BDL
14	Cyanide ( as CN)	Distillation followed by Spectrophotometric Method APHA 23 <sup>RD</sup> Ed,2017: 4500 CN- C,D	mg/l	BDL
15	Lead (as Pb)	By AAS Method APHA 23 <sup>RD</sup> Ed,2017 3111 B	mg/l	BDL
16	Mercury (as Hg)	AAS Method APHA 23 <sup>RD</sup> Ed,2017: 3112 B	mg/l	BDL
17	Nickel (as Ni)	By AAS Method APHA 23 <sup>RD</sup> Ed,2017 3111 B	mg/l	BDL
18	Arsenic (as As)	By AAS Method APHA 23 <sup>RD</sup> Ed,2017: 3114 B	mg/l	BDL
19	Total Chromium (as Cr)	By AAS Method APHA 23 <sup>RD</sup> Ed,2017 3111 B	mg/l	1.38
20	Zinc (as Zn)	By AAS Method APHA 23 <sup>RD</sup> Ed,2017 3111 B	mg/l	0.45
21	Hexavalent Chromium (as Cr <sup>+6</sup> )	Diphenyl Carbazide Method APHA 23 <sup>RD</sup> Ed,2017: 3500Cr B	mg/l	0.52



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- Waste Management Services

22	Vanadium (as V)	<b>By AAS Method</b> APHA 23 <sup>RD</sup> Ed,2017 3111 D	mg/l	BDL
23	Temperature	By Thermometer APHA 23 <sup>RD</sup> Ed,2017 2550 B	°C	30
24	Dissolved Oxygen	<b>Modified Winkler Method</b> APHA 23 <sup>RD</sup> Ed,2017: 4500 O, C	mg/l	5.2
25	Biochemical Oxygen Demand as BOD(3days at 27 <sup>o</sup> C)	IS 3025(P-44) : 1993 RA 2003	mg/l	12.0
26	Chemical Oxygen Demand (as COD)	<b>Open Reflux Method</b> APHA 23 <sup>RD</sup> Ed,2017: 5220 C	mg/l	186
27	Oil & Grease (as O & G)	<b>Gravimetric Method (Solvent Extraction)</b> APHA 23 <sup>RD</sup> Ed,2017:5520-B	mg/l	10.0
28	Ammonical Nitrogen (as NH <sub>3</sub> -N)	<b>TKN Instrument (Distillation) followed by Titrimetric Method</b> APHA 23 <sup>RD</sup> Ed,2017 : 4500NH <sub>3</sub> C	mg/l	8.8
29	Total Kjeldahl Nitrogen (as N)	<b>TKN Instrument (Digestion)</b> APHA 23 <sup>RD</sup> Ed,2017: 4500 N <sub>ORG</sub> C	mg/l	12.4
30	Sulphide (as S)	<b>Iodometric Method</b> APHA 23 <sup>RD</sup> Ed,2017 : 4500 S <sup>2-</sup>	mg/l	BDL
31	Free Ammonia (as NH <sub>3</sub> )	<b>By Calculation</b>	mg/l	12.9
32	Dissolve Phosphate	<b>APHA 23<sup>rd</sup> Edition 4500 P D</b>	mg/l	8.8
33	Particulate Size of Suspended Solids	Gravimetric Method APHA 23 <sup>RD</sup> 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, C<sub>6</sub>H<sub>5</sub>OH<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<sup>6+</sup><0.01 mg/l, Al<0.1 mg/l, B<0.1 mg/l, NO<sub>3</sub>1 mg/l)

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- Mineral/Sub-Soil Exploration
- Waste Management Services

