



ज़ावर माईंस  
पिन कोड - 313901  
ज़िला - उदयपुर (राज.)

**HINDUSTAN ZINC LIMITED**  
**हिन्दुस्तान जिंक लिमिटेड**  
Telephone - (0294) 2723400

Zawar Mines  
PIN Code – 313901  
Dist - Udaipur (Raj.)

Ref.: - HZL/ZM/ENV/2023/ ३२०

Date – 10.08.2023

**By Registered**

The Member Secretary  
Rajasthan State Pollution Control Board  
4- Institutional Area, Jhalana Dungri  
JAIPUR-302004 (Raj)

Sub.: Environmental Statement for the year 2022-23 for Zawar Group of Mines

**Ref: F(Mines)/Udaipur (Sarada)/53(1)/2016-2017/5003-5007 dated 20/12/2022  
F (HDF)/Udaipur (Sarada)/1(1)/2020-2021/5368-5370 dated 28/12/2022  
Environment Clearance vide No – J-11015/259/2012-IA-II(M) dated 16/10/2020**

Sir

Please find attached herewith the **Environmental Statement** for the year **2022-23** for **Zawar Group of Mines**

Thanking you

Yours Sincerely



**Ram Murari**  
**(CEO- IBU, Zawar)**

Encl.: As above

- CC: 1. The Deputy Director (S), Scientist- C, Ministry of Environment, Forest & Climate Change, Integrated Regional Office, A-209 & 218, Aranya Bhawan, Jhalana Institutional Area, Jaipur (Rajasthan)- 302004  
2. The Regional Officer, Rajasthan State Pollution Control Board, F-470, Near UCCI Building, Madri Industrial Area, Udaipur-313003 (Raj.).  
3. Office Copy (Env. Cell)

**FORM – V**  
**(See Rule-14)**

**Environmental Statement for the financial year ending the 31<sup>st</sup> MARCH, 2023**

**PART – A**

(i)	Name and Address of the Owner / Occupier of the Industry / Operation or Process	Sh. Arun Misra (Occupier) CEO & Whole Time Director Hindustan Zinc Limited, Yashad Bhawan, Udaipur-313001 (Raj)
(ii)	Industry category Primary (STC code) Secondary (STC code)	Red/Large Mining of lead-zinc minerals and ore processing NA
(iii)	Production capacity	4.8 Mtpa of ore production & Its beneficiation
(iv)	Year of establishment	Prior to 1950
(v)	Date of last environmental statement submitted	17.09.2022

**PART – B**

Water and Raw material Consumption

- (i) Water consumption m<sup>3</sup>/d  
 Process – 2682.12 m<sup>3</sup>/d  
 Cooling - NA  
 Domestic- 4061.96 m<sup>3</sup>/d

Name of product	Process fresh water consumption per unit of product output.**		
	During the previous financial year (2021-22)	During the current financial year (2022-23)	
(1) Lead - Zinc concentrate	(1) 0.27 m <sup>3</sup> /MT*	(2) 0.29 m <sup>3</sup> /MT*	
(ii) Raw material consumption			
Name of Raw materials	Name of products	Consumption of raw material per unit of output (gm/MT) **	
		during the previous financial year (2021-22)	during the current financial year (2022-23)
Copper Sulphate	Lead - Zinc concentrate	140.66	110.86
MIBC + Frothosol		35.80	29.16
Xanthate		32.40	30.43
Sodium Cyanide		5.56	3.93
Lime		0	3.25

\*Our product output is lead - zinc concentrate. Whereas water consumption shown as cubic meter per ton of ore treatment in beneficiation plant

\*\*Raw material consumption is shown as grams per ton of ore treatment

Production	2021-22 (MT)	2022-23 (MT)
Ore Treatment	4416711	4289517
Total Concentrate	288774	295508

**PART – C**

Pollution discharged to environment/unit of output.

(Parameters as specified in the consent issued)				Percentage of variation from prescribed standards with reason
(1) Pollution	Quantity of pollutants discharged (mass/day)	Concentration of pollutants discharge (mass/volume)	in	
a) Water	Zero discharge status			
(b) Air	Air dust emission from stack (SPM)			
Mochia Crusher	10.2 kg/day	29.18 mg/Nm <sup>3</sup>		80.55 % lesser than standard
Balaria Crusher	8.9 kg/day	27.37 mg/Nm <sup>3</sup>		81.75 % lesser than standard
DE-2 (Mill-2)	7.1 kg/day	31.72 mg/Nm <sup>3</sup>		78.85 % lesser than standard
DG- Set		50.70 mg/Nm <sup>3</sup>		32.40 % lesser than standard

**PART – D**

**HAZARDOUS WASTES**

**(as specified under Hazardous Wastes (Management, Handling & Transboundary Movement) Rules 2016)**

Hazardous wastes	Total Quantity (MT) during the previous financial year (2021-22)	during the current financial year (2022-23)
(a) From Process		
Decontaminated drums	492 Nos. (Gen.), 2.86 MT (Disposed)	337 Nos.(Gen.), 1.8 MT (Disposed)
Oil Sludge sold	43.28 MT	61.94 MT
Used Oil sold	ZM- 260.39 MT ZM CPP- 7.29 MT	ZM- 287.18 MT ZM CPP- 4.96 MT
Scrap lead acid batteries sold	1.28 MT	4.54 MT
(b) From pollution control facilities	Nil	Nil

**PART – E**

**Solid Wastes**

		Total Quantity (MT) during the previous financial year (2021-22)	during the current financial year (2022-23)
a	From process (Tailings)*	4127937 MT	3994009 MT
b	From pollution control facility **	Nil	Nil
c	1-Quantity recycled or reutilized	Nil	Nil
	2-Solid	Nil	Nil
	3-Disposed***		
	Oil Sludge sold	43.28 MT	61.94 MT
	Decontaminated drums	492 Nos. (Gen.), 2.86 MT (Disposed)	337 Nos. (Gen.), 1.8 MT (Disposed)
	Used Oil sold	ZM- 260.39 MT ZM CPP- 7.29 MT	ZM- 287.18 MT ZM CPP- 4.96 MT
	Scrap lead acid batteries sold	1.28 MT	4.54 MT

\* Tailing is a major waste material generated from beneficiation plant.

