

**MONITORING OF ENVIRONMENTAL  
PARAMETERS**

**(INTERIM REPORT FOR RAINY SEASON -2022)**

**FOR**

**JAGGAYAPETA LIMESTONE MINE**

**of**

**M/s. Rashtriya Ispat Nigam Limited.**

**(GOVERNMENT OF INDIA ENTERPRISE)**

**VISAKHAPATNAM STEEL PLANT**

**Budawada (V), Jaggayapeta(M), Krishna (Dist)**

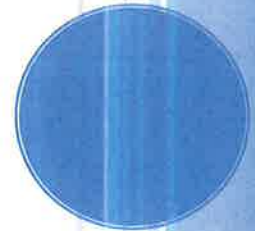
**Andhra Pradesh.**

**Prepared By**

**M/s. SV ENVIRO LABS & CONSULTANTS**

**(MOEF Recognized, NABL & NABET Accredited And  
ISO 9001 Certified Laboratory)**

**Enviro House, B1, Block-B, Autonagar, Visakhapatnam -12**



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**CHAPTER - 1**

**INTRODUCTION**

## 1.0 INTRODUCTION

Rashtriya Ispat Nigam Limited, the corporate entity of Visakhapatnam Steel Plant is a Navratna PSE under the Ministry of Steel. Visakhapatnam Steel Plant fondly called Vizag steel. It is the first shore based Integrated Steel Plant in the country and is known for its quality products delighting the customers. It is a market leader in long products and it caters to the needs of diverse industrial sectors. It is the first Steel plant to be certified ISO 9001:2008 (presently 2015), ISO 14001:2004 (presently 2015), OHSAS 18001:2007 and ISO/IEC 27001:2013 Standards. It is also the first PSE to be certified ISO 50001:2011 – Energy Management Systems and has acquired CMMI Level 3 Certification for S/W development.

The Infrastructure of Visakhapatnam Steel Plant comprises of Coke Ovens and Coal Chemical Plant, Sinter Plant, Blast furnace, Calcining and Refractory Material Plant, Steel Melt Shop and Continuous Casting, Light and Medium Merchant Mill, Medium Merchant and Structural Mill, Wire rod mill, Steel melt shop, Thermal power plant.

Rashtriya Ispat Nigam Limited, has captive mines namely Jaggayyapeta Limestone Mine, Madharam Dolomite Mine, Garbham Manganese Mine, Saripalli Sand Mine and Kintada Quartz Mine.

RINL has retained M/s. SV ENVIRO LABS & CONSULTANTS, to carry out the environmental monitoring studies at Jaggayyapeta Limestone Mine.

This report presents the environmental monitoring data of Rainy Season – AUGUST '2022 at Jaggayyapeta Limestone Mine.

## 1.1 LOCATION OF THE PROJECT

The Project site is located at Jaggayyapeta Limestone Mine of M/s. Rashtriya Ispat Nigam Limited located at Tehsil Jaggayyapeta, District Krishna, Andhra Pradesh.

**CHAPTER - 2**

**SCOPE OF WORK**

## 2.0 SCOPE OF WORK

The scope of the studies include monitoring of the following environmental components

### 1. Water quality

The parameters covered under the scope for each of the above attributes are given below:

#### SCOPE OF WORK

S.No	Attribute	Scope
1.	Water quality	Collection and analysis of river water/mine discharge water/well water and treated water as per <ul style="list-style-type: none"><li>• IS 10500 (Drinking water specifications)</li><li>• GSR 422 (E) –Inland surface water</li></ul> <b>Frequency :</b> Once in a season for all the four seasons at all locations

**CHAPTER – 3**

**METHODOLOGY**



### 3.0 METHODOLOGY

Methodologies adopted for sampling and analysis for each of the above parameters are detailed below

Methods of monitoring and analysis for various parameters

S.No	Attributes	Measurement Technique
1.	<b>Water Quality (Surface water, Mine discharge water, Well Water and Treated water)</b>	As per APHA 23 <sup>rd</sup> Edition'2017

