



GRCD/EHS/ 187

28.09.2023

To

Member Secretary

Madhya Pradesh Pollution Control Board

Paryavaran Parisar E-5 Arera Colony

Bhopal-462016 (M.P)

Subject: Submission of Environment Statement Report (Form-V) for period of April 22-March 23 by M/s Grasim Industries Limited (**Chemical Division**) Nagda.

Reference: 1. EC Letter no: F.No. J-11011/119/2015-I A.II (I) dated 07.01.2020 issued by MoEFCC, New Delhi.

2. Consent No.AW 56933& PCB ID- **25471**

Respected Sir,

With reference to above mentioned subject, we are submitting here with the Environment Statement (Form V) for the period of April 2022 to March 2023.

We hope you will find it in order

Thanks & Regards

Vijay Ajmera

EHS- Head

GRCD- Nagda (Madhya Pradesh)

Copy to: Regional Officer Madhya Pradesh Pollution Control Board,17- Bharatpuri Ujjain

Grasim Industries Limited

Chemical Division

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Regd. Office : P.O. Birlagram, Nagda - 456 331 (M.P.)

ENVIRONMENT STATEMENT REPORT

(FY- 2022-23)

FORM – V

(1)	Name and address of the owner/occupier of the industry operation or process.	Mr. H K Agarwal M/s Grasim Industries Ltd. (Chemical Division) at Village: Birlagram, Tehsil: Nagda, District: Ujjain (Madhya Pradesh)			
(2)	Industry category Primary	4 (d) & 5 (f)			
(3)	Production capacity	S.No	Product Name	Capacity as per EC (TPA)	Capacity as per CTO (TPA)
		1	Caustic Soda/Caustic Soda Lye*	450000	300,000*
		2	Poly Aluminium Chloride	165000	36,500
		3	Stable Bleaching Powder	54750	43,800
		4	Chlorinated Paraffin	45645	27,000
		5	Chloromethane	36000	NA
		6	Chloro Sulphonic Acid	23400	23,400
		7	Calcium Chloride (100%)	54000	54,000
		8	DG-Set (Electricity Generation)	-	2x2000 KVA
		9	Chlorine	365000	2,39,111
		10	Hydrochloric Acid (100%)	135000	87,800
		11	Sodium Hypochlorite (100%)	90000	59,470
		12	Hydrogen	11400	7,480
		13	Compressed Hydrogen	1460	1,070
		14	Carbon Dioxide	23760	23,760
(4)	Year of establishment	Membrane Cell Caustic Soda Plant Unit-1-1995 Membrane Cell Caustic Soda Plant Unit-2-2007 Stable Bleaching Powder-1986 Poly-Aluminium Chloride- 1990 Chloro Sulphonic Acid-1992 Chlorinated Paraffin Plant -2010 Calcium Chloride Plant-2013			
(5)	Date of the last environmental statement submitted	27.09.2022			

PART-B

Water & Raw Material Consumption:**Water consumption m³/day**

CATEGORY	CONSENT LIMIT	ACTUAL CONSUMPTION
Cooling Water	1510	1276
Domestic Purpose	93	80
Mfg. Process	1690	1331

Water is not used in the main process, but used in the water scrubbing and absorption of HCL to control HCL emissions

S.No	Name of Product	Process Water Consumption per Unit of product Output (m ³ /MT)	
		During the previous financial year 2021-22	During the previous financial year 2022-23
1	Membrane Caustic Soda unit -1 & 2	3.433	3.360
2	Poly-Aluminium Chloride	0.819	0.799
3	Stable Bleaching Powder	0.368	0.422
4	Chlorinated Paraffin	2.390	2.142
5	Chlorosulphonic Acid	1.460	1.869
6	Calcium Chloride	2.202	2.094

Please mentioned the quantity of water if we are using in by-products.