\*\* All the dust slurry transported to process plant and utilized.

\*\*\* Used/Spent oil & Scrap lead acid batteries sold to registered parties with MoEF / CPCB.

## **PART – F**

Please specify the characterizations (in terms of composition and quantum) of hazardous as well solid wastes and indicate disposal practice adopted for both these categories of wastes.

- i. **Solid Waste**- The Solid Waste in form of tailings (Non-Hazardous) generated from beneficiation plant is- **3994009 MT** having following mineralogical composition

<b>Particular</b>	<b>% Content</b>
Total Lead	0.09%
Total Zinc	0.10%
Total Iron	3.08%
Insoluble	34.35%
Cadmium	0.0021%

Tailing is pumped to Dry tailing plant where water is separated from tailings and dry tailing cake having moisture around 15 to 18% is disposed in Tailing storage facility (TSF). Water thus separated is 100% recycled in beneficiation plant.

Hydro fill plant and paste fill plant are in place to backfill the tailing in mine void at Mochia and Zawarmala respectively.

**Waste rock**- Total generation – **1349180 MT**

Waste rock are filled back in mine void and partially utilized for covering slope of TSF etc for arresting fugitive dust generation.

**Used oil**- Used oil is recovered from the different machinery and heavy earth movers. Used oil is stored in drums and kept in the specified area for disposal to registered re-refiners with MoEF/CPCB

**Discarded Containers and bags**- Discarded containers of chemicals are stored in the earmarked place and after decontamination, disposal to authorize TSDF.

## **PART – G**

Impact of the pollution abatement measures taken on conservation of natural resources and on the cost of production.

Wet Tailing of beneficiation plant is being processed in Dry Tailing Plant to produce dry tailing of 15-18% moisture content, which is stacked in Tailing Storage facility. Water is reclaimed from Dry Tailing plant and is pumped back to beneficiation plant for reuse. Water requirement is met out by our captive Tidi Dam. The water requirement for process plant is meet out by 80% reclaimed water of tailing storage facility thereby reducing fresh water consumption.



Dry Tailing Plant



Dry Tailing



Tailing Storage Overview



Tailing Embankment Drain

## PART – H

Additional measures/investment proposal for environmental protection including abatement of pollution, prevention of pollution.

- Hydrofill and pastefill plant to backfill tailings in mine void

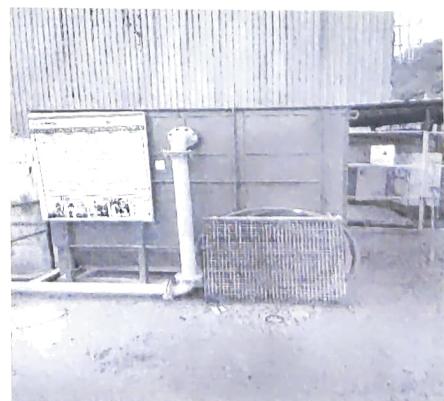
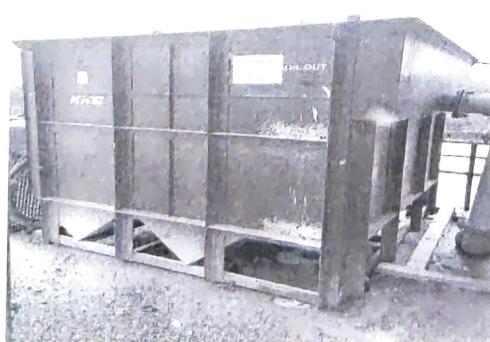


Hydro Fill Plant



Paste Fill Plant

- Wet drilling operations continued.
- Transportation of concentrates in tarpaulin covered trucks.
- Underground water sprinkler on haul road.
- Oil water separator



Oil Water Separator



**Vehicle Washing Facility**



**Tarpaulin covered truck**

- De-dusting systems at both the secondary crushers at Beneficiation Plant (Mochia & Balaria crushers & New Crusher).
- Installation of water sprinklers at Ore Stockpile and other transfer points.



**Mochia Coarse Ore Stockpile**



**Balaria Coarse Ore Stockpile**



**TSF Plantation**

**Unit is certified for ISO-9001:2015 (Quality Management System), ISO-14001:2015 (Environmental Management System), ISO-45001:2018 (Occupational Health & Safety Management System), SA-8000:2014 (Social Accountability) and ISO 50001:2018 (Energy Management System)**

#### **Part- I**

Any other particulars for improving the quality of the environment.

1. **Air pollution control:** Dust extraction systems are in place for the crushers. Water sprinkling on ore while transportation and prior to crushing. Monitoring twice a month of ambient air at 8 locations and stack emission from stacks of crushing section for suspended particulate matter.
2. **Water pollution control:**
  - a. Quality of mine water and ground water in and around the mine complex is being monitored regularly.
  - b. Wet Tailing of beneficiation plant is being processed in Dry Tailing Plant to produce dry tailing of 15-18 % moisture content, which is stacked in Tailing Storage facility. Water is reclaimed from Dry Tailing plant and is pumped back to beneficiation plant for reuse.
  - c. Reclaim water reservoir of 2,000 m<sup>3</sup> capacity is used to prevent processed water from mixing to natural water source.
3. **Noise and Vibration control:** Sound level for mining equipment's, beneficiation plant is regularly monitored. Use of blasting software for blast design and improvement in fragmentation. Ground vibrations are monitored on regular basis.
4. **Plantation:** Land acquired for mining activity is 483.23 hectares, out of this 170.85 is having plantation. During the year 2500 plantation done at TSF & 1500 plantation done as gap filling.
5. **Expenditure:** Year wise expenditure are reported to MoEF and its Regional Office at Lucknow. Total expenses during 2022-23 is **273.61 lac**