**CHAPTER - 4**

**WATER QUALITY**

**4.0 STUDY OF WATER QUALITY – AUGUST – 2022**

<b>S.No</b>	<b>ATTRIBUTE</b>	<b>SCOPE</b>	<b>STUDIES CARRIED OUT</b>
1.	Water Quality	Collection of Surface water, Mine discharge water, Well Water and Treated water	Surface water of Paleru river upstream and downstream, Mine discharge water, VSP township tap water and Budawada borewell water samples have been collected on 22-08-2022.

**Water samples were collected at the following points.**

<b>Station code</b>	<b>Location</b>	<b>Environmental setting</b>
W1	Paleru River Upstream	Surface water
W2	Paleru River Down Stream	Surface Water
W3	Mine sump water	Surface Water
W4	Bore well (VSP Township)	Ground water
W5	Budawada well water	Ground water

The methodology for sample collection and preservation techniques was followed as per the Standard Operating Procedures (SOP) mentioned in table hereunder:

**Standard Operating Procedures (SOP) For Water Sampling**

Parameter	Sample Collection	Sample Size	Storage/ Preservation
pH	Grab sampling Plastic /glass container	50 ml	Refrigeration, can be stored for 7 days
Electrical Conductivity	Grab sampling Plastic /glass container	50 ml	Refrigeration, can be stored for 7 days
Total suspended solids	Grab sampling Plastic /glass container	100 ml	Refrigeration, can be stored for 7 days
Total Dissolved Solids	Grab sampling Plastic /glass container	100 ml	Refrigeration, can be stored for 7 days
BOD	Grab sampling Plastic /glass container	500 ml	Refrigeration, 48 hrs
Hardness	Grab sampling Plastic /glass container	100 ml	Add HNO <sub>3</sub> to pH<2, refrigeration; 6 months
Chlorides	Grab sampling Plastic /glass container	50 ml	Not required; 28 days
Sulphates	Grab sampling Plastic /glass container	100 ml	Refrigeration; 28 days
Nitrates	Plastic containers	100 ml	Refrigeration; 48 hrs
Fluorides	Plastic containers only	100 ml	Not required; 28 days
Alkalinity	Plastic/ glass containers	100 ml	Refrigeration; 14 days
Ammonia	Plastic/ glass containers	100 ml	Add H <sub>2</sub> SO <sub>4</sub> to pH>2, refrigeration, 28 days
Heavy Metals (Ar, Cd, Mn, Cu, Fe, Zn, Pb etc.)	Plastic/ Glass rinse with 1+1 HNO <sub>3</sub>	500 ml	Filter, add HNO <sub>3</sub> to pH>2; Grab sample; 6 months

*Source: Standard Methods for the Examination of Water and Wastewater, Published By APHA 23rd Edition, 2017*

The analytical techniques used for water analysis is given in the table hereunder:

**Analytical Techniques For Water Analysis**

S.No	Parameter	Method
1.	pH	APHA, 4500-H+B, 23rd Ed., 2017
2.	Colour	APHA, 2120-C/2120-B, 23rd Ed., 2017
3.	Odour	APHA, 2150, 23rd Ed., 2017
4.	Temperature	APHA, 2550-A+B, 23rd Ed., 2017
5.	Oil & Grease	APHA, 5520-D, 23rd Ed., 2017
6.	Total Suspended Solids	APHA, 2540-D, 23rd Ed., 2017
7.	Total Dissolved Solids	APHA, 2540-C, 23rd Ed., 2017
8.	Total Residual Chlorine	APHA, 4500-CI B, 23rd Ed., 2017
9.	Biochemical Oxygen Demand	APHA, 5210-B, 23rd Ed., 2017 4500-OC, 23rd Ed., 2017
10.	Chemical Oxygen Demand	APHA, 5220-B, 23rd Ed., 2017
11.	Free Ammonia	IS 3025
12.	Ammonical Nitrogen	APHA, 4500-NH <sub>3</sub> B, 23rd Ed., 2017
13.	Total Kjeldhal Nitrogen	APHA, 4500-Norg B, 23rd Ed., 2017
14.	Zinc	APHA, 3111-B, 23rd Ed., 2017
15.	Lead	APHA, 3111-B, 23rd Ed., 2017
16.	Cadmium	APHA, 3111-B, 23rd Ed., 2017
17.	Mercury	APHA, 3112-B, 23rd Ed., 2017
18.	Arsenic	APHA, 3114-B, 23rd Ed., 2017
19.	Copper	APHA, 3111-B, 23rd Ed., 2017
20.	Nickel	APHA, 3111-B, 23rd Ed., 2017
21.	Cyanide	APHA, 4500-CNB, 23rd Ed., 2017
22.	Fluoride	APHA, 4500-FD, 23rd Ed., 2017 (SPANDS Methods)
23.	Phosphates	APHA, 4500-PD, 23rd Ed., 2017
24.	Sulphates	APHA, 4500-SO <sub>4</sub> <sup>2-</sup> E, 23rd Ed., 2017
25.	Sulphide	APHA, 4500-S <sup>2-</sup> , 23rd Ed., 2017
26.	Manganese	APHA, 3111-B, 23rd Ed., 2017
27.	Iron	APHA, 3111-B, 23rd Ed., 2017
28.	Phenolic Compounds	APHA, 5530-B, 23rd Ed., 2017

Analysis results of the water samples collected from the above locations are enclosed as **Annexure – I.**

**ANNEXURE – I**  
**(Water Analysis Reports)**



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Ref: SVELC/RIL-JLM/22-08/01

Date: 05-09-2022

NAME AND ADDRESS : M/s. JAGGAYYAPETA LIMESTONE MINE,  
Visakhapatnam Steel Plant,  
Jaggayapeta-521175.  
Krishna District, A.P.

SAMPLE PARTICULARS : SURFACE WATER

SOURCE OF COLLECTION : PALERU RIVER UPSTREAM

DATE OF COLLECTION : 22-08-2022

## TEST REPORT

S.No	Parameter	Unit	Result	Standards as per GSR 422 (E)
1	Colour	Hazen	< 1.0	5
2	Odour	Agreeable	Agreeable	Agreeable
3	Turbidity	NTU	0.70	1.0
4	pH	-	7.23	5.5 to 9.0
5	Total Dissolved Solids	mg/l	468	500 – 2000
6	Total Suspended Solids	mg/l	12.0	100
7	Fluorides as F	mg/l	1.19	2.0
8	Nitrates as NO <sub>3</sub> <sup>-</sup>	mg/l	3.14	10
9	Iron as Fe	mg/l	0.07	3.0
10	Total Residual Chlorine	mg/l	<0.1	1.0
11	Phenolic Compounds as C <sub>6</sub> H <sub>5</sub> OH	mg/l	<0.005	1.0
12	Copper as Cu	mg/l	< 0.01	3.0
13	Manganese as Mn	mg/l	< 0.01	2.0
14	Zinc as Zn	mg/l	0.08	5.0
15	Sulphide as S	mg/l	< 0.1	2.0
16	Cadmium as Cd	mg/l	<0.001	2.0
17	Lead as Pb	mg/l	<0.01	0.1
18	Mercury as Hg	mg/l	<0.001	0.01
19	Nickel as Ni	mg/l	<0.01	3.0
20	Total Arsenic as As	mg/l	<0.01	0.2
21	Total Chromium as Cr	mg/l	<0.01	2.0
22	Hexavalent chromium as Cr <sup>+6</sup>	mg/l	< 0.1	0.1
23	Vanadium as V	mg/l	<0.01	0.2
24	Ammonical nitrogen as N	mg/l	< 0.01	50
25	Free ammonia as NH <sub>3</sub>	mg/l	< 0.1	5
26	Chemical Oxygen Demand - COD	mg/l	<10.0	250
27	Biochemical Oxygen Demand –BOD	mg/l	<3.0	30
28	Oil & Grease	mg/l	<1.0	10
29	Selenium as Se	mg/l	<0.01	0.05