(2) Raw Material Consumption

S.No	Name of Raw Material	Name of Product	Raw Material Consumption per Unit of product Output (MT/MT)	
			During the previous financial year 2021-22	During the previous financial year 2022-23
1	Salt	Caustic Soda Lye	1.544 MT/MT	1.560 MT/MT
2	Barium Carbonate		7.027 Kg/MT	7.155 Kg/MT
3	Soda Ash		1.943 Kg/MT	2.151 Kg/MT
4	Alpha Cellulose		0.103 Kg/MT	0.094 Kg/MT
5	NaOH		11.183 Kg/MT	14.117 Kg/MT
6	Hydrochloric Acid		41.561 Kg/MT	38.905 Kg/MT
7	Sodium Bi Sulphite		0.578 Kg/MT	0.619 Kg/MT
8	Coagulant		0.008 Kg/MT	0.009 Kg/MT
9	Alumina Hydrate	Poly Aluminium Chloride	0.158 MT/MT	0.158 MT/MT
10	Hydrochloric Acid		0.118 MT/MT	0.118 MT/MT
11	Hydrated Lime	Stable Bleaching	0.744 MT/MT	0.745 MT/MT

12	Liquid Chlorine	Powder	0.404 MT/MT	0.404 MT/MT
13	HNP (High Normal Paraffin)	Chlorinated Paraffin wax	0.413 MT/MT	0.414 MT/MT
14	Chlorine		1.227 MT/MT	1.170 MT/MT
15	Hydrochloric acid	Chlorosulphonic Acid	0.325 MT/MT	0.326 MT/MT
16	Sulphur-Tri-oxide		0.688 MT/MT	0.693 MT/MT
17	Limestone	Calcium Chloride	1.053 MT/MT	1.056 MT/MT
18	Hydrochloric Acid		0.739 MT/MT	0.743 MT/MT

Polluting Industry may use codes if disclosing details of raw material would violate contractual obligations, otherwise all industries have to name the raw material used.

PART- C

Pollution		Quantity of pollutant discharged (mass/day)	Concentration of pollutant in discharged (mass/volume)	Percentage of variation from prescribed standards with reason
Air				
Stack Name	Pollutant			
Caustic Soda Unit-I, Sodium Hypo Chlorine Stack	Chlorine-mg/Nm3	0.002387 TPD	4.9 mg/Nm3	No Variation
Caustic Soda Unit-I, HCL Furnace-G Stack	HCL- mg/Nm3	0.003880 TPD	7.45 mg/Nm3	No Variation
Caustic Soda Unit-I, HCL Furnace-H Stack	HCL- mg/Nm3	0.004234 TPD	8.13 mg/Nm3	No Variation
Caustic Soda Unit-II, Sodium Hypo Chlorine Stack	Chlorine mg/Nm3	0.002402 TPD	5.08 mg/Nm3	No Variation
Caustic Soda Unit-II, HCL Furnace-50 TPD Stack	HCL- mg/Nm3	0.029537 TPD	5.83 mg/Nm3	No Variation
Caustic Soda Unit-II, HCL Furnace-H Stack	HCL- mg/Nm3	0.033945 TPD	6.7 mg/Nm3	No Variation
Stable Bleaching Powder Stack (Phase 1&2)	PM- mg/Nm3	0.005821 TPD	14.88 mg/Nm3	No Variation
	Chlorine- mg/Nm3	0.002199 TPD	5.62 mg/Nm3	
Stable Bleaching Powder Stack (Phase 3&4)	PM- mg/Nm3	0.006664 TPD	16.05 mg/Nm3	No Variation
	Chlorine- mg/Nm3	0.002292 TPD	5.52 mg/Nm3	
Spray Liquid Stack-I, Poly Aluminium Chloride Plant	HCL- mg/Nm3	0.014752 TPD	7.82 mg/Nm3	No Variation
Spray Liquid Stack-II, Poly Aluminium Chloride Plant	HCL- mg/Nm3	0.610692 TPD	11.80 mg/Nm3	No Variation

