Grasim Industries Limited

(Chemical Division Renukoot)

FY 2022-23

Environmental Statement (Form – V)

ES for Chemical Division

Prepare & Submitted By

Grasim Industries Limited
Chemical Division, Renukoot
Sonebhadra, U.P. -231217

INTRODUCTION

Department of Environment and Forests, Government of India (GOI) under the Environment (Protection) Act, 1986 has made Environmental Statement mandatory for all industries and the report prepared by competent experts has to be submitted to the concerned Pollution Control Board. This is a measure to check any adverse impacts of the processes on the occupational and surrounding environment.

The Environmental Audit programme included the following:

Assessment of compliance status with respect to environmental regulations and Assessment of environmental management system's capability to cope up with existing requirement of CPCB/UPPCB.

CSIR-NEERI-HZC for Bi-annual monitoring and M/s ETRC - Lucknow has been engaged for monitoring of stack emission, ambient air monitoring, solid waste hazardous, water and effluent testing of M/s. Grasim Industries Limited, Renukoot for monthly monitoring respectively from April, 2022 to March, 2023. Based on these Bi-annual and monthly monitoring reports, Annual Environmental Statement Audit (AESA) for the year 2022 - 2023 has been prepared. This Environmental audit report contains data pertaining to ambient air quality, stack emission, water and wastewater quality, hazardous and non-hazardous solid waste generation and its disposal system and other plant details related to environmental pollution and management.

PLANT SITE AND SURROUNDINGS

M/s- Grasim Industries Limited, Renukoot, Sonebhadra UP is located on distance of 2 km from Renukoot Railway station of district- Sonebhadra, Uttar Pradesh.

PART – A

GENERAL INFORMATION ABOUT THE COMPANY

1. Name of the Company : M/s. Grasim Industries Limited
Chemical Division Renukoot

2. Name & Address of the Owner/Occupier : **HARI KRISHNA AGARWAL**
P.O - Renukoot 231217
Dist. Sonebhadra (U.P.)

3. Registered Office Address : Birla gram Nagda – 456 331 M.P.

4. Factory Address : P.O. Renukoot – 231 217
Distt. Sonebhadra, (U.P.)

5. Production Installed Capacity :

Sl. No.	Name of Product	Consented Capacity (MT/Month)
1	Caustic Soda Lye	10750
2	Liquid Chlorine	8630
3	Hydrochloric Acid	2107
4	Stable Bleaching Powder	5400
5	Aluminium Chloride	1500
6	Poly Aluminium Chloride	6000
7	Chlorinated Paraffin	1800
8	Hydrogen	275
9	Sodium Hypo Chlorite	1000

6. Year of Establishment : 1964

7. Date of last Environmental Statement submitted : Submitted to U.P. Pollution Control board vide our letter no GIL/ENV/2022-23/66, dated September 19, 2022

PART – B

1. **TOTAL WATER CONSUMPTION**:

Sl. No.	Description	Consumption (m^3/day)
a	Process	951
b	Cooling	1691
c	Domestic	881
d	Green belt	Treated STP effluent is used for green-belt development.

2. WATER CONSUMPTION PER UNIT OF PRODUCT:

Name of Product	Process water consumed per unit of product manufactured (m^3/MT)	
	(2021-22)	(2022-23)
Caustic Soda	7.11	7.48
Liq. Chlorine		
Hydrochloric acid		
Aluminium Chloride		
Stable Bleaching Powder		
Chlorinated Paraffin		
Poly Aluminium Chloride		

3. RAW MATERIAL CONSUMPTION:

Sl. No.	Name of the Raw Material	Name of Product Concerned	Raw material consumed per unit of product manufactured (MT/MT)	
			(2021-22)	(2022-23)
1	Salt	Caustic Soda Lye	1.57	1.57
2	Soda Ash		2.08	0.002
3	M. Flock/Flocal		0.01	0.01
4	Hydrochloric Acid		23.26	24.12
5	Barium Carbonate		6.66	6.48
6	Caustic Soda Lye		11.53	0.01
7	Sulphuric Acid		14.40	0.01
8	Sodium Sulphide/ bisulphite		0.91	0.71
9	Liquid Chlorine	S.B.P	0.42	0.42
10	Chemical / Hydrated Lime		0.74	0.74
11	Aluminium Ingots	Aluminium Chloride	0.206	0.205
12	Chlorine		1.00	0.78
13	Coal	Boiler	0.18	0.18
14	Paraffin Oil	Chlorinated Paraffin	0.41	0.42
15	Chlorine		1.21	1.21
16	Paraffin Oil	Sulpho	0.256	-
17	Chlorine		0.331	-
18	Alumina Hydrate (Wet)	PAC – 10% Basis	0.16	0.15
19	HCl		0.13	0.15