Note: All the above parameters are tested as per APHA methods, 23<sup>rd</sup> Edition, 2017

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Ref: SVELC/RIL-JLM/22-08/02

Date: 05-09-2022

NAME AND ADDRESS : M/s. JAGGAYYAPETA LIMESTONE MINE,  
Visakhapatnam Steel Plant,  
Jaggayapeta-521175.  
Krishna District, A.P.

SAMPLE PARTICULARS : SURFACE WATER

SOURCE OF COLLECTION : PALERU RIVER DOWN STREEM

DATE OF COLLECTION : 22-08-2022

## TEST REPORT

S.No	Parameter	Unit	Result	Standards as per GSR 422 (E)
1	Colour	Hazen	< 1.0	5
2	Odour	Agreeable	Agreeable	Agreeable
3	Turbidity	NTU	1.77	1.0
4	pH	-	7.36	5.5 to 9.0
5	Total Dissolved Solids	mg/l	492	500 – 2000
6	Total Suspended Solids	mg/l	10.0	100
7	Fluorides as F	mg/l	1.20	2.0
8	Nitrates as NO <sub>3</sub> <sup>-</sup>	mg/l	5.24	10
9	Iron as Fe	mg/l	0.09	3.0
10	Total Residual Chlorine	mg/l	<0.1	1.0
11	Phenolic Compounds as C <sub>6</sub> H <sub>5</sub> OH	mg/l	<0.005	1.0
12	Copper as Cu	mg/l	< 0.01	3.0
13	Manganese as Mn	mg/l	< 0.01	2.0
14	Zinc as Zn	mg/l	0.12	5.0
15	Sulphide as S	mg/l	< 0.1	2.0
16	Cadmium as Cd	mg/l	<0.001	2.0
17	Lead as Pb	mg/l	<0.01	0.1
18	Mercury as Hg	mg/l	<0.001	0.01
19	Nickel as Ni	mg/l	<0.01	3.0
20	Total Arsenic as As	mg/l	<0.01	0.2
21	Total Chromium as Cr	mg/l	<0.01	2.0
22	Hexavalent chromium as Cr <sup>+6</sup>	mg/l	< 0.1	0.1
23	Vanadium as V	mg/l	<0.01	0.2
24	Ammonical nitrogen as N	mg/l	< 0.01	50
25	Free ammonia as NH <sub>3</sub>	mg/l	< 0.1	5
26	Chemical Oxygen Demand - COD	mg/l	<10	250
27	Biochemical Oxygen Demand –BOD	mg/l	<3.0	30
28	Oil & Grease	mg/l	<1.0	10
29	Selenium as Se	mg/l	<0.01	0.05

Note: All the above parameters are tested as per APHA methods, 23<sup>rd</sup> Edition, 2017

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Ref: SVELC/RIL-JLM/22-08/03

Date: 05-09-2022

NAME AND ADDRESS : M/s. JAGGAYYAPETA LIMESTONE MINE,  
Visakhapatnam Steel Plant,  
Jaggayapeta-521175.  
Krishna District, A.P.