Spray Liquid Stack-III, Poly Aluminium Chloride Plant	HCL- mg/Nm ³	0.703896 TPD	13.90 mg/Nm ³	No Variation
Chloro Sulphonic Acid (HCL water Scrubber Stack)	HCL- mg/Nm ³	0.008242 TPD	5.18 mg/Nm ³	No Variation
Chloro Sulphonic Acid (SO ₃ Scrubber Stack)	PM- mg/Nm ³	0.020700 TPD	12.5 mg/Nm ³	No Variation
	Sulphur Trioxide (SO ₃)- mg/Nm ³	0.025171 TPD	15.20 mg/Nm ³	
Chlorinated Paraffin Plant	HCL- mg/Nm ³	0.002316 TPD	6.35	No Variation
	Chlorine- mg/Nm ³	-	BDL	
Calcium Chloride stack	HCL- mg/Nm ³	0.003754 TPD	6.80 mg/Nm ³	No Variation
D.G. Set 2000 KVA (Near CAP Area)	PM- mg/Nm ³	0.0088 TPH	46.4 mg/Nm ³	No Variation
	Oxide of Nitrogen- PPM _v	0.0223 TPH	221.98 PPM _v	
	Sulphur Dioxide- mg/Nm ³	0.0044 TPH	23.23 mg/Nm ³	
	Hydrocarbons- mg/Nm ³	0.0036 TPH	18.85 mg/Nm ³	
	Non-Methane Hydrocarbons- mg/Nm ³	0.0014 TPH	7.23 mg/Nm ³	
	Carbon Monoxide- mg/Nm ³	0.0711 TPH	376.25 mg/Nm ³	
	Carbon dioxide (%)	-	2.44	
D.G. Set 2000 KVA (Near VAP Area)	PM- mg/Nm ³	0.0091 TPH	45.33 mg/Nm ³	No Variation
	Oxide of Nitrogen- PPM _v	0.0272 TPH	255.30 PPM _v	
	Sulphur Dioxide- mg/Nm ³	0.0054 TPH	26.83 mg/Nm ³	
	Hydrocarbons- mg/Nm ³	0.0047 TPH	23.58 mg/Nm ³	
	Non-Methane Hydrocarbons- mg/Nm ³	0.0017 TPH	8.4 mg/Nm ³	
	Carbon Monoxide- mg/Nm ³	0.0785 TPH	391.43 mg/Nm ³	
	Carbon dioxide (%)	-	2.4 (%)	
Fugitive emission	Plant Location		Concentration in (µg/m³)	
	Membrane caustic soda plant-1 (near HCL Plant)		178	
	Membrane caustic soda plant-2		154	
	ZLD area (near ETP)		130	
	Stable bleaching powder Plant (Near cooling tower area)		165	
	Poly Aluminium Chloride (PAC Plant)		187	
	Chloro Sulphonic Acid plant		157	
	Calcium chloride Plant (near Control Room)		142	
Water	Unit has been maintained the zero liquid discharge at site and there will be no effluent discharge			

PART – D

HAZARDOUS WASTE

(As specified under Hazardous & Other Waste Management and Handling Rules 1989)

S.No	Name of Hazardous Waste & Cat No	Total Quantity- MT	
		During the previous financial year 2021-22	During the previous financial year 2022-23
1	Used Oil – 5.1	25.56	11.69
2	Brine Sludge - 16.3	3781.10	3976.85
3	Empty barrels/containers/liners contaminated with hazardous chemicals/wastes-33.1	5.68	10.56
4	Oil and Grease skimming Residues -5.2	0.0	0.0
5	Chemical Sludge from waste water treatment(ETP Sludge)-35.3	96.0	277.30
6	Chemical Sludge from waste water treatment (ATFD/ZLD Salt)-35.3	904.50	820.38
7	Rubber waste-X08	0.0	0.0
8	Asbestos waste/sheets-Z 16	0.7	0.93
9	Filter Waste –Z37	0.0	9.83
10	PVC and Plastic waste –Z46	57.8	181.85
11	Glass wool Insulation Waste –Z 22	2.5	4.79
12	Chemical Waste Solid –Z33	180.41	190.0
13	Thermocol (cold insulation)	0.1	
14	Residue sludge & Filter cake-16.2	0.0	336.63
16	Spent ion exchange resin containing toxic metals(35.2)	0.0	2.0
17	Contaminated cotton rags or other cleaning materials(33.2)	0.0	0.080
18	Spent Carbon-28.3	0.0	0.0