#### **6. Environmental awareness:**

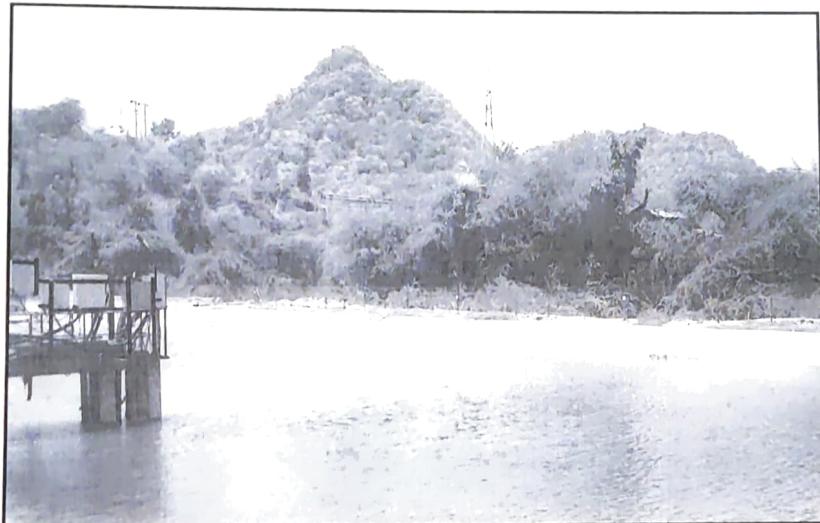
Several environment awareness activities are organized by Zawar Mines Environment Team. Plantation drive Conducted at various locations of Zawar Mines: Balaria Mines, Mochia Mines, Baroi Mines, Zawarmala Mines, Mill Office, VTC. Also, Various competitions were organised on World Environment day.



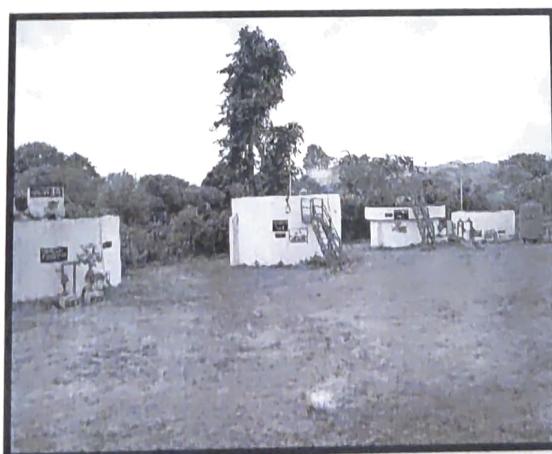
Also, conducted training programs on Environment rules and regulations, waste management Climate change and other environment management aspects.

**7. Water Conservation Measures:** By deploying various water conservation measures Zawar Mines maintains Zero Effluent Discharge status. Following activities are being practiced and will be continued for monitoring and maintain zero discharge:

- Recycling of mine water for mining and beneficiation process.
- Wet Tailing of beneficiation plant is being processed in Dry Tailing Plant to produce dry tailing of 15-18 % moisture content, which is stacked in Tailing Storage facility. Water is reclaimed from Dry Tailing plant and is pumped back to beneficiation plant for reuse.
- Sewage Treatment Plants (300 KLD & 150 KLD) for domestic waste water. Treated water is recycled in Beneficiation plant, surface exploration drilling, plantation etc.
- 5,000 m<sup>3</sup> Reservoir to collect and recycle the water.
- Zero discharge is being maintained.
- Regular monitoring of ground water.



**Recycling arrangement (storage cum pumping arrangement)**

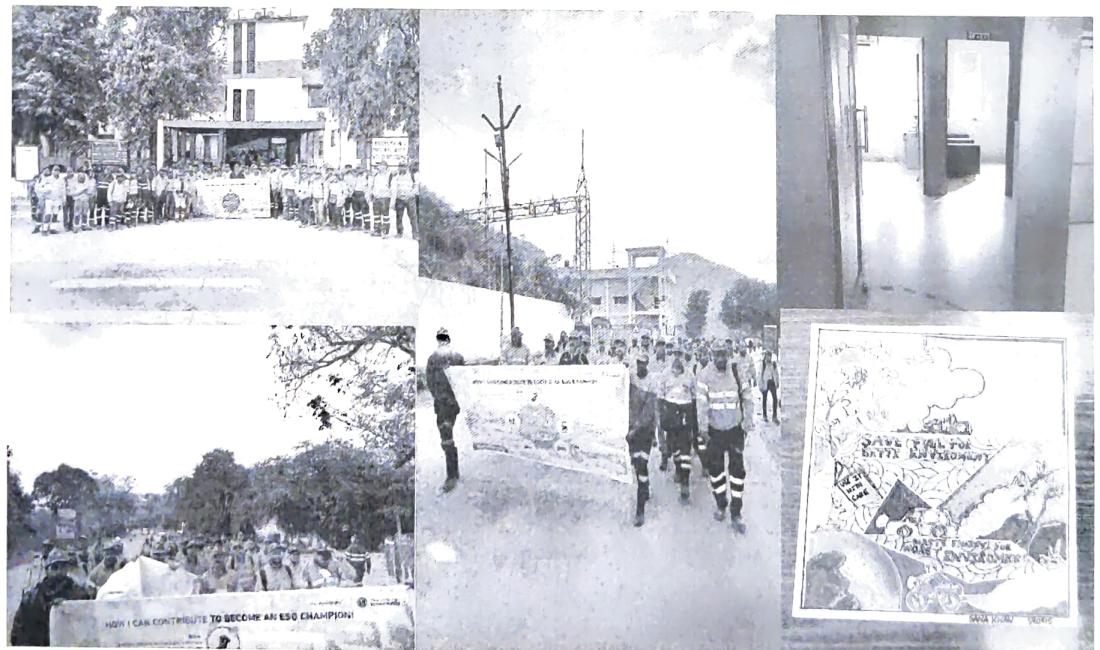


**Sewage Treatment Plan**

**8. World Environment Day Celebration:** World Environment Day was celebrated on **5<sup>th</sup> June 2022 & 2023**. Various competitions were organized for example Miniature painting competition on plastic waste, Quiz competition on environment & sustainability, poster, slogan & creative utilization of waste competition and prizes were distributed to the winners. Plantation was also done by participants at designated site.



**9. Energy Conservation Week Celebration:** Celebrated energy conservation week in which various events like poster, slogan & crossword competition were organized. Conserve to preserve hour organized in office premises. Organized **No Vehicle Day** on 14<sup>th</sup> December.



**10. Green-Co certification-** Zawar Mines received the Silver Rating from CII Green-Co. This is highest rating obtained by Mines in the country. Second Mines in the country to obtain this certification.