PART – C

1. WATER POLLUTION

Sl. No.	Pollutant Parameters	Qty. of Pollutants generated	Concentration of pollutants in untreated effluent (completely recycled to achieve ZLD)	% Variation from prescribed standards
		(kg/day)	**(mg/l)**	-
1	---	Nil	Nil	–––

Note : It is to be noted that since we are maintaining zero liquid discharge of effluent from August -2017, Hence the above discharge load is also zero.

Parameter	Months (FY 2022-23)												
	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Average
pH	7.8	7.6	6.9	7.0	7.1	7.0	7.3	7.1	6.1	7.7	7.4	7.6	7.2
TSS	8.8	8.2	9.2	7.6	8.6	6.2	7.9	5.6	8.2	BDL	BDL	5.6	7.6
TDS	478.0	464.0	185.3	124.0	120.0	170.0	188.0	436.5	96.6	174.6	200.2	208.6	237.2
O & G	1.8	2.0	0.0	0.0	0.0	0.0	0.0	BDL	BDL	BDL	BDL	BDL	0.5
Cl	182.0	175.0	48.0	30.0	28.0	24.0	22.1	26.2	26.2	40.0	96.1	72.2	64.2
BOD	8.0	10.0	8.0	8.2	8.4	4.2	4.1	2.6	2.8	1.2	2.4	4.6	5.4
COD	52.0	46.0	24.2	56.0	52.0	12.0	16.0	8.0	8.0	4.0	8.0	20.0	25.5

Note: - All parameters are in mg/Ltr except pH.

Adoption of ZLD meant comprehensive management of wastewater, through reduced use, efficient recycling and treatment to ensure that discharge of liquid wastes by industrial units was completely eliminated. A multi-level approach to water recovery with modifications was implemented in the production processes.

The plant planned and achieved ZLD by following the 3Rs of reduce, reuse and recycle as the first step.

- **Reduce**: Reduction of water consumption across different processes either through technological changes or through process optimization.
- **Reuse**: Use of water generated from one process in the same or different processes after testing the quality of generated water.
- **Recycle**: Treatment of effluents in such a way that maximum water could be recovered for reuse within the production cycle.

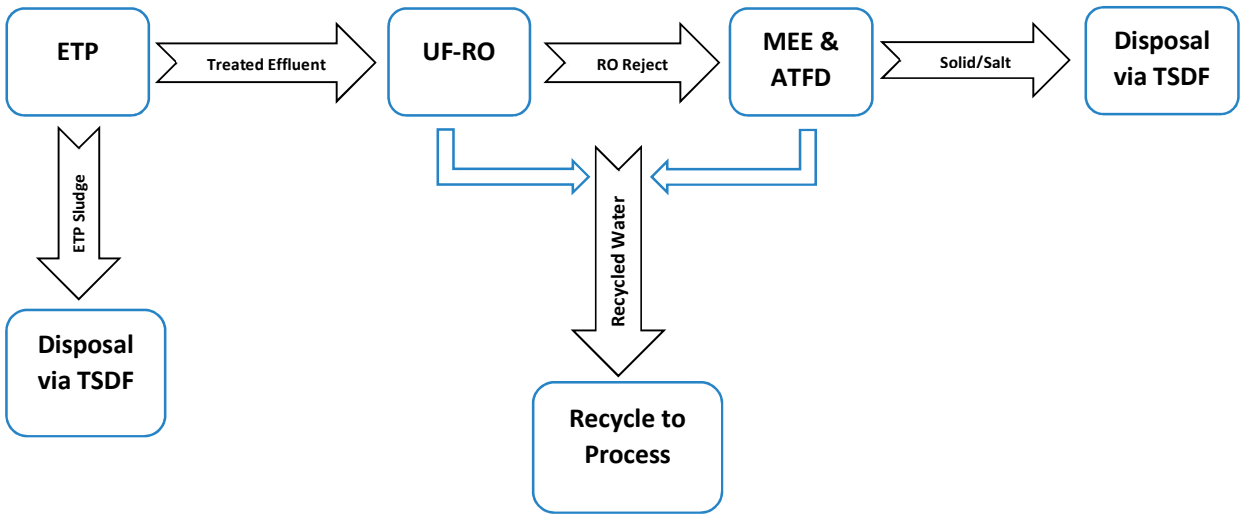
The successful implementation of the 3R processes were, however, preceded by a detailed understanding of the nature of effluents and the quality of wastewater involved. The areas worked on are as explained below:

- Knowing the quality and volume of each effluent generated from different processes
- Segregating and collecting the same quality of effluents for use in same or different processes
- Developing a facility for collection of effluents from different processes for final treatment in ETP
- Reducing the effluent volume as best possible, to make ZLD cost effective

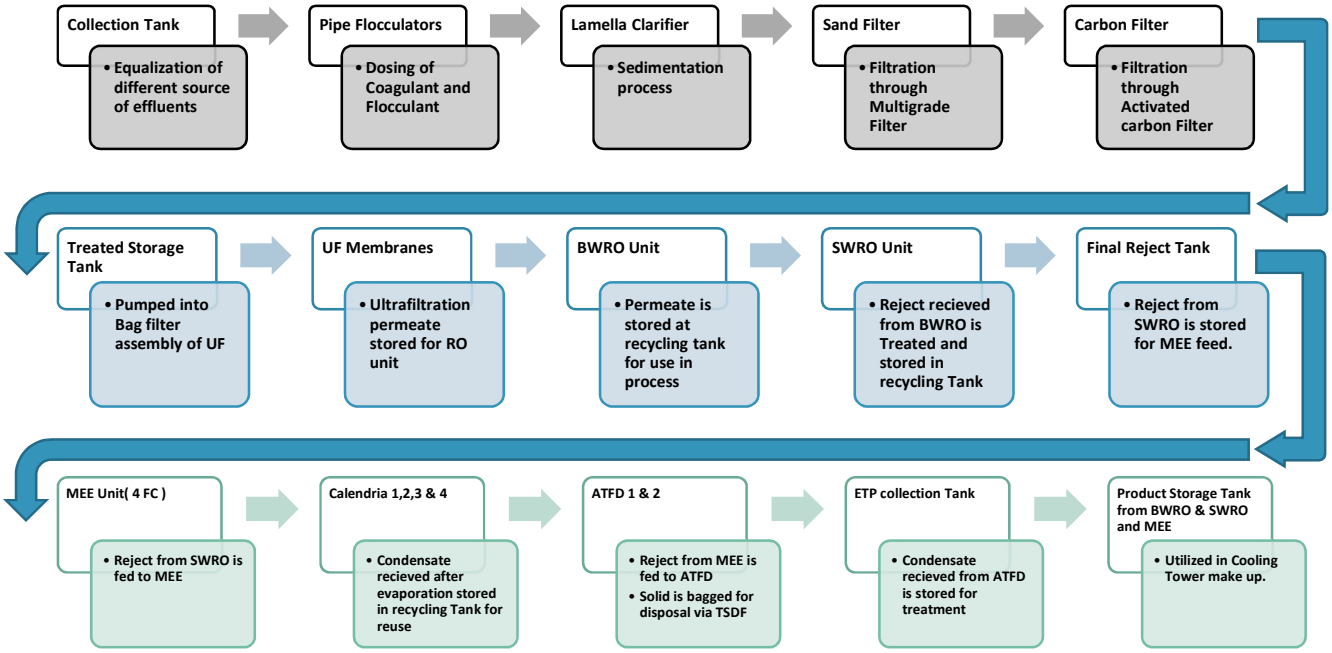
In the second step, the balance wastewater after the 3R approach was passed through Double stage RO plant and Multi-Effect Evaporator to achieve the ZLD status.