PART-E

SOLID WASTE

S.No		Total Quantity- MT	
		During the previous financial year 2021-22	During the previous financial year 2022-23
(a)	From Process	(a). 8.0 MT/Month in form of unreacted Alumina Hydrate is reused in the process. (b). 505.67 MTA Solid Waste generated from Calcium Chloride Unit and same is disposed in our Captive SLF.	(a). 7.89 MT/Month in form of unreacted Alumina Hydrate is reused in the process. (b). 600 MTA Solid Waste generated from Calcium Chloride Unit and same is disposed in our Captive SLF.

(b)	From Pollution Control Facility	No any		No any	
(c)	Quantity recycled or re- utilized within the unit	800-900 Kg/Month in the form of sediment lime which is reused in plant		No any	
	Sold	Metal Scrap, Valves& Pipe, Copper & Aluminium Cables	958.6	Metal Scrap, Valves& Pipe, Copper & Aluminium Cables	2190.0
		Discarded Equipment & Machinery	148.8	Discarded Equipment & Machinery	94.73
		Wooden Waste	46.2	Wooden Waste	21.5
	Disposed	Food waste	0.2	Food waste	0.39
		STP Sludge	16.8	STP Sludge	18.27

PART-F

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

S.No	Name of Hazardous Waste & Cat No	Consented Qty (MTA)	Characterization	Mode of Disposal
1	Used Oil - 5.1	40.25	Generated from the machinery /rotatory parts in plants	Collection, storage and disposal to authorized recyclers, (Co-processing & Pre-processing if not suitable for recycling)
2	Brine Sludge - 16.3	7500.00	Generated from the brine purification system.	Captive Land fill
3	Empty barrels/containers/liners contaminated with hazardous chemicals/wastes-33.1	25.00	Containing traces of paints and chemicals used in plant	CTSDf, Co-processing, Pre-processing, authorized recyclers
4	Oil and Grease skimming Residues - 35.4	2.00	Containing traces of oils & grease used in machinery	CTSDf, Co-processing, Pre-processing,
5	Chemical Sludge from waste water treatment(ETP Sludge)-35.3	500.00	Sludge generated from waste water treatment in ETP	Captive Land fill
6	Chemical Sludge from waste water treatment (ATFD/ZLD Salt)-35.3	3000.00	Sludge generated from the waste water treatment plant	CTSDf
7	Rubber waste-X08	10.00	Generated from maintenance (gaskets & liners)	Authorized recyclers,

8	Asbestos waste/sheets-Z 16	1.0	Generated from the replacement of old sheets	Captive Land fill
9	Filter Waste -Z37	10.0	Generated from the filter press & water treatment plant	CTSDf, Co-processing, pre-processing
10	PVC and Plastic waste - Z46	600.00	Generated from the replacement of liner, packing material etc.	Authorized Recyclers, consented recyclers
11	Glass wool Insulation Waste -Z 22	5.0	Generated from maintenance of steam lines/jackets	Captive Land fill
12	Chemical Waste Solid - Z33	210.00	It is generated from reactor cleaning etc.	Captive Land fill
13	Thermocol (cold insulation)	5.00	Generated from maintenance of steam lines/jackets	Captive Land fill
14	Residue sludge & Filter cake- 16.2	8400.00	Generated from the filter press from manufacturing process	CTSDf, Co-processing, pre-processing
16	Spent ion exchange resin containing toxic metals(35.2)	2.00	Particles of resin used in water treatment.	CTSDf, Co-processing, Pre-processing, co-incineration in boilers
17	Contaminated cotton rags or other cleaning materials(33.2)	2.00	Cotton generated during cleaning, dedusting of machinery/equipment's	CTSDf, Co-processing, Pre-processing
18	Spent Carbon-28.3	5.00	Generated from water treatment plant filters	CTSDf, Co-processing, Pre-processing