**AMBIENT AIR QUALITY AT ZAWAR GROUP OF MINES**

PM <sub>10</sub> IN AMBIENT AIR ZAWAR GROUP OF MINES ( $\mu\text{g}/\text{m}^3$ ) Limit for PM <sub>10</sub> =100						
Month	Mill Office	Mochia Mine	Balaria Mine	Admin Block	Zawarmala Mine	Baroi Mine
Apr-22	67.04	79.74	65.27	72.56	68.76	68.32
May-22	66.2	71.91	69.51	76.45	77.1	76.01
Jun-22	71.85	74.5	67.49	65.88	70.01	68.2
Jul-22	46.47	39.9	42.49	39.31	43.88	36.02
Aug-22	46.47	51.88	50.03	49.03	43.08	51.42
Sep-22	56.77	61.26	64.6	74.02	45.85	56.51
Oct-22	67.27	58.87	49.61	55.31	76.06	75.27
Nov-22	68.8	78.9	79.16	63.68	70.32	66.82
Dec-22	74.43	80.52	75.31	72.87	83.81	79.26
Jan-23	79.45	64.82	70.11	72.65	77.02	68.04
Feb-23	76.05	78.37	72.13	64.64	69.41	78.82
Mar-23	70.81	75.44	62.13	72.59	74.15	71.31

PM <sub>2.5</sub> IN AMBIENT AIR ZAWAR GROUP OF MINES ( $\mu\text{g}/\text{m}^3$ ) Limit for PM <sub>2.5</sub> =60						
Month	Mill Office	Mochia Mine	Balaria Mine	Admin Block	Zawarmala Mine	Baroi Mine
Apr-22	39.01	31.18	38.53	29.45	28.48	28.96
May-22	32.55	26.15	28.26	34.17	37.27	34.7
Jun-22	36.52	37.87	32.48	31.28	38.95	34.17
Jul-22	23.22	19.78	21.17	18.18	19.38	18.79
Aug-22	19.42	25.23	21.04	21.82	20.93	18.24
Sep-22	29.98	27.03	26.36	23.25	21.7	23.58
Oct-22	26.9	26.27	24.33	30.09	31.65	27.94
Nov-22	41.01	38.05	36.41	25.52	30.63	32.74
Dec-22	33.02	32.51	32.94	36.6	36.44	32.43
Jan-23	31.34	29.01	30.64	27.7	30.12	25.32
Feb-23	33.07	36.98	35.57	37.89	41.56	33.46
Mar-23	30.94	30.35	25.52	28.08	27.73	30.17

SO <sub>2</sub> IN AMBIENT AIR ZAWAR GROUP OF MINES ( $\mu\text{g}/\text{m}^3$ ) Limit for SOX=80						
Month	Mill Office	Mochia Mine	Balaria Mine	Admin Block	Zawarmala Mine	Baroi Mine
Apr-22	2.03	4.42	2.03	4.57	4.42	3.62
May-22	4.3	4.45	4.29	4.86	4.77	4.8
Jun-22	4.12	3.03	3.25	3.2	3.85	3.66
Jul-22	2.92	3.24	4.38	3.43	2.81	3.38
Aug-22	3.6	3.8	3.69	3.38	3.98	4.07
Sep-22	3.84	3.72	3.7	3.67	3.86	3.78
Oct-22	3.99	3.1	3.59	3.61	3.82	3.46
Nov-22	3.1	3.93	3.98	4.31	3.42	3.63
Dec-22	5.26	5.27	4.75	5.16	5.49	5.05
Jan-23	5.28	4.04	4.85	3.62	5.3	5.09
Feb-23	5.45	5.33	5.36	4.9	4.96	3.55
Mar-23	5.52	6.5	3.44	5.26	3.42	5.87

NOX IN AMBIENT AIR ZAWAR GROUP OF MINES ( $\mu\text{g}/\text{m}^3$ ) Limit for NOX=80						
Month	Mill Office	Mochia Mine	Balaria Mine	Admin Block	Zawarmala Mine	Baroi Mine
Apr-22	12.85	11.08	11.35	13.52	13.75	12.48
May-22	14.87	14.63	14.61	16.19	16.26	15.46
Jun-22	13.26	13.12	13.95	13.2	13.41	13.28
Jul-22	12.65	14.78	11.57	11.67	13.9	10.54
Aug-22	12.87	12.67	13.05	12.6	12.44	12.58
Sep-22	12.71	12.98	12.88	12.38	12.63	13.25
Oct-22	13.21	12.48	13.19	10.92	11.93	11.45
Nov-22	12.26	11.1	11.67	15.39	11.01	9.99
Dec-22	12.8	13.03	12.78	13.75	12.7	13.51
Jan-23	12.58	12.48	12.34	12.66	12.27	12.63
Feb-23	12.51	12.44	12.82	12.76	13.81	12.58
Mar-23	14.79	13.59	13.16	14.09	13.33	15.11

CO IN AMBIENT AIR ZAWAR GROUP OF MINES ( $\mu\text{g}/\text{m}^3$ ) Limit for CO=2000						
Month	Mill Office	Mochia Mine	Balaria Mine	Admin Block	Zawarmala Mine	Baroi Mine
Apr-22	340	310	330	340	370	320
May-22	350	280	290	280	310	310
Jun-22	320	300	290	290	300	260
Jul-22	290	320	290	270	310	300
Aug-22	280	220	190	170	240	230
Sep-22	340	330	240	310	250	240
Oct-22	340	330	340	310	330	300
Nov-22	330	340	340	300	310	280
Dec-22	390	310	330	270	250	260
Jan-23	380	430	370	360	340	320
Feb-23	360	380	350	390	360	370
Mar-23	350	370	330	360	320	340