Ref: Envlab/23-24/R- 12212

Date : 07.12.2023

## EFFLUENT WATER DISCHARGE ANALYSIS REPORT NOV 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 : **03.11.2023**
6. Date of Analysis : **04.11.2023 to 10.11.2023**
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	<b>Visual Comparison Method</b> APHA 2120 B; 23 <sup>rd</sup> Edition, 2017	Hazen	Colourless	>5
2	Odour	<b>Threshold Odour Method</b> APHA 2150 B; 23 <sup>rd</sup> Edition, 2017	--	Odourless	Agreeable
3	pH at 25°C	<b>pH Meter</b> APHA 4500 H <sup>+</sup> B; 23 <sup>rd</sup> Edition, 2017	--	5.5-9.0	7.61
4	Total Suspended Solids	<b>Gravimetric Method</b> APHA 2540 D; 23 <sup>rd</sup> Edition, 2017	mg/l	100	44
5	Copper as Cu	<b>By AAS Method</b> APHA 3111 B; 23 <sup>rd</sup> Edition, 2017	mg/l	3	BDL
6	Fluoride as F	<b>Distillation followed by Spectrophotometric Method</b> APHA 4500 F <sup>-</sup> C,D; 23 <sup>rd</sup> Edition, 2017	mg/l	2	0.38
7	Total Residual Chlorine	<b>Iodometric Method</b> APHA 23RD Ed,2017 : 4500Cl, B	mg/l	1	ND
8	Iron as Fe	<b>By AAS Method</b> APHA 3111 B; 23 <sup>rd</sup> Edition, 2017	mg/l	3	0.45
9	Manganese as Mn	<b>By AAS Method</b> APHA 3111 B; 23 <sup>rd</sup> Edition, 2017	mg/l	2	BDL
10	Nitrate as NO <sub>3</sub>	<b>By UV-Screen Method</b> APHA 4500 NO <sub>3</sub> <sup>-</sup> B; 23 <sup>rd</sup> Edition, 2017	mg/l	10	7.20
11	Phenolic Compounds as C <sub>6</sub> H <sub>5</sub> OH	<b>Distillation Followed by Spectrophotometric Method</b> APHA 5530-B, D; 23 <sup>rd</sup> Edition, 2017	mg/l	1	BDL
12	Selenium as Se	<b>By AAS Method</b> APHA 3500 Se C; 23 <sup>rd</sup> Edition, 2017	mg/l	0.05	BDL
13	Cadmium as Cd	<b>By AAS Method</b> APHA 3111 B; 23 <sup>rd</sup> Edition, 2017	mg/l	2.0	BDL
14	Cyanide as CN	<b>Distillation Followed by Spectrophotometric Method</b> APHA 4500 -CN-C,E; 23 <sup>rd</sup> Edition, 2017	mg/l	0.2	BDL
15	Lead as Pb	<b>By AAS Method</b> APHA 3111 B; 23 <sup>rd</sup> Edition, 2017	mg/l	0.1	BDL
16	Mercury as Hg	<b>By AAS Method</b> APHA 3112 B; 23 <sup>rd</sup> Edition, 2017	mg/l	0.01	BDL
17	Nickel as Ni	<b>By AAS Method</b> APHA 3111 B; 23 <sup>rd</sup> Edition, 2017	mg/l	3	BDL
18	Arsenic as As	<b>By AAS Method</b> APHA 3114 B; 23 <sup>rd</sup> Edition, 2017	mg/l	0.2	BDL
19	Total Chromium as Cr	<b>By AAS Method</b> APHA 3111 B; 23 <sup>rd</sup> Edition, 2017	mg/l	2	0.24
20	Zinc as Zn	<b>By AAS Method</b> APHA 3111 B; 23 <sup>rd</sup> Edition, 2017	mg/l	5	0.08
21	Hexavalent Chromium as Cr <sup>+6</sup>	<b>By AAS Method</b> APHA 3500 Cr B; 23 <sup>rd</sup> Edition, 2017	mg/l	0.05	0.024