PART-G

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

The mitigation Measures/ pollution abatement measures taken are as follows:

S.No	Air Pollution Abatement Measures	Water Pollution for Industrial Effluent & Domestic Sewage Abatement Measures	Noise Pollution Abatement Measures
1	<ul style="list-style-type: none"> Bag Filters are provided in manufacturing unit (SBP) to maintain the PM (Particulate Matter) emission level within the prescribed limit. Providing Alkali and water scrubbers for removal of chlorine vapors and absorption of untreated HCL. 	<ul style="list-style-type: none"> Waste water generated from the manufacturing process is being treated in full-fledged operational Effluent Treatment of capacity 1000 m³/day, ETP plant is followed by ultrafiltration and Reverse Osmosis (RO plant) MEE & ATFD & treated effluent is being reused in utility and process. 	<ul style="list-style-type: none"> Properly insulated enclosures have been provided to equipment's making excessive noise. Ear plugs have been provided to persons working in high noise zone. Development of greenbelt with carefully selected plant species is of prime importance due to their capacity to reduce noise and air

<ul style="list-style-type: none"> • Online continuous monitoring system has been installed to monitor the real time emission data and same is being transmitted to the state pollution control board as well as CPCB. • All the roads inside the plant premises are paved and maintained for future. • Water spraying to reduce the PM emission level is being practiced 	<ul style="list-style-type: none"> • Multi effect (Four effect) evaporator plant is installed to treat RO reject followed by Agitated Thin Film dryer. • The domestic wastewater generated from plant is being treated in two Sewage Treatment Plant (STP) and treated sewage water is being used for greenbelt/ plantation development. 	<p>pollution impacts by attenuation/assimilation and for providing food and habitat for local macro and micro fauna.</p> <ul style="list-style-type: none"> • Development of Greenbelt in and around the plant site
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PART – H

Additional measures/ investment proposal for environment protection including abatement of pollution/ prevention of pollution

Various equipment's are installed in the plants to minimize inevitable air pollutants. Alkali scrubbers, water scrubbers, Bag Filters, Cyclone, Dust Collector, Gravity Settling Chamber, Hood Cover and H2SO4 Scrubber are installed to control chlorine, HCL, PM and SO3. Efficient running of these equipment's is ensured round the clock.

PART-I

Any other particular for improving the quality of the environment

POLLUTION ABATEMENT IN CAUSTIC SODA MEMBRANE CELL PLANT

GRASIM'S Caustic soda plant at Nagda has a lot of in-built design features, which go a long way towards pollution abatement. Besides the in-built design features, requisite steps have been taken by the company towards complete reuse of liquid effluent and proper treatment of air and proper disposal of solid waste, so as to minimize pollution.

1. WATER POLLUTION CONTROL

We take care to minimize effluent generation through recycle / reuse of wastewater within the process. A lot of in- built design features, which go a long way towards pollution abatement are incorporated in the system. Besides the in-built design features, requisite steps have been taken by the company towards proper treatment of liquid effluent. Through use of various segregations and recycle schemes, the volume of wastewater is reduced.

Arrangements for collection and reuse have been made in all the sections of the plant.

1.1 TREATMENT OF EFFLUENT GENERATED FROM CAUSTIC SODA PLANT UTILITIES:

All plants have collection pits constructed in each of the sections. The wastewater generated is collected in the collection pits/tanks and same is pumped to ETP for treatment.