The effluent from various sections is collected in effluent collection pit where it is collected for equalization. The pH of the effluent after equalization is maintained in the desired range with alkali or acid, whatever may be the requirement. The neutralized effluent is then passed through pipe flocculator into flocculation tank where dosing of polyelectrolyte is done using flash mixer. Effluent dosed with polyelectrolyte then goes to lamella clarifier where sufficient retention time is given for settling and clarification. By gravity suspended solids settle down and are removed as sludge from the bottom. The sludge is then dewatered at filter press. The water from filter press is again recycled back in collection tank. The filter cake is filled in bags and stored for disposal in TSDF.

Effluent Treatment Flow Diagram:



Effluent treatment process flow –



2. AIR POLLUTION

Sl. No.	Pollutant	Qty. of pollutants generated (kg/day)	Concentration of pollutants in discharge (mg/Nm^3)	% variation from prescribed standards
a.	**Thermax Boiler 's average emission / discharge**			
i	Particulate Matter (PM)	11.56	23.98	Within limits
ii	SO_2	56.81	128.76	-do-
iii	NOx	35.77	76.22	-do-
b.	**CVPL Boiler 's average emission / discharge**			
i	Particulate Matter (PM)	10.01	32.21	Within limits
ii	SO_2	48.11	194.34	-do-
iii	NOx	31.20	121.76	-do-

Summary of Process Boilers Stack Emission Results for FY 2022-23

Unit #	Quarters	Parameters				
		PM mg/Nm3	SOx mg/Nm3	NOx mg/Nm3	CO2 %	Hg mg/Nm3
CVPL	Q 1	41.42	238.21	154.16	5.70	0.00
	Q 2	31.88	230.34	142.68	5.97	0.00
	Q 3	39.58	204.79	125.54	6.20	0.00
	Q 4	15.96	104.03	64.69	3.17	0.00
Average FY 22-23		**32.21**	**194.34**	**121.76**	**5.26**	**0.00**
Thermax	Q 1	25.29	101.64	52.39	2.90	0.00
	Q 2	23.62	100.05	58.23	2.80	0.00
	Q 3	15.99	110.87	71.55	3.13	0.00
	Q 4	31.02	202.47	122.71	6.33	0.00
Average FY 22-23		**23.98**	**128.76**	**76.22**	**3.79**	**0.00**

Summary of Process Boilers Stack Emission Results for 1st Quarter

Q 1		Parameters				
Unit #	Months	PM mg/Nm3	SOx mg/Nm3	NOx mg/Nm3	CO2 %	Hg mg/Nm3
CVPL	APR	59.68	296.12	220.30	8.60	0.00
	MAY	Standby	Standby	Standby	Standby	Standby
	JUN	64.58	418.52	242.17	8.50	0.00
Avg of Q 1		**41.42**	**238.21**	**154.16**	**5.70**	**0.00**
Thermax	APR	Standby	Standby	Standby	Standby	Standby
	MAY	75.88	304.93	157.17	8.70	0.00
	JUN	Standby	Standby	Standby	Standby	Standby
Avg of Q 1		**25.29**	**101.64**	**52.39**	**2.90**	**0.00**

Summary of Process Boilers Stack Emission Results for 2nd Quarter

Q 2		Parameters				
Unit #	**Months**	**PM** mg/Nm3	**SOx** mg/Nm3	**NOx** mg/Nm3	**CO2** %	**Hg** mg/Nm3
CVPL	**JUL**	45.68	359.41	212.17	8.70	0.00
	AUG	Standby	Standby	Standby	Standby	Standby
	SEP	49.97	331.60	215.86	9.20	0.00
Avg of Q 2		**31.88**	**230.34**	**142.68**	**5.97**	**0.00**
Thermax	**JUL**	Standby	Standby	Standby	Standby	Standby
	AUG	70.85	300.15	174.69	8.40	0.00
	SEP	Standby	Standby	Standby	Standby	Standby
Avg of Q 2		**23.62**	**100.05**	**58.23**	**2.80**	**0.00**