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- Waste Management Services

22	Vanadium as V	<b>By AAS Method</b> APHA 3500 V; 23 <sup>rd</sup> Edition, 2017	mg/l	0.2	BDL
23	Temperature	<b>By Thermometer</b> APHA 2550 B; 23 <sup>rd</sup> Edition, 2017	°C	Shall not exceed 5°C above the receiving water temperature	29
24	Biochemical Oxygen Demand as BOD	<b>Oxygen Depletion Method</b> IS 3025 ( Part 44 ):2003	mg/l	30	6.4
25	Chemical Oxygen Demand as COD	<b>Open Reflux Method</b> APHA 5220 B; 23 <sup>rd</sup> Edition, 2017	mg/l	250	28.0
26	Oil & Grease	<b>Gravimetric Method (Solvent Extraction)</b> APHA 5520 B; 23 <sup>rd</sup> Edition, 2017	mg/l	10	10.0
27	Ammonical Nitrogen as N	<b>By TKN Method</b> APHA 4500-NH <sub>3</sub> C; 23 <sup>rd</sup> Edition, 2017	mg/l	50	4.4
28	Total Kjeldahl Nitrogen as N	<b>By TKN Method</b> APHA 4500-N <sub>org</sub> C; 23 <sup>rd</sup> Edition, 2017	mg/l	100	5.4
29	Sulphide as S	<b>By Methylene Blue Method</b> APHA 4500-S D; 23 <sup>rd</sup> Edition, 2017	mg/l	2	BDL
30	Free Ammonia as NH <sub>3</sub>	<b>By Calculation</b>	mg/l	5	0.56
31	Dissolve Phosphate as PO <sub>4</sub>	<b>APHA 23<sup>rd</sup> Edition 4500 P D</b>	mg/l	5	1.9
32	Particulate Size of Suspended Solids	<b>Gravimetric Method</b> APHA 2540 D; 23 <sup>rd</sup> Edition, 2017	μ	Shall pass 850 micron IS Sieve	<850
33	Bio-assay Test	<b>Evaluating Acute Toxicity</b> 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<0.05 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<sup>+6</sup><0.01 mg/l, Al<0.1 mg/l, B<0.1 mg/l, NO<sub>3</sub>1 mg/l)



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- Waste Management Services

Ref : Envlab/23-24/R- 12213

Date : 07.12.2023

## SOIL QUALITY ANALYSIS REPORT- NOV 2023

- Name of Client : M/s FERRO ALLOYS CORPORATION LIMITED , BHADRAK
- Name of the Project : OSTAPAL CHROMITE MINES , KALIAPANI, JAJPUR
- Sampling Location : S1 : East Side Quarry  
S2 : West Side Quarry  
S3 : North Side Quarry  
S4 : South Side Quarry
- Date of Sampling : 17.11.2023
- Date of Analysis : 18.11.2023 to 22.11.2023
- 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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- Mineral/Sub-Soil Exploration
- Waste Management Services

Ref : Envlab/23-24/R- 12214

Date : 07.12.2023

## NOISE QUALITY ANALYSIS REPORT- NOV 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 : 07.11.2023
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	69.7	63.1
N2	COB Plant	66.3	57.6
N3	Mines Loading & Unloading	65.6	62.8
N4	At Project Site	68.9	60.1
N5	Ostapal Village	48.7	40.9
N6	Gurujanga Village	52.9	43.1
N7	Gurujanga Village II	50.1	41.2
N8	Sukurangi Village	52.2	42.6
N9	Talangi Village	48.2	40.8
N10	Sukurangi Village II	51.9	39.2
N11	Kaliapani Village	50.4	41.4
N12	Kaliapani Colony	55.3	44.2
N13	Ostia Village	53.9	42.1

### 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- 12215

Date : 07.12.2023

## GROUND WATER LEVEL REPORT- NOV 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** : 24.11.2023
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	24.11.2023	4.10
2	Bore well Near Main Gate of OCM	mt/bgl	24.11.2023	5.38
3	Open Well Near Ostia Village	mt/bgl	24.11.2023	5.6
4	Open Well Near Ostapal Village	mt/bgl	24.11.2023	6.1
5	Tube well inside Shiva Temple of the Village Gurujanga	mt/bgl	24.11.2023	10.5
6	Tube well outside Shiva Temple of the Village Gurujanga	mt/bgl	24.11.2023	6.8
7	Eastern side of the Quarry (PZ-1)	mt/bgl	24.11.2023	6.2
8	Southern side of the Quarry (PZ-2)	mt/bgl	24.11.2023	5.7
9	Watsternside of the Quarry (PZ-3)	mt/bgl	24.11.2023	6.0

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Ref : Envlab/23-24/R-12216

Date : 07.12.2023

## FUGITIVE EMISSION ANALYSIS REPORT- NOV 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 : 28.11.2023
6. Date of Analysis : 19.11.2023 to 01.12.2023
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 <sup>rd</sup> 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 <sup>3</sup>	160	216	189

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- Waste Management Services

Ref : Envlab/23-24/R- 12217

Date : 07.12.2023

## DUST FALL ANALYSIS REPORT- NOV 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 : 10.11.2023
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 <sup>2</sup> d	ND
2	Nickel as Ni	mg/m <sup>2</sup> d	ND
3	Cobalt as CO	mg/m <sup>2</sup> d	ND
4	Arsenic as As	mg/m <sup>2</sup> d	ND