Up gradation of Effluent Treatment Plant

The effluent treatment plant has manual control for pH correction and TSS removal. To strengthen the system and ensure proper treatment of effluent 1000 KLD capacity Effluent Treatment Plant has been installed with auto control dosing system of different chemical. New equipment has been installed like Pipe mixture, flocculator, Lamella Clarifier and Filter press, sand and activated carbon filter for

removal of suspended particle. The suspended matter after clarification in lamella clarifier passed through filter press to get sludge and dispose of in secured landfill.

1.2 Double Stage Effluent RO Plant

To achieve ZLD status double stage RO plant of 600 KLD capacity has been installed which comprises of Ultra Filtration system, brackish water RO and Sea Water RO. The treated effluent passed through BWRO where 60 % permeate water received having TDS below

100 mg/l, while reject again feed into the SWRO to get further 60 % permeate water having TDS below 200 mg/l.

All permeate water received as above are using in different cooling towers while reject of SWRO treat through MEE and ATFD plant.

MEE & ATFD

To treat reject of SWRO unit has installed MEE and ATFD plant having capacity 120 KLD. The SWRO reject feed in Multi Effect Evaporator plant under vacuum to get 85 % water as condensate having TDS below 100 mg/l while concentrate feed in Agitated Thin Film Dryer to get condensate having TDS below 200 mg/l and dry salt.

List of equipment's installed in the upgraded effluent treatment system:

- 1. Collection pits 3 nos.:** Capacity: 80+80+160 M³.
- 2. Aeration system includes 3 nos. air blowers**
- 3. Flocculation:** Capacity: 6 M³, with agitator & continuous flow arrangement.
- 4. Clarifier:** Capacity: 40 M³ with residence time of 25 min. The tank is equipped with moving racker arm device.
- 5. Lamella Settler**
- 6. Sludge drying beds: 2 nos.** RCC storage tank structures with sand laid at the bottom and having sludge holding capacity of 25 M³ each.
- 7. Treated water Collection tank:** Capacity: 50 M³
- 8. Sand filter:** A MS tank filter with sand as filter media and is provided with pressurized inlet/outlet facility.

9. Activated carbon filter: A MS tank filter with activated carbon as adsorbing media and is provided with pressurized inlet/outlet facility.

10. Treatment methodology: The influent is collected in the collection pits by pumping arrangement. This forms a batch process for treatment. The collected effluent is aerated from bottom by means of air blowers. During aeration the process of chemical and coagulant dosing is carried out so that it ensures proper mixing and neutralization. The effluent is then pumped to flocculator. Vigorous mixing takes place in flocculator tank. Here the flocculation takes place by means of chemical reaction enhanced by coagulant. Then effluent flows into the clarifier by gravity flow.

In the clarifier/lamella the suspended particles settle down at the clarifier tank/lamella bottom in form of sludge, which is drained out from the bottom. Suspended solids in the effluent are removed in form of sludge. The sludge from clarifier/lamella is drained in a pit. Collected sludge in a pit and pass through filter press for moisture removal and semi- solid sludge disposed to our secured land fill. If filter press is in maintenance, we have two nos sludge drying beds. Liquid sludge pumped on drying beds, the sludge is then allowed for sun drying and disposed off.