Pb IN AMBIENT AIR ZAWAR GROUP OF MINES ( $\mu\text{g}/\text{m}^3$ ) Limit for Pb=1						
Month	Mill Office	Mochia Mine	Balaria Mine	Admin Block	Zawarmala Mine	Baroi Mine
Apr-22	0.12	0.1	0.11	0.11	0.12	0.13
May-22	0.08	0.12	0.11	0.12	0.12	0.12
Jun-22	0.18	0.21	0.12	0.18	0.15	0.19
Jul-22	0.15	0.1	0.14	0.11	0.17	0.1
Aug-22	0.1	0.1	0.1	0.1	0.11	0.1
Sep-22	0.09	0.12	0.09	0.1	0.09	0.12
Oct-22	0.18	0.17	0.2	0.17	0.18	0.21
Nov-22	0.2	0.19	0.16	0.13	0.13	0.11
Dec-22	0.1	0.11	0.11	0.14	0.15	0.15
Jan-23	0.1	0.09	0.14	0.09	0.1	0.1
Feb-23	0.09	0.09	0.15	0.13	0.13	0.09
Mar-23	0.11	0.11	0.11	0.1	0.09	0.11

**STACK MONITORING AT ZAWAR GROUP OF MINES**

All units are in mg/Nm<sup>3</sup>

Month		Mochia Crusher Stack	Balaria Crusher Stack	DE - 2 (Mill - 2)	D.G. Set Stack			
Parameters		SPM	SPM	SPM	SPM	NO <sub>x</sub>	CO	NMHC
Prescribed by RSPCB	Limits	150	150	150	75	710	150	100
Apr-22		37.24	27.19	31.72	-	-	-	-
May-22		27.61	36.08	18.34	-	-	-	-
Jun-22		34.54	29.26	35.99	-	-	-	-
Jul-22		27.65	26.21	28.03	-	-	-	-
Aug-22		38.3	14.19	34.18	-	-	-	-
Sep-22		23.02	15.98	32.08	53.64	341	132	64
Oct-22		30.59	32.8	37.26	-	-	-	-
Nov-22		26.21	44.61	31.8	-	-	-	-
Dec-22		32.45	30.13	21.59	-	-	-	-
Jan-23		21.56	21.97	23.42	-	-	-	-
Feb-23		23.34	28.65	22.85	-	-	-	-
Mar-23		29.17	23.81	24.88	47.76	320	126	45

**Ground Water wells quality at Zawar Group of Mines**

May-22 (Except pH all values are in mg/l.)								
S.No.	Parameters	IS : 10500:2012		Zawarmata Hand pump	Zawarmata Well	Naka Well	Mahadev ki Nal Well	Tiger Well
		Acceptable	Permissible					
1	pH	6.5-8.5	No Relaxation	7.48	6.68	7.12	6.87	7.12
2	Chlorides	250	1000	75.21	136.92	100.28	75.21	71.35
3	TSS	-	-	3	5	3	4	4
4	Zinc	5	15	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)
5	Lead	0.01	No Relaxation	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)
6	Iron	0.3	No Relaxation	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)
7	Copper	0.05	1.5	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)
8	Cadmium	0.003	No Relaxation	BDL<(0.001)	BDL<(0.001)	BDL<(0.001)	BDL<(0.001)	BDL<(0.001)
9	Cyanides	0.05	No Relaxation	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)
10	Nickel	0.02	No Relaxation	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)
11	Cobalt	-	-	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)
12	Chromium	0.05	No Relaxation	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)

**Aug-22** (Except pH all values are in mg/lit.)

S.No.	Parameters	IS : 10500:2012		Zawarmata Hand pump	Zawarmata Well	Naka Well	Mahadev ki Nal Well	Tiger Well
		Acceptable	Permissible					
1	pH	6.5-8.5	No Relaxation	7.49	7.49	7.48	6.98	7.19
2	Chlorides	250	1000	64.58	78.27	52.83	73.38	78.27
3	TSS	-	-	5	7	4	4	5
4	Zinc	5	15	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	0.08	BDL(<0.01)
5	Lead	0.01	No Relaxation	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)
6	Iron	0.3	No Relaxation	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)
7	Copper	0.05	1.5	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)
8	Cadmium	0.003	No Relaxation	BDL<(0.001)	BDL<(0.001)	BDL<(0.001)	BDL<(0.001)	BDL<(0.001)
9	Cyanides	0.05	No Relaxation	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)
10	Nickel	0.02	No Relaxation	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)
11	Cobalt	-	-	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)
12	Chromium	0.05	No Relaxation	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)

**Nov-22** (Except pH all values are in mg/lit.)

S.No.	Parameters	IS : 10500:2012		Zawarmata Hand pump	Zawarmata Well	Naka Well	Mahadev ki Nal Well	Tiger Well
		Acceptable	Permissible					
1	pH	6.5-8.5	No Relaxation	7.16	7.61	7.24	7.32	6.76
2	Chlorides	250	1000	68.49	83.17	68.49	83.17	63.60
3	TSS	-	-	4	6	6	3	8
4	Zinc	5	15	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)
5	Lead	0.01	No Relaxation	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)
6	Iron	1.0	No Relaxation	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)
7	Copper	0.05	1.5	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)
8	Cadmium	0.003	No Relaxation	BDL<(0.001)	BDL<(0.001)	BDL<(0.001)	BDL<(0.001)	BDL<(0.001)
9	Cyanides	0.05	No Relaxation	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)
10	Nickel	0.02	No Relaxation	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)
11	Cobalt	-	-	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)
12	Chromium	0.05	No Relaxation	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)

**Dec-22 (Except pH all values are in mg/l.t.)**

S.No.	Parameters	IS : 10500:2012		Zawarmata Hand pump	Zawarmata Well	Naka Well	Mahadev ki Nal Well	Tiger Well
		Acceptable	Permissible					
1	pH	6.5-8.5	No Relaxation	7.50	7.49	7.17	7.23	7.01
2	Chlorides	250	1000	63.07	93.62	73.91	93.62	68.99
3	TSS	-	-	8	8	7	6	13
4	Zinc	5	15	0.15	BDL(<0.01)	0.23	BDL(<0.01)	0.03
5	Lead	0.01	No Relaxation	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)
6	Iron	1.0	No Relaxation	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)
7	Copper	0.05	1.5	0.02	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)
8	Cadmium	0.003	No Relaxation	BDL<(0.001)	BDL<(0.001)	BDL<(0.001)	BDL<(0.001)	BDL<(0.001)
9	Cyanides	0.05	No Relaxation	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)
10	Nickel	0.02	No Relaxation	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)
11	Cobalt	-	-	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)
12	Chromium	0.05	No Relaxation	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)