Summary of Process Boilers Stack Emission Results for 3rd Quarter

Q 3		Parameters				
Unit #	**Months**	**PM** mg/Nm3	**SOx** mg/Nm3	**NOx** mg/Nm3	**CO2** %	**Hg** mg/Nm3
CVPL	**OCT**	Standby	Standby	Standby	Standby	Standby
	NOV	47.19	322.70	205.15	9.40	0.00
	DEC	71.56	291.67	171.46	9.20	0.00
Avg of Q 3		**39.58**	**204.79**	**125.54**	**6.20**	**0.00**
Thermax	**OCT**	47.96	332.62	214.64	9.40	0.00
	NOV	Standby	Standby	Standby	Standby	Standby
	DEC	Standby	Standby	Standby	Standby	Standby
Avg of Q 3		**15.99**	**110.87**	**71.55**	**3.13**	**0.00**

Summary of Process Boilers Stack Emission Results for 4th Quarter

Q 4		Parameters				
Unit #	Months	PM mg/Nm3	SOx mg/Nm3	NOx mg/Nm3	CO2 %	Hg mg/Nm3
CVPL	JAN	Standby	Standby	Standby	Standby	Standby
	FEB	47.89	312.09	194.06	9.50	0.00
	MAR	Standby	Standby	Standby	Standby	Standby
Avg. of Q 4		**15.96**	**104.03**	**64.69**	**3.17**	**0.00**
Thermax	JAN	43.19	324.63	215.46	9.40	0.00
	FEB	Standby	Standby	Standby	Standby	Standby
	MAR	49.86	282.78	152.67	9.60	0.00
Avg. of Q 4		**31.02**	**202.47**	**122.71**	**6.33**	**0.00**

Summary of Process Stack Emission Results for FY 2022-23

Unit #	Parameters (mg/Nm3)	Q 1			Q 2			Q 3			Q 4			Annual Average
		APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	
Mem - I	HCl	9.2	5.2	5.6	5.3	5.8	6.1	6.8	6.6	6.4	6.2	6.1	6.3	**6.3**
	Cl_2	2.5	0.9	0.7	0.6	0.6	0.6	0.6	0.6	0.7	0.6	0.6	0.6	**0.8**
Mem - II	HCl	8.4	6.8	6.3	5.8	5.4	5.8	6.2	6.3	6.5	6.3	6.2	6.1	**6.3**
	Cl_2	2.5	0.9	0.7	0.6	0.6	0.6	0.6	0.6	0.7	0.6	0.6	0.6	**0.8**
Mem - III	HCl	8.6	6.4	6.2	6.0	5.6	6.0	6.4	6.5	6.3	6.4	6.5	6.4	**6.4**
	Cl_2	3.1	0.5	0.4	0.4	0.4	0.5	0.6	0.6	0.6	0.6	0.7	0.7	**0.7**

Summary of Ambient Air Quality Results

Location	Parameter								
	PM 10 ug/m^3	PM-2.5 ug/m^3	SO_2 ug/m^3	NO_x ug/m^3	Lead (Pb) ug/m^3	CO mg/m^3	O_3 ug/m^3	CO2 NA	Cl_2 NA
ETP plant	61.58	39.45	12.60	16.60	BDL	0.54	14.17	NA	NA
Main gate	74.51	43.18	12.95	18.30	BDL	0.57	15.39	NA	NA
PGD (area)	74.90	43.81	13.32	18.22	BDL	0.62	15.97	NA	NA
Project Office	64.13	38.30	11.84	16.19	BDL	0.57	15.02	NA	NA

PART – D

(As specified under Hazardous Waste (Management and Transboundary Movement) Rules, 2016