Photographs of Pollution Control Equipment



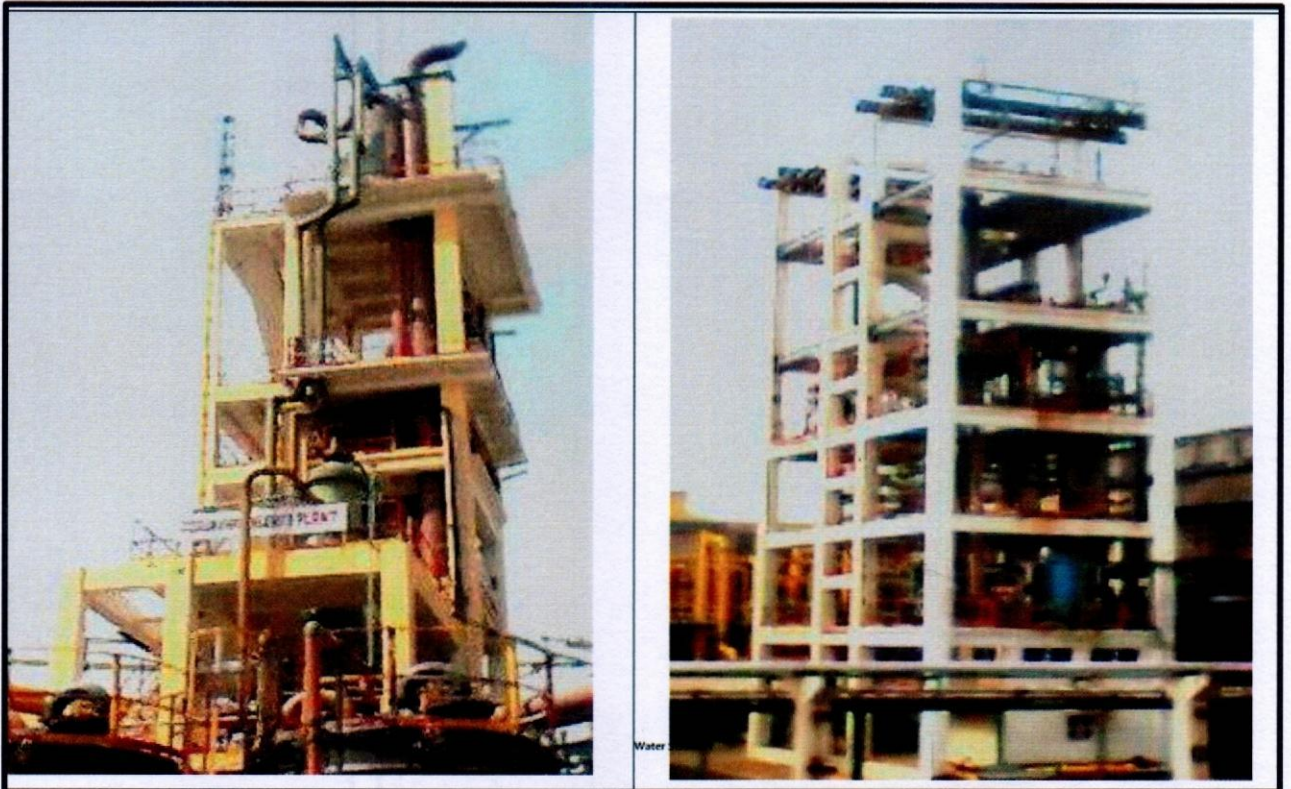
Effluent Treatment Plant

Lamella Clarifier with Sand & Carbon Filter

MULTI EFFECT EVAPORATO PLANT



ALKALI & WATER SCRUBBERS



ENVIRONMENTAL MANAGEMENT

The company has always laid most importance on conservation of environment in and around its various plants. The technology selection and continuous updating of existing plants is done carefully keeping the environmental aspects in view. A number of steps have been taken to control environmental discharge and to ensure conservation of natural resources. Modernization and strict surveillance are continuous process.

EXPENDITURE FOR ENVIRONMENTAL MANAGEMENT:

Besides capital investment, we also incur recurring expenditure to maintain the pollution control equipment as well as hazardous waste management.

- Rs. 155106 /- approx. per day for water, emission control and Effluent Treatment.
- Rs. 39724 /- approx. per day for Hazardous & Solid waste.

Preventive maintenance expenses in the various sections of the whole plant for good housekeeping and maintenance for avoiding leakages are not included in the above-mentioned figures.