**Jan-23 (Except pH all values are in mg/l.t.)**

S.No.	Parameters	IS : 10500:2012		Zawarmata Hand pump	Zawarmata Well	Naka Well	Mahadev ki Nal Well	Tiger Well
		Acceptable	Permissible					
1	pH	6.5-8.5	No Relaxation	7.91	7.61	7.60	7.65	7.48
2	Chlorides	250	1000	57.00	95.01	74.10	90.26	47.50
3	TSS	-	-	9	7	5	8	3
4	Zinc	5	15	0.11	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)
5	Lead	0.01	No Relaxation	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)
6	Iron	1.0	No Relaxation	0.04	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)
7	Copper	0.05	1.5	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)
8	Cadmium	0.003	No Relaxation	BDL<(0.001)	BDL<(0.001)	BDL<(0.001)	BDL<(0.001)	BDL<(0.001)
9	Cyanides	0.05	No Relaxation	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)
10	Nickel	0.02	No Relaxation	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)
11	Cobalt	-	-	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)
12	Chromium	0.05	No Relaxation	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)

**Mar-23** (Except pH all values are in mg/lit.)

S.No	Parameters	IS : 10500:2012		Zawarmata Hand pump	Zawarmata Well	Naka Well	Mahadev ki Nal Well	Tiger Well
		Acceptable	Permissible					
1	pH	6.5-8.5	No Relaxation	7.50	7.27	7.08	7.22	7.02
2	Chlorides	250	1000	61.26	100.5	67	86.14	78.49
3	TSS	-	-	3	7	6	22	4
4	Zinc	5	15	0.09	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)
5	Lead	0.01	No Relaxation	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)
6	Iron	1.0	No Relaxation	0.10	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)
7	Copper	0.05	1.5	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)
8	Cadmium	0.003	No Relaxation	BDL<(0.001 )	BDL<(0.001 )	BDL<(0.001 )	BDL<(0.001 )	BDL<(0.001 )
9	Cyanides	0.05	No Relaxation	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)
10	Nickel	0.02	No Relaxation	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)
11	Cobalt	-	-	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)
12	Chromium	0.05	No Relaxation	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)	BDL(<0.01)

## Piezometer Well Water Quality at Zawar Group of Mines

**Jun-22** (Except pH all values are in mg/lit)

**Sep-22** (Except pH all values are in mg/lt)

S.No.	Parameter S	IS : 10500:2012		Near Bridge Vala Patel House (Pz - 01)	Near In front of Old Tailing Dam (Pz - 02)	Near Tailing Dam Pump House (Pz - 03)	Near Magazi ne Area (Pz - 04)	Near Below Tailing Pipe Lines (Pz - 05)	Near Way to Tailing Dam Road (Pz - 06)
		Accep table	Permissible						
1	pH	6.5- 8.5	No Relaxation	6.81	6.88	7.30	7.93	7.55	7.78
2	Chlorides	250	1000	53.81	58.71	29.35	53.81	58.71	58.71
3	Zinc	5	15	BDL (<0.01)	BDL (<0.01)	BDL (<0.01)	BDL (<0.01 )	BDL (<0.01)	BDL (<0.01)
4	Lead	0.01	No Relaxation	BDL (<0.01)	BDL (<0.01)	BDL (<0.01)	BDL (<0.01 )	BDL (<0.01)	BDL (<0.01)
5	Iron	0.3	No Relaxation	BDL (<0.01)	BDL (<0.01)	BDL (<0.01)	BDL (<0.01 )	BDL (<0.01)	BDL (<0.01)
6	Copper	0.05	1.5	BDL (<0.01)	BDL (<0.01)	BDL (<0.01)	BDL (<0.01 )	BDL (<0.01)	BDL (<0.01)
7	Cadmium	0.003	No Relaxation	BDL (<0.001 )	BDL (<0.001)	BDL (<0.001)	BDL (<0.001 )	BDL (<0.001 )	BDL (<0.001)
8	Nickel	0.02	No Relaxation	BDL (<0.01)	BDL (<0.01)	BDL (<0.01)	BDL (<0.01 )	BDL (<0.01)	BDL (<0.01)
9	Chromium	0.05	No Relaxation	BDL (<0.01)	BDL (<0.01)	BDL (<0.01)	BDL (<0.01 )	BDL (<0.01)	BDL (<0.01)
10	Cyanide	0.05	-	BDL (<0.01)	BDL (<0.01)	BDL (<0.01)	BDL (<0.01 )	BDL (<0.01)	BDL (<0.01)
11	Cobalt	-	-	BDL (<0.01)	BDL (<0.01)	BDL (<0.01)	BDL (<0.01 )	BDL (<0.01)	BDL (<0.01)

**Dec-22** (Except pH all values are in mg/lit)

**Mar-23** (Except pH all values are in mg/lt)

S.No.	Parameter	IS : 10500:2012		Near Bridge Vala Patel House (Pz - 01)	Near In front of Old Tailing Dam (Pz - 02)	Near Tailing Dam Pump House (Pz - 03)	Near Magazine Area (Pz - 04)	Near Below Tailing Pipe Lines (Pz - 05)	Near Way to Tailing Dam Road (Pz - 06)
		Acceptable	Permissible						
1	pH	6.5-8.5	No Relaxation	6.99	7.09	7.69	7.13	7.68	7.37
2	Chlorides	250	1000	47.86	47.86	61.26	71.79	63.17	61.26
3	Zinc	5	15	BDL (<0.01)	BDL (<0.01)	BDL (<0.01)	BDL (<0.01)	BDL (<0.01)	BDL (<0.01)
4	Lead	0.01	No Relaxation	BDL (<0.01)	BDL (<0.01)	BDL (<0.01)	BDL (<0.01)	BDL (<0.01)	BDL (<0.01)
5	Iron	1.0	No Relaxation	0.18	0.08	0.24	0.14	0.49	0.14
6	Copper	0.05	1.5	BDL (<0.01)	BDL (<0.01)	BDL (<0.01)	BDL (<0.01)	BDL (<0.01)	BDL (<0.01)
7	Cadmium	0.003	No Relaxation	BDL (<0.001)	BDL (<0.001)	BDL (<0.001)	BDL (<0.001)	BDL (<0.001)	BDL (<0.001)
8	Nickel	0.02	No Relaxation	BDL (<0.01)	BDL (<0.01)	BDL (<0.01)	BDL (<0.01)	BDL (<0.01)	BDL (<0.01)
9	Chromium	0.05	No Relaxation	BDL (<0.01)	BDL (<0.01)	BDL (<0.01)	BDL (<0.01)	BDL (<0.01)	BDL (<0.01)
10	Cyanide	0.05	-	BDL (<0.01)	BDL (<0.01)	BDL (<0.01)	BDL (<0.01)	BDL (<0.01)	BDL (<0.01)
11	Cobalt	-	-	BDL (<0.01)	BDL (<0.01)	BDL (<0.01)	BDL (<0.01)	BDL (<0.01)	BDL (<0.01)
12	Total Organic Carbon	-	-	1.50	1.35	1.50	BDL(<1)	6.0	BDL(<1)