SAMPLE PARTICULARS : SURACE WATER

SOURCE OF COLLECTION : MINE SUMP WATER

DATE OF COLLECTION : 22-08-2022

## TEST REPORT

S.No	Parameter	Unit	Result	Standards as per GSR 422 (E)
1	Colour	Hazen	< 1.0	5
2	Odour	Agreeable	Agreeable	Agreeable
3	Turbidity	NTU	<0.01	1.0
4	pH	-	7.76	5.5 to 9.0
5	Total Dissolved Solids	mg/l	198	500 – 2000
6	Total Suspended Solids	mg/l	24.0	100
7	Fluorides as F	mg/l	0.14	2.0
8	Nitrates as NO <sub>3</sub> <sup>-</sup>	mg/l	1.36	10
9	Iron as Fe	mg/l	0.05	3.0
10	Total Residual Chlorine	mg/l	<0.1	1.0
11	Phenolic Compounds as C <sub>6</sub> H <sub>5</sub> OH	mg/l	<0.005	1.0
12	Copper as Cu	mg/l	< 0.01	3.0
13	Manganese as Mn	mg/l	< 0.01	2.0
14	Zinc as Zn	mg/l	<0.01	5.0
15	Sulphide as S	mg/l	< 0.1	2.0
16	Cadmium as Cd	mg/l	<0.001	2.0
17	Lead as Pb	mg/l	<0.01	0.1
18	Mercury as Hg	mg/l	<0.001	0.01
19	Nickel as Ni	mg/l	<0.01	3.0
20	Total Arsenic as As	mg/l	<0.01	0.2
21	Total Chromium as Cr	mg/l	<0.01	2.0
22	Hexavalent chromium as Cr <sup>+6</sup>	mg/l	< 0.1	0.1
23	Vanadium as V	mg/l	<0.01	0.2
24	Ammonical nitrogen as N	mg/l	<0.1	50
25	Free ammonia as NH <sub>3</sub>	mg/l	< 0.1	5
26	Chemical Oxygen Demand - COD	mg/l	30.2	250
27	Biochemical Oxygen Demand – BOD	mg/l	10.0	30
28	Oil & Grease	mg/l	<1.0	10
29	Selenium as Se	mg/l	<0.01	0.05

Note: All the above parameters are tested as per APHA methods, 23<sup>rd</sup> Edition, 2017

BDL- Below detectable limit, Detectable limit- <0.005 µg/l

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Ref: SVELC/RIL-JLM/22-08/04

Date: 05-09-2022

NAME AND ADDRESS : M/s. JAGGAYYAPETA LIMESTONE MINE,  
Visakhapatnam Steel Plant,  
Jaggayapeta-521175.  
Krishna District, A.P.

SAMPLE PARTICULARS : GROUND WATER

SOURCE OF COLLECTION : BORE WELL WATER (VSP TOWNSHIP)