Sl. No.	Description	Total quantity in MT (2021-22)	Total quantity in MT (2022-23)
A	**FROM PROCESS**		
1	16.3-Brine Sludge	6448.83	9848.040
2	Sch. II B30-PAC SLUDGE	103.86	115.550
3	5.1-waste Oil	9.570*	6.200
4	33.1-FRP Waste	25.970	40.890
5	35.2-Spent Resin	2.250	-
6	5.2-Oil soaked cotton	0.34	0.935
7	Sch. II Cat (B 21)-Asbestos Sheets	0.65	35.110
8	Discarded Filter Medium ETP,RO,PAC Schedule I Cat -36.2	-	4.810
9	Discarded Welding rods Schedule II Cat -B28	-	0.110
10	Discarded rubber waste Schedule III Cat- B3040	-	7.505
11	SBP Sludge Schedule II Cat -B30	-	325.050
12	Molten Salt Schedule I Cat – 16.2	-	2.62
B	**FROM POLLUTION CONTROL FACILITIES**		
1	35.3-ETP SLUDGE	124.590	77.065
2	35.5-MEE Salt Waste	393.3	804.550

❖ * The quantity mentioned here is combined for both Chemical Division and Power division.

PART – E

(Solid Waste)

Sl. No.	Description	Total quantity in MT (2021-22)	Total quantity in MT (2022-23)
a	From process	Nil	Nil
b	From pollution control facilities	Nil	Nil
C 1	Qty. recycled or utilised within limits	Nil	Nil
C2- a	Quantity Sold (Metal Scrap)	984.33	755.86
C2-b	Quantity Sold (HDPE/LDPE Bags, etc.)	579.79	231.09
C2-b	Quantity Sold (Battery Waste)	7.410	0.220
C3	Quantity Disposed (E-waste)	1.29	1.995

PART – F

(Characteristics of Hazardous and Solid Waste)

Sl. No.	Description	Nature of waste	Composition/Characteristics	Quantity (MT) (FY 2022-23)	Management (Methods of Collection & Disposal)
a	16.3-Brine Sludge	Hazardous	Chloride, Sodium, sulphate, Magnesium, Calcium, Arsenic, Cobalt, Zinc etc.	9848.040	stored at impervious surface Disposed through TSDF
b	Sch. II B30-PAC Sludge	Hazardous	Aluminium, Cadmium, Fluoride, Chloride, etc.	115.550	Filled in HDPE bags and stored at impervious surface Disposed through TSDF

c	5.1-waste Oil	Hazardous	PCBs, Lead, Arsenic, Cadmium, Chromium, PAHs etc.	6.200	Filled in MS drums and stored at impervious surface. Recycled/Disposed through TSDF
d	33.1-FRP Waste	Hazardous	Contaminated FRP scraps	40.890	Stored at impervious surface. Disposed through TSDF
e	35.2-Spent Resin	Hazardous	Spent Resin	-	Filled in HDPE bags and stored at impervious surface. Disposed through TSDF
f	5.2-Oil soaked cotton	Hazardous	Oil soaked cotton	0.935	Filled in HDPE bags and stored at impervious surface. Disposed through TSDF
g	Sch. II Cat (B 21)-Asbestos Sheets	Hazardous	Asbestos	35.110	Stored at impervious surface. Disposed through TSDF
h	35.3-ETP SLUDGE	Hazardous	Chloride, Lead Magnesium, Calcium, Arsenic, Cobalt, Zinc etc.	77.065	Filled in HDPE bags and stored at impervious surface. Disposed through TSDF
i	35.5-MEE Salt Waste	Hazardous	Chloride, Sodium, sulphate, Magnesium, Calcium, Arsenic, Cobalt, Zinc etc.	804.550	Filled in HDPE bags and stored at impervious surface. Disposed through TSDF
j	Discarded Filter Medium ETP,RO,PAC Schedule I Cat -36.2	Hazardous	Spent Carbon or Filter Medium	4.810	Filled in HDPE bags and stored at impervious surface. Disposed through TSDF
k	Discarded Welding rods Schedule II Cat - B28	Hazardous	B 28 Ferro silicate Alloys	0.110	Filled in HDPE bags and stored at impervious surface. Disposed through TSDF

l	Discarded rubber waste Schedule III Cat- B3040	Hazardous	Rubber Wastes the following materials, provided they are not mixed with other wastes.	7.505	Filled in HDPE bags and stored at impervious surface. Disposed through TSDF
m	SBP Sludge Schedule II Cat -B30	Hazardous	Aluminium, Cadmium, Fluoride, Chloride, etc.	325.050	Filled in HDPE bags and stored at impervious surface Disposed through TSDF
n	Molten Salt Schedule I Cat – 16.2	Hazardous	Residue or sludge's and filter cakes	2.62	Filled in HDPE bags and stored at impervious surface Disposed through TSDF
o	Metal Scrap	Non-Hazardous	Iron/steel scraps	755.86	Sold to recyclers
p	HDPE Bags	Non-Hazardous	Plastic bags	231.09	Sold to recyclers
q	E-waste	Hazardous	Electrical and electronic waste	1.995	Disposed through Recycler/TSDF
r	Battery Waste	Hazardous	Lead acid battery with diluted acid	0.220	Authorized recycler