**Ground Water Level Monitoring at Zawar Group of Mines**

S.No.	Piezometers	Apr - 22(m)	May - 22 (m)	Jun - 22(m)	Jul - 22(m)	Aug-22 (m)	Sep-22 (m)
1.	Near Bridge (Vala Patel House) (Pz - 01)	1.37	1.42	1.23	1.02	0.89	0.63
2.	Near In front of Old Tailing Dam (Pz - 02)	6.48	6.54	6.03	5.64	4.32	3.49
3.	Near Tailing Dam Pump House (Pz - 03)	2.89	2.93	2.64	2.53	2.01	1.67
4.	Near Magazine Area (Pz - 04)	4.43	4.49	4.13	4.16	3.67	3.28
5.	Near Below Tailing Pipe Lines (Pz - 05)	3.52	3.58	3.17	3.32	2.83	2.46
6.	Near Way to Tailing Dam Road (Pz - 06)	1.81	1.92	1.52	1.56	1.09	1.01

S.No.	Piezometers	Oct-22(m)	Nov-22 (m)	Dec- 22 (m)	Jan-23 (m)	Feb-23 (m)	Mar-23
1.	Near Bridge (Vala Patel House) (Pz - 01)	0.73	0.94	1.08	1.11	1.95	2.09
2.	Near In front of Old Tailing Dam (Pz - 02)	3.97	4.21	4.92	4.97	5.39	5.47
3.	Near Tailing Dam Pump House (Pz - 03)	1.81	2.01	2.38	2.36	2.99	3.10
4.	Near Magazine Area (Pz - 04)	3.51	3.94	4.36	4.39	5.13	5.27
5.	Near Below Tailing Pipe Lines (Pz - 05)	2.62	2.87	3.27	3.24	3.91	4.01
6.	Near Way to Tailing Dam Road (Pz - 06)	1.16	1.27	1.71	1.73	2.19	2.37

S.No.	Wells in the area	Apr - 22(m)	May-22 (m)	Jun - 22(m)	Jul - 22(m)	Aug-22 (m)	Sep-22 (m)
1.	Zawarmata Well	4.69	5.23	5.62	4.07	0.93	1.41
2.	Mahadev ki Nal Well	2.82	2.96	4.01	2.72	0.18	1.06

S.No.	Wells in the area	Oct -22 (m)	Nov- 22 (m)	Dec- 22(m)	Jan-23 (m)	Feb- 23 (m)	Mar- 23 (m)
1.	Zawarmata Well	2.78	3.11	3.59	1.28	1.73	2.21
2.	Mahadev ki Nal Well	1.10	0.95	2.05	4.28	4.66	1.75

**ANALYSIS OF MINE WATER AT ZAWAR GROUP OF MINES**

**1. Mochia Mine Water Report**

<b>Parameters</b>	<b>Effluent Standards as per IS:2490</b>	<b>Apr-22</b>	<b>Jul-22</b>	<b>Oct-22</b>	<b>Jan- 23</b>
pH	5.5-9.0	7.30	7.24	7.89	7.99
Chlorides	1000	59.30	109.96	63.59	45.0
Hardness	-	226.01	556.31	585.8	139.62
Total Solids	2200	469	1905	1441	359
Total D.S.	2100	461	1886	1432	353
Total S.S.	100	8	19	09	06
Zinc	5.0	BDL <(0.01)	0.52	1.82	0.02
Lead	0.10	BDL <(0.01)	0.01	BDL <(0.01)	BDL <(0.01)
Iron	3.0	BDL <(0.01)	0.04	0.03	BDL <(0.01)
Copper	3.0	BDL <(0.01)	BDL <(0.01)	BDL <(0.01)	BDL <(0.01)
Cadmium	2.0	BDL<(0.001)	BDL<(0.001)	BDL<(0.001)	BDL<(0.001)
Cyanide	0.2	BDL<(0.05)	BDL<(0.05)	BDL<(0.05)	BDL<(0.05)
Except pH all values are in mg/lt					

**2. Balaria Mine Water Report**

<b>Parameters</b>	<b>Effluent Standards as per IS:2490</b>	<b>Apr-22</b>	<b>Jul-22</b>	<b>Oct-22</b>	<b>Jan- 23</b>
pH	5.5-9.0	7.15	6.97	7.83	8.08
Chlorides	1000	1.54	84.97	58.70	50.88
Hardness	-	<5	584.46	582.6	135.84
Total Solids	2200	32	1876	1449	342
Total D.S.	2100	29	1854	1436	338
Total S.S.	100	3	22	13	04
Zinc	5.0	0.22	0.17	1.64	BDL <(0.01)
Lead	0.10	BDL <(0.01)	0.01	BDL <(0.01)	BDL <(0.01)
Iron	3.0	BDL <(0.01)	0.03	0.02	BDL <(0.01)
Copper	3.0	BDL <(0.01)	BDL <(0.01)	BDL <(0.01)	BDL <(0.01)
Cadmium	2.0	BDL<(0.001)	BDL<(0.001)	BDL<(0.001)	BDL<(0.001)
Cyanide	0.2	BDL<(0.05)	BDL<(0.05)	BDL<(0.05)	BDL<(0.05)
Except pH all values are in mg/lt					