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- Mineral/Sub-Soil Exploration
- Waste Management Services

Ref : Envlab/23-24/R-12218

Date : 07.12.2023

## MEASUREMENT OF GROUND WATER QUALITY ANALYSIS REPORT NOV 2023

- Name of Client : M/s FERRO ALLOYS CORPORATION LIMITED , BHADRAK
- Name of the Project : OSTAPAL CHROMITE MINES , KALIAPANI, JAJPUR
- 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
- Method of Sampling : APHA 1060 B
- Date of Sampling : 10.11.2023
- Date of Analysis : 11.11.2023 to 13.11.2023
- 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	GW1	GW2	GW3	GW4	GW5
1	Hexavalent Chromium as Cr <sub>6+</sub>	By AAS Method APHA 23 <sup>RD</sup> Ed,2017: 3500 Cr B	mg/l	--	--	BDL	BDL	BDL	BDL	BDL

BDL value:0.01 mg/l

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- Environmental & Social Study

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- 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-12219

Date : 07.12.2023

## MEASUREMENT OF GROUND WATER QUALITY ANALYSIS REPORT NOV 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 : 10.11.2023
- Date of Analysis : 11.11.2023 to 13.11.2023
- 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 <sub>6+</sub>	By AAS Method APHA 23 <sup>RD</sup> Ed,2017: 3500 Cr B	mg/l	--	--	BDL	BDL	BDL	BDL

BDL Valve-0.01 mg/l

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- Agricultural Development
- Information Technology
- Public Health Engineering

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

Ref : Envlab/23-24/R- 12220

Date : 07.12.2023

## STP WATER QUALITY ANALYSIS REPORT- NOV 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: 28.11.2023

Date of Analysis: 29.11.2023 to 04.12.2023

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	7.23	7.30
2	SuspendedSolids	mg/l	APHA 2540 D	<100	71	78
3	Oil&Grease	mg/l	APHA 5520 B	--	4.7	4.1
4	BOD(3)daysat27°C	mg/l	APHA 5210 B	30	8.0	6.1
5	COD	mg/l	APHA 5220 C	--	28.0	20.0
6	TotalChromium(as Cr)	mg/l	APHA 3111 B	--	<0.01	<0.01
7	FeecalColiform	MPN/100ml	APHA 9221 E	<1000	63	40

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- Information Technology
- Public Health Engineering

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

Ref : Envlab/23-24/R-12221

Date : 07.12.2023

## STPMBBR BASIN WATER QUALITY ANALYSIS REPORT- NOV 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: : 28.11.2023

Date of Analysis: 29.11.2023 to 04.12.2023

SL.NO.	Parameters	Unit of Measurement	Standard Operating Range	W1	W2
1	pH Value (at 25°C)	--	6.5-8.0	6.69	6.75
2	MLSS	mg/l	2300-2500	2376	2315
3	MLVSS	mg/l	2700-3200	2744	2809
4	DO	mg/l	1.0-2.0	1.5	1.3