PART - G

(Impact of pollution control measures on conservation of natural resources and consequently on the cost of production)

Solid Waste Management:

Brine Sludge Interim Storage: The unit is now equipped with an intermediate storage of brine sludge which has a permanent shed on the top.

Picture: Hazardous waste storage area at GRCD

The total amount spent in the construction of the interim storage was Rs. 38.0 Lakh (INR). The stored Brine Sludge is disposed of to the Treatment Storage & Disposal Facility (TSDF) within 90 Days as per Hazardous and Other Waste Management Rules – 2016. The construction of a permanent shed was a legal requirement as well which was complied with full conformity.

Water Conservation: Treatment & Recycling:

Apart from recycling of generated effluent recycled inside plant premises, all domestic effluent generated from colony is treated with STP plant of capacity 1000 KLD followed by UF plant, installed and continuous operation of UF unit is ensured and the treated permeate is utilized in cooling towers for make-up water.

The generated sewage sludge is dewatered with press filter and used in gardening.

Environmental Monitoring:

An amount of 9.02 lakh (INR) was spent towards monitoring of various environmental parameters in FY 2022-23. This consist of air quality monitoring at a frequency of monthly with 24 hourly sampling and water quality monitoring, effluent quality monitoring etc.

An amount of 7.58 Lakh (INR) was spent towards Biannual Environmental Assessment during FY 2022-23 done by recognized institute CSIR-NEERI HZC with objectives -

1. Assessment of the prevailing environmental data w.r.to air, water and noise for a period of three years on biannual basis
2. To delineate suitable environmental management plan, if any

Apart from manual monitoring GRCD has also installed OCEMS for process stacks, as per CPCB guidelines with data connectivity to CPCB server, which being properly maintained by awarding AMC to competent vendor.

GRCD has also installed 02 No's of Continuous Ambient Air Monitoring Station installed for real time Air Quality monitoring. In addition to that weather monitoring station is also installed for weather data.

Cost estimation for pollution control

Sl. No.	Description	Total expenditure (in lacs)	
		(2021-22)	(2022-23)
1	Water Pollution	363.41	401.92
2	Air Pollution	7.92	10.84
3	Solid & Hazardous waste	305.75	502.87
4	Green Belt development	10	8
5	Others	56.9*	84.51*
	Total	**743.98**	**1008.14**

*Housekeeping Expenses

PART – H

(Additional measures/ investment proposal for environmental protection including abatement of pollution)

GRCD has pro-actively started water sprinkling inside the colony and outside the premises to mitigate the dust exposure for the improvement of Air quality.

Replacement of Existing Lamps with Energy Efficient LED/ Induction Lamp.

GIL is actively involved in awareness programme related to Environment like celebration of Environment Day like every year. Various activities were organized among children, ladies, workers, employees.

PART – I

(Any other particulars for improving the quality of environment)

GIL always puts environmental issues on top priority. As a result of continuous efforts, GIL got certified for the following ISO standards by TUV Nord CERT:

- ISO-9001:2015
- ISO-14001:2015
- ISO-45001:2018
- ISO-50001:2018

GIL has a separate environmental Management Cell and its function includes monitoring of Water usages and consumption trends, wastewater treatment and its parameter control, Source and Ambient Air Quality monitoring that is monitored and assessed by GIL's top management.

A separate fully equipped Environment laboratory is maintained at GIL for monitoring Environmental parameters as per EC condition.

GIL trains its employees for environmental conservation activities and need of the ecological balance for sustainable development and operation process.

V.K. Yadav

(Dr. Vinay Kumar Yadav)