DATE OF COLLECTION : 22-08-2022

## TEST REPORT

S.No	Parameter	Unit	Result	IS 10500:2012 Specifications	
				Acceptable Limit	Permissible Limits
1.	Colour	Hazen	< 1.0	5 Max	15 Max
2.	Odour	-	Agreeable	Agreeable	Agreeable
3.	Temperature	°C	28.8	-	-
4.	Taste	-	Agreeable	Agreeable	Agreeable
5.	Turbidity	NTU	1.38	1 Max	5 Max
6.	pH	-	7.50	6.5 to 8.5	No relaxation
7.	Total Dissolved Solids	mg/l	410	500 Max	2000 Max
8.	Total Alkalinity as CaCO <sub>3</sub>	mg/l	281	200 Max	600 Max
9.	Total Hardness as CaCO <sub>3</sub>	mg/l	312	200 Max	600 Max
10.	Calcium as Ca	mg/l	50.4	75 Max	200 Max
11.	Magnesium as Mg	mg/l	45.2	30 Max	100 Max
12.	Chlorides as Cl <sup>-</sup>	mg/l	68.6	250 Max	1000 Max
13.	Fluorides as F <sup>-</sup>	mg/l	0.23	1.0 Max	1.5 Max
14.	Nitrates as NO <sub>3</sub> <sup>-</sup>	mg/l	8.14	45 Max	No relaxation
15.	Sulphates as SO <sub>4</sub> <sup>2-</sup>	mg/l	13.2	200 Max	400 max
16.	Iron as Fe	mg/l	0.16	0.3 Max	No relaxation
17.	Free Residual Chlorine	mg/l	< 0.1	0.2 Min	1.0 Min
18.	Phenolic Compounds as C <sub>6</sub> H <sub>5</sub> OH	mg/l	<0.005	0.001 Max	0.002 Max
19.	Copper as Cu	mg/l	< 0.01	0.05 Max	1.5 Max
20.	Manganese as Mn	mg/l	< 0.01	0.1 Max	0.3 max
21.	Zinc as Zn	mg/l	0.53	5.0	15 Max
22.	Aluminum as Al	mg/l	< 0.01	0.03 Max	0.2 Max
23.	Boron as B	mg/l	< 0.01	0.5 Max	1.0 Max
24.	Sulphide as H <sub>2</sub> S	mg/l	< 0.1	0.05 Max	No relaxation
25.	Anionic Detergents (as MBAS)	mg/l	< 0.1	0.2 Max	1.0 Max
26.	Barium as Ba	mg/l	0.65	0.7 Max	No relaxation
27.	Chloramines (as Cl <sub>2</sub> )	mg/l	<1.0	4.0 Max	No relaxation
28.	Ammonia as total ammonia-N	mg/l	< 0.01	0.5	No relaxation
29.	Mineral Oil	mg/l	< 0.01	0.5 Max	No relaxation
30.	Selenium as Se	mg/l	< 0.01	0.01 Max	No relaxation
31.	Silver as Ag	mg/l	< 0.01	0.1 Max	No relaxation





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32.	Cadmium as Cd	mg/l	<0.001	0.003	No relaxation
33.	Cyanide as CN	mg/l	<0.02	0.05	No relaxation
34.	Lead as Pb	mg/l	<0.01	0.01	No relaxation
35.	Mercury as Hg	mg/l	<0.001	0.001	No relaxation
36.	Molybdenum as Mo	mg/l	<0.01	0.07	No relaxation
37.	Nickel as Ni	mg/l	<0.01	0.02	No relaxation
38.	Total Arsenic as As	mg/l	<0.01	0.01	0.05
39.	Total Chromium as Cr	mg/l	<0.01	0.05	No relaxation
40.	Polychlorinated biphenyls	mg/l	<0.0001	0.0005	No relaxation
41.	Polynuclear aromatic Hydrocarbons as PAH	mg/l	<0.0001	0.0001	No relaxation

### MICROBIOLOGY:

42.	<i>E. coli</i>	CFU/100mL	Not detected	Shall not be detected in 100 ml	Shall not be detected in 100 ml
43.	<i>Total coliforms</i>	CFU/100mL	Not detected	Shall not be detected in 100 ml	Shall not be detected in 100 ml
44.	<i>Faecal coliforms</i>	CFU/100mL	Not detected	-	-

### PESTICIDES:

45.	Alpha HCH	µg/l	BDL	0.01	No relaxation
46.	Beta HCH	µg/l	BDL	0.04	No relaxation
47.	Butachlor	µg/l	BDL	125	No relaxation
48.	Chlorpyrifos	µg/l	BDL	30	No relaxation
49.	Delta HCH	µg/l	BDL	0.04	No relaxation
50.	2,4- Dichlorophenoxyacetic Acid	µg/l	BDL	30	No relaxation
51.	DDT (o,p and p,p-Isomers of DDT, DDE and DDD)	µg/l	BDL	1.0	No relaxation
52.	Endosulfan (alpha, beta and Sulphate)	µg/l	BDL	0.4	No relaxation
53.	Ethion	µg/l	BDL	3.0	No relaxation
54.	Gamma-HCH (Lindane)	µg/l	BDL	2.0	No relaxation
55.	Isoproturon	µg/l	BDL	9.0	No relaxation
56.	Malathion	µg/l	BDL	190	No relaxation
57.	Methyl Parathion	µg/l	BDL	0.3	No relaxation
58.	Alachlor	µg/l	BDL	20	No relaxation
59.	Atrazine	µg/l	BDL	2.0	No relaxation
60.	Aldrin/ Dieldrin	µg/l	BDL	0.03	No relaxation
61.	Monocrotophos	µg/l	BDL	1.0	No relaxation
62.	Phorate	µg/l	BDL	2.0	No relaxation