**3. Zawarmala Mine Water Report**

<b>Parameters</b>	<b>Effluent Standards as per IS:2490</b>	<b>Apr-22</b>	<b>Jul-22</b>	<b>Oct-22</b>	<b>Jan- 23</b>
pH	5.5-9.0	7.06	7.01	8.07	7.98
Chlorides	1000	52.39	99.97	78.27	44.02
Hardness	-	139.36	581.55	592.4	141.50
Total Solids	2200	336	1822	1513	389
Total D.S.	2100	329	1793	1502	382
Total S.S.	100	7	29	11	07
Zinc	5.0	BDL<(0.01)	0.52	1.53	0.04
Lead	0.10	BDL<(0.01)	0.01	BDL<(0.01)	BDL<(0.01)
Iron	3.0	BDL<(0.01)	0.03	0.03	BDL<(0.01)
Copper	3.0	BDL<(0.01)	BDL<0.01	BDL<(0.01)	BDL<(0.01)
Cadmium	2.0	BDL<(0.001)	BDL<0.001	BDL<(0.001)	BDL<(0.001)
Cyanide	0.2	BDL<(0.05)	BDL<0.05	BDL<(0.05)	BDL<(0.05)
Except pH all values are in mg/lt					

**4. Baroi Mine Water Report**

<b>Parameters</b>	<b>Effluent Standards as per IS:2490</b>	<b>Apr-22</b>	<b>Jul-22</b>	<b>Oct-22</b>	<b>Jan- 23</b>
pH	5.5-9.0	7.13	7.22	8.08	8.04
Chlorides	1000	45.29	99.97	63.4	48.92
Hardness	-	118.32	542.71	573.4	141.50
Total Solids	2200	298	1874	1480	340
Total D.S.	2100	290	1848	1469	335
Total S.S.	100	8	26	11	05
Zinc	5.0	0.04	0.21	1.72	BDL<(0.01)
Lead	0.10	BDL<(0.01)	0.01	BDL<(0.01)	BDL<(0.01)
Iron	3.0	BDL<(0.01)	0.03	0.04	BDL<(0.01)
Copper	3.0	BDL<(0.01)	BDL<(0.01)	BDL<(0.01)	BDL<(0.01)
Cadmium	2.0	BDL<(0.001)	BDL<(0.001)	BDL<(0.001)	BDL<(0.001)
Cyanide	0.2	BDL<(0.05)	BDL<(0.05)	BDL<(0.05)	BDL<(0.05)
Except pH all values are in mg/lt					

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## Analysis of Tailing Dam Reclaim Water

Zawar Group of Mines

Except pH all values are in ppm.

**HINDUSTAN ZINC LIMITED**

**Ashok Nagar STP Analysis Report for 2022-23**

Except pH all value are in mg/lt

<b>Parameters</b>	<b>Limits</b>	<b>Apr-22</b>	<b>May-22</b>	<b>Jun-22</b>	<b>Jul-22</b>	<b>Aug-22</b>	<b>Sep-22</b>	<b>Oct-22</b>	<b>Nov-22</b>	<b>Dec-22</b>	<b>Jan-23</b>	<b>Feb-23</b>	<b>Mar-23</b>
Total Suspended Solids	100	25	28	34	28	30	9	16	11	29	28	30	10
pH Value	5.5-9.0	7.20	7.10	7.34	7.11	7.27	7.67	7.12	7.11	7.16	7.29	7.12	7.00
Oil and Grease	10	2	4	4	5	4	2	2	2	5	4	5	3
Total Residual Chlorine	1	BDL < (0.1)											
Ammonical Nitrogen (as N)	50	8.96	12.80	10.63	9.79	11.27	1.07	1.45	1.71	6.71	9.17	9.19	8.04
Total Kjeldahl Nitrogen (as N)	100	22.40	25.42	26.33	21.72	18.28	3.79	8.06	5.51	23.76	21.34	22.84	18.72
Biochemical Oxygen Demand (3 days at 27°C)	30	4.36	20.71	9.67	13.75	10.23	5.88	6.29	7.00	14.33	9.5	15	9.40
Sulphide (as S)	2	BDL < (0.1)											
Nitrate Nitrogen	10	8.50	3.39	7.24	2.51	2.56	4.19	4.59	4.18	4.14	5.07	2.98	1.73
Chlorides	1000	97.84	111.54	91.21	71.25	97.84	115.71	95.01	110.89	101.25	110.89	115.71	110.89
Sulphates	1000	30.66	52.00	25.25	33.37	30.25	35.25	27.00	44.37	15.87	35.25	35.71	41.14
Chemical Oxygen Demand	250	32.64	154.05	88.13	127.30	81.60	23.52	30.72	43.26	97.66	83.90	115.71	78.62

**Ram Nagar STP Analysis Report for 2022-23**

Except pH all value are in mg/lit

Parameters	Limits	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23
Total Suspended Solids	100	7	26	24	27	27	7	23	10	18	13	25	12
pH Value	5.5-9.0	7.36	7.07	7.28	7.21	7.04	7.15	7.09	7.09	7.55	7.39	6.77	7.32
Oil and Grease	10	2	4	5	5	3	2	4	2	4	2	5	3
Total Residual Chlorine	1	BDL <(0.1)											
Ammonical Nitrogen (as N)	50	2.80	8.27	1.06	5.88	8.76	1.79	2.52	1.53	2.37	8.39	6.77	7.49
Total Kjeldahl Nitrogen (as N)	100	4.20	18.45	6.12	17.44	16.29	3.45	7.72	6.69	8.32	15.23	13.76	15.41
Biochemical Oxygen Demand (3 days at 27°C)	30	5.11	7.80	11.40	15.56	6.40	6.20	14.44	7.17	13.33	6.75	16.67	8.17
Sulphide (as S)	2	BDL <(0.1)											
Nitrate Nitrogen	10	3.00	2.84	6.69	1.09	1.43	4.95	5.12	5.86	4.31	6.88	1.27	2.02
Chlorides	1000	92.95	97.84	85.51	66.50	112.52	77.14	90.26	81.96	96.42	71.35	125.35	102.73
Sulphates	1000	36.00	47.33	28.37	28.87	33.75	30.25	32.75	37.37	29.11	30.50	43.43	41.43
Chemical Oxygen Demand	250	26.11	66.40	104.45	146.88	48.96	35.28	94.40	49.92	80.22	38.27	112.11	58.66