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

Ref : Envlab/23-24/R-12222

Date: 07.12.2023

## SURFACE WATER QUALITY ANALYSIS REPORT- NOV 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 : 07.11.2023
- Date of Analysis : 08.11.2023 to 15.11.2023
- 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 <sup>RD</sup> Ed,2017 : 2120 B. C	Hazen	300	<5	5
2	pH Value	pH Meter APHA 23 <sup>RD</sup> Ed,2017 : 4500H <sup>+</sup> B	--	6.0-9.0	7.22	7.25
3	Suspended solids	Gravimetric Method APHA 23 <sup>RD</sup> Ed,2017 : 2540 D	mg/l	--	60	78
4	Dissolved Oxygen (minimum)	Modified Winkler Method APHA 23 <sup>RD</sup> Ed,2017 : 2540 C	mg/l	4.0	6.1	6.4
5	Turbidity	Nephelometric Method APHA 23 <sup>RD</sup> Ed,2017: 2130 B	NTU	--	2.8	3.9
6	Chloride (max)	Titrimetric Method APHA 23 <sup>RD</sup> Ed,2017: 4500Cl <sup>-</sup> B	mg/l	600	35.0	40.0
7	Total Dissolved Solids	Gravimetric Method APHA 23 <sup>RD</sup> Ed,2017: 2540 C	mg/l	1500	150	167
8	BOD (3) days at 27 <sup>o</sup> C (max)	IS 3025(P-44) : 1993 RA 2003	mg/l	3.0	BDL	BDL
9	Arsenic as As	By AAS Method APHA 23 <sup>RD</sup> Ed,2017: 3114 B	mg/l	0.2	BDL	BDL
10	Lead as Pb(max)	By AAS Method APHA 23 <sup>RD</sup> Ed,2017 3111 B	mg/l	0.1	BDL	BDL
11	Cadmium as Cd (max)	By AAS Method APHA 23 <sup>RD</sup> Ed 2017: 3111 B	mg/l	0.01	BDL	BDL
12	Hexa Chromium as Cr <sup>+6</sup>	Diphenyl Carbazide Method APHA 23 <sup>RD</sup> Ed,2017: 3500Cr B	mg/l	0.05	<0.01	<0.01
13	Copper as Cu (max)	By AAS Method APHA 23 <sup>RD</sup> Ed,2017: 3111 B	mg/l	1.5	BDL	BDL
14	Zinc as Zn(max)	By AAS Method APHA 23 <sup>RD</sup> Ed,2017: 3111 B	mg/l	15	BDL	BDL
15	Selenium as Se (max)	By AAS Method APHA 23 <sup>RD</sup> Ed,2017: 3500 Se C	mg/l	0.05	BDL	BDL
16	Cyanide as CN (max)	Distillation followed by Spectrophotometric Method APHA 23 <sup>RD</sup> Ed,2017: 4500	mg/l	0.05	BDL	BDL
17	Fluoride as F (max)	Distillation followed by Spectrophotometric Method APHA 23 <sup>RD</sup> Ed,2017: 4500F <sup>-</sup> C	mg/l	1.5	0.22	0.35
18	Sulphates (SO <sub>4</sub> ) (max)	Turbidimetric Method APHA 23 <sup>RD</sup> Ed,2017: 4500 SO <sub>4</sub> <sup>2-</sup> F	mg/l	400	1.4	1.9



# Visiontek Consultancy Services Pvt. Ltd.

(Committed For Better Environment)

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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

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- Environmental & Social Study
- Surface & Sub-Surface Investigation
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19	Phenolic Compounds as C <sub>6</sub> H <sub>5</sub> OH (max)	Chloroform Extraction By Colorimetric Method APHA 23 <sup>RD</sup> Ed,2017: 5530 B,D	mg/l	0.005	BDL	BDL
20	Iron as Fe (max)	By AAS Method APHA 23 <sup>RD</sup> Ed,2017: 3500Fe, B	mg/l	0.5	0.092	0.098
21	Nitrate as NO <sub>3</sub> , (max)	By UV-Screen Method APHA 23 <sup>RD</sup> Ed,2017: 4500 NO <sub>3</sub> ·E	mg/l	50	3.5	4.1
22	Anionic Detergents (max)	Anionic Surfactants as MBAS APHA 23 <sup>RD</sup> Ed,2017: 5540 C	mg/l	1.0	ND	ND
23	Total Coli form	By Multiple Tube Fermentation Technique APHA 23 <sup>RD</sup> Ed,2017: 9221 B	MPN/ 100 ml	5000	700	940

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<0.05 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<sup>6+</sup><0.01 mg/l, Al<0.1 mg/l, B<0.1 mg/l, NO<sub>3</sub>1 mg/l)

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- Waste Management Services

Ref: VCSPL/23-24/R-12223

Date: 07.12.2023

## FLOW RATE MEASUREMENT REPORT OF DAMSALA NALLAH

1. Name of Industry : M/s FERRO ALLOYS CORPORATION LIMITED , BHADRAK  
OSTAPAL CHROMITE MINES , KALIAPANI, JAJPUR
2. Date of Sampling : 17.11.2023
3. Sampling Location : DAMSALA NALLAH
4. Sample Drawn By : VCSPL Representative in presence of Client representative

SL.No.	Location	Unit	Result
1.	Damsala Nallah	m <sup>3</sup> /s	144.7

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