### TRihalomethane

63.	Bromoform	mg/l	<0.05	0.1	No relaxation
64.	Dibromochloromethane	mg/l	<0.05	0.1	No relaxation
65.	Bromodichloromethane	mg/l	<0.05	0.06	No relaxation
66.	Chloroform	mg/l	<0.05	0.2	No relaxation

Note: All the above parameters are tested as per APHA methods, 23<sup>rd</sup> Edition, 2017

BDL- Below detectable limit, Detectable limit- <0.005 µg

CHECKED BY



SV ENVIRO LABS & CONSULTANTS



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(Environmental Engineers & Consultants in Pollution Control)

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Recognized by Govt.of India-MoEF & CC, New Delhi, Accredited by : NABL & NABET



Ref: SVELC/RIL-JLM/22-08/05

Date: 05-09-2022

NAME AND ADDRESS : M/s. JAGGAYAPETA LIMESTONE MINE,  
Visakhapatnam Steel Plant,  
Jaggayapeta-521175.  
Krishna District, A.P.

SAMPLE PARTICULARS : GROUND WATER

SOURCE OF COLLECTION : BUDAWADA DUG WELL WATER

DATE OF COLLECTION : 22-08-2022

## TEST REPORT

S.No	Parameter	Unit	Result	IS 10500:2012 Specifications	
				Acceptable Limit	Permissible Limits
1.	Colour	Hazen	< 1.0	5 Max	15 Max
2.	Odour	-	Agreeable	Agreeable	Agreeable
3.	Temperature	°C	29.6	-	-
4.	Taste	-	Agreeable	Agreeable	Agreeable
5.	Turbidity	NTU	<0.01	1 Max	5 Max
6.	pH	-	7.15	6.5 to 8.5	No relaxation
7.	Total Dissolved Solids	mg/l	1234	500 Max	2000 Max
8.	Total Alkalinity as CaCO <sub>3</sub>	mg/l	250	200 Max	600 Max
9.	Total Hardness as CaCO <sub>3</sub>	mg/l	360	200 Max	600 Max
10.	Calcium as Ca	mg/l	196	75 Max	200 Max
11.	Magnesium as Mg	mg/l	41.4	30 Max	100 Max
12.	Chlorides as Cl <sup>-</sup>	mg/l	308	250 Max	1000 Max
13.	Fluorides as F	mg/l	1.18	1.0 Max	1.5 Max
14.	Nitrates as NO <sub>3</sub> <sup>-</sup>	mg/l	130	45 Max	No relaxation
15.	Sulphates as SO <sub>4</sub> <sup>2-</sup>	mg/l	260	200 Max	400 max
16.	Iron as Fe	mg/l	2.48	0.3 Max	No relaxation
17.	Free Residual Chlorine	mg/l	< 0.1	0.2 Min	1.0 Min
18.	Phenolic Compounds as C <sub>6</sub> H <sub>5</sub> OH	mg/l	<0.005	0.001 Max	0.002 Max
19.	Copper as Cu	mg/l	< 0.01	0.05 Max	1.5 Max
20.	Manganese as Mn	mg/l	< 0.01	0.1 Max	0.3 max
21.	Zinc as Zn	mg/l	1.12	5.0	15 Max
22.	Aluminum as Al	mg/l	< 0.01	0.03 Max	0.2 Max
23.	Boron as B	mg/l	< 0.01	0.5 Max	1.0 Max
24.	Sulphide as H <sub>2</sub> S	mg/l	< 0.1	0.05 Max	No relaxation
25.	Anionic Detergents (as MBAS)	mg/l	< 0.1	0.2 Max	1.0 Max
26.	Barium as Ba	mg/l	0.51	0.7 Max	No relaxation
27.	Chloramines (as Cl <sub>2</sub> )	mg/l	<1.0	4.0 Max	No relaxation
28.	Ammonia as total ammonia-N	mg/l	< 0.01	0.5	No relaxation
29.	Mineral Oil	mg/l	< 0.01	0.5 Max	No relaxation
30.	Selenium as Se	mg/l	< 0.01	0.01 Max	No relaxation
31.	Silver as Ag	mg/l	< 0.01	0.1 Max	No relaxation
32.	Cadmium as Cd	mg/l	<0.001	0.003	No relaxation
33.	Cyanide as CN	mg/l	<0.02	0.05	No relaxation
34.	Lead as Pb	mg/l	<0.01	0.01	No relaxation
35.	Mercury as Hg	mg/l	<0.001	0.001	No relaxation



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36.	Molybdenum as Mo	mg/l	<0.01	0.07	No relaxation
37.	Nickel as Ni	mg/l	<0.01	0.02	No relaxation
38.	Total Arsenic as As	mg/l	<0.01	0.01	0.05
39.	Total Chromium as Cr	mg/l	<0.01	0.05	No relaxation
40.	Polychlorinated biphenyls	mg/l	<0.0001	0.0005	No relaxation
41.	Polynuclear aromatic Hydrocarbons as PAH	mg/l	<0.0001	0.0001	No relaxation

### MICROBIOLOGY:

42.	<i>E. coli</i>	CFU/100mL	Not detected	Shall not be detected in 100 ml	Shall not be detected in 100 ml
43.	<i>Total coliforms</i>	CFU/100mL	21	Shall not be detected in 100 ml	Shall not be detected in 100 ml
44.	<i>Faecal coliforms</i>	CFU/100mL	Not detected	-	-

### PESTICIDES:

45.	Alpha HCH	µg/l	BDL	0.01	No relaxation
46.	Beta HCH	µg/l	BDL	0.04	No relaxation
47.	Butachlor	µg/l	BDL	125	No relaxation
48.	Chlorpyrifos	µg/l	BDL	30	No relaxation
49.	Delta HCH	µg/l	BDL	0.04	No relaxation
50.	2,4- Dichlorophenoxyacetic Acid	µg/l	BDL	30	No relaxation
51.	DDT (o,p and p,p-Isomers of DDT, DDE and DDD)	µg/l	BDL	1.0	No relaxation
52.	Endosulfan (alpha, beta and Sulphate)	µg/l	BDL	0.4	No relaxation
53.	Ethion	µg/l	BDL	3.0	No relaxation
54.	Gamma-HCH (Lindane)	µg/l	BDL	2.0	No relaxation
55.	Isoproturon	µg/l	BDL	9.0	No relaxation
56.	Malathion	µg/l	BDL	190	No relaxation
57.	Methyl Parathion	µg/l	BDL	0.3	No relaxation
58.	Alachlor	µg/l	BDL	20	No relaxation
59.	Atrazine	µg/l	BDL	2.0	No relaxation
60.	Aldrin/ Dieldrin	µg/l	BDL	0.03	No relaxation
61.	Monocrotophos	µg/l	BDL	1.0	No relaxation
62.	Phorate	µg/l	BDL	2.0	No relaxation

### TRIHALOMETHANE

63.	Bromoform	mg/l	<0.05	0.1	No relaxation
64.	Dibromochloromethane	mg/l	<0.05	0.1	No relaxation
65.	Bromodichloromethane	mg/l	<0.05	0.06	No relaxation
66.	Chloroform	mg/l	<0.05	0.2	No relaxation

**Note: All the above parameters are tested as per APHA methods, 23<sup>rd</sup> Edition, 2017**

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